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## FUNCHAL – MADEIRA – PORTUGAL
## SEPTEMBER 12th – 17th, 2011

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1. A PROFILE OF NON-NATURAL DEATHS IN THE AREA OF TRANSKEI - SOUTH AFRICA
   *Meel B*
2. FORENSIC EYE ON JANUARY REVOLUTION CASES REFERRED TO KASR ALAINY MEDICAL SCHOOL HOSPITALS, CAIRO-EGYPT
   *Shokry D*
3. SPECTRUM OF ACUTE POISONING IN CHILDREN ADOLESCENTS IN CHANDIGARH ZONE OF INDIA - A 25 YEARS AUTOPSY EXPERIENCE FROM TERTIARY CARE HOSPITAL OF NORTH-WEST INDIA
   *Singh D*
4. ABANDONMENT OF NEWBORN INFANTS: A DANISH FORENSIC MEDICAL SURVEY 1997-2008
   *Gheorghe A, Banner J, Hansen S, Lynnerup N, Stolborg U*
5. ANALYSIS OF 188 HOMICIDE DEATHS AMONG MINORS IN SHANGHAI FROM 1999 TO 2009
   *Shen Y, Ma K, Li L*
6. INDIGENOUS AUSTRALIANS, SUICIDE AND THE AUTOPSY
   *Austin A, Van den Heuvel C, Byard R*
7. POVERTY AND SUICIDE IN TRANSKEI REGION OF SOUTH AFRICA
   *Meel B*

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1. O CONSENTIMENTO INFORMADO E OS DILEMAS ÉTICOS PERICIAIS PSIQUIÁTRICOS
   *Castro U, Martins C*
2. ATRIBUIÇÃO DO PARÂMETRO "PERIGO PARA A VIDA" EM DIREITO PENAL E SUAS IMPLICAÇÕES JUDICIAIS
   *Oliveira C, Pereira R, Santos B Lemos Silva R, Mena F, Santos Costa G, Pinto da Costa D, Corte-Real F*
3. AVALIAÇÃO PERICIAL NOS ESTADOS ALTERADOS DE CONSCIÊNCIA - REFLEXÃO NEUROLÓGICA
   *Laia M*
4. NEUROBIOLOGIA DO SUICÍDIO: FUNDAMENTOS TEÓRICOS
   *Brito A, Santos JC*
5. A BALÍSTICA TERMINAL NOS PROJÉCTEIS DE ALTA ENERGIA
   *Prestes Jr L*
6. "MULAS HUMANAS" NO NARCOTRÁFICO INTERNACIONAL BOLÍVIA-BRASIL - SUICIDAS EM POTENCIAL
   *Campos Neto M*
7. UMA VOZ VINDA DA MORGUE CENTRAL DE LUANDA
   *Sebastião A, Jorge F, Capapelo A, Quitembo M*
8. PORTUGUESE ASSESSMENT OF A FORENSIC VETERINARY MEDICINE UNIT
   *Resende L, Gouveia R, Bragança M, Santos JC*

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1. LEGAL IMPLICATIONS OF AND CURRENT ANALYSIS STRATEGIES FOR CANNABIMIMETIC AMINOALKYLINDOLES IN HERBAL MIXTURES - FOLLOW-UP OF THE "SPICE" PHENOMENON
   *Puetz M, Auwaerter V, Haertel C*

2. A ROADSIDE SURVEY OF ALCOHOL, DRUGS AND BENZODIAZEPINES USE AMONG DRIVERS IN PORTUGAL
   *Dias M, Fonseca S, Simões S*

3. EMERGING DRUG THREATS - SYNTHETIC CANNABINOIDS, CANNABIMIMETICS AND SUBSTITUTED CATHINONE DESIGNER DRUGS
   *Comparin J*

4. FORENSIC ASPECTS IN TEARGAS TOXICITY "A THOUGHT OUT OF THE BOX"
   *Bendary AM*

5. ESTIMATING COCAINE CONSUMPTION IN THE BRAZILIAN FEDERAL DISTRICT BY SEWAGE ANALYSIS: QUANTOX PROJECT
   *Maldaner AO, Schmidt LL, Locatelli MAF, Jardim WF, Sodré FF, Almeida FV, Pereira CEB, Silva CM*

6. NEW SYNTHETIC PSYCHOTROPIC DRUGS - ONE STEP AHEAD OF THE LAW
   *Konaris K, Orphanidou M, Panayiotidou L, Zachariou Z, Papamichael D*

7. DEMONSTRATION CONTROL AGENTS; EVALUATION OF 64 CASES AFTER MASSIVE USE OF THESE AGENTS IN ISTANBUL
   *Unuvar U, Fincanci SK, Sahin U, Irencin S*

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1. A DISCRIMINANT ANALYSIS ON A CONTEMPORARY SPANISH POPULATION: SEX DETERMINATION FROM THE TALUS AND RADIUS VOLUME
   *Ruiz Mediavilla E, Labajo González E, Perea Pérez B, Sánchez Sánchez JA, Benito Sánchez M, García Fernández-hijicos S*

2. MODIFICATION OF FACIAL MORPHOLOGY IN CHILDREN AGED BETWEEN 6 AND 10 YEARS: A PILOT STUDY FOR A NEW MODEL OF FACE AGING
   *Gibelli D, Poppa P, Sforza C, Cattaneo C*

3. AN UNIDENTIFIED SKELETAL ASSEMBLAGE FROM A POST-1755 MASS GRAVE OF LISBON - DENTAL MORPHOLOGY
   *Pereira C5, Telles Antunes M, Pestana D, Mendonça MC56, Santos JC5*

4. TAPHONOMY AND ANTHROPOMETRY: THE POST MORTEM FATE OF MEASUREMENT. A PRELIMINARY STUDY ON BURIED SKULLS
   *Borrini M, Tomba GPS, Mariani PP, Murgia C, Rodriguez C*

5. COMPUTER-ASSISTED PHOTO-TO-PHOTO COMPARISON AND PHOTOGRAPHIC AGE-PROGRESSION IN SUBADULTS
   *Urbanová P, Cuta M, Králík M, Morkovský T, Eliášová H*

6. THE POTENTIAL OF FORENSIC ANALYSIS ON HUMAN BONES FOUND IN RIVERINE ENVIRONEMENT
   *Delabarde T, Tracqui A, Keyser C, Ludes B*

7. DENTAL DIVERSITY IN A SPANISH MILITARY POPULATION. USEFULNESS FOR DENTAL IDENTIFICATION.
   *Martínez-Chicon J, Luna del Castillo JDD, Valenzuela Garach A*

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1. SYSTEMATIC ANALYSIS OF BLUE BALLPOINT PEN INK BY RAMAN SPECTROSCOPY, FTIR SPECTROSCOPY AND LC-MS/MS
   *Xu C, Luo Y, Sun Q, Yang X, Xi J*
2. EVALUATION OF THE AGING BEHAVIOR OF CRYSTAL VIOLET IN BALLPOIN PEN INK ENTRIES BY LC-MS/MS
   *Xu C*
3. THE MICRO-MORPHOLOGICAL CHARACTERISTICS OF PRINTING IN DETECTION OF ALTERED PRINTED DOCUMENTS
   *Shi S, Yang X, Qian H, Xu C, Bian X, Sun W*
4. STUDY ON THE METHOD OF STAMP IMPRESSION DATING
   *Yng X, Shi S, Xu C, Yang L, Wu X, Bian X, Chen X, Luo Y*
5. SIMULTANEOUS DETERMINATION OF ORIGINAL CONTENT OF FE(II) AND FE(III) IN HANDWRITING OF GALL INK FOR POTENTIAL USE IN FORENSIC ANALYSIS OF RELATIVE AGE VIA CAPILLARY ELECTROPHORESIS
   *Yu C, Zhuo X, Cao C*
6. A DISCUSSION ON PROBLEMS AND SOLVING-STRATEGIES OF FORENSIC QUESTIONED DOCUMENT EXAMINATION PRACTICE IN MAINLAND CHINA - LEGAL AND PRACTICAL ASPECTS
   *Ying Xiong G, Ai Dong X, Shi Chun L*

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1. ISOTOPE AND DNA ANALYSIS OF TEETH TO FACILITATE IDENTIFICATION OF UNKNOWN DEAD BODIES
   *Alkass K*
2. THE STR ANALYSIS OF TWO CONGENITAL CHIMERAS IN PATERNITY CASES
   *Liu Y, Zhao Z, Lin Y, Zhang S*
3. COMPARISON STUDY IN DETERMINATION OF FULL SIBLING WITH IDENTIFILER MULTIPLEX SYSTEM BETWEEN ITO METHOD AND IDENTITY BY STATE SCORING METHOD
   *Zhao S*
4. EVALUATION OF KINSHIP IDENTIFICATION SYSTEMS BASED ON STR DNA PROFILES
   *Corradi F*
5. DNA PATERNITY TESTING IN AN INFERTILE CASE
   *Atmadja DS, Untoro E*
6. PARENTAGE TESTING: ARE WE STATISTICALLY ACCURATE? A RETROSPECTIVE ANALYSIS OF PARENTAGE CASES IN THE LEBANESE POPULATION
   *El Andari A, Othman H, Abou Sleymane G, Mahfouz R, Mansour I*
7. MIXED MARKER APPROACHES TO FORENSIC ANCESTRY INFERENCE: COMBINING DATA FROM STRS, SNPS AND INDELS
   *Phillips C, Fernandez L, Pereira R, Santos C, Fondevila M, Tato A, Alvarez J, Gusmão L, Carracedo A, Lareu M*

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1. READING BETWEEN THE LINES: AN ASSESSMENT OF FORENSIC PSYCHOLOGICAL AND PSYCHIATRIC REPORTS
   *Silva Guerreiro J, Santos JC*
2. PROFICIENCY TEST ON FORENSIC PSYCHIATRY IN CHINA
   *Qinting Z, Weixiong C, Chao L*
3. DOING AWAY WITH MENS REA IN CANADA
   *Tkatchouk M*
4. CHILDREN LIVING IN SOME INSTITUTIONS (PROTECTED BY LAW) AND THE CONCEPT OF SELF-ESTEEM
   *Kasikçi G, Yalçin M, Özmen G, Yilmaz A, Yorulmaz AC*
5. HOMICIDE LANGUAGE ANALYSIS AND PERSONALITY PROFILING USING THE KLIWC PROGRAM
   *Jonghan S, Kyungil K*
6. TARGET SELECTION AND MODUS OPERANDI OF RAPISTS AND CHILD MOLESTERS: AN ENVIRONMENTAL CRIMINOLOGY APPROACH
   *Rebocho MF, Gonçalves RA*

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1. INJURY INTERPRETATION IN ADULT AND PAEDIATRIC FORENSIC MEDICINE. POTENTIAL FOR ERRORS AND FALLACIES AND HOW TO AVOID THEM
   *Gall J, Payne-james J*
2. BIO-MATHEMATICAL MODEL OF BRAIN LESIONS DUE TO CAR ACCIDENTS
   *Stan C, Olteanu M, Tanase M, Purtan R*
3. FORENSIC AGE ESTIMATION PORTUGUESE APPROACH
   *Coelho L Frazão S Dias R, Pinto N, Rodrigues F*
4. ASSESSMENT OF BRUISE AGE ON DARK SKINNED INDIVIDUALS USING TRISTIMULUS COLORIMETRY
   *Vanezis P, Thavarajah D, Perrett D*
5. PROTEOMICS TO DETERMINE THE AGE OF HUMAN BRUISES
   *Lecomte M, Vintiner S, Elliot D, Simons J*

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1. VITREOUS POTASSIUM TO DETERMINE POST MORTEM INTERVAL
   *Zilg B, Bernard S, Alkass K, Berg S, Druid H*
2. IMMUNOSTAINING FOR PLAKOGLOBIN: A DIAGNOSTIC MARKER OF ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPHATY?
   *Munkholm J, Ottesen G, Andersen C*
3. HEAT SHOCK PROTEIN EXPRESSION (HSP 70) IN KIDNEYS IN SUDDEN INFANT DEATH
   *Doberentz E, Genneper L, Madea B*
4. THE SPEED OF CEREBRAL SWELLING FOLLOWING BLUNT CRANIAL TRAUMA - AN ANIMAL MODEL
   *Byard R, Gabrielian L, Helps S, Thornton E, Vink R*

5. POST MORTEM INTERVAL ESTIMATION BASED ON CORNEAL IMAGE CLASSIFICATION
*Zhou L, Zhao W, Wan D, Zhu S, Liu L, Liu F, Liu Y, Zhou S, Shi J, Tang X*

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1. PROGRESSES IN THE JUDICIAL EXPERTISE PRACTICES AND QUALITY CONTROL OF MEDICAL FAULTS IN CHINA
*Sun D*

2. CONSCIENTIOUS OBJECTION TO ABORTION IN MEDICAL CIVIL SERVANTS IN SPAIN: IS IT POSSIBLE?
*Uroz V, Alonso S*

3. THE RESEARCH OF MECHANISM OF ENSURING THE EFFECTIVENESS OF THE EXPERT CONCLUSION - THE QUALITY CONTROL OF THE PRODUCTION AND JUDICIAL APPLICATION PROCESS OF EXPERT CONCLUSION
*Li X*

4. FORENSIC NURSE EXAMINER RESPONSE TO TORTURE: CONTEMPORARY HEALTHCARE CONCERNS AND FORENSIC RESPONSIBILITIES
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1. ANALOGUES OF ILLICIT DRUGS - A NEW GLOBAL CHALLANGE
*Zuba D, Byrska B*

2. FATAL DIFENACOUM POISONING: AUTOPTIC AND TOXICOLOGIC FINDINGS
*Tambuscio S, Bonvicini B, Frison G, Calabrese F*

3. THE PHYSICAL AND CHEMICAL FEATURES OF INGESTED NARCOTIC-CONTAINING FOREIGN BODIES: STUDY PROTOCOL
*Médiouni Z, Bécour B, Hammache A, Dumas F, Rey C, Pourriat J*

4. HAIR AS A SPECIMEN TO DOCUMENT TETRAMETHYLENE DISULFOTETRAMINE EXPOSURE
*Shen M, Xiang P, Zhou F, Shen B, Shi Y*

5. ENVIRONMENTAL MODELLING OF METHYLAMPHETAMINE WASTE
*Kates L, Gauchotte C, Nic Daéid N, Kalin R, Knapp C, Keenan H*

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1. VIRTUAL ANTHROPOLOGY: ADVANTAGES AND LIMITATIONS OF MULTI-DETECTOR COMPUTED TOMOGRAPHY AND DEVELOPMENT OF ADEQUATE PROTOCOLS FOR DATA ACQUISITION
*Uldin T, Froidmont S, Elandoy C, Bass A, Vaucher P, Mangin P, Grabherr S*

2. SKELETAL PRESERVATION AND TIME SINCE DEATH IN A NEW PORTUGUESE IDENTIFIED SKELETAL COLLECTION (CEI/XXI)
*Ferreira MT, Cattaneo C, Cunha E*

3. THE TAPHONOMIC STUDY OF LIME BURIALS: DETECTING LIMED AND UNLIMED GRAVES WITH GROUND-PENETRATING RADAR
*Schotsmans EMJ, Gaffney C, Cuenca-Garcia C, Janaway RC, Wilson AS*

4. MICROSCOPIC AGE CHANGES IN THE HUMAN CLAVICLE
*Sobol J, Zaba C, Kolowski J, Lorkiewicz-Muszynska D, Wachowiak R, Hryb A*

5. JUVENILE FACES AS SUITABLE AGE INDICATORS IN CHILD PORNOGRAPHY CASES? ACCURACY AND APPLICABILITY OF A MORPHOLOGICAL, METRIC AND AUTOMATED APPROACH
*Obertova Z, Ratnayake M, Gabriel P, Tutkuviene J, Ritz-Timme S, Cattaneo C*

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1. DEFYING GEOGRAPHIC PROFILING: A CASE STUDY IN POACHING BEHAVIOR
*Rebocho MF*

2. ENVIRONMENTAL AND GEOGRAPHIC INFLUENCES ON TARGET SELECTION PATTERNS IN RAPE
*Rebocho MF, Beauregard E, Rossmo DK*

3. ANALYSIS OF DEMOGRAPHIC AND CRIMINOLOGICAL CHARACTERISTICS OF CHILDREN IN CONFLICT WITH LAW AND VICTIM CHILDREN
*Yilmaz A, Özmen G, Yalçin M, Kasikçi G, Yorulmaz AC, Ziyalar N*

4. SELF-INJURY AND CHILDREN IN CONFLICT WITH LAW
*Özmen G, Yilmaz A, Kasikçi G, Yalçin M, Iscan M, Yorulmaz A*

5. OFFENCE BEHAVIOURS AS PREDICTORS OF OFFENDER CHARACTERISTICS IN SEX OFFENDERS
*Tkatchouk M, Rebocho MF*

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1. ASSESSMENT OF ENDOGAMY AND CONSANGUINITY EFFECT ON Y-STR PROFILES AND ESTABLISHMENT OF Y-CHROMOSOME STR FREQUENCIES IN THE LEBANESE POPULATION
*Al-Azem M, Mahfouz R, Abou Sleymane G, Mansour I*

2. GENETIC ANALYSIS OF 30 INDEL MARKERS FOR FORENSIC USE IN FIVE DIFFERENT CHINESE POPULATIONS
*Li C*

3. THE NEED OF POPULATION CODIS-13 DNA DATABASE FOR PATERNITY INDEX CALCULATION: COMPARISON BETWEEN ASIAN AND INDONESIAN DATABASE
*Untoro E, Atmadja DS*

4. ASSESSMENT OF ENDOGAMY AND CONSANGUINITY EFFECT ON DNA PROFILING IN THE LEBANESE POPULATION
*Abbas S, Abou-Sleymane G, Othman H, Mahfouz R, Mansour I*

5. GENETIC ANALYSIS OF 16 X-STRS LOCI IN XINJIANG UIGHUR AND NORTHERN HAN POPULATION FROM CHINA
*Li C, Zhang S, Zhao S, Li L, Li S*

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1. PLANE CRASH IN THE BRAZILIAN AMAZON RAINFOREST WITH 154 FATAL VICTIMS - A DISASTER VICTIM IDENTIFICATION STUDY

*Ferreira S, Trindade-Filho A, Galvão M, Nogueira R, Oliveira E, Mendes C, Pak H, Maia F, Paula K, Moraes A*

2. ARMED CONFLICT AND WATERBORNE DISEASES IN TURKEY
*Toprak S, Cetin I, Akgul E, Yilmaz R*

3. FLOODS AND MUDSLIDES IN RIO DE JANEIRO - THE BIGGEST NATURAL DISASTER IN BRAZIL - A DISASTER VICTIM IDENTIFICATION STUDY
*Ferreira S, Kuser H, Garcez S, Araújo C, Nogueira R, Oliveira E, Mizokami L, Silva L, Jesus S5, Moraes A6*

4. MEDICO-LEGAL ASPECTS OF TERRORIST SUICIDE BOMBINGS IN SRI LANKA - A REVIEW OF THREE DECADES
*Perera C, Cordner S, Hewage S, Wijayaweera H*

5. THE FAITH OF LJUDEVIT JURAK (1881-1945) AND EDUARD MILOSLAVIC (1884-1952) TWO CROATIAN FORENSIC EXPERTS OF MASS GRAVES AT KATYN AND VINNITSA.
*Petrovecki V, Fatovic-Ferencic S*

6. DEAD VICTIM IDENTIFICATION OF MERAPI VOLCANO ERUPTION.
*Nurhantari Y*

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1. EMOTIONAL STRESS INDUCED CARDIAC DEATH AND ITS LEGALS IMPLICATIONS IN THE UNITED KINGDOM
*Vanezis A, Vanezis P*

2. DIAGNOSIS AND CERTIFICATION OF ENVIRONMENTAL HEAT-RELATED DEATHS
*Jentzen J*

3. SURGICAL MALPRACTICE IN OPERATED CONGENITAL HEART DISEASES: THE FORENSIC PATHOLOGIST'S APPROACH
*Portelli F, Busardò FP, Zerbo S, Gutsul L, Comparato C, Maresi E*

4. VENTRICULAR PREEXCITATION AND SUDDEN DEATH: THE IMPORTANCE OF THE CONDUCTION SYSTEM EXAMINATION
*Busardò FP, Fleres P, Portelli F, Zerbo S, Gutsul L, Centineo F, Maresi E*

5. DESTRUCTIVE HOSTILITY: THE JEFFREY DAHMER - A PSYCHIATRIC AND FORENSIC STUDY OF A SERIAL KILLER
*Jentzen J*

6. ALCOHOL INTOXICATION AND BLUNT CRANIAL TRAUMA - A BIOCHEMICAL RELATIONSHIP?
*Vink R, Byard R*

7. THE RELATIONSHIP BETWEEN BODY MASS INDEX AND PULMONARY THROMBOEMBOLISM (PTE) IN AN AUTOPSY POPULATION
*Rosenfeld H, Byard R*

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1. BIOETHICS PROBLEMS IN FORENSIC MEDICINE
*Mammadov V, Pigolkin Y, Dubrovin IA*

2. CADAVERIC EXPLANTATION
*Duma A, Veljanov Z, Janeska B, Poposka V, Cakar Z*

3. ANALYSIS OF FATAL ACT IN IRANIAN LAW

*Jafarizadeh F, Zarenezhad M, Ghorbanzadeh M, Arami A, Fereidooni M, Rahimi M*

4. STUDY OF RISK FACTORS IN BODY PACKERS CARRYING INGESTED DRUG PACKETS: LEGAL AND REGULATORY ISSUES
*Médiouni Z, Bécour B, Hammache A, Rey C, Pourriat J*

5. STUDY OF RISK FACTORS IN BODY PACKERS CARRYING INGESTED DRUG PACKETS: ETHICAL ISSUES
*Bécour B, Médiouni Z, Hammache A, Dumas F, Rey C, Pourriat J*

6. FORENSIC THEOLOGY: A NEW BREAKTHROUGH IN THE RESOLUTION OF CONFLICT IN INDONESIA
*Akhmad S*

7. DISCUSSIONS ON NEW PATIENTS RIGHTS LEGISLATION IN AZERBAIJAN
*Mammadov V*

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1. FREEFALL TRAUMA: ANALYSIS OF FRACTURES WITH REGARD TO HEIGHT AND CAUSE OF FALL
*Petaros A, Cengija M, Sosa I, Coklo M*

2. AGE ESTIMATION BY PULP/TOOTH RATIO IN MONORADICULAR TEETH
*Cameriere R, Deluca S, Nuzzolese E, Pagliara F, Wasterlain S, Cunha E*

3. MEASUREMENT OF FACIAL SOFT TISSUE DEPTHS OF LIVING INDIVIDUALS FROM A BRAZILIAN POPULATION USING MAGNETIC RESONANCE IMAGING (MRI) FOR APPLICATION IN FORENSIC FACIAL RECONSTRUCTION
*Santos WDFD, Diniz PRB, Marques PMDA, Nogueira-Barbosa MH, Dos Santos AC, Evison MP, Guimarães MA*

4. FORENSIC ANTHROPOLOGY AT THE MEDICO LEGAL CENTER OF THE FACULTY OF MEDICINE RIBEIRÃO PRETO - USP (CEMEL/FMRP-USP): COMPARATIVE STUDY OF CASES FROM 1999 TO 2010
*Francisco RA, Velloso APDS, Silveira TCP, Secchieri JM, Evison MP, Costa Júnior MLD, Guimarães MA*

5. A SIMPLE METHOD OF NOSE TIP SHAPE VALIDATION FOR FACIAL APPROXIMATION
*Davy-Jow S, Decker S, Ford J*

6. INSERTING CRANIOFACIAL X-RAY FILES IN THE INTERPOL NOTICES: A NEW CHALLENGE, A NEW WAY TO MATCH.
*Nazat D*

7. AGE ESTIMATION BY RIB-PHASE ANALYSIS IN INDIAN MALES.
*Bhagavath P, Monteiro F, Kumar P*

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1. A DIAGNOSTIC METHOD IN TORTURE INVESTIGATION : BONE SCINTIGRAPHY
*Ozkalipci O, Unuvar U, Fincanci SK, Sahin U, Irencin S*

2. THE RAPE AS A WAR CRIME - A FORENSIC PERSPECTIVE
*Barbu C*

3. TORTURE VICTIMS EXAMINED AT DEPARTMENT OF MEDICINE, UNIVERSITY OF COPENHAGEN, 1995-2010 - THE GEOGRAFICSL PATTERN OF TORTURE
*Hansen S*

4. THREE DIFFERENT CASES OF HUMERAL SHAFT FRACTURE DURING POLICE ARREST - BIOMECHANICAL ASPECTS AND RECONSTRUCTION OF THE EVENTS
*Franckenberg S, Nyffeler R, Siegenthaler L, Kneubuehl B, Thali M, Vonlanthen B, Bolliger S*

5. HUMAN RIGHTS VIOLATION AN EGYPTIAN VIEW
*Kameel Georgi. E*

6. USE AND ABUSE OF THE ISTANBUL PROTOCOL- THE TERMS FOR ASSESSING EVIDENCE OF TORTURE AS TESTED IN THE UK ASYLUM SYSTEM
*Cohen J, Pettitt J*

7. IMPACT OF MEDICO-LEGAL DOCUMENTATION AS AN ANTI TORTURE MECHANISM - REAPPRAISAL OF SRI LANKAN EXPERIENCE
*Perera C, Verghese A*

8. WHY DO THEY TORTURE? ETHICAL ARGUMENTS AROUND THIS DARK PRACTICE
*Ghaleb S*

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1. DENTISTRY OR ODONTOLOGY? A BITEMARK ANALYSIS USED IN JUDICIAL PROCEEDINGS OF A COLD CASE
*Nuzzolese E*

2. DENTAL EROSION AS A SIGN OF POSSIBLE DENTAL NEGLECT
*Cukovic-Bagic I, Buljan Flander G, Mateskovic D, Brkic H, Nuzzolese E*

3. DENTAL TORTURE - HOW DIFFICULT TO INTERPRET
*Weeratna J*

4. DENTAL REPORT FORM IN CHILD ABUSE
*Alves L*

5. A UNIQUE DENTAL IDENTIFICATION INVOLVING CO-MINGLED REMAINS FOLLOWING A MIDAIR AIRCRAFT COLLISION
*Klim-Lemann J, Cardoza A*

6. THE QUALITY OF THE DENTAL DATA IN THE INTERPOL NOTICES - REVISITED
*Dawidson I*

7. THE RECOVERY AND IDENTIFICATION OF THE VICTIMS OF THE 2008 TRINITY COUNTY HELICOPTER CRASH
*Cardoza A, Farrell W*

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1. ON THE MECHANISM OF GUNSHOT RESIDUE FORMATION AND DISTRIBUTION IN THE VICINITY OF THE SHOOTING GUN
*Brozek Mucha Z*

2. EFFECT OF BARREL LENGTH ON PELLET DISTRIBUTION: AN EXPERIMENTAL STUDY WITH VARIOUS BARREL LENGTHS AND CALIBERS
*Dogan K, Demirci S, Koc S*

3. CARTRIDGE CASE SIGNATURE IDENTIFICATION USING TOPOGRAPHY MEASUREMENTS AND CORRELATIONS; UNIFICATION OF MICROSCOPIC AND MATHEMATICAL COMPARISONS
*Thompson R, Song J, Zheng A, Renegar T, Yen J*

4. BULLET SIGNATURE IDENTIFICATION USING TOPOGRAPHY MEASUREMENTS AND CORRELATIONS: THE UNIFICATION OF MICROSCOPIC AND MATHEMATICAL COMPARISONS
*Thompson R, Song J, Yen J, Zheng A, Vorburger T, Renegar T, Silver R*

5. ABOUT THE NEW METHOD OF DETERMINATION OF DISTANCE OF A BULLET SHOT FROM A FIRE-ARM
*Bishmanov B, Isaeva O, Alexsandrov K*

6. NANOTECHNOLOGY AND FORENSIC SCIENCES: A NOVEL FABRICATION PROCEDURE FOR DETECTING AMMUNITION FEATURES
*Valle F, Bianchi M, Tortorella S, Biscarini F, Delia M*

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1. RESEARCH RESULTS IN FORENSIC SCIENCE DISCIPLINES SUCH AS BALLISTICS, FIRE DEBRIS AND LATENT PRINTS, DEMONSTRATE HUMAN VARIABLES AND OLD SCHOOL THEORY ARE THE CULPRITS OF MISS HITS AND ERRONEOUS IDENTIFICATIONS
*Ballou S*

2. DATING ISSUES IN FORENSIC SCIENCES
*Weyermann C*

3. IS IT POSSIBLE TO ELIMINATE SUBJECTIVITY FROM FORENSIC SCIENCE?
*Moszczynski J*

4. SEXUAL HOMICIDE: A QUALITATIVE ANALYSIS OF THE CRIMINAL EVENT
*Rebocho MF, Tkatchouk M, Nunes LM, Sani A*

5. A KEY MODEL OF FORENSIC SCIENCE: K.E.E.
*Hazard D, Margot P*

6. THE APPROACH OF PRE-HOSPITAL CARE IN TURKEY TO EVIDENCE PRESERVATION AND COLLECTION IN FORENSIC CASES
*Dogan MB, Guchan AS, Yukseloglu EH*

7. A STANDARDIZED APPROACH TO CRIME SCENE IN ITALY
*Curtotti D, Saravo L, Spangher G, Lorusso S*

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1. STUDY OF LETHAL AND NONLETHAL FILMED HANGINGS: NEW INSIGHT INTO THE PATHOPHYSIOLOGY OF HANGING
*Sauvageau A*

2. NATURAL VS VIOLENT DEATH IN THE ELDERLY - A RETROSPECTIVE STUDY
*Santos CL, Silva BS, Vieira DN*

3. INFRARED TYMPANIC TEMPERATURE FAILS TO ASCERTAIN THE TIME OF DEATH IN A CONTROVERSIAL CASE OF INFANTICIDE BY DROWNING
*Camperio Ciani AS, Fontanesi L*

4. GESTURE CONTROLLED PACS SYSTEM USING THE MICROSOFT KINECT DEPTH CAMERA
*Ebert LC, Ampanozi G, Thali M, Ross S*

5. EVALUATION OF THE APPROPIATENESS OF HOSPITALIZATION IN SECURE MEDICAL UNITS

*Bécour B, Médiouni Z, Rey C, Pourriat J*

6. DETERMINATION OF HANDEDNESS USING BICEP, FOREARM AND HAND SPAN MEASUREMENTS AND ITS RELEVANCE IN FORENSIC MEDICINE
*Vanezis P, Khistriya A*

7. FREEDOM-RESTRAINING MEASURES IN NURSING CARE - DEATHS DUE TO PHYSICAL RESTRAINTS
*Keil W, Schöpfer J, Berzlanovich A*

8. MEDICAL MALPRACTICE IN HUNGARY - RECENT CASE LAW DEVELOPMENTS
*Dosa A*

## SESSION 15.25

1. MEDICAL MALPRACTICE IN HUNGRY- RECENT CASE LAW DEVELOPMENTS.
*Dosa A*

2. TRENDS IN THE ROMANIAN MEDICAL MALPRACTICE SYSTEM: FROM CRISIS TO REFORM
*Stan C, Piciorus L, Purtan R, Imbrisca CI, Stan C*

3. DONATION OF EGGS IN ASSISTED REPRODUCTION IN SPAIN: INFORMED CONSENT ON POSSIBLE ADVERSE EFFECTS AND LIMITS TO THE LEGALITY OF ITS ADVERTISING
*Uroz V, Prensa L*

4. MEDICAL MALPRACTICE AND RESPONSIBILITY
*Mammadov V*

5. PROCESS AND HOW TO ADDRESS VIOLATIONS OF MEDICAL MALPRACTICE IN IRAN
*Hedjazi A, Zarenezhad M, Jafarizadeh F, Ghorbanzade M, Chahabi GR*

6. MALPRACTICE LITIGATION IN ALBANIA: A REVIEW OF THE LAST FOUR YEARS HISTORY
*Shaqiri E, Çipi B, Vyshka G*

7. TO ACT OR NOT TO ACT, THAT IS THE QUESTION: INFORMED CONSENT IN A CRIMINAL PERSPECTIVE
*Raposo V*

## SESSION 15.26

1. DENTAL RECORD PROPOSE AND IT'S UTILITY IN LARGE-SCALE DISASTERS
*Guimarães MI, Gaio R, Carneiro de Sousa MJ, Valenzuela A*

2. INDIVIDUAL IDENTIFICATION IN THE FORENSIC ANTHROPOLOGICAL PRACTICE OF ALBANIA
*Cipi B*

3. OSTEOLOGICAL FINDINGS FROM A SECRET CEMETERY: THE REMAINS OF COLD WAR KILLINGS
*Sinamati A, Tahiri A, Ymaj B, Ismaili Z, Vyshka G, Cipi B*

4. DATING HUMAN SKELETAL REMAINS: AN ANTHROPOLOGICAL AND RADIONUCLIDE APPROACH USING 90SR AND 210PB
*Schrag B, Uldin T, Mangin P, Froidevaux P*

5. THE UTILIZATION OF STABLE ISOTOPES ANALYSIS FOR ESTIMATING THE GEOGRAPHIC ORIGINS OF CORPSES
*Mclean S, Takasaka T, Miyamori D, Ikegaya H*

6. THE IDENTIFICATION PROCESS IN MASS GRAVES AND PRISONER'S CEMETERIES FROM THE SPANISH CIVIL WAR (1936-1939) AND POSTWAR YEARS (1939-1945)
*Rios L, García-rubio A, Martínez B, Herrasti L, Jiménez J, Etxeberría F*

## SESSION 15.27

1. FORENSIC IDENTIFICATION ON ERECTILE DYSFUNCTION AFTER TRAFFIC ACCIDENTS FOR 56 CASES REPORT
*Wang F, Zhe G*

2. THE APPLICATION OF QTT IN THE EVALUATION NEUROLOGIC ERECTILE DYSFUNCTION
*Zhu G, Weng S*

3. ASSESSMENT OF THE RESPONSIBILITY BETWEEN A ROAD TRAFFIC ACCIDENT AND MEDICAL DEFECTS AFTER THE TRAFFIC ACCIDENT INJURY OF KNEE JOINT
*Xia W*

4. IDENTIFICATION OF MARKS INVOLVING IN MOTOR VEHICLE COLLISIONS.
*Lili L*

5. THE APPLICATION RESEARCH OF PROJECT RISK MANAGEMENT IN THE APPRAISAL FOR TRAFFIC ACCIDENT.
*Lili L*

## SESSION 15.28

1. PROCESO DE JUSTICIA Y PAZ EN COLOMBIA. PARTE I: ATENCIÓN FORENSE DE LOS CUERPOS EXHUMADOS E IDENTIFICACION DE LAS VICTIMAS. LA EXPERIENCIA COLOMBIANA
*Morcillo-Mendez M, Vivas J, Navarro A*

2. PROCESO DE JUSTICIA Y PAZ EN COLOMBIA. PARTE II: DESMEMBRAMIENTO: CAUSA DE MUERTE EN EL CONFLICTO ARMADO COLOMBIANO
*Morcillo-Mendez M, Campos I*

3. PROCESO DE JUSTICIA Y PAZ EN COLOMBIA. PARTE III: EL PERITAJE FORENSE EN UN JUICIO, VERSIONES VS HALLAZGOS CIENTÍFICOS. PRESENTACIÓN DE UN CASO
*Franco Zuluaga J*

4. PROCESO DE JUSTICIA Y PAZ EN COLOMBIA. PARTE IV: APORTE DE LA BALISTICA FORENSE DURANTE LA NECROPSIA MEDICO LEGAL EN CADAVERES ESQUELETIZADOS
*Pachon J*

5. PROCESO DE JUSTICIA Y PAZ EN COLOMBIA. PARTE V: LA IDENTIFICACIÓN DE CASOS COMPLEJOS
*Barragan Amaya OL, Morcillo Mendez M*

6. THE USE OF TOXICOPATHOLOGY TO DETERMINE CAUSES OF DEATH IN ANCIENT AND RECENT CASES
*Cerda-Aguilar C, Borgel L*

7. MUERTE SÚBITA JUVENIL POR ENFERMEDAD CORONARIA ARTEIOSCLERÓTICA EN SEVILLA
*Rico A, Santos M, Blanco M, Marín R, Brell J, Sánchez A, González–Cámpora R, Lucena J*

8. MUERTE SÚBITA DE ORIGEN CEREBRO-VASCULAR EN SEVILLA: ESTUDIO SOBRE UNA SERIE DE 6360 AUTOPSIAS FORENSES
*Blanco M, Marín R, Rico A, Santos M, Brell J, Sánchez A, Lucena J*

9. THE TRAINING OF SPECIALISTS IN LEGAL MEDICINE IN CHILE
*Cerda C*

## SESSION 15.29

1. PRE-TREATMENT STRATEGIES FOR THE IMPROVED CYANOACRYLATE DEVELOPMENT OF DRY LATENT FINGERMARKS ON NON-POROUS SURFACES
*Montgomery L, Spindler X, Maynard P, Lennard C, Roux C*

2. COGNITIVE PROFILING- DEFINING AND QUANTIFYING THE COGNITIVE UNDERPINNING OF EXPERTISE IN LATENT PRINT EXAMINATION
*Bucht R, Dror I*

3. FINGERMARKS: A SMALL WORLD DISCLOSING A WORLD OF INFORMATION USING MALDI MSI
*Francese S, Ferguson L, Wolstenholme R, Clench M, Bradshaw R*

4. A NEW TECHNIQUE FOR VISUALIZATION OF LATENT FINGERPRINTS ON VARIOUS SURFACES USING POWDER FROM TURMERIC: A RHIZOMATOUS HERBACEOUS PLANT (CURCUMA LONGA)
*Garg R, Kumari H, Kaur R*

5. CONTROLLING THE EFFECTS OF COGNITIVE BIAS ON FINGERPRINT IDENTIFICATION: STRATEGIES FOR RESEARCH, TRAINING, AND STANDARD OPERATING PROCEDURES
*Sahota E*

6. FINALISING THE REACTION MECHANISM OF 1,2-INDANEDIONE-ZINC WITH AMINO ACIDS IN LATENT FINGERMARKS AND THE ROLE OF CELLULOSE SUBSTRATES IN THE REACTION
*Spindler X, Shimmon R, Roux C, Lennard C*

7. A NOVEL DUAL-SUSPENSION METHOD FOR THE DETECTION AND ENHANCEMENT OF LATENT AND BLOODY FINGERMARKS ON NON-POROUS SURFACES
*Bossers L, Crilley C, Mcdonagh A, Te S, Bell M, Roux C*

## SESSION 15.30

1.MEASUREMENTS AND COMPARISONS OF VELOCITIES OF BLOOD SPATTERS USING A HIGH SPEED CAMERA
*Seo Y, Moon B, Cho Y, Jeon W, Kim S, Park N*

2.BLOOD-ENHANCEMENT REAGENTS, LUMINOL, BLUESTAR®, FLUORESCEIN, AND HEMASCEIN™: A QUANTITATIVE COMPARISON OF PROPERTIES ESSENTIAL FOR CRIME SCENE INVESTIGATIONS
*Bilous P, Fossum M, Hallmark C*

3.THE USE OF PRESUMPTIVE TESTS TO DISTINGUISH FLY ARTEFACTS FROM HUMAN BIOLOGICAL FLUID AT A CRIME SCENE
*Durdle A, Van Oorschot R, Mitchell R*

4.PORTABLE ASSAY FOR BODY FLUID CONFIRMATION: PROOF OF CONCEPT
*Young S, Bishop C*

5.BLOOD DROPS IN FLIGHT
*Bruin K, Laan N, Jannink T, Van der Bos A*

6.APPLYING RESEARCH TO THE REAL WORLD: THE SPECIALIST LOCATION RECOVERY UNIT, NEW SOUTH WALES POLICE FORCE
*Raymond J, Bell M*

## SEPTEMBER, 16th

### SESSION 16.1

1. FORENSIC PATHOLOGY; YESTERDAY, TODAY AND TOMORROW. A BRIEF SURVEY OF FORENSIC PATHOLOGY WITH SPECIAL REFERENCE TO ITS CURRENT STATUS IN DEVELOPING COUNTRIES
*Sharifzad HR, Sharifzad A, Rategh R*

2. UXORICIDE: BEATEN TO DEATH
*Schillaci DR*

3. TRAFFIC ACCIDENT RECONSTRUCTION USING NUMERICAL SIMULATION TECHNOLOGY
*Zou D, Li Z, Huang P, Chen Y*

4. ANALYSIS OF 59 CASES DUE TO ALLERGIC REACTION
*Shen Y, Li Z, Li L, Zhao Z, Liu N, Zhang J*

5. THE STRANGE CASE OF A "WALKING" BULLET
*J. Nóbrega, B. Silva, F. Corte Real*

### SESSION 16.2

1. EXAMINATION OF CHAINSAW TOOL MARKS ON BONE USING DIGITAL INFRARED IMAGING
*Bailey J, Gerretsen R*

2. THE EVIDENTIAL VALUE OF FINDING GLASS ON HEAD HAIR AND HEADWEAR
*Jackson F, Cavanagh-Steer K, Dusting T, Maynard P, Roux C*

3. CHEMICAL ANALYSIS OF AUTOMOTIVE CLEAR COAT PAINTS BY UV MICROSPECTROPHOTOMETRY AND MICRO LASER RAMAN SPECTROSCOPY
*Siegel J, Goodpaster J, Mendlein A*

4. MICRO-RAMAN SPECTROSCOPIC INVESTIGATION OF DIRECT DYES AND DYED CELLULOSE FIBERS
*Luo Y, Xu C, Sun Q, Yang X, Xi J*

5. ANALYSIS OF FIBRE DYES BY CAPILLARY ELECTROPHORESIS - QUADRUPOLE TIME-OF-FLIGHT MASS SPECTROMETRY
*Lee J, Woodhouse K, Doble P, Roux C, Blanes L, Hemmings J*

6. THE EVIDENTIAL VALUE OF FINDING FIBRES ON HUMAN HANDS
*A Almazrooei M, Hemmings J, Robertson J, Spindler X, Maynard P, Roux C*

# 19th IAFS WORLD MEETING
# 9th WPMO TRIENNIAL MEETING
# 5th MAFS MEETING

## SESSION 16.3

1. EXAMINATION OF INTRA-INDIVIDUAL DIFFERENCE IN THE SIGNATURE OF JAPANESE REAL AND FICTITIOUS NAMES
   *Seki Y*

2. A STUDY OF ANALYZING HANDWRITTEN ELECTRONIC SIGNATURE UPON CONVENTIONAL APPROACHES
   *Kim H, Lee K, Kang T, Jin M, Lee Y, Yang H*

3. TWO EFFICIENT METHODS FOR FORENSIC VERIFICATION OF CHINESE SIGNATURES
   *Chen X, Yang X, Bian X, Shi S, Xu C, Luo Y*

4. NEW OBJECTIVE METHODS FOR THE EXAMINATION OF QUESTIONED DOCUMENTS. PART 1 - VARIATION IN ARABIC SIGNATURES
   *White P, Al Haddad A*

5. NEW OBJECTIVE METHODS FOR THE EXAMINATION OF QUESTIONED DOCUMENTS. PART 2 - THE USE OF PRINCIPAL COMPONENT ANALYSIS (PCA) FOR THE OBJECTIVE EXAMINATION OF ARABIC SIGNATURES
   *Al Haddad A*

6. IDENTIFYING A COMMON ORIGIN OF TONER PRINTED COUNTERFEIT BANKNOTES BY MICRO-RAMAN SPECTROSCOPY
   *Skenderovic Božicevic M, Gajovic A*

7. A NEW METHOD OF USING IN VIVO X-RAY IMAGES OF THE SKULL DURING PHOTO SUPERPOSITION WITH THE IMAGE OF THE SKULL
   *Abramov A*

8. DIAMOND CELL FOURIER TRANSFORM INFRARED SPECTROSCOPY TRANSMITTANCE ANALYSIS OF BLACK TONERS ON QUESTIONED DOCUMENTS
   *Almeida Assis A, Barbosa M, Custódio A, Tropecelo P, Valente Nabais J*

## SESSION 16.4

1. STYRYL DYE COATED METAL OXIDE NANOPOWDERS FOR THE DETECTION OF LATENT FINGERMARKS ON NON-POROUS SURFACES
   *Chadwick S, Maynard P, Kirkbride P, Lennard C, Mcdonagh A, Spindler X, Roux C*

2. NOVEL AMINO-ACID TARGETING IMMUNOGENIC REAGENTS FOR THE DETECTION OF LATENT FINGERMARKS ON POROUS AND NON-POROUS SUBSTRATES
   *Spindler X, Wood M, Hofstetter O, Mcdonagh A, Maynard P, Kirkbride P, Roux C, Lennard C5*

3. REACH ON A NEW METHOD OF FLUORESCENT YELLOW WET POWDER TO DEVELOP LATENT FINGERMARKS
   *Zhang X, Zhang Y, Zhang Y*

4. NILE RED - AN ALTERNATIVE TO PHYSICAL DEVELOPER FOR THE DETECTION OF LATENT FINGERMARKS ON WET POROUS SURFACES?
   *Braasch K, Deppe J, Spindler X, Shimmon R, Maynard P, Lennard C, Roux C, Chadwick S*

## SESSION 16.5

1. ERROR MÉDICO. LA COMUNICACIÓN ASISTENCIAL COMO PROGRAMA DE PREVENCIÓN EN LA GESTIÓN DE RIESGOS
   *Osuna E, Gremels M, Valbuena S*

2. DISTENSIÓN GÁSTRICA AGUDA COMO CAUSA DE MUERTE: REPORTE DE CASO
   *Vivas Díaz J*

3. IMMERSION SCALD BURNS IN UNSUPERVISED CHILDREN - ACCIDENT OR NEGLECT? - A CASE REPORT
*Oliveira R, Marques C, Fonte Santa J, Tavares S, Corte-Real F*

4. HOMICIDIOS POR ASFIXIA POSICIONAL. PRESENTACION DE DOS CASOS
*Pareja J, Bravo V*

5. "ESTUDIO DESCRIPTIVO SOBRE AGRESIONES SEXUALES PROVINCIA DE BIO-BIO. SML LOS ANGELES"
*Gómez de la Fuente J, Hermosilla Gallegos C*

6. LA ENFERMEDAD DE CROHN ES INCAPACITANTE?
*Martin C, Puig L, Pujol A, Vidal C, Maosa M, Medallo J*

7. INDIVIDUALIZACION DE LA MARCA DE UNA MORDEDURA A TRAVES DE LOS ANGULOS DE LOS INCISIVOS SUPERIORES CON RESPECTO AL EJE INTERCENINO
*Muñoz Barrio JE, Perez Calvo JC, Luna Maldonado A, Gomez J, Lopez Nicolas M*

8. HUELLAS DE MORDEDURA EN UN CASO DE MALTRATO INFANTIL. REPORTE DE CASO
*Barragan Amaya OL*

## SESSION 16.6

1. APPLICATION OF ADVANCED ANALYTICAL TECHNIQUES IN DETECTING POST-BLAST TRACES OF SOME COMMON IMPROVISED EXPLOSIVES
*Bendary A, Ismail M*

2. DETECTING PETROL ON HANDS - DOES IT HAVE ANY EVIDENTIAL VALUE?
*Horne N, Roux C, Grimwood K, Maynard P*

3. ANALYSIS OF DEATHS CAUSED BY GUNSHOT WOUNDS IN MATERIALS OF BRATISLAVA MEDICOLEGAL WORKPLACES
*Sidlo J*

4. NEW SUGGESTIONS AND MODIFICATIONS IN THE EXTRACTION, ANALYSIS AND DETECTION OF ORGANIC POST-EXPLOSION TRACES
*Bendary A, Ismail M, Hadhoud M, Naser A, Hamam A*

5. STUDY ON THE EXPLOSION TRACE AND QUANTITIVE CHARACTERISTICS IN EXPLOSION CASE SCENE
*Zhang Y, Zhang H, Zhang X*

## SESSION 16.7

1. EXPERIENCES IN THE MEDICO-LEGAL ORGANIZATIONS OF KOSOVO AND FINLAND. A COMPARATIVE STUDY OF BUILDING-UP OF A MEDICO-LEGAL SYSTEM AND RENEWAL OF AN ESTABLISHED ORGANIZATION
*Jääskeläinen A*

2. THE PROGRESS OF ACCREDITATION FOR FORENSIC SCIENCE LABORATORIES IN CHINA
*Zhaoming G, Yanbin W*

3. FORENSIC MEDICINE IN DUBAI, UAE
*Benomran F*

4. STRATEGY OF JUDICIAL EXPERTISE STANDARD MANAGEMENT
*Wu H*

5. CONCERNING PERSONAL INJURY COMPENSATION SYSTEM IN CHINA
*Zhang C*

6. A CONTRIBUTION TO THE HISTORY OF SCIENCE IN PORTUGAL: ARE THE METHODS AND PRIORITIES OF MEDICO-LEGAL SCIENCES IMMUNE TO IDEOLOGY AND POLITICS?
*Souto L*

## SESSION 16.8

1. SURGICAL INTERVENTIONS WITH FATAL OUTCOME: MEDICO-LEGAL INVESTIGATIONS USING POST-MORTEM CT-ANGIOGRAPHY
*Grabherr S, Doenz F, Dominguez A, Palmiere C, Uske A, Mangin P*

2. CONGENITAL HEART DISEASE (CHD) IN FETUSES: THE DIAGNOSTIC ROLE OF "TRADITIONAL" AND "TOMOGRAPHY" AUTOPSY
*Maresi E, Portelli F, Busardò FP, Gutsul L, Averna L, Procaccianti P*

3. DETECTION OF THE SOURCE OF HEMORRHAGE: DIAGNOSTIC VALUE OF POSTMORTEM CT-ANGIOGRAPHY
*Palmiere C, Doenz F, Bize P, Binaghi S, Chevallier C, Mangin P, Grabherr S*

4. DISCOVERY OF INCIDENTALOMAS ON THE ABDOMINOPELVIC SCANS OF BODY PACKERS: 100 CASES
*Bécour B, Rousset P, Médiouni Z, Hammache A, Rey C, Pourriat J*

5. CARDIAC TROPONIN I INTEREST IN THE POST MORTEM DIAGNOSIS OF MYOCARDIAL DAMAGE
*Aissaoui A, Haj Salem N, Boughattas M, Zaqout A, Chadly A*

6. THE EFFECT OF USING CRIME SCENE RECONSTRUCTION TECHNOLOGIES TO THE UNDERSTANDING OF A CRITICAL CRIMINAL CASE: PRELIMINARY STUDY
*Yilmaz R, Yakupoglu A, Demircan T, Yukseloglu H, Yorulmaz C*

## SESSION 16.9

1. THE NATIONAL ACADEMY OF SCIENCES (NAS) REPORT: IT IS TWO YEARS LATER AND WHERE ARE WE NOW?
*Siegel J*

2. AN EXPLORATION OF EPISTEMOLOGICAL UNCERTAINTY IN FORENSIC SCIENCE
*Evison M*

3. "FORGING A STABLE RELATIONSHIP? BRIDGING THE LAW AND FORENSIC SCIENCE DIVIDE IN THE ACADEMY"
*Mccartney C, Cassella J*

4. THE APPROPRIATE EDUCATION FOR A FORENSIC SCIENTIST: WHERE DO WE GO FROM HERE?
*Siegel J, Houck M*

5. FORENSIC SCIENCE EDUCATION: INVESTIGATION INTO CURRENT TERTIARY FORENSIC SCIENCE COURSES
*Samarji A*

## SESSION 16.10

1. FORMULATION AND APPLICATION OF BONE AGE STANDARD ATLAS OF CHINESE HAN POPULATION TEENAGERS
*Zhu G, Wang Y*

2. A POST-PROCESSING TECHNIQUE FOR CRANIAL CT IMAGE IDENTIFICATION
*Jianjun W*

3. USING A PORTABLE XRF TO DETECT THE TRANSFER OF MATERIAL FROM THE PRIOR USE OF A SAW IN CUTTING BONE
*Williams J*

4. AGE ESTIMATION IN CHINESE LIVING TEENAGERS WITH LIMB JOINTS RADIOGRAPHS
*Wang Y*

5. A STANDARD PROCEDURE FOR FORENSIC ANTHROPOLOGICAL EXAMINATIONS UNDERTAKEN IN TROPICAL BRAZIL
*Guimarães MA, Francisco RA, Velloso APDS, Silveira TCP, Secchieri JM, Gual ÉPD, Evison MP*

## SESSION 16.12

1. THE APPROACH OF MASS MEDIA IN TURKEY TO TRANSPHOBIC HATE CRIMES
*Guchan A, Dogan M, Yukseloglu E*

2. REPORTING OF STRONGLY DISCRIMINATING TECHNIQUE COMBINATION RESULTS IN THE NETHERLANDS
*Van der Peijl G, Van Breukelen M, Van Es A, Wiarda W*

3. FORENSICS AND THE MISSING IN THE BALKANS: FORENSIC STRUCTURES, CURRENT CHALLENGES, AND FUTURE NEEDS
*Finegan O*

4. COMBINATION OF EVIDENCE IN COMPLEX CASEWORK USING BAYESIAN NETWORKS
*Van der Peijl G, Sjerps M*

## SESSION 16.13

1. COLD CASES REOPENED. DNA MAKES LIGHT (OR DARK?)
*Onofri V, Tagliabracci A*

2. DIRECT AMPLIFICATION APPROACHES TO STREAMLINING DATABASING SAMPLE PROCESSING
*Wang D, Zhong C, Ma M, Carbonaro A, Calandro L, Hennessy L*

3. CONSENSUS METHOD FOR LOW TEMPLATE TYPING AFFECTS GENOTYPING RELIABILITY AND DATABASE SEARCH RESULTS
*Benschop C, Van der Beek C, Meiland H, Van Gorp A, Westen A, Sijen T*

4. DNA DATA EXCHANGE BETWEEN EU MEMBER STATES - PORTUGUESE EXPERIENCE
*Ferreira C, Corte Real F*

5. DEVELOPMENT AND IMPLEMENTATION OF A RAPID DNA PROFILING SERVICE
*Verheij S, Harteveld J, Van Gorp A, Sijen T*

6. DOING MORE WITH LESS: IMPLEMENTING DIRECT AMPLIFICATION WITH THE POWERPLEX® 18D SYSTEM
*Bimbashi L, Oostdik K, Ensenberger M, Krenke B, Sprecher C, Storts D*

# 19th IAFS WORLD MEETING
# 9th WPMO TRIENNIAL MEETING
# 5th MAFS MEETING

## SESSION 16.14

1. TOPOGRAPHY MEASUREMENTS AND PERFORMANCE COMPARISONS BETWEEN NIST SRM 2460 STANDARD BULLET MASTERS AND BKA BULLET REPLICAS
   *Song J, Thompson R*
2. ILLEGAL FIREARMS IN PORTUGAL
   *Pereira N*
3. PISTOL BARREL DISCRIMINATION: A NUMERICAL ANALYSIS
   *Bolton-king R, Bencsik M, Evans P, Smith C, Allsop D, Painter J, Cranton W*
4. THE EXAMINATION, EVALUATION AND IDENTIFICATION OF 9MM CALIBER CARTRIDGE CASES FIRED FROM 1,275 GLOCK SEMIAUTOMATIC PISTOLS MANUFACTURED OVER AN 18 YEAR PERIOD
   *Hamby J, Norris S*
5. GSR ANALYSIS BY SEM/EDX - A POWERFUL TOOL FOR FIREARMS CRIME INVESTIGATION
   *Machado F, Fonseca J*

## SESSION 16.15

1. ACCIDENT OR HOMICIDE?
   *Hajtman A, Krajcovic J, Novomesky F, Straka L, Stuller F*
2. THE OCCURRENCE OF NON-NATURAL DEATH IN THE AUTOPSIES PERFORMED IN THE CASES OF SUDDEN UNEXPECTED DEATH (2006-2010)
   *Varga T, Tiffinger A, Harmath A, Kereszty É, Dunai G, Keller É*
3. RE-EVALUATION OF SUDDEN UNEXPECTED DEATH IN EPILEPSY
   *Zhuo L, Zhang X, Zielke H, Levine B, Fowler D, Li L*
4. JUVENIL SUDDEN DEATH. WHAT KILLS YOUNG PEOPLE IN SEVILLE?
   *Lucena J, Santos M, Rico A, Marin R, Blanco M, Sanchez A, Gonzalez–Campora R*
5. ACCURACY OF DEATH CERTIFICATE FOR FOREIGN BODIES
   *Keller E, Magyar L, Dósa A*
6. COMBINED HOMICIDE-SUICIDE IN EASTERN CROATIA
   *Marcikic M, Vukšic Z, Blažanovic A, Dumencic B, Matuzalem E*
7. CHILDREN VICTIMS OF ANOTHER WAR
   *Kelahmet S, Gulmen MK, Avci A, Cekin N*

## SESSION 16.16

1. A PROPOSAL FOR THE RENEWAL OF THE CLASSIFICATION OF DEATH
   *Jääskeläinen A*
2. TIME-DEPENDENT FTIR SPECTRAL CHANGES IN RATS OF MASSIVE HAEMORRHAGE DEATH DURING THE LATER POSTMORTEM PERIOD
   *Huang P, Li L, Chen Y, Li S, Wang Z, Chen Y*

3. THE BEHAVIOR OF THE HYPOXIA INDUCED FACTOR 1-ALPHA (HIF1-A) IN NORMAL, PATHOLOGICAL AND HYPOXIC LUNG TISSUE
*Cecchi R, Luigi C, Cristina S, Mariani A, Catanese M, Terranova C, Cecchetto G, Mucciaccia B*

4. THE IDIOPATHIC GIANT CELL MYOCARDITIS
*Krajcovic J, Novomesky F, Straka L, Stuller F, Hajtman A, Adamicova K*

5. A MOLECULAR APPROACH FOR EXTENDED POSTMORTEM INTERVAL ESTIMATES
*Young S, Bishop C*

## SESSION 16.17

1. VICTIMS OF THE SLAVE TRADE- INJURIES IN VICTIMS TRAFFICKED FOR SERVITUDE AND PROSTITUTION TO THE UK
*Cohen J*

2. RECENT SITUATION AND PROSPECT OF PERIPHERAL NERVE INJURY FORENSIC APPRAISAL AND ELECTROMYOGRAPHY IN CHINA
*Gao D*

3. EVALUATION OF BODY INJURY TO WORKERS OF THERAPEUTIC HYPERBARIC CHAMBERS: BASIC ASPECTS
*Ponce Leão R, Silva M, Alvim H, Camacho O, Nóbrega J, Diogo M5, Baptista J5*

4. WHEN BODILY INJURIES IN CHILDREN CAN ALERT TO CASES OF VIOLATES HUMAN RIGHTS?
*Camargo R, Ferreira Martins De Andrade E, Candido M, Aguiar Sarmento G, Hoppe L, Mendes Colmenero J, Added C, De Sousa Filho J, Dias Vieira M, Zeri Nunes S*

5. PRACTICAL PROBLEMS FACED BY MEDICAL OFFICERS IN RELATION TO ALLEGED TORTURE CASES
*Senanayake K*

6. THE KINDS OF SEXUAL VIOLENCE ATTENDED IN THE BEM-ME-QUER UNITY OF THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL, IN THE PERIOD FROM 2001 TO 2009
*Camargo R, Candido M, Mendes Colmenero J, Hoppe L, De Toledo Leme V, Aguiar Sarmento G, Pereira de Oliveira J, Perioli C, Zeri Nunes S, De Souza J*

## SESSION 16.18

1. THE BRAZILIAN FEDERAL POLICE FORENSIC SCIENCES: AN ONTOLOGICAL AND EPISTEMOLOGICAL APPROACH BASED ON THE TERM PAPER OF THE NATIONAL POLICE ACADEMY, BETWEEN 2006 AND 2010
*Miranda G, Diana G*

2. AN ANGLO-BRAZILIAN PARTNERSHIP IN FORENSIC DEATH INVESTIGATION
*Evison M, Guimaraes M*

3. FORENSIC INVESTIGATION IN INDIAN PERSPECTIVE
*Vyas J, Singh K*

4. POST MORTEM CIRCULATION: AN ESSENTIAL TECHNIQUE FOR THE LIVING?
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*Enache A, Chatzinikolaou F, Florou C, Gatourgidis K, Zagelidou E*

35. ANALYSIS OF INFANTICIDE CASES IN VARNA DISTRICT FOR 40 YEARS (1971-2010)
*Radoinova D, Kolev Y*

36. USEFULNESS OF POSTMORTEM TRACE ELEMENTS IN VITREOUS HUMOR IN THE DIAGNOSIS OF DROWNING
*Perez-Carceles MD, Vazquez M, Sibon A, Ibarra I, Osuna E, Luna A*

37. THE IMPORTANCE OF A THOROUGH CRIME SCENE INVESTIGATION AND FORENSIC AUTOPSY: HOMICIDE OR SUICIDE? A CASE OF UNUSUAL DEATH
*Portunato F, Bonsignore A, Botto M, Pizzorno E, Ventura F*

38. WEIGHT MEASURES AS A MARKER OF ABUSE OF ANABOLIC ANDROGENIC STEROIDS
*Thiblin I, Jepsen M, Mobini-far H*

39. SUICIDES AND ECONOMIC CRISIS
*Chatzinikolaou F, Zagelidou E, Enache A, Voultsos P, Kalyva E, Florou C, Mastrogianni O, Raikos N, Vasileiadis N*

40. THE FORENSIC PATHOLOGICAL DIAGNOSIS AND EVALUATION OF SUDDEN DEATH FROM MINOR HEART LESION: 3 AUTOPSY CASES
*Qin Z, Zhang J, Huang P*

41. SUICIDE BY SELF-IMMOLATION. A 20-YEAR RETROSPECTIVE STUDY (1990-2010) OF ALL AUTOPSY CASES CONDUCTED BY THE FORENSIC MEDICAL SECTOR AT THE UNIVERSITY OF FLORENCE
*Focardi M, Pagnini C*

42. STRONTIUM ANALYSIS OF HUMAN TEETH BY LASER-INDUCED BREAKDOWN SPECTROSCOPY: ITS APPLICATION TO DIAGNOSIS OF DROWNING
*Perez-carceles MD, Fortes F, Sibon A, Luna A, Laserna J*

43. THE KEY ROLE OF FORENSIC DENTISTRY FOR HUMAN SKELETAL IDENTIFICATION: A HOMICIDE CASE REPORT (I)
*Franco Costa J, Viegas F, Farinha C, Santos JC, Pereira C*

44. ELDERLY SUICIDE TARRANT COUNTY, TEXAS
*Hilal A, Gülmen MK, Peerwani N, Yorulmaz C, Singer R, Kukuchi Y*

45. THE KEY ROLE OF FORENSIC DENTISTRY FOR AGE ESTIMATION: A HOMICIDE CASE REPORT (III)
*Cardoso JP, Viegas F, Franco Costa J, Farinha C, Santos JC, Mendonça MC, Pereira C*

46. FEMALE HOMICIDE IN NORTH TUNISIA
*Gloulou F, Bekir O, Allouche M, Ben Khelil M, Shimi M, Hamdoun M, Zhioua M*

47. MOLECULAR ANALYSIS OF FRAGMENTS OF SPLEEN, LIVER AND BRAIN FIXED IN FORMALIN AND PARAFFIN EMBEDDED (FFPE) OBTAINED FROM AUTOPSY CASES. ANALYSIS OF SHORT TANDEM REPEAT (STR) PROFILES AND THE MITOCHONDRIAL DNA (MITDNA) HVI AND HV2 SEQUENCING
*Funabashi K, Yamada K, Sousa ML, Bittencourt E, Barcelos D, Kunii I, Cerutti J, Franco M, Iwamura E*

48. RADIO FREQUENCY IDENTIFICATION DEVICE (RFID) AT THE CATALONIAN INSTITUTE OF LEGAL MEDICINE (IMLC)
*Martin Fumado C, Vidal Gutierrez C, Barberia Marcalain E, Marron Moya T, Castella Garcia J, Medallo Muniz J*

49. VIRTOPSY VERSUS AUTOPSY IN AN UNUSUAL CASE OF MECHANICAL VIOLENT ASPHYXIA: CASE REPORT
*Aquila I, Falcone C, Bertucci B, Boca S, Di Nunzio C, Giudice A, Tamburrini O, Ricci P*

## SESSION B2

1. FORENSIC APPLICATIONS OF AMBIENT MASS SPECTROMETRY - DIRECT SEARCHING OF EXPLOSIVES USE EVIDENCES
*Hubert C, Machuron-Mandard X, Tabet J*

2. THE COMBUSTION CHARACTERISTICS OF CELL PHONE IN THE MICROWAVE
*Nam J*

3. NEW APPROACH FOR ARSON DETECTION WITH A METROLOGICAL EVALUATION
*Salgueiro PAS, Bettencourt da Silva RJN, Aires-de-Sousa J, Monteiro AMFMBR, Carvalho AMD, Borges CMFS*

4. DEVELOPMENT OF A STATISTICALLY SOUND STRATEGY FOR THE IDENTIFICATION OF EXPLOSIVE RESIDUES BY HPLC
*Carapinha HAQ, Salgueiro PAS, Bettencourt da Silva RJN, Matos MJ*

5. EXPERIMENTAL STUDY ON THE MORPHOLOGICAL CHARACTERISTICS AND SCENE DISTRIBUTION RULE OF EXPLOSIVE DEVICE FRAGMENTS
*Zhang Y, Zhang H, Chen L, Sun L*

6. RESEARCH ON THE RECONSTRUCTION OF EXPLOSIVE DEVICE
*Hongguo Z, Yanchun Z, Lihong C, Yi L*

7. CAN WELDING PARTICLES BE MISTAKEN FOR GUNSHOT RESIDUE?
*Brozek Mucha Z*

8. A LOGICAL APPROACH FOR ASSESSING THE TIME SINCE DISCHARGE: AN EVALUATIVE PERSPECTIVE
*Gallidabino M, Romolo F, Taroni F, Weyermann C*

9. GUNSHOT RESIDUES ANALYSIS: A COMPARATIVE STUDY BETWEEN EGYPT AND ITALY
*Barbaro A, Bendary A*

10. CONTEMPORARY QUALIFICATION IN FORENSIC BALLISTICS AND GSR ANALYSIS AS A CONDITION FOR AN UNUSUAL TRIAL CASE SOLUTION
*Di Mizio G, Colosimo F, Romeo M, Gentile C, Ricci P*

11. CALIBERS AND TYPES OF FIREARMS USED IN THE COMMISSION OF MURDER OF NDRANGHETA (ORGANIZED CRIME) OCCURRED IN THE PROVINCE OF CATANZARO (I)
*Di Mizio G, Colosimo F, Romeo M, Ricci P, Gentile C*

12. EXAMINATION OF BALLISTIC HEAD MODELS USING COLOUR CONTRAST
*Schyma C, Madea B*

13. DISCRIMINATION BETWEEN HOLE PRODUCED BY BULLET COMPARED TO TEAR PRODUCED BY OTHER CAUSES BY SEM-EDX MICROSCOPY
*Di Mizio G, Colosimo F, Romeo M, Tramonte S, Ricci P, Gentile C*

14. EXPERIMENTAL EFFECTS OF SHOT CAUSED BY PROJECTILES FIRED FROM PNEUMATIC WEAPON WITH KINETIC ENERGY BELOW 17 J
*Smedra-Kazmirska A, Barzdo M, Antoszczyk L, Szram S, Berent J*

15. SURPRISING FINDINGS IN THE TWO VICTIM BODIES OF ONE GUNSHOT
*Pérez-Cao A, Valero C, Nogal M, Santamaria M, Díaz M*

16. EVIDENCE OF AN HEALED GUNSHOT WOUND: A STUDY CASE FROM THE BRAZILIAN AMAZON
*Freire Lira V, Alves Cardoso F*

17. TRACING JOMON MAN AND YAYOI MAN USING THE DISTRIBUTION OF THE ALDH2 MUTATION GENOTYPE AND THE JC VIRUS GENOTYPE
*Miyamori D, Takasaka T, Stuart M, Ikegaya H*

18. ESTIMATING STATURE FROM HUMAN SKELETAL REMAINS: DOES IT MATTER WHETHER WE ARE ESTIMATING LIVING OR CADAVER STATURE?
*Cardoso H*

19. COMPUTER-BASED THREE-DIMENSIONAL FACIAL RECONSTRUCTION FROM CT SCANNED SKULLS USING SOFT TISSUE MEASUREMENTS OBTAINED FROM A BRAZILIAN POPULATION THROUGH MRI
*Theodoro MJA, Santos WDFD, Marques PMDA, Nogueira-barbosa MH, Santos AC, Evison MP, Guimarães MA*

20. A PROTOCOL FOR SOFT TISSUE REMOVAL FROM DECOMPOSING BODIES ENCOUNTERED IN FORENSIC INVESTIGATIONS IN TROPICAL BRAZIL
*Secchieri JM, Silveira TCP, Francisco RA, Velloso APDS, Soares ATC, Evison MP, Guimarães MA*

21. IDENTIFICATION OF THREE CHARRED VICTIMS OF ROAD TRAFFIC ACCIDENT VIA ESTIMATION OF AGE FROM THE PELVIS
*Silveira TCP, Francisco RA, Velloso APDS, Secchieri JM, Gual ÉPD, Guimarães MA*

22. STATISTICAL CORRELATION BETWEEN THE LENGTHS OF THE FIRST METACARPAL AND THE FEMUR OFFERS AN ALTERNATIVE METHOD FOR ESTIMATING STATURE
*Fernandes CR, Guimarães MA, Prudente PS, Bachur JA, Silveira TCP, Evison MP, Gracia SB*

23. LIBS ANALYSIS OF HUMAN TISSUES IN FORENSIC SCIENCES
*Garofano L, Carelli G, Grassi R, Sorrentino F, Legnaioli S, Lorenzetti G, Palleschi V, Pardini L, Colombini MP, Rasmussen KL*

24. DOES FIRE SIGNIFICANTLY ALTER BLUNT FORCE INJURIES IN BONE?
*Regazzola V, Garofalo P, Porta D, Collini F, Gibelli D, Cattaneo C*

25. THE CORRELATION BETWEEN THE SHOULDER HEIGHT AND STATURE AMONG THE INDONESIAN PEOPLE
*Atmadja DS, Untoro E*

26. REGIONAL (DISTRICTS) PATTERNS OF DNA POLYMORPHISMS IN EAST TIMOR
*Souto L, Moreira H, Tavares F, Gomes S, Corte-Real F, Vieira DN*

27. THE SECONDARY DNA TRANSFER: LOW COPY NUMBER (LCN) DNA PROFILING
*Oztunc A, Yukseloglu H, Gul E, Erkan I, Yediay E, Yorulmaz C, Ozcan S, Kalfaoglu E*

28. INVESTIGATOR HEXAPLEX ESS KIT: EVALUATION AND VALIDATION TESTS
*Pontes ML, Cerqueira J, Pinheiro MF*

29. APPLICATION OF INDELS (INVESTIGATOR DIPPLEX) IN MIXTURE SAMPLES
*Carvalho A, Cainé L, Carvalho R, Pinheiro MF-*

30. INDIVIDUALIZATION OF FETAL AND MATERNAL GENETIC PROFILES FROM A PLACENTA, IN THE RESOLUTION OF A CRIMINAL MATERNITY CASE
*Amorim A, Afonso-Costa H, Vieira-Silva C, Espinheira R, Santos JC*

31. EVALUATION OF IDPLEX STR KIT IN FORENSIC GENETICS LABORATORY´S ROUTINE
*Cerqueira J, Pinheiro MF-*

32. EVALUATION OF DIFFERENT STR TYPING KITS ON DNA EXTRACTED FROM FINGERNAILS OF UNIDENTIFIED DECOMPOSED CADAVERS
*Turrina S, Filippini G, De Leo D*

33. ANALYSIS OF DNA EXTRACTION PROTOCOLS FROM HAIRS. LABORATORY PROCEDURES AND MOLECULAR ANALYSIS FOR HUMAN IDENTIFICATION
*Godoy C, Soares Vieira JA, Sinagawa D, Muñoz D, Sousa ML, Funabashi K, Kunii I, Cerutti J, Yamada K, Iwamura E*

34. MITOCHONDRIAL DNA HAPLOGROUPS IN AN AFRICAN ORIGIN POPULATION
*Tavares A, Bom J, Dario P, Ribeiro T, Geada H, Santos JC*

35. X- STR MUTATIONS IN PATERNITY INVESTIGATION CASES
*Ribeiro T, Ruivo D, Dario P, Geada H, Santos JC*

36. NGM LOCI IN SOUTH PORTUGUESE POPULATION
*Ribeiro T, Dario P, Vital N, Sanches S, Espinheira R, Geada H, Santos J*

37. OPTIMIZATION OF DNA EXTRACTION AND TYPING FROM SKELETAL REMAINS
*Filippini G, Turrina S, Leo D*

38. DEVELOPMENT OF TWO QUINTET MINISTR MULTIPLEX FOR FORENSIC PURPOSE
*Liu Y, Li L, Zhao S, Shao W, Li C*

39. ANALYSIS OF SOIL SAMPLE METAGENOME AS AN ADDITIONAL TOOL FOR FORENSICS
*Aaspõllu A, Lilje L, Simm J, Kägo E, Sipp Kulli S, Moora M, Zobel M, Metsis M*

40. DEVELOPMENT OF A DNA EXTRACTION METHOD FROM BUCCAL-SWAB CARDS USING A H-PREP
*Choi DH, Shin SC, Lee WH, Moon SO, Nam YH, Lee JM, Han MS*

41. GENES OF THE EXOCYTOTIC MACHINERY IN THE ETIOLOGY OF ALCOHOLISM AND SUICIDAL BEHAVIOUR: STX1A GENE
*Ambrósio AM, Lameiras MR, Almeida A, Feijão A, Pinto A, Silva D, Falcão L, Vieira DN*

42. CANDIDATE GENES OF THE DOPAMINERGIC AND SEROTONERGIC SYSTEMS IN THE ETIOLOGY OF DOMESTIC VIOLENCE: A PILOT STUDY
*Marques A, Pinto A, Lameiras MR, Almeida A, Feijão A, Gaspar H, Vieira DN, Ambrósio AM*

43. SUICIDAL BEHAVIOUR AND NEURONAL NITRIC OXIDE SYNTHASE GENE
*Alves M, Silva BS, Marques C, Fonte Santa J, Oliveira R, Vieira DN, Ambrósio AM*

44. THE WAY TOWARDS PERFECT FORENSIC LABORATORY
*Khomeriki D, Barbaro A*

45. GENETIC POLYMORPHISMS OF 5-HT2A, 5-HT1D?, 5-HT1D? AND 5-HTT GENES IN SUICIDE COMPLETERS: A CASE CONTROL STUDY
*Ambrósio AM, Bessa F, Tavares S, Coelho S, Lemos R, Castanheira G, Vieira DN*

46. ALCOHOLISM AND DOMESTIC VIOLENCE: CYP2E1 GENE.
*Marques A, Lameiras M, Almeida A, Feijão A, Pinto A, Gaspar H, Vieira DN, Ambrósio A*

47. SUICIDE AND NEUROTROPHINS: P75NTR GENE
*Alves M, Cordeiro C, Silva BS, Marques C, Fonte Santa J, Vieira DN, Ambrósio A*

48. HIGH-RESOLUTION ANALYSIS OF Y-CHROMOSOME SNP AND STR GENETIC POOL OF CHRISTIAN, MUSLIM ARABS AND KURDISH JEWS FROM ISRAEL AND THE PALESTINIAN AUTHORITY AREA
*Gonçalves R, Fernandes A, Rosa A, Gomes S, Filon D, Nebel A, Faerman M, Brehm A*

49. FORENSIC COMPARISON OF SOIL SAMPLES
*Min J, Kim K, Heo S, Kim M*

50. REFORM CHANGES IN HUNGARIAN FORENSIC SCIENCES
*Kovács G, Turzó C*

51. MEDICO-LEGAL EXPERTISE FORM IN CASES OF SUSPICION OF CHILD PHYSICAL ABUSE: A PROPOSAL
*Silveira Ribeiro C, Rodrigues F, Magalhães T*

## SESSION C1

1. FORENSIC AGE ESTIMATION A REVIEW OF THREE CASES
*Dias R, Pinto N, Frazão S, Coelho L, Rodrigues F*

2. MULTIPLE ABRASIONS ON THE NECK: IS IT PHYSICAL CHILD ABUSE? AN ANALYSIS OF THREE CASES
*Vadysinghe A, Nanayakkara D*

3. "GRANNY RAPE": A STUDY OF ELDER SEXUAL ABUSE
*Rebocho MF, Sani A, Nunes LM*

4. VIOLENCE IN INTIMATE RELATIONSHIPS: A COMPARISON OF MARRIED AND DATING COUPLES
*Caridade S, Machado C, Martins C*

5. MULTIPLE LEVELS ABUSE OF A 1 AND ½ YEAR-OLD INFANT FEMALE CASE REPORT
*Zagelidou E, Chatzinikolaou F, Voultsos P, Vasileiadis N, Raikos N, Psaroulis D*

6. MEDICO-LEGAL AND CRIMINAL STUDY OF GENDER VIOLENCE IN GALICIA (NW SPAIN)
*Regueira Diéguez A, Pérez Rivas N, Ordóñez Mayán L, Guinarte Cabada G, Fernández Rodríguez MT, Muñoz-Barús JI, Concheiro L, Vázquez-Portomeñe F, Rodríguez-Calvo MS*

7. HOMICIDE-SUICIDE IN NORTH TUNISIA
*Gloulou F, Allouche M, Bekir O, Ben Khelil M, Shimi M, Banasr A, Hamdoun M, Zhioua M*

8. FORENSIS MOLECULAR BOTANY: A PRELIMINARY STUDY IN A NORTH OF PORTUGAL SPECIMENS
*Lopes S, Cainé L, Carvalho R, Pinheiro MF*

9. USE PLANTS AS PROBATIVE VALUE IN SOLVING A CASE: AN EXAMPLE OF APPLIED FORENSIC BOTANY
*Aquila I, Infante L, Boca S, Di Nunzio C, Pepe F, Ausania F, Amirante C, Ricci P*

10. FORENSIC BOTANY IN COLOMBIA: PLANT MATERIAL ANALYSIS IN FORENSIC SCIENCES
*Galindo Bonilla A*

11. COLOMBIAN COCA PLANTS. A CRITICAL DISCUSSION ON TAXONOMY OF CULTIVATED ERYTHROXYLUM P.BROWNE SPECIES (ERYTHROXYLACEAE)
*Galindo Bonilla A, Fernández-Alonso JL*

12. ATTRACTIVENESS TO BAITED TRAPS BY DIPTERA IN FORENSIC SCENARIO: PRELIMINARY STUDY
*Farinha A, Centeio N Oliveira R, Ferreira S, Dias D, Rebelo MT*

13. OUTDOOR FORENSIC ENTOMOLOGY: COLONIZATION OF HUMAN REMAINS IN COLD ENVIRONMENTS
*Gherardi M, Vanin S*

14. OBSERVATION OF DECOMPOSITION ON NATURAL DEATH AND HANGING DEATH EXPERIMENT USING PIG IN REPUBLIC OF KOREA(WONJU CITY, (GANGWON-DO)
*Cho SJ*

15. THE USE OF INSECTS TO ELUCIDATE TIME OF DEATH AND SUSPECTS ASSOCIATION TO THE CRIME: CASE REPORT IN A RURAL AREA OF SOUTHERN BRAZIL
*Gonçalves Palanch de Lima C, Rodrigues Dias Filho C, Jacqueline Thyssen P*

16. THE IDENTIFICATION OF OPHYRA CALCOGASTER IN A HUMAN CADAVER FOUND IN SICILY
*Zerbo S, Triolo V, Busardò FP, Procaccianti S, Seidita G, Argo A, Procaccianti P*

17. ANALYSIS OF THE FORMATION OF THE CRIMINAL EXPERTS IN THE POLICE ACADEMY NORTH BRAZIL
*Velho JA, Bentes PRP, Gouveia OS, Yoshida RL, Messias JM, Bruni AT*

18. THE SWISS MANUAL (SPI) FOR THE "PROTECTION AND COLLECTION OF EVIDENCES"
*Scossa-Baggi E, Monico I, Pun K, Members of Suisse Police Institute*

19. IS FORENSIC SCIENCE A PROFESSION? A SOCIAL INQUIRY INTO FORENSIC SCIENCE PRACTICE
*Samarji A*

20. A NOVEL METHOD FOR FOOTPRINT EXAMINATION
*Feng C*

21. INTERNATIONAL DRUG TRAFFICKING: REPORT OF TWO ORIGINAL CASES OF "HUMAN MULES" USING ALUMINUM PAPER AS WRAPS OF SWALLOWED COCAINE CAPSULES
*Campos Neto M, Santana SCBF, Santana ACMBF*

22. IRMS ANALYSIS OF CANNABIS SEIZURES IN SINGAPORE
*Woo MSM, Lee YK, Tan YY, Yap TW*

23. IN VITRO EXPERIMENTAL STUDIES ON THE RECENT USE OF ALUMINUM AS A MANTLE OF COCAINE CAPSULES SWALLOWED BY "HUMAN MULES"
*Campos Neto M, Santana SCBF, Santana ACMBF*

24. ARRANGEMENTS FOR TRAFFIC PASTA BASE (COCAINE) IN THE WEST BORDER OF MATO GROSSO STATE (BRAZIL - BOLIVIA)
*Campos Neto M, Castilhone Jr. CC*

25. STUDY OF OPIATES BY HYPHENATED TECHNOLOGY OF CE-MS
*Pinjia M*

26. MULTI-CLASS DIFFERENTIATION OF CANNABIS SEEDLINGS IN A FORENSIC CONTEXT
*Broséus J, Vallat M, Esseiva P*

27. RAPID ANALYSIS TECHNIQUE FOR ILLICIT TABLETS WITHOUT SAMPLE PREPARATION: DESORPTION-ELECTROSPRAY-IONIZATION-MASS SPECTROMETRY (DESI-MS)
*Haertel C, Puetz M, Karst U*

28. OXI: FROM ANONYMITY TO THE FAME AS THE MOST DANGEROUS DRUG ON THE BRAZIL
*Balbino MA, Bruni AT, Oliveira MF, Martinis BS, Velho JÁ*

29. CONFLICTS OF INTEREST IN FORENSIC MEDICINE
*Martins C, Castro U*

30. REVIEW OF ALL MEDICAL ERRORS REFERRED TO THE DEPARTMENT OF FARS PROVINCE LEGAL MEDICINE CENTER IN SOUTH OF IRAN DURING THE 2007 TO 2010
*Hedjazi A, Zarenezhad M, Bahador A, Khalafi M, Yaghmaei A, Ramezanpour M, Salehi M, Hasanzadeh R, Rahimi M, Firoozi A*

31. LEGAL REGULATION OF GENETICALLY MODIFIED FOOD PRODUCTS TURNOVER IN NATIONAL LAWS OF CIS COUNTRIES
*Mammadov V, Mustafayeva A*

32. TRENDS OF ORGAN DONATION IN AZERBAIJAN AND OTHER COUNTRIES
*Mammadov V, Mustafayeva A*

33. BIOETHICS EDUCATION IN THE SYSTEM OF MEDICAL EDUCATION IN CIS COUNTRY
*Mammadov V*

34. A STUDY FOR DENTAL MALPRACTICE CLAIMS IN SOUTH OF IRAN (SHIRAZ CITY), IRAN, 2006- 2010
*Zarenezhad M, Hedjazi A, Salehi M, Ali Z, Hassanzadeh R*

35. MALFUNCTION OF HEART PROSTHETIC VALVES AND CRIMINAL LIABILITY: ANALYSIS OF 105 CASES
*Manzoni S, Verzeletti A, Restori M, Ferrari F*

36. THE ROLE OF INFORMED CONSENT IN LAWSUITS AGAINST MEDICAL DOCTORS: ANALYSIS OF FIRST STAGES PROCEEDING VERDICTS OF THE CIVIL COURT OF ROME.
*Marsella LT, Eramo A, Marino V*

37. THE QUESTION OF MEDICAL LIABILITY FOR PRESCRIPTION DRUGS OUTSIDE THE MARKETING AUTHORIZATION INDICATIONS IN EUROPEAN COUNTRIES: ABOUT AN ACCIDENTAL CASE OF BACLOFEN OVERDOSE IN LYON, FRANCE
*Maujean G, Fanton L, Guinet T, Malicier D*

38. HOW TO AVOID MALPRACTICE IN FORENSIC ENT MEDICINE?
*Attia M*

39. SURVEY ABOUT THE QUALITY OF THE HEALTH CARE INFORMATION: DOCTOR´S OPINION
*Marhuenda-Amoros D, Vazquez-Ruiz J, Prieto-Castelló M, Parets-Llorca R, Cardona-Lloréns A, Snacel-Sanchez N*

40. SURVEY ABOUT THE QUALITY OF THE HEALTH CARE INFORMATION:PATIENT´S OPINION.
*Prieto-Castelló M, Vazquez-Ruiz J, Marhuenda-Amorós D, Parets-Llorca R, Cardona-Llorens A, Snacel-Sánchez N*

41. OBSTETRICS AND GINECOLOGY AT HIGH-RISK OF LITIGATION
*Gómez-Durán E, Mulá-Rosias J, Torné-Escasany R, Benet-Travé J, Arimany-Manso J*

42. PREDOMINANCE OF THE CAUSES OF DEATH FOR ASPHYXIA IN THE NECROPSY FULFILL IN THE PERIOD FROM 2009 TO 2010 IN THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL
*Camargo R, Candido M, Aguiar Sarmento G, Hoppe L, Mendes Colmenero J, Pereira de Oliveira J, Zeri Nunes S, Politzer Telles G, Andrade EFM, Costa Aloe R*

43. PREDOMINANCE OF SUICIDE IN NECROPSIES, ANALYSES AT THE PERIOD FROM 2009 TO 2010 IN LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL
*Camargo R, Candido M, Aguiar Sarmento G, Hoppe L, Mendes Colmenero J, Oliveira JP, Zeri Nunes S, Politzer Telles G, Dias Vieira M, Souza J*

44. EVALUATION OF THE NECROPSY IN MURDER AND THE MECHANISMS OF DEATH IN THE PERIOD FROM 2004 TO 2009, AT THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SAO PAULO - BRAZIL
*Camargo R, Politzer Telles G, Pires de Campos Godoy M, Candido M, Aguiar Sarmento G, Hoppe L, Souza J, Pereira de Oliveira J, Perioli C*

45. THE MECHANISMS OF BODILY HARM IN CHILDLIKE POPULATION IN THE AGE GROUP FROM ZERO TO TWELVE YEARS. IS NECESSARY TO CREATE A SPECIFIC SERVICE TO THE CHILDLIKE POPULATION IN THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL?
*Camargo R, Candido M, Paiva de Castro R, Silva Viola M, Ferreira Ramacioti M, Mendonça Ruiz M, Hoppe L, Perioli C, Mendes Colmenero J*

46. THE BODY DAMAGE ANALYSED AT THE EXAMINATIONS AD CAUTELAM, FOR THE GUARANTEE OF THE INDIVIDUAL RIGHTS IN THE PERIOD FROM 2004 TO 2010, EVALUATED AT THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL
*Camargo R, Candido M, Mendes Colmenero J, Hoppe L, Aguiar Sarmento G, Oliveira JP, Perioli C, Zeri Nunes S, Andrade EFM, Politzer Telles G*

47. DRUG ABUSE VIOLATIONS IN UPPER EGYPT THROUGH 2003-2009
*Sayed Aly N*

48. POSSIBLE FACTORS PREDICTING POST TRAUMATIC SYMPTOMS IN JAPANESE BEREAVED FAMILY MEMBERS: INVESTIGATION OF FORENSIC AUTOPSY CASES
*Ogata K, Nishi Y, Michiue T, Ishikawa T, Maeda H*

49. FUNERARY CUSTOMS IN GREECE- A COURSE IN TIME AND THE SYSTEM IN EFFECT
*Chatzinikolaou F, Zagelidou E, Chatzinikolaou K, Voultsos P, Kalyva E, Florou C, Raikos N, Vasileiadis N*

50. CREMATION IN GREECE NOWADAYS - REFERENCES TO THE PAST
*Chatzinikolaou F, Zagelidou E, Chatzinikolaou K, Voultsos P, Raikos N, Florou C, Psaroulis D, Vasileiadis N*

51. EPIDEMIOLOGICAL STUDY ON SUICIDE IN RELATION WITH BACKGROUNDS OF ACT IN JAPANESE LARGE CITY AND SMALL TOWNS
*Yamazaki K, Haneda T, Umetsu K, Fukunaga T*

## SESSION C2

1. IMPLEMENTATION OF ICD-10 DIAGNOSIS OF THE CAUSE OF DEATH
*Gallego Alvarez M, Galtes Vicente I, Subirana Domenech M, Castella Garcia J, Medallo Muniz J, Martin Fumado C*

2. ANALYSIS OF 56 DEATHS IN PRISON
*Martin Fumado C, Xifro Collsamata A, Arroyo Fernandez A, Rueda Ruiz M, Garcia Albalat E, Galtes Vicente I, Barberia Marcalain E*

3. LEAN TOOLS IN A FORENSIC PATHOLOGY SERVICE
*Martin Fumado C, Galtes Vicente I, Gallego Alvarez M, Castella Garcia J, Medallo Muniz J, Cuatrecasas Castellsagues O*

4. LIVER INFARCT IN THE CONTEXT OF A TRAFFIC ACCIDENT
*Vidal Gutierrez C, Canos Villena JC, Borondo Alcazar JC, Marron Moya T, Martin Fumado C, Hospital Ribas A, Medallo Muniz J*

5. PHEOCHROMOCYTOMA: TWO CASES DIAGNOSED BY FORENSIC AUTOPSY
*Eisele R, Santos A*

6. AORTIC INJURY FOLLOWING FOREIGN BODY PERFORATION OF THE THORACIC ESOPHAGUS. REVIEW OF THE LITERATURE AND REPORT OF A CASE
*Gloulou F, Bekir O, Shimi M, Allouche M, Zhioua M, Hamdoun M*

7. YEARS OF POTENTIAL LIFE LOST AND VIOLENT DEATH: A FIVE-YEAR RETROSPECTIVE ANALYSIS
*Silva BS, Santos CL, Castanheira G, Nóbrega J, Simon A, Carreira C, Oliveira C, Pereira A, Cordeiro C, Veira DN*

8. IMMUNOHISTOCHEMICAL DIAGNOSIS OF MYOCARDITIS ON AUTOPSY MATERIAL - DOES IT IMPROVE THE DIAGNOSIS?
*Marmagen S, Oswald S, Madea B*

9. DETECTION OF ENDOTHELIAL PROGENITOR CELLS IN HUMAN SKIN WOUNDS AND ITS APPLICATION FOR WOUND AGE DETERMINATION
*Ishida Y, Kimura A, Nosaka M, Kuninaka Y, Kawaguchi M, Ohata S, Wagatsuma S, Eisenmenger W, Kondo T*

10. IMMUNOHISTOCHEMICAL DETECTIO OF HARMONIZATION OF OF UPA, TPA AND PAI-1 WITHIN EXPERIMENTAL THROMBI AND ITS APPLICATION TO THROMBUS AGE DETERMINATION
*Nosaka M, Ishida Y, Kimura A, Kawaguchi M, Ohata S, Kondo T*

11. POST MORTEM COMPUTED TOMOGRAPHY AS AN IMPORTANT TOOL IN ESTABLISHING A CAUSE OF DEATH IN FIRE FATALITIES
*Andersen AM, Boel LWT*

12. HOMICIDE AGAINST CHILDREN BEFORE SCHOOL AGE IN TARRANT COUNTY, TEXAS
*Kikuchi Y, Yorulmaz C, Hilal A, Singer R, Peerwani N*

13. UNUSUAL CASE OF FATAL CARBON MONOXIDE POISONING DUE TO FAULTY CHIMNEY DUCT
*Choi Y, Park W, Choi B*

14. POSTMORTEM BIOCHEMISTRY OF PERICARDIAL FLUID IN DEATH INVESTIGATIONS
*Kawamoto O, Michiue T, Hara J, Ishikawa T, Maeda H*

15. VARIATION OF POSTMORTEM PULMONARY CT HIGH-DENSITY AREAS IN SERIAL AUTOPSY CASES OF SUDDEN CARDIAC DEATH
*Michiue T, Sakurai T, Ishikawa T, Oritani S, Kamikodai Y, Tsuda K, Okazaki S, Maeda H*

16. FORENSIC EXAMINATION OF POSTMORTEM DISMEMBREMENT
*Galtes Vicente I, Gallego Alvarez M, Subirana Domenech M, Pruns Galera E, Pascual Minarro J, Castella Garcia J, Medallo Muniz J, Martin Fumado C*

17. PATTERN OF UNNATURAL DEATH DURING A 13-YEAR PERIOD IN THE REGION OF EPIRUS, GREECE
*Fragkouli K, Passalis G, Kousi C, Boumba V, Vougiouklakis T*

18. OVERESTIMATION OF POST MORTEM INTERVAL RELATED TO EXTRACTION OF SAMPLES FROM VITREOUS HUMOUR?
*Lendoiro E, Cordeiro C, Seoane R, Rodríguez-Calvo MS, Vieira DN, Muñoz-Barús JI*

19. RECORDING OF DEATHS RELATED TO ALCOHOL CONSUMPTION IN THE RIBEIRÃO PRETO REGION, SÃO PAULO, BRAZIL, FROM 1996-2007
*Benedicto RP, Francisco RA, Guimarães MA, Costa Júnior MLD*

20. PREVALENCE AND CHARACTERISTICS OF PHYSICAL ABUSE IN CHILDREN: A RETROSPECTIVE STUDY IN GREATER CAIRO (2008-2009)
*Shokry D, Kotb H, Eldessouky N, Alhassan I, Elsebaey E, Helal M*

21. PHYSICAL AND SEXUAL ABUSE OF CHILDREN IN REPUBLIC OF MACEDONIA
*Janeska B, Poposka V, Veljanov Z, Bitoljanu N, Cakar Z*

22. PERSONAL IDENTIFICATION FROM HUMAN REMAINS BY DNA TYPING
*Jankova-ajanovska R, Jakovski Z, Pavlovski G, Cakar L, Duma A*

23. EVALUATION OF MOBILE ULTRASSOUND DEVICE AT THE SITE OF A BODY FIDING
*Franckenberg S, Ruder T, Fliss B, Thali M*

24. RESEARCH ON IMPROVISED EXPLOSIVE DEVICES
*Hongguo Z, Yanchun Z*

25. MANAGEMENT OF DEAD IN MASS DISASTERS -RECENT ADVANCES IN SOUTH ASIA
*Perera C, Briggs C*

26. IMPLEMENTATION OF ISTANBUL PROTOCOL - GEORGIAN EXPERIENCE
*Beriashvili R*

27. A CASE OF ANTI-REGIME - A FIREARM INJURY
*Arslan MM, Zeren C, Ilhan Ö, Coşkun M, Keskin U*

28. FIREARM INJURIES DOCUMENTED AMONG SYRIAN REFUGEES IN ANTAKYATURKEY
*Zeren C, Arslan MM, Aydogan A, Özkalipçi Ö*

29. DEATH BY AN ATTACK OF "AFRICANIZED" BEES: REPORT OF A CASE IN CACERES - MT - BRAZIL
*Campos Neto M, Plá Levy L, Haddad Júnior V*

30. ATTACKS BY JAGUARS (PANTHERA ONCA) ON HUMANS IN CENTRAL BRAZIL: REPORT OF THREE CASES, WITH OBSERVATION OF A DEATH. SHORT TITLE: ATTACKS BY JAGUARS ON HUMANS IN BRAZIL
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31. INJURY CAUSED BY A TAPIR (TAPIRUS TERRESTRIS): A CASE REPORT IN CÁCERES - MT - BRAZIL
*Campos Neto M, Haddad Júnior V*

32. FINDINGS CHARACTERISTIC OF ATTACKS BY FISH THE CORPSES OF DROWNING VICTIMS.
*Campos Neto M, Haddad Júnior V*

33. DEATH BY DROWNING ASSOCIATED WITH AN ATTACK BY PIRANHAS OCCURRED IN CÁCERES (MATO GROSSO STATE) - BRAZIL
*Campos Neto M, Haddad Júnior V*

34. GENETIC CHARACTERIZATION OF EGYPTIAN MONGOOSE (HERPESTES ICHNEUMON) POPULATION IN PORTUGAL: A WILDLIFE SPECIES WITH POTENTIAL FORENSIC INTEREST
*Souto L, Barros T, Gaubert P, Fonseca C*

35. CASEWORK ICPMS/IRMS EXAMPLES IN THE NETHERLANDS
*Van der Peijl G, Van Breukelen M, Van Es A, Wiarda W*

36. DISCRIMINATION OF FORENSIC GLASS SAMPLES WITH LA-ICP-MS
*Min J, Kim K, Heo S, Kim J, Jang J*

37. A MODERN METHOD OF INVESTIGATING A FRACTURE PLANE IN FORENSIC MEDICINE
*Savka I, Mykhailichenko B, Stasyuk M, Santos A*

38. THE FREQUENCY OF DEATHS DUE TO AORTIC ANEURYSM AND ITS DETACHMENT AMONG THE POPULATION OF CITY OF YEREVAN
*Vardanyan S*

39. APPLICATION OF TYRE IMPRESSION EXAMINATION IN ROAD TRAFFIC ESCAPE ACCIDENT INVESTIGATION
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## SEPTEMBER, 16th

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3. VALIDATED METHOD FOR THE SIMULTANEOUS DETERMINATION OF 12 ANTIEPILEPTIC DRUGS BY ULTRA PERFORMANCE LIQUID CHROMATOGRAPHY - TANDEM MASS SPECTROMETRY
   *Marcos M, Proença P, Mustra C, Franco JM, Pinho E Melo TMVD, Corte-Real F, Vieira DN*

4. FORENSIC AND SOCIAL EVALUATION OF DRUG FACILITATED CRIMES
   *Acikkol M, Mercan S, Ziyalar N*

5. DRUGS IN FINNISH DRIVERS: A COMPARISON OF HOSPITALISED AND KILLED DRIVERS
   *Blencowe T, Langel K, Pehrsson A, Engblom C, Lillsunde P*

6. APPLICATION OF THE MATHEMATICAL MODELS FOR MICROBIAL ETHANOL PRODUCTION IN POST-MORTEM CASES
   *Boumba V, Kourkoumelis N, Vougiouklakis T*

7. DETERMINATION OF TETRODOTOXIN IN BIOLOGICAL SAMPLES USING SOLID-PHASE EXTRACTION AND LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY: A FATAL CASE REPORT
   *Liu W, Da Q, Shen M*

8. A SIMPLE METHOD FOR DETERMINATION OF BENZOYL-ECGONINE FROM ORAL FLUID, BLOOD AND URINE BY GC-MS FOLLOWING LIQUID/LIQUID EXTRACTION
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9. COCAINE POSTMORTEM REDISTRIBUTION IN BLOOD, BRAIN AND VITREOUS HUMOR
   *Fuzinato D, Carvalho V, Fukushima A, Fontes LR, Chasin AA, Florio JC*

10. POSTMORTEM DISTRIBUTION OF DRUGS AND OTHER CHEMICALS IN PERICARDIAL FLUID AND BONE MARROW ASPIRATE
    *Maeda H, Michiue T, Ishikawa T, Oritani S, Koide I, Kuramoto Y, Ogawa M*

11. MUENCHAUSEN SYNDROME BY PROXY: A WARFARIN CASE
    *Turkmen Z, Anilanmert B, Aydin M, Yayla M, Ziyalar N, Cengiz S*

12. WHEN IS BLOOD ALCOHOL CONCENTRATION LETHAL? TWO DICHOTOMIC CASES STUDY
    *Rangel R, Quintas M, Santos A, Teixeira HM*

13. EXTERNAL QUALITY CONTROL: THE CRUCIAL EVIDENCE OF QUALITY
    *Costa P, Quintas M, Tarelho S, Castro A, Teixeira HM*

14. WHAT ABOUT ACETALDEHYDE?
    *Quintas M, Costa P, Tarelho S, Teixeira HM*

15. OXAZEPAM FATAL INTOXICATION: A CASE REPORT
    *Melo P, Jardim P, Tarelho S, Castro A, Costa P, Quintas M, Oliveira J, Teixeira HM*

16. DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHODOLOGY BY GC/MS/MS FOR ANTIDEPRESSANTS DETECTION IN WHOLE BLOOD
*Truta L, Tarelho S, Castro A, Sales MGF, Teixeira HM*

17. IS THE PSYCHOACTIVE DRUGS CONSUMPTION AFFECTED BY THE ECONOMIC CRISIS?
*Tarelho S, Melo P, Castro A, Costa P, Teixeira HM*

18. VALIDATION OF AN IMMUNOASSAY SCREENING METHOD FOR PHENCYCLIDINE (PCP) IN WHOLE BLOOD FOR FORENSIC PURPOSES
*Castro A, Costa P, Melo P, Tarelho S, Teixeira HM*

19. ANALYSIS OF COUNTERFEIT DRUGS AND PHARMACEUTICAL PREPARATIONS SEIZED IN THE ILLEGAL MARKET AMONG BODYBUILDERS
*Coopman V, Cordonnier J*

20. CYP3A4 AND CYP2C19 GENOTYPES AND ZOLPIDEM METABOLITE RATIOS IN CHINESE HAN POPULATION: A PILOT STUDY
*Shi Y, Shen M, Xiang P, Li L*

21. DETERMINATION OF COCAINE AND COCAINE METABOLITES IN SINGLE HAIRS BY MALDI MASS SPECTROMETRY IMAGING
*Musshoff F, Madea B, Strupat K, Arrey T*

22. ETHLY GLUCURONIDE CONCENTRATIONS IN PULVERIZED AND CUT HAIR SAMPLES
*Albermann ME, Musshoff F, Madea B*

23. DRIVING UNDER INFLUENCE OF DRUGS: RELEVANCE OF URINE CANNABINOIDS TESTS AND EFFECTIVE POSSIBILITY OF USE AS JUDICIAL EVIDENCE
*Di Nunzio C, Rosa C, Aquila I, Ricci P*

24. INDEL POLYMORPHISMS APPLIED TO CADAVERIC GENETIC IDENTIFICATION
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25. Y-CHROMOSOMAL STR DATA FOR THE 16-AMPFISTR®YFILER™ LOCI UN FOUR ETHNIC GROUPS LIVING IN ANGOLA
*São-Bento M, Lopes V, Andrade L, Balsa F, Serra A, Brito P, Bento AM, Bogas V, Carvalho M, Anjos M.*

26. CHARACTERIZATION OF BIOLOGICAL TRACES OF SEMEN AND SALIVA BY MRNA PROFILING
*Bento AM, Carvalho M, Lopes V, Balsa F, Serra A, Andrade L, Brito P, Bogas V, São-Bento M, Anjos MJ*

27. EXTRACTION OF HAIR SAMPLES WITH PREPFILER EXPRESSTM FORENSIC DNA EXTRACTION KIT IN AUTOMATE EXPRESS DNA EXTRACTION SYSTEM AND TWO OTHER EXTRACTION KITS
*Bogas V, Balsa F, Cunha P, Brito P, Serra A, Lopes V, Carvalho M, Andrade L, São-Bento M, Anjos MJ*

28. SELECTIVE CULTURING AND GENUS-SPECIFIC PCR DETECTION FOR THE IDENTIFICATION OF AEROMONAS IN TISSUE SAMPLES TO ASSIST THE MEDICO-LEGAL DIAGNOSIS OF DEATH BY WET DROWNING
*Huys G, Coopman V, Van Varenbergh D, Cordonnier J*

29. SKELETAL MUSCLE PROTEIN DEGRADATION PATTERNS IN TWO MODEL ORGANISMS: A NOVEL APPROACH TO DELIMITATE THE TIME OF DEATH?
*Pittner S, Foditsch EE, Monticelli FC, Steinbacher P, Stoiber W, Tutsch-Bauer E, Sänger AM*

30. THE APPLICABILITY OF HISTOCHEMICAL AND IMMUNOCYTOCHEMICAL METHODS IN MATTERS OF DELIMITATING THE TIME SINCE DEATH - A PILOT STUDY ON RAT SKELETAL MUSCLE
*Mair A, Geisler S, Foditsch EE, Monticelli FC, Steinbacher P, Stoiber W, Tutsch-Bauer E, Saenger AM*

31. EVALUATION OF SWAB TYPES FOR TRACE DNA COLLECTION
*Verdon T, Mitchell J, Van Oorschot R*

32. PRESSURE OVERLOAD-INDUCED CARDIAC HYPERTROPHY AFFECTS OSCILLATION AMPLITUDE OF CLOCK GENES EXPRESSION BUT NOT THEIR CIRCADIAN RHYTHM
*Kimura A, Ishida Y, Nosaka M, Kawaguchi M, Wagatsuma S, Ohata S, Kondo T*

33. DO FIXATION TIME PERIOD AND DECREASING POSTMORTEM PH-VALUES INFLUENCE THE PATTERN OF POSTMORTEM DEGRADATION OF SKELETAL MUSCLE - A HISTOLOGICAL AND FINE STRUCTURAL PILOT STUDY ON RATS USING DIFFERENT PH-VALUES AND TIMES FOR FIXATION
*Zissler A, Reiter V, Roider K, Foditsch EE, Monticelli FC, Steinbacher P, Stoiber W, Tutsch-Bauer E, Sänger AM*

34. ANTERIOR TEETH FEATURES AND TRAITS IN AN AZOREAN POPULATION: FORENSIC IMPLICATIONS
*Simões R, Caldas I, Cardoso H*

35. TALON CUSP PREVALENCE IN A PORTUGUESE POPULATION: ITS DISCRIMINATIVE VALUE
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36. PREVALENCE OF MISSING ANTERIOR TEETH IN A PORTUGUESE POPULATION AND ITS USEFULNESS IN BITE MARK ANALYSIS
*Simões R, Caldas I, Cardoso H*

37. IMPLEMENTATION OF EUROPEAN METHODOLOGY EXPERTISE IN BRAZILIAN
*Santos C, Verçosa C, Dias PE, Melani R*

38. A NEW METHODOLOGY TO EVALUATE MASTICATORY FUNCTION IN A CLINICAL AND FORENSIC PRACTICE
*Santos C, Areda C, Mestriner Jr W, Freitas O, Ramos M, Melani R*

39. A MODEL FOR PERFORMING RADIOGRAPHIC STUDIES IN ISOLATED MAXILLARY BONES FOR IDENTIFICATION PROCEDURES
*Lopez Nicolas M, Falcon M, Laborda M, Perez-Carceles M, Sanchez Rodriguez F, Luna A*

40. THE KEY ROLE OF FORENSIC DENTISTRY FOR IDENTIFICATION OF CRIMINAL SEXUAL ABUSE: A SEXUAL CASE REPORT (IV)
*Rodrigues J, Figueiredo H, Franco Costa J, Viegas F, Farinha C, Santos JC, Pereira C*

41. PUPIL FUNCTION AS A PARAMETER FOR BEING UNDER THE INFLUENCE OF CENTRAL NERVOUS ACTING SUBSTANCES FROM A TRAFFIC-MEDICINE PERSPECTIVE
*Monticelli F, Keller T*

42. SR AND PB ISOTOPE RATIOS IN HAIR KERATIN: METHODS AND APPLICATION FOR GEOGRAPHICAL HUMAN PROVENANCE
*Font Morales L, Van der Peijl G, Van Breukelen M, Horn P, Davies G*

43. INFLUENCE OF TEMPERATURE AND HUMIDITY FOR THE PRESERVATION OF BODIES BURIED IN CHARNARIUM
*Fuzinato D, Silva S, Fontes L, Cansio P, Morais J*

44. FORENSIC CHARACTERIZATION OF SUSPECTED PHYSICAL ABUSE OF CHILDREN IN THE NORTH OF PORTUGAL
*Silveira Ribeiro C, Coelho L, Jardim P, Magalhães T*

45. MASS DESASTER IN RIO DE JANEIRO - BRASIL. LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO-BRAZIL
*Camargo R, Guidugy R, Ribeiro AT, Oliveira FVN, Simonsen S, Horwacz M, Candido M, Hoppe L, Colmenero JM, Filho JS*

46. GARROTE VIL, HISTORICAL REPORT OF CASE NECROPSY IN THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SAO PAULO - BRAZIL, WHEN THE ORGANIZED CRIME USED SIMILAR TALENT TO EXECUTION OF THE VICTIM
*Camargo R, Guidugy R, Ridolfi A, Candido M, Hoppe L, Colmenero JM*

47. SUICIDE IN BRAZIL: WHO ARE THEY? AS THEY DIE? ANALYSIS OF 59 CASES OF SUICIDES IN 2010
*Camargo R, Vieira MD, Candido M, Sarmento GA, Hoppe L, Colmenero JM, Oliveira JP, Nunes SZ, Telles GP, Filho JS*

48. DEATHS BY POISONING CHEMICAL IN THE FIFTH BIGGEST CITY OF SÃO PAULO STATE (OSASCO) - BRAZIL. REVIEW OF 67 CASES IN THE PERIOD JANUARY TO THE JUNE 2010
*Camargo RS, Vieira MD, Candido M, Sarmento GA, Hoppe L, Colmenero JM, Oliveira JP, Nunes SZ, Telles GP, Aloe RC*

49. TOTAL OF EXPERT EXAMINATIONS CARRIED OUT BY THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO-BRAZIL, IN THE PERIOD OF JANUARY OF 2009 TO DECEMBER OF 2010
*Camargo R, Candido M, Aguiar Sarmento G, Hoppe L, Colmenero JM, Oliveira JP, Zeri Nunes S, Telles GP, Andrade EFM*

50. THE CRASH ACCIDENTS DRIVING TRAFFIC IN THE STATE OF SÃO PAULO - BRAZIL. THE NECROPSIES EXAMINATIONS WERE ANALYSED AT THE LEGAL MEDICINE INSTITUTE
*Camargo R, Candido M, Sarmento GA, Hoppe L, Colmenero JM, Oliveira JP, Nunes SZ, Telles GP, Aloe RC, Added C*

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1. UNIDENTIFIED BODIES:THE USEFULNESS OF FORENSIC ANTHROPOLOGY
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2. METHOD OF AGE ESTIMATION OF ADULTS FROM THORACIC VERTEBRA
*Sarajlic N, Klonowsk EE*

3. CHANGES IN EMOTIONAL BONDS BETWEEN DECEASED AND KINSFOLK IN SITUATIONS OF DISASTER: FEBRUARY 27TH 2010 - CHILE. THE INVISIBLE EMERGENCY
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4. A MULTIDISCIPLINARY APPROACH FOR THE SEARCH OF BODIES BURIED IN SOIL: AN EXPERIMENTAL STUDY FROM NORTHERN ITALY
*Poppa P, Gibelli D, Porta D, Mazzarelli D, Cappella A, Magli F, Caccianiga M, Trombino L, Salsarola D, Cattaneo C*

5. POST-MORTEM CT: METHODOLOGY AND APPLICATIONS
*Ruzza E, Frustaci M, Mauro S, Pozzetto A, Cavalli F, Costantinides F*

6. MEDULLA TYPES OF HAIR AMONG THE RASTOGIS
*Rastogi P, Chattopadhyay P*

7. ETHNIC DETERMINATION USING THE GENOME PROFILING METHOD
*Ikegaya H, Miyamori D, Takasaka T, Mclean S*

8. IMPLICATION OF HUMAN MTDNA, Y-CHROMOSOME AND JC VIRUS GENOTYPE ANALYSIS WHEN DETERMINING THE ETHNIC ORIGIN OF HUMANS
*Takasaka T, Mclean S, Miyamori D, Ikegaya H*

9. SYSTEM OF SKELETISATION DONE USING AN INDUSTRIAL BOILING PAN
*Crespo S, Castella J, Marrón T, Subirana M, Font G, Vidal C, Martin C, Medallo J*

10. APPLICATION OF THE MAXILLARY SUTURE OBLITERATION METHOD FOR ESTIMATING AGE AT DEATH IN GREEK POPULATION
*Apostolidou C, Koletsa T, Chatzinikolaou F, Natsis K, Dalampiras S, Psaroulis D, Apostolidis S, Psifidis A, Tsikaras P, Njau S-N*

11. FOUR CASES REGARDING HUMAN REMAINS IDENTIFICATION: AN EVOLUTION OVER THE LAST THIRTY YEARS?
*Verzeletti A, Manzoni S, Restori M, De Ferrari F*

12. IMPORTANCE OF FOOT AND FOOTPRINTS IN FORENSIC ANTHROPOLOGY CASEWORK
*Krishan K*

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# 9th WPMO TRIENNIAL MEETING
# 5th MAFS MEETING

30. BNP SERUM AND CTNI LEVELS IN THE POSTMORTEM DIAGNOSIS OF CONGESTIVE AND ISCHEMIC CARDIAC DISEASE
*Osuna E, Pérez-Cárceles M, Navarro E, Cardona B, Giner S, Devesa M, Bañón R*

31. INJURY PATTERN IN PEDESTRIAN-MOTORCYCLES COLLISION IN THE CITY OF BARCELONA IN 2010
*Soria M, Fumado C, Castro A, Dalmases C*

32. DENTAL BIOGRAPHY OF UNIDENTIFIED SKELETAL HUMAN REMAIN
*Nuzzolese E, Wasterlain S, Cunha E, Luca S, Cameriere R, Di Vella G*

33. P-SELECTIN AND PECAM-1 FOR AGE ESTIMATION OF INJURIES
*Jepsen M, Cedergren L, Rönnlund J, Alkass K, Druid H*

34. EPIDEMIOLOGICAL FINDINGS IN MEDICOLEGAL AUTOPSY CASES WITH POSITIVE NARCOTIC RESULTS
*Delaveris G, Rogde S, Teige B*

35. MAJOR TRAUMA FROM A MANGLED BODY: DIAGNOSTIC POSSIBILITIES IN FORENSIC PATHOLOGY
*Colosimo F, Lambardi A, Di Mizio G, Ricci P*

36. BONE MARROW EMBOLI
*Gouveia RH, Cordeiro C, Silva BS, Corte Real F, Vieira DN*

37. THE CONTRIBUTION OF THE FORENSIC AND THE ANATOMICAL PATHOLOGY TO THE MEDICO-LEGAL INVESTIGATION OF A FETAL DEATH
*Oliveira C, Silva BS, Gouveia RH, Simón A, Corte Real F*

38. POSTMORTEM LEVELS OF TRACE ELEMENTS IN LUNG AND HISTOLOGIC EXPRESSION BY SEM IN DROWNING
*Perez-Carceles MD, Motas M, Sibon A, Jerez S, Aviles M, Luna A*

39. CARDIAC CONGENITAL MALFORMATIONS AND SUDDEN DEATH. THE STORY OF A CASE
*Gouveia RH, Pontinha C, Pinto Ribeiro I, Santos JC, Vieira DN*

40. SUDDEN DEATH DUE TO 'PATENT FORAMEN OVALE AND DUCTUS ARTERIOSUS'
*Gouveia RH, Oliveira C, Oliveira R ,Silva BS, Corte Real F , Vieira DN*

41. FORENSIC HISTOCHEMISTRY: AN UP-TO-DATE OR AN OBSOLETE TECHNIQUE?!
*Gouveia RH, Carvalheiro F, Cordeiro C, Silva BS, Corte Real F, Vieira DN*

42. ELDERLY SUICIDE - WHO, WHAT, WHEN, WHERE, HOW AND WHY - A 5 YEAR REVIEW SOUTH BRANCH OF THE PORTUGUESE NATIONAL INSTITUTE OF LEGAL MEDICINE
*Lopes E, Gallo F, Mestre C, Eiras L, Dias MJ, Mendonça MC, Santos JC*

43. DEATH IN YOUNGER THAN 18 YEARS OLD: REVIEW OF THE AUTOPSY FILES PERFORMED AT THE SOUTH BRANCH OF THE NATIONAL INSTITUTE OF LEGAL MEDICINE, PORTUGAL
*Coelho A, Timóteo P, Lopes E, Ribeiro IP, Mendonça MC Santos JC*

44. EFFECT OF DISGUISE ON HUMAN LISTENERS' SPEAKER RECOGNITION
*Zhang C, Tan T*

45. APPLICATION OF GEOGRAPHIC LINGUISTICS IN FORENSIC SPEAKER ANALYSIS
*Cao Q*

46. STUDY ON INDIVIDUAL CHARACTERISTICS OF STOPS IN MANDARIN
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47. THE FORENSIC TRANSCRIPT: STATE OF THE ART IN ITALY
*Luciano R, Andrea T, Rosita L*

48. COMPARATIVE RESEARCH ON FORENSIC ADMINISTRATION SYSTEM BETWEEN CHINA AND GERMANY
*Xiaodan H*

49. ENVIRONMENTAL MONITORING OF BACKGROUND DNA WITHIN A FORENSIC BIOLOGY LABORATORY
*Daniel R, Oorschot R*

50. EXAMINATION OF MARKS ON THE STRAIGHT-SLOT SPRING LOCK UNLOCKED BY SPECIAL TOOLS
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51. TOOL ESTIMATION USING MANUFACTURE FEATURES OF WIRE CLIPPERS ON MARKS
*Tan T*

52. MATRIX ASSISTED LASER DESORPTION IONISATION MASS SPECTROMETRY IMAGING (MALDI MSI) OF FINGERMARKS RECOVERED FROM DIFFERENT DEPOSITION SURFACES
*Ferguson L, Bradshaw R, Wolstenholme R, Carolan V, Clench M, Francese S*

53. SIMILARITY IN CUT MARKS USING DIFFERENT KNIVES AT DIFFERENT PENETRATING ANGLES: AN EXPERIMENTAL STUDY
*Puentes K, Cardoso H, Santos A*

## SESSION E1

1.MEDICO-LEGAL AGE ESTIMATION IN LIVING INDIVIDUAL: THIRD MOLAR MINERALIZATION
*Silva Branco M, Pestana D, Pereira C*

2.ODONTOLOGIST'S ROLE IN DIAGNOSING CHILD ABUSE AND NEGLECT
*Guimarães MI, Braga S*

3.EPIDEMIOLOGICAL STUDY OF POST TRAUMATIC OROFACIAL DAMAGE BASED ON CIVIL, CRIMINAL AND LABOR LAW
*Santos P, Santos JC, Pereira C*

4.DENTAL IDENTIFICATION USING DENTAL CONE BEAM COMPUTED TOMOGRAPHY
*Kumagai A*

5.AGE ESTIMATION BY DENTAL PARAMETERS - VALIDATION IN A PORTUGUESE POPULATION OF THE TWO METHODS: KVAAL AND SOLHEIM, BANG AND RAMM
*Caldas R, Pestana D, Pereira C*

6.AN INTEGRATED APPROACH (CHEMICAL AND MORPHOLOGICAL METHODS) TO ESTIMATED THE AGE BY UNIRADICULAR TEETH ANALYSIS
*Lopez Nicolas M, Falcon M, Perez-Sirvent C, Laborda M, Perez-Carceles M, Luna A*

7.DEVELOPMENT OF A FINGERMARK RESIDUES DATING TECHNIQUE: STATISTICAL SELECTION OF TARGET LIPID COMPONENTS
*Girod A, Weyermann C*

8.MODERN COMPUTER 3D TECHNOLOGIES OF CRANIOFACIAL IDENTIFICATION WITH THE USE OF THE SOFTWARE SYSTEM TADD SM AND 3D SCANNER R TEK IN RUSSIA. THE USE OF 3D SKULL IMAGES IN CRANIOFACIAL IDENTIFICATION WHEN APPLYING THE PHOTO SUPERIMPOSITION METHOD
*Abramov A, Romanko N, Merkviladze A, Bannikov A*

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# LECTURES

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# HANDWRITING AND QUESTIONED DOCUMENT EXAMINATION: OBJECTIVITY, SUBJECTIVITY AND THE HUMAN FACTOR

**Author(s):** Sze Chung L

**Institution(s):** SCIENTIFIC CONSULTANCY LIMITED

**Abstract:** Questioned document examination is a forensic science discipline pertaining to the examination of handwriting and various types of documents in criminal investigation or civil litigations. This specialist area generally involves a comparison of the questioned (handwriting or document) sample(s) with a set of known standards. The need for interpreting examination results on such documents as passports, credit cards, counterfeit banknotes and other types of paper documents will be minimal and the examination process is generally objective. The determination of authorship is based upon the fact that handwriting embodies various qualities and attributes which in combination are sufficiently unique for identifying the writer.

The initial stage of handwriting analysis is basically a comparison between the questioned writing and the control exemplars. It depends on the document examiner's ability of discovering the subtle, personal writing attributes in the script as opposed to the more common features and is by and large objective. The second stage of authorship determination is the interpretation and evaluation of the relative significance of the depicted writing characteristics, consideration of the information related to the case and the alleged writer e.g. handedness, physical condition, any influence of drugs or alcohol, and the possibility of disguise.

Based on all the assessments, an opinion will be expressed. This is a mental exercise that encompasses a certain degree of subjectivity: An entirely objective opinion would be restricted only to facts and figures whereas a wholly subjective opinion would represent the examiner's personal view without any evidential support.

The delivery of an appropriate opinion is therefore one of the most important skills for a handwriting and document examination expert.

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# FORENSIC SCIENCE CULTURE: WHERE AND HOW CAN THIS BE ACQUIRED

**Author(s):** Pierre Margot

**Institution(s):** UNIVERSITY OF LAUSANNE

**Abstract:** The current debates all seem to narrow down the potential of forensic science to a legal end product as a part of the evidential phase of the courts. This narrow view has introduced strict rules and standards that limit the overall richness that science can provide for societies in detecting disturbing trends and crime phenomena. The forum in antiquity was the place for public debate and not only a court that would decide on the fate of a given criminal.

One important part of public debate concerns security, safety of citizen, crime and how to respond to such phenomena, as well as trying to solve cases. Traces left during criminal operations are a rich source of information which may not be useful in a probative process but very useful in prevention, strategic or operational crime analysis and intelligence-led policing. Forensic science culture must embrace a vision of where and when science can be useful at best to benefit societies at large.

Traces have a physical and/or chemical reality that can be measured, compared, and are truthful witnesses or results of criminal or dangerous activities that can lead to policy decisions. The fact that it can lead to evidence against a criminal in a court is only one minor or residual strength of what forensic science can offer. Lausanne University is developing research along the lines of detecting threatening phenomena, using scientific methods that may impact policy decisions in prevention, strategic and operational crime fighting measures, such as in crime intelligence and crime analysis.

The overall process may lead to investigative measures or result in traditional court proceedings when forensic science is also used to structure the information and support courts with technical and scientific assistance in the evidential process. This latter investigative process followed by the evidential process is currently attracting most of the interest of "traditional" forensic scientists and forensic science management but is probably missing where it can have a major impact: security. This view of a forensic science culture implies a change in the way forensic science education and research should go forward.

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# ERRORS AND PITFALLS IN EXPERT TESTIMONY

**Author(s):** Rex Ferris

**Institution(s):** CONSULTANT FORENSIC PATHOLOGIST

**Abstract:** An expert witness has an over-riding duty to assist the Court impartially on relevant matters within the expert's area of expertise. An expert witness is in a privileged position in most jurisdictions and, unlike other witnesses to fact, is allowed to express opinions that would be inadmissible from other witnesses.

An expert witness is not an advocate for one side or the other but should be able to present objective and unbiased opinions to the Court. Some jurisdictions have developed Codes of Conduct for expert witnesses and this presentation will use such a Code for Expert Witnesses, developed in New Zealand, to illustrate the importance of such a code in guiding an expert in the presentation of opinion evidence.

A review of many cases of apparent miscarriages of justice can be attributed to a failure to comply with such codes of practice and this paper will illustrate some of the pitfalls and errors associated with the presentation of expert testimony with reference to case examples from the United Kingdom, Canada, the USA, Australia and New Zealand. In some of these cases, the expert was incompetent and untrained. In others the opinions expressed were dogmatic and contrary opinions were either dismissed or ignored. A failure to properly investigate the case or accept inadequate investigation by others can also lead to incorrect conclusions.

The foundation for any opinion must be based on experience, material evidence, or scientific literature and all of these must be disclosed so that they can be reviewed by others. An expert must define his or her qualifications and areas of expertise and be prepared to defend their expertise before the court. Where appropriate an expert must be prepared to confer with other experts and if the Court so directs, prepare a joint statement covering areas of agreement.

Perhaps the most difficult part of expert testimony is to admit "I don't know", yet this may be the most reliable measure of the integrity and honesty of such a witness.

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# GIVING EXPERT EVIDENCE

**Author(s):** Jeffrey Manishen

**Institution(s):** ROSS MCBRIDE LLP, BARRISTERS SOLICITORS

**Abstract:** The process of giving expert evidence does not commence with the first question asked of the witness by counsel. It doesn't commence with the completion of the expert's report, nor does it commence with the work done in the field, lab or hospital. Rather, it begins with a thoughtful awareness of the role which the forensic expert has in the system of justice in which he or she is a participant, not only from the standpoint of the system's expectations of the witness but also the limitations and responsibilities which accompany that role. Yet, notwithstanding the horrific consequences which may result from misleading, erroneous or inadequate evidence from a forensic expert, which may take years and even public inquiries to identify, meaningful systemic changes have yet to be implemented to diminish the risk of wrongful convictions.

Central to these issues is the lack of communication between lawyers and experts. Scientists engage in ongoing research to advance their state of knowledge in their fields and lawyers similarly pursue the study of rules of evidence and applicable legal principles but the extent of interaction between the disciplines remains limited and sporadic. Members of the legal profession are in the best position to assist experts in identifying the scope of admissible evidence, the level of qualification needed to opine on particular issues and the use of language to testify with clarity and the proper degree of certainty.

Given the opportunity, they can also assist in meaningful oversight and accountability of the expert's participation should problems arise. Forensic scientists are best qualified to educate lawyers on the limitations of their opinions, current challenges to previously-held beliefs and the need to engage other disciplines for a comprehensive consideration of issues.

The time is long overdue for the development of a collaborative methodology for the presentation of expert evidence.

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# ADMISSION OF FORENSIC EVIDENCE IN COURT: THE SERIAL MURDER CASE OF ROBERT WILLIAM PICKTON

**Author(s):** Derrill Prevet

**Institution(s):** B.C. MINISTRY OF ATTORNEY GENERAL

**Abstract:** Since 1985, sex-trade workers had been disappearing from the Downtown Eastside of the City of Vancouver, British Columbia, Canada. A combined investigative task force of Royal Canadian Mounted Police and Vancouver City Police, called the Missing Women's Task Force, was established in 2001 to determine whether these women were simply missing, or dead.

During a February 5, 2002 search for unregistered firearms onRobert William Pickton's seven-hectare property in nearby Coquitlam, (one of the several municipalities of Metropolitan Vancouver), personal effects of two of the missing sex-trade workers werefound.Because Pickton was a person of interest in the Vancouver investigation, the MWTF immediately took over.Soon after, blood stains in a derelict recreational vehicle were matched through DNA analysis to a third missing woman.

On January 22, 2002 Pickton was arrested and questioned. While he made vague admissions to investigators in a formal interrogation, Pickton afterward bragged to a cell-mate, an under-cover police officer, that he had killed 49 women and disposed of their remains at a rendering plant.With the approval of prosecutors, Pickton was charged with two counts of first-degree (planned and deliberate) murder. The subsequent investigation set out to prove that what Picktonhad admitted was true. As a result of the forensic examination that followedPickton was charged with the murder of 26of the missing women.

In its complexity this investigation and prosecution was unprecedented. The condition of the search scene created a forensic nightmare. Apart from sheer size, the property was littered with stagnant ponds,wreckedvehicles, dilapidated buildings, large piles of building materials and soil. The accused's primary business was slaughtering and butchering pigs. This he conducted in a rat-infested, blood-stained slaughterhouse.Many steel drums of rotting offal awaited disposal. The interior of the accused's mobile home was in a state of complete upheaval. Themeticulous search of the accused's premises took 17 months.

While virtually every forensic discipline engaged in the investigation the most important of these was forensic DNA analysis. The soil of the entire property was excavated then sifted. Every building was dismantled and searched. The primary process for DNA collection was swabbing. When dealing with large objects, like chest freezers or parts of buildings, large areas were gridded prior to swabbing.

The Biology Section of the R.C.M.P.'s National Forensic Services in Vancouver was overwhelmed with exhibits. The development of several different DNA data banks was essential.Only through the application of leading-edge robotic techniques was the forensic service able to cope in a realistic time for trial.

Aside from the DNA of the missing womensomepartial remains were located. These ranged from small hand bones and teeth to bifurcated heads containing hands and feet. Packages of frozen ground meat containing the flesh of two missing women blended with ground pork were also found. Regrettably, much of the evidence discovered was not admitted at trial.

The trial commenced in January 2006 and lasted nearly two years. Before the leading of evidence before the jury the trial judge reduced the trial from twenty-six counts to only six.

Several rulings of the trial judgeseverely restrictedmuch of theevidence the prosecution was permitted to lead.

Pickton was convicted of six counts of second-degree murder, which requires a life sentence in Canada. It typically includes a shorter parole ineligibility period than convictions for first-degree murder. The judge exercised his discretionto set the parole ineligibility period at 25 years, matching that of first-degree murder.

The prosecution and the defence appealed. Twenty-six counts of first-degree murder were reinstated and a new trial ordered on the basis that, if the accused did not succeed in his further appeal to the Supreme Court of Canada, the prosecution would not proceed since there would be no practical purpose. In Canada no sentence consecutive to life imprisonment is permitted.

Pickton's final appeal wasunanimously denied by the Supreme Court of Canada on July 31, 2010. Pickton remains convicted of six counts of second-degree murder. He will be eligible to apply for parole in 2027 when he will be 78.

This case teaches important lessons with respect to investigative organization andforensic methodology. Giventhe intense public scrutiny that mega-cases attract, it stands as an excellent example of effective team work between the prosecution, the investigators and forensic scientists.

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# DAMNED IF YOU DO, DAMNED IF YOU DON'T: THE INVIDIOUS POSITION OF THE FORENSIC EXPERT UNDER CROSS-EXAMINATION

**Author(s):** Judith Fordham

**Institution(s):** CENTRE FOR FORENSIC SCIENCE, UNIVERSITY OF WESTERN AUSTRALIA

**Abstract:** For the forensic expert, science and law meet in the courtroom. Lawyers and scientists have different concepts of investigation and proof. An expert may hold a qualified opinion, or her/his opinion may only in part suit the adversarial position of the lawyer.

Should the expert disclose this qualification of the opinion, or the parts of her/his opinion which do not suit the party questioning them, irrespective of what questions are asked in court? If the qualification is not disclosed, or the entire opinion not given, then the evidence is not entirely accurate and from a scientific viewpoint is open to criticism.

This has raised ethical issues as to whom the expert owes a duty. Scientific evidence has become increasingly complex and the trier of fact (judge or magistrate or jury) may not have the knowledge or the capacity to evaluate this evidence. Hence, the expert witness must provide an impartial opinion to assist the trier of fact with the criteria for evaluation. Does the expert owe a duty to the court or to the party paying for their service?

There appears to be a seemingly irreconcilable tension between the demands of science and law in this circumstance. The expert may interfere with the fundamental basis of the adversarial system when the expert volunteers evidence during a trial instead of answering questions put to them. A verbose witness may also confuse the jury, especially if he or she does not know what has already been disclosed to the jury and may blur the edges as to who decides the issues at hand.

It is time to debate whether justice is about truth and whether law is about justice! How far must an expert go when the counsel for the opposing parties are not sufficiently acquainted with forensic evidence to provide competent cross-examination? The question is one which will increasingly impact on the giving of evidence by forensic experts in court. It is a development of great concern, and has consistently resulted in experts receiving implicit and explicit criticism from judicial officers, with no apparent solution being offered. The issue arises from an intrinsic conflict between the basic principles of science and law.

Is the criticism warranted? Is there any answer?

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# NEW METHODOLOGY IN ESTIMATING TIME SINCE DEATH AND SPECIES DETERMINATION

**Author(s):** Douglas Ubelaker

**Institution(s):** SMITHSONIAN INSTITUTION

**Abstract:** Estimating the postmortem interval and species recognition represent significant challenges for forensic anthropologists confronted with skeletal evidence. Recently, methodology related to these issues has advanced considerably with new applications of radiocarbon analysis, scanning electron microscopy/energy dispersive spectroscopy (SEM/EDS), histology, and protein radioimmunossay (pRIA).

Radiocarbon analysis of different tissues coupled with comparison of resulting values with the modern bomb-curve potentially can provide useful information on both the birth date and the death date, depending on the age at death of the individual. With fragmentary evidence, SEM/EDS can distinguish bone or tooth from other materials.

Histology and pRIA can assist in the determination of human status. Methods of pRIA can even determine non-human species in cases where it is important to do so.

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# GEOMETRIC MORPHOMETRIC: 3D-ID CLASSIFICATION OF CRANIA FOR FORENSIC SCIENTISTS.

**Author(s):** Ann Ross

**Institution(s):** NORTH CAROLINA STATE UNIVERSITY

**Abstract:** During this session, attendees will be introduced to geometric morphometrics as an alternative approach to characterize biological forms (e.g. skulls, pelvis) in a forensic context. Human variation as it relates to biological profiling in medico-legal cases of unknown victims is paramount for the globalization of forensic anthropologists investigating crimes against International Humanitarian Law. Once an academic endeavor, human variation has now become a legal question of whether methods for estimating biological profiles are reliable universally.

This session will compare traditional craniometric methods to geometric morphometrics and will introduce 3D-ID (http://www.3d-id.org/) a free, dedicated, software program that provides geometric morphometric tools to aid in the assessment of the sex and/or ancestral affiliation of unknown cranial remains. In addition, case examples will be presented.

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# FACIAL SOFT TISSUE DEPTHS IN FRENCH ADULTS: VARIABILITY AND SPECIFICITY

**Author(s):** Pierre Guyomarch P

**Institution(s):** UNIVERSITÉ BORDEAUX; ANTHROPOLOGIE DES POPULATIONS PASSÉES ET PRÉSENTES

**Introduction:** Soft tissue depths (STD) at different cranial landmarks are traditionally used in facial approximation since the end of the 19th century. Until recently, the literature strived to provide referential samples specific to population, sex, age and corpulence. The modern French population still lacks a wide and representative STD data set. This study aims at filling this gap. It also tests whether or not a unique pooled data set may be valuable in favour of specific samples.

**Materials:** More than nine hundred of anonymous CT (computed tomography) scans were collected in French hospitals. A subsample of 500 exams of known age (mean = 52 years; min = 18; max = 96; sd = 20) and sex (ratio male / female = 1.13:1) was extracted to follow the distribution of the actual French adult population. Ethical committees were consulted to insure the exploitability of this material.

**Methods:** CT scans were exclusively treated with TIVMI. This software allows for a reproducible 3D surface reconstruction of the skull and face of the individuals. The Frankfurt Horizontal was built and the consequent reference planes were used to enhance the repeatability and reproducibility of landmark positioning (which was checked through the evaluation of intra- and inter-observer measurement uncertainty). A total of 65 bony landmarks were placed on the skull. The majority of the STD was collected automatically, by projecting the bony landmark on the skin following the reference planes. This guaranteed the homology of the 38 STD measured. Because the sample is composed of both entire and partial faces (superior or inferior part), the information of each STD was not available for the whole sample. The corpulence of the subjects was estimated using the literature data on the landmarks systematically correlated to this factor. Asymmetry, sexual dimorphism and age influence were also tested. The centroid size of the individuals was extracted after a Procrustes superimposition and its influence was checked on the STD to detect a potential static allometry. Different data sets were extracted for comparison from the literature (USA, South Africa, Belgium, Portugal and France).

**Results:** The measurement uncertainty was negligible and no STD showed a significant asymmetry. The French STD data set is based on a minimum of 203 individuals (mouth fissure) and a maximum of 469 subjects (nasion). The estimated corpulence of the sample revealed to fit the actual sex repartition and age trends in the actual population. The STD were all significantly greater in overweight individuals. Sexual dimorphism was subtle but significant in 29 STD, and more important in the lower face. The age was correlated with 20 STD; this pattern was coherent with a gain of weight with age. Allometry was significant in 25 STD (mainly in the mouth, chin and nose regions), showing a tendency in those STD to vary with the global size of the face. Inter-samples comparison revealed that the deviations were not necessarily linked with the population or the measurement technique. The differences were higher in overweight subjects. However, most of the general pattern of the sub-samples compared, showed a high correlation ($0.88 < r < 0.97$) with the pattern of our sample. One of the highest correlations was obtained with the Tallied Facial STD data (T-Table), which tends to prove that the differences are mainly due to a linear change in proportion.

**Discussion and Conclusions:** The influences of the biological factors (age, sex, corpulence) on the French sample are coherent with the general literature. Allometry has never been reported in STD studies, while it explains more variations than age. Visual evaluation of the impact of such factors can be made through computer-assisted facial approximation. The gain of precision using a specific data set or the T-Table may be negligible in facial recognition. However, the prediction of STD from craniometric data will be further investigated as it might provide more objective and appropriate STD specific to the unknown skull.

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# QUALITY ASSURANCE IN FORENSIC PATHOLOGY

**Author(s):** Michael Pollanen

**Institution(s):** CHIEF FORENSIC PATHOLOGIST FOR ONTARIO; ASSOCIATE PROFESSOR OF LABORATORY MEDICINE AND PATHOBIOLOGY AND AN ASSOCIATE MEMBER OF THE SCHOOL OF GRADUATE STUDIES AT THE UNIVERSITY OF TORONTO; FOUNDING CHAIR FOR THE FORENSIC PATHOLOGY SECTION OF THE CANADIAN ASSOCIATION OF PATHOLOGISTS

**Abstract:** The development of a modern forensic pathology service involves commitment to several important initiatives including:

(i) properly trained and credentialed forensic experts;

(ii) independent and well funded institutions;

(iii) an evidence based or scientific approach to analysis;

(iv) innovative use of technology

(v) a quality management system. In Ontario, the forensic pathology services have been legislatively reorganized to modernize the approach utilized.

An integral component to the modernization has been the development of a comprehensive quality management system.

The components of the quality management system include:

(i) a system of formal registration and credentialing of pathologists;
(ii) the implementation of autopsy practice guidelines;
(iii) peer review of autopsy reports that enter the criminal justice system;
(iv) audit of autopsy reports with assessment of key performance indicators (eg turnaround time, adequacy of conclusions)
(v) quarterly reporting of system wide results using pareto analysis, feedback to individual pathologists on audit results, and investigation of critical incidents.

The quality management system has improved the openness and transparency of the forensic pathology service. In addition, the analysis of turnaround times and the pareto results will improve the timeliness and quality of services provided.

We believe our approach may have general applicability to other quality management of autopsy services in other jurisdictions.

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# ADVANTAGES AND DISADVANTAGES OF VIRTUAL AUTOPSY

**Author(s):** Michael Thali and Virtopsy Team

**Institution(s):**[1] UNIVERSITY ZURICH, SWITZELAND

**Abstract:** The aim of the VIRTOPSY is utilizing modern imaging technology to push low-tech documentation and classic autopsy procedures in a world of high-tech medicine in order to improve scientific value, to increase significance and quality in the forensic field. The benefits of Virtopsy are examiner-independent, objective 3D-documentation and the non-invasive approach.

Virtopsy is an option in cases of autopsy-rejection by family or religious reasons. Virtopsy is the rapid identification and examination tool in mass disaster or ABC-terrorism. For prosecutors and courts forensic findings could be demonstrated in 3D and without bloody images. The cost are factor 2-3 higher than a classical autopsy.

Because of the quality improvement and added value in documentation, it is worth to do this investment in forensic.

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# CHILD ADVOCACY CENTER MODEL: A HUMANE BUT COMPETENT INTERDISCIPLINARY FORENSIC MODEL TO MANAGE CHILD SEXUAL ABUSE.

**Author(s):** Resmiye Oral

**Institution(s):** [1]MEDICAL DIRECTOR - CHILD PROTECTION PROGRAM, UNIVERSITY OF IOWA CHILDREN'S HOSPITAL, IOWA CITY; PROFESSOR OF PEDIATRICS, UNIVERSITY OF IOWA, CARVER COLLEGE OF MEDICINE, DEPARTMENT OF PEDIATRICS, IOWA CITY, IOWA, USA

**Abstract:** Children's Advocacy Center (CAC) model was developed in Huntsville, Alabama, USA in 1985 to provide a child-friendly environment designed to meet the needs of children who are alleged to have been, especially sexually abused. Currently, there are more than 700 Children's Advocacy Centers throughout the US. In 2010, those centers served more than 260,000 abused children. These centers provide support and protection for the child and the non-offending family members via the following coordinated services: forensic interviews, investigation and prosecution, medical and mental health treatment, victim advocacy, crisis intervention, multidisciplinary case review, case tracking, and other allied services.

CACs bring together representatives from child protective services (CPS), law enforcement, prosecution, mental health, and the medical community. The task forces meet regularly to define and refine professional roles in investigations and intervention in order to improve the system's response to child sexual abuse. With this collaboration the duplication of services for children and their families is eliminated and a comprehensive coordinated response is generated among the systems in place.

A central focus of CACs is the prevention of further trauma to the child, which may be caused by multiple, repetitive contacts with different community professionals. This is accomplished by multidisciplinary response to allegations of child abuse and assist with the coordination and tracking of investigative, prosecutorial, and treatment efforts that occurs in the CAC, a neutral facility, where interviews of and services for children who are alleged to have been abused may be provided to the child and non-offending family members. Although some aspects of a multidisciplinary approach to child abuse can exist without a neutral facility, a designated facility is fundamental to a CAC. In addition, the center should create a sense of safety and security for the children. Among other things, this model eliminates the children to have to tell their story over and over.

The team response to allegations of child abuse includes forensic interviews, medical evaluations, therapeutic intervention, victim support/advocacy, case review, and case tracking. These components may be provided by CAC staff or by members of the MDT, preferably at the center in order to promote a sense of safety and consistency to the child and family. The MDT members of each agency (CPS, law enforcement, prosecution, and others) develop mutually agreed-upon procedures and guidelines that outline each agency's role in, responsibilities to, and expectations from the CAC function.

No single model for an ideal multidisciplinary program exists because each community's approach must reflect its unique characteristics. However, most communities have adopted a shared philosophy and similar goals. This gives the different philosophies among interacting agencies a context that allows them to develop procedures for responding together to child abuse cases quickly and effectively. It also enables participating professionals to address problems together as they arise.

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# PROBLEMS, ERRORS AND PITFALLS IN THE FORENSIC DIAGNOSTIC OF CHILD ABUSE

**Author(s):** Mete Gulmen; N Cekin

**Institution(s):** [1]CUKUROVA UNIVERSITY

**Abstract:** In the evaluation of child abuse and neglect, physicians' opinion plays an important role; nevertheless, approach to such cases differs considerably among medical examiners. In most of the countries, reliable information on the approach of physicians to child abuse, reporting, sensitiveness, level of knowledge necessary for management as well as incidence of abuse is limited.

Medical specialties most probably involved in the evaluation of child abuse (pediatricians, pediatric surgeons, orthopedic and trauma surgeons, neurosurgeons, gynecologists and obstetricians, general surgeons, emergency staff physicians and general practitioners) mostly have some basic knowledge yet for the case management and adequate approach, new training strategies and restructuring seems mandatory. Despite certain limitations that we have worldwide, still these studies will be of valuable and contributory for the future efforts on effective management and prevention of child abuse by physicians. The fundamental characteristics of the Child Abuse and Neglect a) A deliberate harm to the child, b) A socially prohibited act, c) An International consensus that action is an abusive attitude, d) The abusive action should be caused individually, e) Only one or more children should be damaged by the abusive action.

The first scientific discussions of the issue came out in 1961 by the studies of a pediatrician Henry Kempe during the annual meetings of the American Pediatric Society as the battered child syndrome. The "Battered Child" article of Dr. Kempe in 1962 in the "Journal of American Medical Association" brought up the child abuse and neglect issue on the sight of the media, the society and the medical community. The type of abuse cases may be, Physical, Sexual, Emotional and Neglect. In today's world, the society, media, medical community more aware and sensitive of the Child Abuse cases.

Forensic scientist and clinical legal medicine practices improve everyday. Yet however the condition still raises and the importance of those cases continues. In this presentation we will try to analyze and understand the problems that still go on in child abuse cases as well as the errors that mostly the physicians perform. On the other hand we will try to build up suggestions that may prevent those errors and clarifies the abuses. It is our duty to prevent the children from the negative effects of the life and to be sure them to be in good physical and mental health conditions, support and prepare them for the future with hope. Only powerful state organizations and institutions will be able to smooth the conditions for the children whom are in risk groups.

We think that hospital based children protection units are one of the main solutions for today and for the future and we will discuss the pitfalls for the child abuse in the bases of this unit. We will try to review the literature, put some pitfalls on that issue and discuss the titles and conclude with the advanced benefit of the children.

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# GLOBAL FORENSIC COLLABORATION: THE INTERNATIONAL FORENSIC STRATEGIC ALLIANCE

**Author(s):** Jan de Kinder

**Institution(s):** [1]NICC/INCC, VILVOORDSESTEENWEG, BRUSSELS, BELGIUM

**Abstract:** The International Forensic Strategic Alliance is a partnership among the regional networks representing forensic science laboratory management. The participating networks have similar roles, functions and objectives and recognize the value to be gained through long-term collaboration and cooperation on strategic issues related to the management of forensic science laboratories and the promotion of forensic science.

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# PUBLISHING IN FORENSIC SCIENCES – WHERE AND HOW TO PUBLISH AND THE MEANING OF NUMBERS

**Author(s):** Alan Wayne Jones

**Institution(s):** DEPARTMENT OF FORENSIC GENETICS AND FORENSIC TOXICOLOGY, NATIONAL BOARD OF FORENSIC MEDICINE, SWEDEN

**Abstract:** Scientific research would be hard to imagine without the existence of scientific journals, which provide a forum for investigators to spread new knowledge and to put this information in the public domain. Prolific authorship is closely linked to success in science, especially within academia when decisions are made about promotion to higher positions, salary increments, obtaining funding for research and attracting graduate students and new collaborators. Scientific journals are usually subdivided into different subject categories, such as forensic science and legal medicine, which is a relatively small discipline compared with biochemistry or internal medicine. In many countries forensic investigations are done by private organizations or government laboratories belonging to the police authorities.

These forensic practitioners are under less pressure to publish scientific articles in peer-reviewed journals and to engage in research and scholarship. Indeed, much of the recent criticism of the forensic sciences by the US National Academy of Sciences was because of a lack of publication and peer-review of the reliability of the various methodologies used. Practitioners in the field of legal medicine are more closely connected with university teaching hospitals, which give better opportunities for teaching, research and publication. The increasing competition for research grants and government funding has led to more and more emphasis being placed on performance assessment, which takes the form of evaluating publications and article citation counts (bibliometrics). Scientific journals are compared and contrasted by their impact factor, which is the ratio of citations to articles published in the journal and number of citable items over a given time period. Journals devoted to forensic science and legal medicine tend to have fairy low impact factors (< 2.0), owing to the limited size of the field and author citation practices. This makes it important not to compare and contrast the impact factors of journals that belong to different disciplines or subject categories. A widely used bibliometric indicator often used to compare individual scientists, is the so-called "Hirsch Index" a single number that provides information about quantity (numbers of papers) and quality (numbers of citations) of the articles published. A person with a Hirsch index of 30 has his or her name on 30 articles each of which has been cited at least 30 times. In this connection careful consideration should be given to the number of co-authors on the 30 articles that make-up the Hirsch core of papers, as well as the relative positioning of the names. Multiple-authorship often means multiple problems when it comes to judging the merits of individual scientists with long bibliographies and scores of co-authors. Solo authorship should be considered most meritorious followed by first-authorship on multi-authored papers and the person who stands as the corresponding author also deserves extra credit. Attributing credit to individual authors on multi-authored papers is a difficult task and the entire question of what constitutes being included as an author or simply mentioned in acknowledgments remains unresolved.

Guidelines promulgated by a committee of senior editors of medical journals exist but their recommendations have not been widely accepted by individual research groups, many of whom have their own traditions and requirements when it comes to deciding who should be included as a co-author. Honorary authorship and ghost authorship are dubious practices and should be condemned. An increasing number of so-called open access journals now exist and their editorial teams are active in recruiting potential authors of manuscripts. Indeed, many of these newer journals expect authors to pay part of the costs of publication by "page charges" that might reach $1,000 or more per article.

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# THE INTERNATIONAL NETWORK FOR FORENSIC RESEARCH (INFOR) AND THE CLASSIFICATION OF ASPHYXIA: CAN WE ARRIVE TO AN INTERNATIONAL CONSENSUS?

**Author(s):** Anny Sauvageau

**Institution(s):** OFFICE OF THE CHIEF MEDICAL EXAMINER, ALBERTA, CANADA

**Introduction:** The classification of asphyxia and the definitions of subtypes are far from being uniform, varying widely from one textbook to another and from one paper to the next. Unfortunately, similar research designs can lead to totally different results depending on the definitions used. Closely comparable cases are called differently by equally competent forensic pathologists/medico-legal doctors. In response to this situation, a unified system of classification was recently proposed. This standardized classification was pieced together by drawing mainstream definitions from a thorough review of forensic textbooks and literature. In the present study, an international consultation on this unified classification was undertaken in an attempt to achieve a global agreement on a standardized classification of asphyxia.

**Materials and Methods:** A questionnaire was designed to evaluate which parts of the standardized classification and which definitions the international forensic community is ready to adopt, and which parts need to be revised.

**Results:** 173 surveys were compiled: 88 from North America, 58 from Europe, 10 from form Asia, 5 from Oceania, 4 from Central and South America, 4 from Africa, and 4 from Middle-East. There is a large majority in favour of adopting the overall standardized classification and the following definitions: suffocation (80%), confined spaces/ entrapment/ vitiated atmosphere (80%), strangulation (84%), hanging (84%), ligature strangulation (78%), positional asphyxia and traumatic asphyxia (77%), and drowning (76%). The epiglottis as the anatomical landmark between smothering and choking is agreed with a small majority (60%). There are two elements of the classification that will have to be further worked on. First, there is no consensus if the category of asphyxia labelled confined spaces/ entrapment/ vitiated atmosphere should be further subdivided (37%) or not (48%). Second, it is not clear if a hanging accompanied by a fall from height should be part of the classification of asphyxia (45%) or not (48%). Third, it is not clear if mechanical asphyxia is a broad term encompassing several types of asphyxia caused by various mechanical means (32% worldwide, 58% in Europe, 7% in North-America) or is a term that designates asphyxia by restriction of the respiratory movements either by the position of the body or by external chest compression (61% worldwide, 33% in Europe, 88% in North-America).

**Discussion:** Mutual concessions are going to be necessary to achieve international agreement; but as a scientific community, we cannot continue to use different definitions and classifications depending on our geographical location or depending on our favourite textbook. As a scientific community, forensic pathologists and medicolegal doctors need to agree on a standardized classification of asphyxia. The practice of forensic pathology and legal medicine has been for a long time part art and part science. To grow as a scientific discipline, we have to make an effort to shift away from art and move toward a more scientific approach, and the standardization of classifications and definitions is an important step in that direction.

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# THE NATIONAL CLEARINGHOUSE FOR SCIENCE, TECHNOLOGY AND THE LAW: AN INTERNATIONAL RESOURCE

**Author(s):** Carol Henderson

**Institution(s):** DIRECTOR NATIONAL CLEARINGHOUSE FOR SCIENCE, TECHNOLOGY AND THE LAW, FLORIDA, USA

**Abstract:** This presentation will discuss the numerous projects of the National Clearinghouse for Science, Technology and the Law (NCSTL) including the online database, the reference collection, distance education courses, special seminars and more. New challenges for expert witnesses, law enforcement and the legal community have arisen due to recent developments in and challenges to science and technology. New technologies and methodologies, as well as fields long considered well established, such as fingerprints and tool marks are facing increased scrutiny as evidenced by the National Academy of Sciences Report, Strengthening Forensic Science in the United States: A Path Forward (2009). Given the explosion of litigation involving scientific evidence, scientists, law enforcement, laboratory personnel, judges and lawyers are overwhelmed by the amount of information required to educate them to meet the legal challenges. Until the creation of NCSTL, no one centralized source existed that would allow those in the civil and criminal justice systems to navigate all the journals, reports, proceedings , relevant case law and other resources necessary to conduct effective investigations and litigation. A searchable online database was developed by NCSTL and is now accessible at NCSTL.org. It is designed to be "one-stop-shopping" for information related to the nexus of science, technology and the law. The more than 30 database topics include bloodstain pattern analysis, biometrics, digital evidence, DNA, fingerprints, firearms and tool mark analysis, forensic anthropology, odontology, pathology, questioned documents and trace evidence, among others.

Within each topic, resources are provided : scientific and legal articles, books and periodicals, legislation, conference proceedings, dissertations, media, continuing education courses and other relevant information. The online resource/website is a collection of thousands of bibliographic records .These records provide you with an abstract for each item, as well as all the information you will need to locate the item, including the URL to the full text whenever it is available online. The website also includes an online quarterly newsletter that focuses on the latest topics. In addition, there is a Cold Case Tool Kit and Identifying the Missing resources, as well as information on Identity theft. We also provide research bibliographies, for example, CSI Effect and Digging Up Dirt on Experts. At present we have 130,793 records and add between 1300-1500 records per month. We have had 500,000 visitors from 170 countries. Best of all, the resource is free to use. In addition to the searchable online resource, NCSTL has built partnerships with various agencies, associations and organizations. NCSTL also holds an annual seminar series, has hosted national conferences and convenes Community Acceptance Panels at the request of NIJ.Training modules have been developed and have been delivered or are in the process of being delivered at present . Some examples include Law 101, Capital Litigators training in forensic science, DNA for the Defense and Sexual Assault nurses forensic training. The Stetson University College of Law library houses NCSTL's special collection of law, science and technology literature and media, which is available through interlibrary loan.

NCSTL seeks to improve forensic science on a global scale. The presentation will solicit feedback from attendees on additional research needs to be addressed worldwide. Thus, this presentation will advance the IAFS theme " Forensic Sciences in the 21st Century: Global Cooperation.

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# CONFIDENTIALITY IN FORENSIC EXPERTISE'S AND THE DUTY TO PROTECT VULNERABLE PERSONS

**Author(s):** André Pereira

**Institution(s):** FACULTY OF LAW OF THE UNIVERSITY OF COIMBRA, COIMBRA, PORTUGAL

**Abstract:** In the first part of this presentation, international and national sources of law of confidentiality in the physician-patient relationship will be explained. In the second part, there will be an clarification of the justification grounds for a legal breach of confidentiality: consent, presumed consent, necessity and statutory authorizations. The last ones are especially relevant to justify the intervention of forensic experts.

In fact the expert is called to court not as a health care provider, but as connoisseur who shall deliver a statement with accuracy and according to objective criteria. Therefore, hypocritical confidentiality rules do not entirely apply in this field. On the other, vulnerable persons, such as children, victims of sexual crimes, persons who suffer from mental diseases, migrants, victims of hate crimes and others deserve special protection of the law.

Therefore, confidentiality is very important also in the domain of forensic experts' activity. The forensic expert becomes, like Janus, with a double face: on the one hand, he shall state the truce and the facts as he analyses them to the court, on the other hand, he might be obliged to keep secrecy of the facts and opinions towards the mass media and the public in general.

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# THE ISSUE OF CONSENT IN FORENSIC PRACTICE

**Author(s):** Eduardo Dantas

**Institution(s):** WORLD ASSOCIATION FOR MEDICAL LAW

**Abstract:** As medical sciences develop, forensic experts are able to offer several kinds of tests, treatments and procedures, either to help patients or to collaborate in a Police investigation. Sometimes, as obvious as it seems, these techniques are invasive, or intrusive, and can collide with other principles such as consent and right to privacy, raising issues like the duty to inform and the competence to consent. This study aims to explain why this is a new source of medical liability.

The exceptions to the right to consent in the field of forensic medicine are analyzed, especially in criminal procedural law. The validity of the paternity tests, namely when they are done with no connection to a legal suit (especially the home-test), is discussed according to Portuguese and Brazilian laws, as well as with references to comparative law.

Finally, the aims to bring some light to the discussion of the rules concerning post-mortem removal of human organs and tissues for transplantation, the employment of cadavers for teaching and research purposes and the forensic autopsy, and concludes that the irrelevance of the refusal to be subject to an autopsy reinforces the fairness of the "opting-out system" that prevails in the two first afore-mentioned subjects.

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# RESEARCH ON LIVING VICTIMS, HUMAN TISSUES, CADAVERS AND BODY PARTS: OPTING OUT OR OPTING IN SYSTEMS

**Author(s):** Marcella Fierro

**Institution(s):** WORLD ASSOCIATION FOR MEDICAL LAW

**Abstract:** In the United States the donation of organs and tissues is considered an altruistic gift and excellent public policy. Recipients include living persons needing replacement of diseased organs; commercial companies that receive and process tissues for replacement of specific tissues such as tendons and heart valves; teaching and research programs in universities; surgical specialty organizations that provide training in special surgical procedures and others needing tissue for study or research.

Legal issues arise when questions are raised about informed consent for donation, the role of the coroner or medical examiner in the release of tissues or organs on medicolegal cases, the retention of tissues by medical examiners for further study, as medical evidence and the retention of tissues for research. Organ and tissue donation is controlled by state specific statutes largely drawn from a nationally promulgated model act. One component of the act is valid consent of the next of kin or a person designated by the donor.

As a rare exception, in a few states there is a legal presumption of presumed consent to allow time-sensitive recovery of corneas without family consent. Some states permit donors to opt-in or opt-out of permission for donation that is recorded on a donor's driver's license where the wish of the donor is paramount and not subject to challenge after death by kin. In recent years, families have sued medical examiners in the civil courts alleging unlawful retention of tissue for study of brain and heart for occult or genetic disease and unlawful release of tissue for diagnosis and subsequent research studies.

This presentation will review pertinent legal actions related to organ and tissue donation, related court decisions and the response of national organizations to develop policies and procedures to advance a beneficial public policy and, at the same time, protect the medical examiners and coroners who give permission for release of tissues and who retain tissues for legitimate study.

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# THOUSANDS OF GUNSHOT WOUND FATALITIES ANNUALLY IN THE ONE FORENSIC FACILITY

**Author(s):** Maria Morcillo-Méndez

**Institution(s):** MEDICAL DOCTOR SPECIALIST IN FORENSIC MEDICINE AND PATHOLOGY; NATIONAL DEPARTMENT OF FORENSIC PATHOLOGY; NATIONAL INSTITUTE OF LEGAL MEDICINE AND FORENSIC SCIENCES, BOGOTA, COLOMBIA

**Abstract:** The National Institute of Legal Medicine and Forensic Sciences is the public organization in charge of directing and controling the medico legal and forensic sciences system in Colombia. Provides forensic to the community and Judicial Authorities supported on scientific and technical standards, in a framework of quality, ethics, fairness and competitiveness, respecting the dignity of people and helping to restore their rights. In Colombia, a country of approximately 45 million people, 32790 autopsies were performed last year in the 139 offices located around the country. Of those, 5455 autopsies were performed in Bogota, the capital city of approximately 8 million people. Among these number of cases, 1923 (36%) correspond to homicides, 253 (5%) suicides, 434 (8%) accidental deaths, 607 (11%) cases are traffic (road) accidents, in 106 (2%) cases the manner of death could not be determined, in 379 (6%) cases, the manner of death is violent, but no further classification could be made . 1242 (23%) cases correspond to Natural deaths and 511 (9%) correspond to pending cases . Within the 5455 autopsies performed in Bogota in 2010, the cause of death was gunshot wounds in 1238 (23%) cases, from these, 1164 (94%) are homicides, 58 (5%) suicides and in 16 (1%) cases, manner of death could not be determined. Gunshot wounds cases offer a particular degree of difficulty, related not only with the circumstances surrounding the events, but with the number of impacts observed on the bodies, the various types of guns and ammunition employed. The medico legal approach of the large number of cases, some of them related with the armed conflict and /or being suspicious of human rights violations, will be illustrated during this presentation. Information on the methodology we usually apply at the mortuary, forensic experts involved during the process, radiographs taken and with what purposes, photographs taken, distance range tests, examination of clothing, autopsy reports in these cases, among other aspects, will be provided in general and by presenting three cases where the role of each participant and the result of this approach can be observed. Among the main characteristics of this approach are following national and international standards, principles of criminal investigation and chain of custody in order to assure quality to the process. Other positive aspects, such as adequate interpretation of the evidence and autopsy findings, that result from working together and simultaneously with ballistic experts at the mortuary, and negative aspects related with the methodology used will be pointed out. Is of our interest to share with the conference the medico legal approach applied at the mortuary in Bogota when managing gunshot wound cases. Despite the large number of deaths, this approach brings qualified results to the judicial investigative process, as well as a great experience and very important skills for the doctors when examining and dissecting the body.

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# A DVI OPERATION IN THE AFTERMATH OF A VOLCANIC ERUPTION - CASE STUDY OF MERAPI ERUPTION

**Author(s):** Anton Castilani

**Institution(s):** INDONESIAN DVI COMMITTEE, INDONESIA NATIONAL POLICE

**Abstract:** Merapi Volcano in Central Java was erupted at the end of October 2010 took hundreds of death tolls among the people living within 20 km radius, affected 16 districts in the vicinity, 89.724 people evacuated and 128 death bodies collected in Yogyakarta Province Hospital, only 56 successfully identified. Managing DVI operation is one of Police Duty, that in this case become responsibility of Indonesian DVI Team under management of Police Medicine Department of Indonesian National Police. Another 3 disasters happened almost at the same time, Flood in Wasior - Papua, Police aircraft crashed in Nabire - Papua, Earthquake and Tsunami in Mentawai, that also need a lot of efforts. Experienced in so many disaster since Bali Bombing in 2002, we managed DVI resources in 31 provinces and divide into 4 regional areas, that could operate autonomically depend on the area of disaster.

Since Merapi volcano eruption affected 2 provinces, 2 DVI province teams from Central Java and Yogyakarta were activated, and backed up by East Java DVI team as Regional DVI also Jakarta Capitol City DVI team and National DVI team as second and third line back up team. The only circumstances during Merapi Volcano's eruption that we didn't have enough antemortem data as comparison to post mortem data and the broaden of the affected area because of the changing direction of the eruption itself.

Lesson learnt from this case, that National DVI resource management had been proven effective in handling multi disaster.

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# RE-ESTABLISHING LOCAL CONTROL OF THE FORENSIC MEDICINE SERVICE AFTER WAR

**Author(s):** Naim Uka, Musa Gashi, Arsim Gerxhaliu, Flamur Blakaj

**Institution(s):** DEPARTMENT OF FORENSIC MEDICINE, JUSTICE MINISTRY PRISHTINË, KOSOVO

**Abstract:** The aim of this study is to describe re-establishment of medico legal system in the countries after war. In previous last 20-25 years medico-legal system in Balkan area went through wars and armed conflicts. This unfavorable and unwanted development pushed forensic systems toward establishment of anthropology sections. In general, the medico legal system in postwar period has been working in identification process. After wars, new countries born from ex-Yugoslavia followed up the old medico legal systems. In all ex-Yugoslavia territory, a UN mission has supported establishing of the medico legal systems, focused in anthropology sector, through ICRC, ICMP and local NGO-s. Thus during last years medico legal systems has been changed in several countries according to rules of the medico-legal autopsy.

The medico legal system in Balkan area has been developed based in medical examiner system during several years. From ex-Yugoslavia, only Kosova followed up Harmonization of Medico-Legal autopsy rules in details. Kosova is one of the newest countries of the world that has start application of the rules of harmonization autopsies. The medico-legal system in Kosova is under Justice Management, (Justice Ministry). All other countries, including wider region in Balkan, has continued with old medico-legal system. Still most of the countries have regulated their medico legal systems under health management (Ministry of Health).

Kosovo is story of success in development of medico legal system.

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# PROVIDING CAPITAL CITY FORENSIC SERVICES FOR REMOTE FIRST NATION COMMUNITIES

**Author(s):** Michael Pollanen

**Institution(s):** ONTARIO FORENSIC PATHOLOGY SERVICE, CANADA

**Abstract:** In Canada, death investigation services for all citizens are organized by provincial governments, rather than the federal government. However, several First Nations communities have been long established within provincial geographic areas. On this basis, provincial death investigation systems in Canada (Medical Examiners and Coronial systems) are responsible for delivering death investigation services for First Nations communities. In Ontario, Canadas largest province, many First Nations communities are found throughout the province, including including several reservation communities in the far North. Many of these so-called "fly-in" communities can only be reached by small airplanes. Over the last 2 years, the Ontario Forensic Pathology Service (along with the coronial service) has attempted to develop new approaches to providing service in the North.

Three discrete challenges have become apparent in delivering high quality forensic pathology services to First Nations communities:

(1) cultural and geographic barriers to the transportation of bodies away from communities to autopsy centres in large cities;
(2) issues around organ and tissue retention and objections to autopsy;
(3) the high incidence of teenage suicide and solvent and alcohol use. In this presentation, the various responses to these challenges are discussed.

The guiding principles that have informed our systemic responses to these challenges have been:

(1) respect for First Nations cultural autonomy; and

(2) the need to deliver forensic pathology services of uniform quality to all communities in Ontario.

One of the many modalities to assist in service delivery is the development of telepathology for remote examination of bodies and death scenes.

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# ESTABLISHING A NEW FORENSIC MEDICINE SYSTEM IN MALAYSIA

**Author(s):** Mohomed Shah

**Institution(s):** NATIONAL INSTITUTE OF FORENSIC MEDICINE/HOSPITAL KUALA LUMPUR

**Abstract:** Forensic Medicine ICT system development in Malaysia was initiated since early 2005 with the aim of efficiently and accurately managing the national death database as well as providing a centralised digital storage and retrieval of highly secured and confidential medical information. A national system will also ensure a uniform and standardised practice of Forensic Medicine in

Malaysia since forensic medicine services is under the administration of the health ministry. The Forensic Medicine system consists of two main modules as follows; a database management module and a case management module. Malaysia has 14 states with a total population of 28.5 million and with more than 130 hospitals under the Ministry of Health. The first phase of development was the setting up of Forensic Medicine system in 14 state centres in 2009-2010. The financial support for this pilot project is jointly sponsored by the Ministry of Health and the Ministry of Science and Technology with a total cost equivalent to approximately USD 2 million or Euro 1.4 million. The second phase of the project is still in progress to capture death information from the rest of the hospitals nationwide in view of a comprehensive compilation of death information for Malaysia. Data from all 14 state centres for year 2010 is in the process of compilation and analysis with the expectation of a more accurate and reliable death statistics.

An ICT system for Forensic Medicine services is a very useful tool and highly recommended in compiling data on Forensic Medicine cases to be used for assessing and monitoring trends in health status as well as evaluating mortality trends.

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# ESTABLISHING AND OPERATING THE AFRICAN NETWORK OF FORENSIC MEDICINE (ANFM)

**Author(s):** Steve Naidoo

**Institution(s):** FORENSIC PATHOLOGIST, DURBAN, SOUTH AFRICA; CHAIR – INTERIM COMMITTEE: AFRICAN NETWORK OF FORENSIC MEDICINE

**Abstract:** Borne out of need to promote empowering relationships between forensic health practitioners in Africa, and fostered by an initial cooperative effort between Australia and Botswana, the African Network of Forensic Medicine (ANFM) is to be formalised in Uganda in November this year at its first meeting in Kampala, Uganda.

There are impressive engagements in the Continent by various groups, including international agencies such as the WHO, the ICRC and the ICC, and by individual groups such as the AFP, the VIFM, the MAFS and the EAAF, but there are little recognised collaborative forensic medical efforts in Africa by Africans. With minimal continental coordination of forensic medical work, and hardly for that matter, between the different forensic expert fields, forensic health practitioners, and their ministries, largely work in isolation, except for occasional initiatives that are the result of individual personal and professional interactions. It is hoped that this will change with the emergence and development of the Network. Areas of concern include human rights awareness, sexual violence, and the lack of capacity to handle mass casualty incidents, especially disaster relief. An issue to engage with is how the ANFM would fit in and work with other organisations doing similar work in Africa. This is indeed a stimulating challenge.

The presentation will focus upon Africa's challenges for medico-legal work and how we propose to overcome these, including inadequate forensic expertise and the training needed, differences in conditions of political stability, cohesion between forensic sciences, and forensic work practices and standards between countries, bearing in mind regional differences in medico-legal and judicial systems and police investigative practices. It is hoped that interaction with international delegates at the IAFS/WPMO/MAFS Conference will provide additional suggestions for the way forward.

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# FORENSIC CAPACITY BUILDING: EXPECTATIONS AND REALITIES

**Author(s):** Soren Blau[1]; Luis Fondebrider[2]

**Institution(s):** [1]HUMAN IDENTIFICATION SERVICES, VICTORIAN INSTITUTE OF FORENSIC MEDICINE / DEPARTMENT OF FORENSIC MED; [2]EQUIPO ARGENTINO DE ANTROPOLOGIA FORENSE (EAAF), BUENES AIRES, ARGENTINA

**Abstract:** The importance of developing forensic medical and scientific capacity is increasingly seen as a priority, particularly in developing countries, because of the pivotal role forensic evidence plays in supporting the robust implementation of justice. While forensic capacity building commences with the best of intentions, there are a number of factors which, in reality, hinder effective of the implementation and limit the outcomes for people on the ground. In this paper we discuss the expectations and realities of a capacity building project initiated in 2008 in East Timor and the lessons learnt three years on.

We argue that effective forensic capacity building must be developed around identified, rather than assumed, needs. Such needs can only be recognized by undertaking a scoping assessment (and often more than one), which involves talking with all the relevant government and non-government organizations. Such scoping requires dedicated time and diplomacy, and should be undertaken by someone who has sound background knowledge of the cultural and politically aspects of the country as they relate to the forensic issues.

Effective consultation before, during and after the implementation of the capacity building work will ensure that funding provided for forensic capacity building is more than just a political tool by which donor countries gain credibility about the aid they provided.

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# PROGRESS IN DEALING WITH SEXUAL ASSAULT GLOBALLY.

**Author(s):** Claudia Garcia–Moreno

**Abstract:** There is growing evidence that sexual violence is a global problem with profound long and short term heath and other consequences. Strengthening prevention as well as the provision of health and other services to survivors/ victims requires concerted efforts by multiple sectors and interventions to address risk factors at many levels.

The presentation will provide an overview of what we know about sexual violence: its nature prevalence, and risk factors. It will review the evidence for different approaches to the primary prevention of sexual violence, highlighting interventions that have been shown to be effective or appear promising. It will address also the role of the health sector and health providers in prevention and response to sexual violence.

Lastly it will identify some of the gaps in our knowledge and in existing policies and programmes to respond to sexual violence and suggest some ways forward.

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# WHO PROJECT ON INJURY PREVENTION USING DATA DIRECTLY FROM MORTUARIES.

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**Institution(s):** [1]DEPARTMENT OF FORENSIC MEDICINE, MONASH UNIVERSITY, MELBOURNE, AUSTRALIA

**Introduction:** Globally, injury is one of the major causes of death and disability and the second leading contributor to total Disability Adjusted Life Years lost due to health conditions in Low-Middle Income Countries (LMICs) The World Health Organisation estimates that 5.8 million die per year from injury and 90% of fatal injuries occur in the developing world. A major barrier to successful injury prevention in LMICs is obtaining reliable estimates of the scale and pattern of injury deaths. In most High Income Countries vital registration is the main source of death information. Even in these countries completeness and coverage may be inadequate and importantly detail is lacking. This lack of complete, reliable and accurate mortality data, including circumstances of injury poses a problem in informing effective injury prevention interventions. This project aims to develop a standardized manual for mortuary based fatal injury surveillance. It has 5 stages: feasibility study; development of manual; pilot; revision; publication with the potential for adoption by countries or regions

**Methods:** Through an international collaboration between WHO Geneva and Monash University and an International Advisory Group, a manual was planned and developed, including data collection tools. (1) The tools, including a one page data collection form, coding guide, data dictionary and data entry and analysis program were piloted in 5 WHO member states. (2) An evaluation process was undertaken.

**Results:** The overall results of the development and piloting will be presented with a focus on the implications for forensic practitioners. The major section of the data collection form was completed by medical officers or forensic pathologists in all pilot countries. They determined the cause of death, intent and circumstance of the fatal injury. Data was collected in both urban and rural mortuaries in the participating member states. 2 countries collected data retrospectively , while the remaining 3 countries undertook the process prospectively. The data collection tool was reported by all practitioners as useful and simple to understand. In systems where the the medical officer completed the form immediately after the post mortem, it was reported that it took approximately 3-4 minutes as the information required to fill the form was already available and did not require additional time to refer back to records. One pilot country reported the ability to integrate the data collection tool to the existing system as a usefull atttribute that contributed to the project.

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# TRAINING IN FORENSIC MEDICINE - A GLOBAL CHALLENGE, A REGIONAL ANSWER?

**Author(s):** Stephen Cordner[1]; Elizabeth Manning[2]

**Institution(s):** [1]PROFESSOR OF FORENSIC MEDICINE, MONASH UNIVERSITY; [2]MANAGER, NATIONAL AND INTERNATIONAL, PROGRAMS

**Abstract:** The size of the forensic medicine work force in any particular country is tiny. The ability of most countries to train their own experts is correspondingly weak. Sending medical practitioners for training to larger or wealthier centres occurs in an ad hoc way, and depending on the centre, the training provided may be good, and may be useful, or not.

In 2011, there are some, but relatively few, examples of sustained provision over many years of forensic medicine training in one centre for numbers of medical practitioners from another country. And if it is true for forensic medicine, it is even more so for the related disciplines of odontology, anthropology and toxicology. It is time for existing, laudable, but ad hoc efforts to be raised to a more organized level.

The advantages to justice and hence the rule of law, and to public health are obvious. We need to build a consensus around a new forensic medicine capacity development model. The model will recognize existing capable forensic medicine hubs, in regions requiring capacity building, that with some support can themselves provide for the training needs of that region. Instead of wealthier institutions directly offering training in resource poor contexts, these institutions need to work with an identified forensic medicine hub to support it in undertaking the training.

This will be a win-win approach. The wealthy institution receives direct exposure to particular experiences otherwise not available to it, improving its abilities to perform domestically. It also makes it training contributions more effective by partnering a regional training hub than they would be providing it in ad hoc ways to individuals itself. The regional hub receives support for itself, and to deliver forensic medicine training in its region. And the countries needing forensic medicine training receive it from a regional institution which probably understands its needs and context better, and which will probably provide more meaningful and useful training.

There is much to be done including identifying the regional hubs, identifying larger institutions to stand as partners with them, and enthusing donors about this approach.

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# AND IF, AFTER ALL, FORENSIC CHEMISTRY DID NOT EXIST?

**Author(s):** Claude Roux

**Institution(s):** [1]CENTRE FOR FORENSIC SCIENCE, UNIVERSITY OF TECHNOLOGY, SYDNEY

**Abstract:** Over the last decade, there has been growing criticisms about the reliability and validity of forensic science. The 2009 report of the US National Academies of Science epitomises the criticisms. Almost all forensic science sub-disciplines except DNA are in the firing line. The general response by those leading and administering forensic science has been to call for more normalisation, standardization, quantitation of uncertainties, etc. The need to improve the underpinnings of and research in forensic science are also widely called for. The advent of new technologies to add in the forensic 'toolkit' is also often quoted as a crucial solution to our problems.

If recent advances in analytical chemistry and related disciplines will take some time before they can have an impact on routine forensic science casework, there is little doubt that significant changes are around the corner. With sophisticated portable instrumentation increasingly moving to the crime scene, some may even see the end of the traditional crime laboratory as we know it. However, new technologies do not only bring expanded capabilities and opportunities, but also generate many challenges that may take years to be identified. Some examples include: loss of a holistic approach due to ultra-specialization, apparent slow pace of "high-tech" laboratories, "false comfort zone" where the increased number of sophisticated tests rarely translates into more accurate or useful information for the criminal justice system, non-relevant questions being asked, etc.

These opportunities and challenges are reviewed in this presentation, along with recent research outcomes achieved by the UTS Centre for Forensic Science and partners in the areas of homeland security, illicit drugs, fingermark detection and chemical criminalistics, as well as casework examples.

The successful marriage of cutting-edge analytical sciences with fundamental forensic science principles and novel approaches applied early in the investigative process will ultimately allow forensic science to reach new levels never achieved so far. However it is concluded that this will only happen if we can develop and foster a forensic science culture with crime and its traces as the central object of study. It is then fair to ask the question: And if, after all, forensic chemistry did not exist?

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# PHARMACOGENOMICS: ANOTHER TOOL FOR MEDICOLEGAL DEATH INVESTIGATION

**Author(s):** Jeffrey Jentzen

**Institution(s):** UNIVERSITY OF MICHIGAN, U.S.A.

**Abstract:** Pharmacogenomics (PGx) , is the study of individual genetic makeup that may influence drug metabolism. PGx aids the forensic pathologist in the interpretation of drug deaths, determining whether death may have been produced by an intentional ingestion of an excessive amount of the drug, or by documentation an individual's inability to metabolize the drug via P450 enzyme system. A recent study of methadone drug deaths certified in twelve US medical examiner offices indicates a genotypic mutation rate of sixty percent (60%) in comparison to a rate of ten percent (10%) in the general population.

The vast majority of drugs are metabolized by a limited number of P450 enzymes, CYP 2D6, 2B6, 2C9, 2C19, and 3A4/5. PGx thus serves as an adjunct for drug death certification by medical examiners and coroners. PGX testing has the potential to determine whether the increase in drug deaths is indeed due to increased consumption and distribution or from a particular distribution of genotypic variants that decrease drug metabolism in certain individuals resulting in subsequent death. Thus PGX might aid in the interpretation of the effect of impair drug metabolism due to genetic variations.

Determining other genetic variants, rapid or intermediate metabolizers, may have wide ranging implications for determining deaths due to drug-drug interactions in the future. Robust scientific and clinical studies are lacking to demonstrate the benefits of routine PGx testing in the forensic field, which may serve as a valuable public health tool in the prevention of unnecessary drug deaths. The application pharmacogenomics has additional potential in the judicial arena as "personalized justice".

This area is concerned with whether an individual involved in drug deaths or driving under the influence has motivation, intent, or culpability in a drug death or driving infraction. Personalized justice complements personalized medicine and the overlaps practice of translational medicine which hold broad future legal implications in determining which individual differences are caused primarily by genetic and/or environmental factors.

This presentation will provide attendees with a discussion of the current and future applications of pharamacogenomics in the field of forensic medicine and the methodology and interpretation using actual case presentations.

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# USEFULNESS OF POSTMORTEM CHEMISTRY IN FORENSIC PATHOLOGY

**Author(s):** Patrice Mangin

**Institution(s):** CENTRE UNIVERSITAIRE ROMAND DE MÉDECINE LÉGALE, LAUSANNE, SWITZERLAND

**Abstract:** Forensic chemistry represents today a more and more irreplaceable tool in forensic routine to determine the cause of death. Moreover, its contribution is becoming increasingly helpful in solving forensic problems in natural deaths and even in the interpretation of the forensic toxicological results.

In the last 20 years, the number of substances which may be handled for a diagnostic purpose in forensic routine has significantly grown, as well as the accuracy of the sampling, the choice of the analytical technique and the precision of the measurements. Glucose metabolism, electrolytes disorders, inflammation, sepsis, anaphylaxis, kidney and liver functions represent actually the most investigated fields in postmortem chemistry. Reliable results may be obtained today from the measurements in vitreous humour and other biological fluids.

However, some controversial points still exist and intensive researches have been conducted in the recent years all over the world in order to develop different techniques to analyse specific chemical compounds, to define the influence of the laboratory procedure on the results and to increase the quality of the diagnosis. The objective of this presentation is to illustrate the diagnostic potential of the postmortem chemistry in some cases which have come under our observation at the University Center of Legal Medicine in Lausanne.

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# TRENDS AND TESTING OF AMPHETAMINE-TYPE STIMULANTS

**Author(s):** Heesun Chung

**Institution(s):** DIRECTOR GENERAL OF THE NATIONAL FORENSIC SERVICE, SEOUL, KOREA

**Abstract:** The abuse of amphetamine-type stimulants (ATS) is the main concern in Asian countries. The synthetic stimulants carries the image of being both modern and relatively safe and their pharmacological properties, such as enhancing performance, endurance and self-confidence and inducing anorectic effects, contributes to their increasing popularity in this region.

In this talk, firstly the abuse trend of ATS will be given. Global demand for amphetamines, which increased strongly in most parts of the world in the 1990's, is now showing signs of an overall stabilization, however their abuse is still prevalent all over the world. As far as their production is concerned, the largest production areas for methamphetamine (MA) continue to be in South-East Asia and North America, while amphetamine (AP) production continues to be primarily located in Europe, notably in the Netherlands and Poland. The detailed world trend and production of ATS will be given based on the data from the United Nation Office of Drug and Crime (UNODC). In order to show the abuse trend of ATS in the Asian region, the data from Asia and Pacific ATS Information Center (a part of UNDOC program) will be described.

In this program, national and regional data were collected, ATS trends and risks were monitored and standardized data categories were adopted by exchanging data pertinent to ATS abuse prevention and control in this region. In addition, the abuse trend of ATS in Korea will be provided with the fatalities of methamphetamine. The cause of death and blood concentrations in the postmortem specimens will be revealed with the demographic characteristics.

Secondly, the analytical aspects of the stimulants will be discussed. In order to aid the interpretation of hair results from MA abusers, the MA and AP concentrations in 2070 hair samples were statistically evaluated. The low, medium and high ranges of MA were 0.5-4.2, 4.2-24.5 and 24.5-608.9 ng/mg and those of AP were 0.1-0.4, 0.4-1.7 and 1.7-41.4 ng/mg. The AP-to-MA ratios showed large variation but a tendency that it decreased as the MA ranges increased. The reference ranges were very useful to presume the severity of individuals' MA abuse. Pubic hair is often analyzed as an alternative to scalp hair to prove previous drug use. However, no correlation was found in the MA and AP concentrations between scalp and pubic hair from illegal MA users and one of the possible reasons could be due to personal hygiene practices.

As oral fluids become the practical specimens for drug testing, the concentration of MA in oral fluid, urine and hair specimen was investigated. The analysis of MA and AP was performed in oral fluid, urine and hair samples from twelve drug abusers. As the results, MA and AP were positive in all twelve urine and hair samples, while in eleven oral fluid. Urinary MA and AM concentrations were substantially higher than those in oral fluids, but there was a good correlation of the qualitative results for MA and AM between urine and oral fluid.

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# QUALITY ASSURANCE WITHIN THE FORENSIC PROCESS IN EUROPE

**Author(s):** Jan de Kinder

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**Abstract:** ENFSI aims to ensure the quality of development and delivery of forensic science throughout Europe. It encourages all ENFSI laboratories to comply with best practice and international standards for quality and competence assurance. In this presentation an overview will be given of all the initiatives and projects undertaken by ENFSI to achieve this aim.

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# RECENT ADVANCES AND FUTURE PERSPECTIVES FOR NATIONAL DNA DATABASES

**Author(s):** Peter Schneider

**Institution(s):** PROFESSOR AT THE INSTITUTE OF LEGAL MEDICINE, FACULTY OF MEDICINE, UNIVERSITY OF COLOGNE, GERMANY; HEAD OF THE DIVISION OF FORENSIC GENETICS; CHAIRMAN OF THE GERMAN STAIN COMMISSION ; FORMER PRESIDENT, VICE PRESIDENT AND MEMBER OF THE EXECUTIVE BOARD OF THE INTERNATIONAL SOCIETY FOR FORENSIC GENETICS (ISFG)

**Abstract:** The introduction of national DNA databases holding DNA profiles from unsolved crime cases as well from suspects and convicted offenders has dramatically changed the strategies of investigating a crime. Due to the impressive success rate a database search is the first and foremost intelligence tool to provide investigative leads in cases without suspects. Thus the detection and collection of biological stains has become one of the central activities when a crime scene is investigated. Nevertheless, the databases are locked into the current status quo due to the type of genetic markers used to define the DNA profiles. Perspectives for future enhancements of the database process have to take this into account, as a quick change of genetic markes will be impossible. The strategies that are currently explored for expanding the use of databases include the search for relatives of perpetrators, the so-called "familial searching", and the improvement of DNA typing quality to obtain more informative DNA profiles from crime scene samples which are suitable for database searching. This has led to the expansion of the currently used set of markers, and to "enhancement" methods for typing difficult stain samples. These developments will be explained and discussed in the presentation.

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# NATURAL SCIENCE: ITS ROLE IN INVESTIGATING CRIMES AGAINST THE PERSON

**Author(s):** Patricia Wiltshire

**Institution(s):** [1]DEPARTMENT OF GEOGRAPHY AND ENVIRONMENT, UNIVERSITY OF ABERDEEN

**Abstract:** Over about the last twenty years, disciplines such as botany, zoology, mycology, and soil science have contributed greatly in criminal investigations where molecular, and other more conventional methods, fail to help enquiries. Frequently, the natural sciences provide the only forensic evidence in a criminal investigation. Like all biological studies, findings are probabilistic but the complexity, yet clarity, of results obviate the need for statistical analysis. Indeed, a recent ruling in the British courts means that Bayesian and other statistical approaches cannot be used for interpretation except in the case of DNA interpretation.

An outline of the approaches used in recent criminal investigations will be given, exemplified by case studies to demonstrate how quantitative and qualitative information have helped to gain convictions in serious crime by providing both intelligence and evidential data.

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# FUNGAL SPORES AS TRACE EVIDENCE: APPLICATION IN SOME RECENT CRIMINAL CASES

**Author(s):** David Hawksworth

**Institution(s):** DEPARTAMENTO DE BIOLOGÍA VEGETAL II, FACULTAD DE FARMACIA, UNIVERSIDAD COMPLUTENSE DE MADRID; DEPARTMENT OF BOTANY, NATURAL HISTORY MUSEUM, CROMWELL ROAD, LONDON

**Abstract:** Experience in investigations of serious crimes during the last five years has established that assemblages of fungal spores can complement those obtained from pollen and plant spores in linking people and objects with places. As fungi belong to a kingdom distinct from that of plants, they do not merely extend the range of propagules for analysis, but serve as an independent data set which can be used to test the validity of opinions based on pollen and plant spores. Examples of the application of fungal spore data in selected recent cases will be provided to demonstrate the efficacy of the approach.

As yet, no two sites have been found to yield identical assemblages of fungal spores, and it is the uniqueness of assemblages that makes the technique so powerful. In all the cases where fungal data have been used, the opinions based on those data have proved to be consistent with the reality of situations as established in the courts. Investigating officers need to be aware of the discriminatory power of the approach and its potential to contribute to securing sound outcomes in cases they handle.

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# ETHICS IN FORENSIC PRACTICE

**Author(s):** Haskell Pitluck

**Institution(s):** AMERICAN ACADEMY OF FORENSIC SCIENCES

**Abstract:** Ethics in Forensic Science has always been an important concern, but never more important than it is now. Advances in science coupled with criticism of some forensic disciplines makes ethical behavior even more important for forensic scientists to be ethical and above reproach in the conduct of their evaluations and in presentations to the judge or jury. Many cases rely on forensic scientific evaluation and testimony. It is important that those relying on that information receive honest and ethical opinions.

It is disturbing enough when a forensic scientist is incompetent, but the situation is worse when someone, competent or incompetent, is not truthful or is unethical in the conduct of his or her work as well as in his or her conclusions and presentations. In this electronic age of quick check by computer, it is easy to see what others in your field are doing in their work as well as what they are saying in their testimony. Forensic scientists are no longer confined to their own little area of the world. Electronic media has extended the reach of forensic scientists, and has made it easier to keep track of what has been done, written and said by others.

This presentation will focus on ethical considerations and some steps forensic scientists can take to keep from getting involved in ethical dilemmas. Also included will be a discussion of the American Academy of Forensic Sciences Code of Ethics and Conduct with some examples of recent ethical questions.

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# AAFS - A GLOBAL FORENSIC SCIENCE ORGANIZATION

**Author(s):** Douglas Lucas

**Institution(s):** CENTRE OF FORENSIC SCIENCES, CANADA

**Abstract:** In this presentation, “global” will be interpreted more broadly than meaning just “geographical.” One definition of global is “ relating to or embracing the whole of something, or of a group of things” and it is this definition that will be used in order to include the wide range of scientific disciplines involved in forensic science. It will be proposed that the American Academy of Forensic Sciences is a global organization - both geographically and professionally - as is most research, including that in the forensic sciences.

This will be supported by discussion of the origin and development of the Academy, and of the history of some of the fundamental disciplines of forensic science such as fingerprint identification, firearms identification, toxicology and DNA profiling. It will be shown that the fundamental tools in just these four forensic science disciplines are based on the works of scientists in sixteen different disciplines from a dozen countries over several centuries.

The miracle of this is that, for almost all of the time period covered by these developments, there was no Internet, E-mail, fax or even international telephone lines for communication. Information exchange was by personal letter and by journal publication, all of which had to cross oceans by weeks of travel by sail or steam ship.

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# INTERNATIONAL COOPERATION IN FORENSIC SCIENCE RESEARCH: OPPORTUNITIES AND CHALLENGES

**Author(s):** Barry Fisher

**Abstract:** Throughout the world, various groups are making great strides to develop the potential of forensic science. Groups in the United States, Canada, Europe, Asia, Australia, and other locales are working towards that end and developing standard methodologies, defining criteria for forensic practice and conducting research in various aspects of forensic science.

While there is some degree of cooperation and coordination, more is needed. This presentation will take a brief look at what efforts are being made in the United States and elsewhere and make some suggestions on improvements in the area of forensic science research and development. Ideally, a centralized body would be best to keep track of all the work currently being done, however this has yet to become the case. The International Association of Forensic Sciences has undertaken some level of coordination as has the United National Office of Drugs and Crime. However, more coordinated efforts are still needed.

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# ESTABLISHING AN INTERNATIONAL FORENSIC EXCHANGE PROGRAM

**Author(s):** Ronald Singer

**Institution(s):** TARRANT COUNTY MEDICAL EXAMINER'S OFFICE, FORT WORTH, TEXAS, USA

**Abstract:** In 2005, the Tarrant County Medical Examiner's Office in Fort Worth, Texas, U.S.A. established the International Forensic Science Center. Between 2005 and 2010, the office hosted occasional international students for one or two weeks at a time. Beginning in 2010, a formal three-month program was established for Forensic Pathologists.

Considerations when designing such a program include issues such as visa requirements, housing considerations, licensing, and selection criteria. As many of these issues are location-specific, it is recommended that each location research their particular needs before beginning a program; however, our experiences may serve as a guide in performing these tasks. In addition, formal programs of study must be developed that offer maximum exposure in a minimum amount of time.

The programs should be designed based on

(1) the facilities available,

(2) the specificity of the particular program,

(3) the needs of the students involved and

(4) the knowledge, abilities and communication skills of the students.

Programs such as this one serve a valuable purpose in that they promote international cooperation and learning.

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# BRINGING THE COMPLEX CRIME SCENE INTO THE COURTROOM: USING ANIMATION AND STILL ILLUSTRATIONS TO SIMPLIFY TESTIMONY IN CRIMINAL AND CIVIL LITIGATION

**Author(s):** Rod Englert

**Institution(s):** ENGLERT FORENSIC CONSULTANTS

**Abstract:** Drawings (illustrations) in cave dwellings date back to historic periods and have demonstrated many sequential events to help the observer understand the occurrence(s). These illustrations have provided us insight into the ancient world, the Renaissance period, and into the 21st Century where illustrations have been animated beyond cartoonish figures into realistic people and places. The use of moving diagrams (animation) and illustrations (art) is not that common in American courtrooms but is becoming more so, and is highly dependent upon the accuracy of the event to be explained.

Demonstrative aides (moving diagrams/illustrative art) in jury trials are, by their very nature, a method to help juries understand what occurred during an event, be it criminal or civil. Sometimes the event involves multiple parties or actions and necessitates more of an explanation of the facts beyond what photographs, physical evidence, charts or graphs can do. Development of animation and illustrations help the expert witness better explain the case to the triers of fact.

This presentation will show how to go about reconstruction of several officer-involved shootings and a homicide. Because of the complexity of the events, moving diagrams (animation) of each scene are digitally created representing what actually occurred. The re-creation is based upon facts from reports, photos, and detailed documentation from each scene. The accuracy of the animation/illustration is important to withstand the scrutiny of opposition motions to suppress.

The cases used as examples can be used in a variety of expert disciplines to simplify what may sound complex if only verbally presented from the witness stand. Some of the examples are in real time, accomplished by time clocks on the viewers screen and with voice transmissions built into the diagram, such as radio calls to dispatchers. Examples involving airplane disasters, motor vehicle collisions, industry accidents, and miscellaneous cases will be shown where both illustrations and moving diagrams are used.

Some of the examples have animated figures built into the actual scene photographs of buildings, vehicles, blood patterns, and physical evidence at the scene. Some walk the viewer through a living body.

Often, moving diagrams (animation) are not as valuable a tool as an artists rendition and illustration of the event. Illustrations also involve the development of stills based upon measurements and facts for the visual re-creation. For example, the wound path of a bullet through the body on its destructive path through vital organs could best be described in one or several artistic poses in still frames.

When to use animation and/or illustrations, along with the cost of producing the rendition will be discussed. Some renditions become very expensive.

Additional areas to be covered will be suppression motions that are often encountered from opposing counsel. Also discussed will be what happens when both sides produce moving diagrams, both quite different from each other. When two moving diagrams are presented, the one likely to survive the courts scrutiny will be the one most accurately portrayed. There can be no guesswork in the final product.

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# SWGGUN (SCIENTIFIC WORKING GROUP IN FIREARM AND TOOLMARK IDENTIFICATION): AN OVERVIEW

**Author(s):** Peter Striupaitis

**Institution(s):** PALOS HEIGHTS, ILLINOIS, USA

**Abstract:** Since the early 1990's the FBI Laboratory has led the way in sponsoring Scientific Working Groups (SWG) to improve discipline practices and build consensus with our federal, state, and local forensic community partners. Currently the FBI sponsors eight SWGs. Among them is the SWGGUN (Scientific Working Group for Firearms and Toolmarks).

Admissibility standards being applied to forensic science disciplines are creating new challenges for the individual analysts when providing expert testimony. The analysts are being held to a higher standard in justifying the science in their respective disciplines. The Admissibility Resource Kit (ARK) is a repository of pertinent information designed to primarily assist Firearm and Toolmark examiners in quickly preparing for evidence admissibility hearings in the United States. The seven categories of the ARK will be discussed: they include, Admissibility Rules Overview, Foundational Overview of Firearm/Toolmark Identification, Review of Admissibility Elements, Court Rulings, Opposing and Supportive Viewpoints of Firearm and Toolmark Identification, and Appendices.

The information given will indicate and/or show how the information provided and/or contained on the website consists of general and foundational text, listed documents, related internet site links and visual aids that serve as an effective educational tool. The formatting of this information provides a learning mode that will quickly educate the user on the critical elements that should be mastered to better articulate the underlying scientific principles of the Firearm and Toolmark Identification forensic discipline.

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# IS IT A BITEMARK? THE IMPORTANCE OF REVIEWING ALL CRIME SCENE PHOTOGRAPHS AND POLICE REPORTS IN MAKING A DETERMINATION

**Author(s):** Adam Freeman

**Abstract:** Often toolmark injuries are misinterpreted as bitemarks. Therefore, it is crucial to determine the origin of patterned injuries at the outset to aid the investigator as to whether a toolmark examiner or forensic odontologist is consulted. This presentation will examine and illustrate numerous examples from the case records of Diplomates of the American Board of Forensic Odontology that had been determined as a bitemark by the investigating forensic odontologist. Making incorrect decisions early in an investigation may lead law enforcement to faulty conclusions and thereby result in wasted time, effort, and resources. In addition, expenditure of funds for unnecessary expert witnesses can increase the overall cost of an investigation.

The importance of requesting and receiving all available information in a case cannot be understated. In every case, close attention to all crime scene photographs and/or police reports may reveal information that is vital to the discovery of the source of the patterned injury in question. Even when a patterned injury proves to be a bitemark, crime scene photographs may aid the odontologist in making recommendations as to the direction of the investigation. For example, if an odontologist is presented a bitemark on the abdomen of a victim in a hospital or morgue the odontologist may swab the bitemark for DNA.

However, if after examining the crime scene photographs, the victim is found to be wearing a shirt the suspects DNA may be found on the article of clothing rather than the skin. Additionally, the clothing may also affect the quality of the bitemark as well as patterns seen within it. Too often, forensic odontologists are given only the information that the investigator deems significant. Had crime scene documentation and police reports been given to and reviewed by the forensic odontologist at the time of the initial investigation time, resources and effort would have been conserved.

It is essential for forensic odontologists to provide a thorough investigation of the evidence presented to them in an effort to determine the cause of the patterned injury. However, it is clear that when the investigation is limited by the information provided, erroneous conclusions can be made. If the truth is what we all strive to discover, then we suggest that discovery of the truth is easier with all of the available case information.

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# THE ROLE OF FORENSIC ODONTOLOGY IN DISASTER VICTIM IDENTIFICATION LESSONS LEARNED FROM HURRICANE KATRINA AND OTHER EVENTS

**Author(s):** Robert Barsley

**Institution(s):** [1]LSU SCHOOL OF DENTISTRY, NEW ORLEANS, LA, USA

**Abstract:** Forensic odontology has long been an important factor in the identification of unknown victims of mass fatality incidents (MFI). One of the goals of disaster victim identification (DVI) is rapid and accurate completion of the task. Dentistry and forensic dental personnel have a long history of success in the field. Recently, however, beginning with the crash of ValueJet flight 592 in March of 1996, followed by the World Trade Center attack of September 2001, the Southeast Asia Tsunami of December 2004, the southern USA hurricanes (Katrina and Rita) of August and September 2005, the earthquake in Haiti of January 2010, and the earthquake and tsunami in Japan of March 2011, the overall rate of identification has fallen and the rate of dental identification has been well below its historical rate of 50% or better. This presentation will discuss reasons for, propose solutions to, and review lessons learned from these incidents. As this abstract goes to press, the DMORT DPU has been activated in Joplin, MO USA to assist in the aftermath of the most recent FS tornado to strike the USA this spring, storms that have resulted in more than 500 deaths. A total not seen for more than 50 years.

Three factors have negatively influenced disaster victim identification - the sheer number of fatalities, a decrease in the accuracy of the listing of possible victims, and increasing difficulty in securing dental ante-mortem information. Each of these factors will be discussed in detail and suggestions to lessen their impact will be presented. The author will draw on his extensive experience in Hurricane Katrina along with his participation in forums designed to better integrate forensic odontology and dental identification into the overall disaster victim identification experience.

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# FORENSIC SCIENCE REFORM IN THE U.S.

**Author(s):** Victor Weedn

**Institution(s):** MARYLAND STATE OFFICE OF THE MEDICAL EXAMINER, BALTIMORE, USA

**Abstract:** Calls for reform of forensic science are decades old. They began to take on more urgency after DNA testing unequivocally revealed the existence of wrongful convictions in the late 1980's. A backdrop was provided by the 1993 U.S. Supreme Court ruling in Daubert v Merrell Dow Pharmaceuticals, which enunciated the federal judicial standard for expert scientific testimony, and emphasized the need for the science to be relevant, reliable and valid. In 2000, Congress enacted the Paul Coverdell Act that established a grant program exclusively for the forensic science community, including both crime laboratories and medical examiner offices.

In 2004, Congress passed the Justice For All Act that included:

1) victims' rights provisions,

2) funding for the DNA backlog,

3) post-conviction DNA rules, and

4) expansion of DNA collections to all federal felons.

Still, the forensic sciences were not subject to any federal regulation, except that DNA labs had to comply with FBI rules for the uploading of DNA specimens into the NDIS system. A few states began to create state forensic science regulatory commissions and advisory boards (NY -1994, VA-2005, TX-2005, MD-2007). In the background, the Innocence Project agitated for state forensic science commissions as well as other reforms. In 2006, the American Bar Association issued a report calling for reform. In 2008, the Justice Project, supported by a Pew Foundation grant, issued its report calling for reform. These calls went unheeded. Then in February of 2009, the National Academy of Sciences (NAS), released its report, Strengthening Forensic Science in the United States: A Path Forward, which immediately captured the attention of policymakers.

This NAS report made 13 recommendations:

1) creation of an independent science-based federal agency;

2) establishment of standard terminology;

3) grant research into the scientific foundations of the forensic science;

4) incentives for independence from law enforcement;

5) research on cognitive bias and mechanisms to avoid it;

6) standards of practice;

7) mandatory accreditation of laboratories and certification of practitioners;

8) quality assurance and quality control;

9) a code of ethics;

10) support of graduate school education for forensic science students and continuing legal education for law students, practitioners, and judges;

11) replacement of coroner offices with medical examiner systems;

12) interoperability of fingerprint databases; and

13) integration of forensic science practitioners into the homeland security first responder community.

In 2010, the White House formed a Forensic Science Subcommittee of the Committee on Science within the Office of Technology and Science Policy.

This subcommittee has created five interagency working groups: Education and Ethics; Accreditation and Certification; Outreach and Communications; Research, Development, Testing and Evaluation; Standards, Practices, and Protocols.

The federal executive branch can implement recommendations for itself, but not for the states, and can make recommendations to Congress. The legislative branch has also responded to the NAS report. Senator Patrick Leahy (D-Vermont), Chair of the Senate Judiciary Committee, submitted a bill entitled the Criminal Justice and Forensic Science Reform Act in January of 2011. This is the first bill proposing broad regulation in the U.S. Specifically, it creates: 1) an Office of Forensic Sciences which supports the Forensic Science Board, 2) creates forensic science discipline-specific committees supported by the National Institute of Standards and Technology, 3) mandates certification of practitioners and accreditation of laboratories, 4) develops standard practices, and 5) funds grant programs to support the scientific foundations and innovations.

These various efforts will be discussed.

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# THE WORK OF THE IRCT/IRCT NETWORK TO PROMOTE MEDICAL DOCUMENTATION OF TORTURE THROUGH TRAININGS, ADVOCACY AND SUPPORT TO STRATEGIC IMPACT LITIGATION" (OVERVIEW)

**Author(s):** Önder Özkalipci [1]; Susanne Kjaer[2]; Miriam Reventlow[3]

**Institution(s):**[1]FORENSIC PHYSICIAN; [2]MSc IN POLITICAL SCIENCE; [3]LAWYER, LLM

**Abstract:** The International Rehabilitation Council for Victims of Torture, Copenhagen, International humanitarian law obliges States to investigate alleged crimes of torture and to bring perpetrators to justice. However, many cases of torture still go unpunished, partly owing to lack of skills and knowledge in the health and legal professions in the field of investigation and documentation of torture.

The IRCT is engaged in a process to increase the provision and use of high quality forensic documentation in legal proceedings for alleged torture cases. A panel of experienced forensic experts, psychologists and psychiatrists has been established to serve as a reference point, provide advice on technical issues and participate in missions to examine torture survivors and assist with bringing cases to court.

The group has developed a manual of prcedures and standards to guide the conduct of medical investigation missions and expect to perform at least 15 such missions in the coming years. The experts will also continue to advocate for the increased use of medical evidence and contribute to the development of a body of knowledge on the subject of forensic documentation. The experiences derived from this project will be shared with the audience.

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# THE PHILIPPINES: THE USE OF THE ISTANBUL PROTOCOL IN DOCUMENTING ALLEGED CASES OF TORTURE

**Author(s):** Benito Molino

**Abstract:** In the Philippines where the society and the people arrested by the armed agents of the state consider torture as part and parcel of getting arrested, investigated or invited in police stations or military camps, the achievement of a society: where there is freedom against torture; where the police and other armed agents of the state respect this freedom; and the people will stand-up for this freedom is still a vision.

The struggle for the upholding of this freedom dates back to the martial law government of the deposed and late Pres. Marcos in the 70s. In 1986 when the new government (Pres. C.C. Aquino), ratified the CAT, various attempts to have an enabling law against torture failed until November of 2009 when a bill was finally signed into law by former Pres. G.M. Arroyo. The Implementing Rules and Regulation which included the documentation format of the Istanbul Protocol was finalized and enforced a year after. The IP, an internationally acknowledged documentation tool for alleged cases of torture has been introduced in the Philippines at the turn of the century by training medical doctors in public health and medico-legal practitioners in the government's investigation agencies on the recognition, documentation and reporting cases of torture. But the trainees coming from investigative agencies of the government are still adamant to use the IP. This is the challenge to the advocates of torture-free Philippine society.

However, with the Supreme Court's landmark decision on the Writ of Amparo in October 7, 2008, where they cited a medical documentation of an alleged case of torture using the Istanbul Protocol, there is a glimmer of hope at the end of the tunnel

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# THE USE OF FORENSIC MEDICAL EVIDENCE IN THE ASYLUM DETERMINATION PROCESS (OVERVIEW)

**Author(s):** Joost den Otter

**Institution(s):** PHD MD PUBLIC HEALTH SPECIALIST

**Abstract:** The 1951 Geneva Convention clearly states the obligation of the State to offer protection as soon as someone flees his or her own country on a well-founded fear. Most people who flee seek protection in a neighbouring country. Less than five percent proceed to countries further away and only a few of these with the assistance of international organisations like the UNHCR. Amongst those people who seek refuge further away from their home country, quite a number - approx. 10 - 30 % - have been subject to torture in their countries of origin. For these the asylum proceedings may pose particular challenges due to the trauma they have experienced. Yet practice shows, for instance, that instead of viewing inaccuracies and inconsistencies as signs of possible medical complications due to acts of persecution asylum claims are often rejected for being considered "inconsistent" and for that reason "manifestly unfounded".

An early identification and documentation of medical complaints following torture or ill-treatment will, other things equal, result in improved quality of the decision-making process based on increased and more professional information, and in a decrease in subsequent procedures to correct previous incomplete asylum determination procedures. Besides, importantly, adding to preventing unnecessary health loss on the part of the asylum seeker. In this [presentation/workshop] we will address the value of forensic examination of asylum seekers in the refugee determination process.

A number of case examples will be highlighted, and a review of the current literature will be presented together with an overview of countries where legislation exists as to the use of (forensic) medical evidence in the asylum process. Furthermore, we will elaborate on the recommendations of the UN Committee on Torture and other relevant bodies on the use of the Istanbul Protocol in the asylum determination process.

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# TORTURE VICTIMS EXAMINED AT THE INSTITUTE OF FORENSIC MEDICINE, UNIVERSITY OF COPENHAGEN, 1995-2010

**Author(s):** Steen Holger Hansen

**Institution(s):** [1]FORENSIC PATHOLOGIST, UNIVERSITY OF COPENHAGEN, DENMARK

**Abstract:** Definition of torture: The deliberate, systematic or wanton infliction of physical or mental suffering by one or more persons acting alone or on the orders of any authority, to force another person to yield information, to make a confession, or for any other reason. (Declaration of Tokyo, 1975). The purposes of the clinical examination are to recover and preserve medical evidence, related to the alleged torture to help in any potential prosecution of those responsible, to obtain redress for victims and to help the authorities in cases of asylum application.

The Institute of Forensic Medicine in Copenhagen performed from 1995 to the end of 2010 a total of 256 examinations of persons claiming to be inflicted of torture. The Danish Immigration Service, in processing cases of asylum application, requested all the examinations. The examinations are initiated with and interview to obtain information of the inflicted torture and the person's medical history.

This is followed by a physical examination, and sometimes further examination by radiologists, dentists or other specialists. Finally a psychiatric examination is carried out to reveal a possible posttraumatic stress syndrome The results and conclusions of the examinations and some cases will be presented.

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# EDUCATION AS THE FOUNDATION OF GLOBAL FORENSIC SCIENCE

**Author(s):** Max Houck

**Institution(s):** ANSER, VIRGINIA, USA

**Abstract:** Although the application of forensic science may vary by political jurisdiction and laws, the science of forensic science needs to be universally grounded in theory, principles, and methods. If the scientific truth varies by jurisdiction, then forensic science, as a discipline, is as negligent and incompetent as its worst critics describe it. Concepts of science, quality, and performance all begin with a sound, comprehensive education in the sciences—forensic science is no different. Efforts at standardization and accreditation of forensic science educational programs have been successful in the US and the UK; the interest in and subsequent volume of forensic educational programs have necessitated this approach. For the rest of the world, the question remains: Is accreditation necessary? If not, then can the discipline achieve standardization of its science through laissez-faire cooperation or is a more stringent approach required? This presentation will discuss these issues and offer a hopeful outlook for the collaborative efforts in codifying forensic science education.

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# HOW CAN EDUCATION AND RESEARCH HELP TO SOLIDIFY AND STANDARDIZE FORENSIC MEDICINE?

**Author(s):** Philip Beh

**Institution(s):** DEPARTMENT OF PATHOLOGY, THE UNIVERSITY OF HONG KONG

**Abstract:** There is a vast disparity in the way clinical forensic medicine and forensic pathology is or is not taught throughout the world. The presence or absence of forensic medical education appears to have no positive correlation with the availability of quality forensic medical expertise and services. There is also little attempt to reach an international consensus of what training is required and for how long before a person can be considered as a trained forensic medical doctor. To complicate the issue further, there is a further difference between how forensic pathology, clinical forensic medicine and legal medicine is organized and practiced.

This presentation will attempt to propose a skeleton that can be taken as a basic blueprint to ensure commonalities and hence take a step towards standardization. It will also discuss how forensic medical research needs to be reorganized to regain relevance and make an impact.

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# WHY EFFECTIVE MANAGEMENT OF A FORENSIC SCIENCE LABORATORY IS IMPOSSIBLE

**Author(s):** William Tilstone

**Institution(s):** FQS, UNITED KINGDOM

**Abstract:** Effective management, whether we follow the philosophy of Drucker's Management by Objectives and Management by Walking About, or Deming's people and systems approach, comes down to organising and controlling resources to give customers the product or service that they want at a cost that they are willing to pay. Forensic science fails miserably because it lacks a defined customer, is an arcane and marginal area of public service, and has painted itself into a corner by an excessively reactive attitude to the quality of its service provision. Examples that will be presented to demonstrate the problems include the exercise of power by the justiciary without consideration of the resource implications of their decisions, the total lack of understanding of bureaucrats (especially those in law enforcement) about the absolute need to fund RD and professional development, the tendency to move to inspecting-in quality, the prevailing culture of defensiveness engendered by the combination of the adversarial system of justice and the absence of anything like academic freedom where controversial matters can be openly discussed without views expressed returning at trial to damage your evidence and reputation, and the inevitable tensions in an activity whose deliverable is an opinion. Who could manage service delivery in such circumstances? Who would want to?

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# MANAGEMENT AND IMPROVEMENT OF FORENSIC SCIENCE SERVICES IN THE 21ST CENTURY.

**Author(s):** Max Houck[1]

**Institution(s):** ANSER, VIRGINIA, USA

**Abstract:** Forensic science faces difficult political, process, and scientific obstacles. Politically, forensic laboratories have many masters and are expected to serve them all equally while remaining neutral. As a process, forensic laboratories convert evidence into information; their raw materials (crime scenes) may be of questionable quality (with few controls) but the laboratories are expected to operate at a better-than-Six-Sigma level (fewer than 3.4 defects per million products). Scientifically, forensic many forensic methods have been developed outside the traditional research-development-validation stream of traditional science. Additionally, managers of scientific laboratories see themselves as scientists first and managers second; consequently, they tend to devalue the managerial aspects of their jobs. Forensic laboratory managers are no different but the stakes may be much higher given the importance of quality science to the criminal justice system. Forensic science methods, ethics, and reliability are increasingly questioned. The need for training and support in forensic laboratory management has been recognized for many years but little has been done to transition the tools of business to the forensic laboratory environment.

This presentation will discuss pathways for improvement of forensic science services in the 21st century, including proven methods of quality, management, and leadership. Using examples from Deming, Mintzberg and Drucker, among others, a platform for forensic managers to work from will be offered.

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# FROM CIA TO CSI: APPLYING INTELLIGENCE COMMUNITY TOOLS TO FORENSIC SCIENCE.

**Author(s):** Lesley Rockwell

**Institution(s):** Henley-Putnam University

**Abstract:** Forensic scientists and intelligence analysts have a lot in common: on a daily basis, practitioners in both groups must answer questions that require them to know the unknowable. For intelligence analysts, knowing the unknowable helps them forecast future events: will a terrorist group attack? For forensic scientists, knowing the unknowable helps them better understand the past in order to solve crimes: who committed this murder? The information that forensic scientists and intelligence analysts need to perform their vital roles effectively is unknowable for many reasons. Crimes, like threats to national security, are complex social situations that are often difficult for scientists and analysts to discern, often because information is kept secret by criminals or intelligence targets.

Moreover, these practitioners' ability to apply logical, critical thinking to these questions are negatively affected by biases inherent in human thought processes. Intelligence analysts have developed analytic tools and techniques to help them answer national security questions more effectively; in essence, to help them better "know the unknowable."

If forensic scientists are willing to reach across the borders of their discipline into the realm of the intelligence analyst, these critical thinking and reasoning tools could help them answer questions about crimes more effectively and accurately.

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# COMPUTER SOFTWARE INVASION OF ACCIDENT RECONSTRUCTION AND THE RISK THAT IT BRINGS: CRASH3 TO PC-CRASH

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**Abstract:** The use of computers to analyze motor vehicle collisions is traceable to Calspan, established by the US aircraft industry at Cornell University during WWII. Calspan's extension into the automobile-safety field in the 1950s followed from its decade of aircraft-safety work. Eventual fruits of the later work include CRASH (Calspan Reconstruction of Accident Speeds on the Highway) and SMAC (Simulation Models of Automotive Collisions), computer programs developed under contract to the U.S. National Highway Traffic Safety Administration. CRASH and its progeny provided a means of estimating impact velocities, while SMAC and its progeny provided a means of determining the goodness of these estimates.

By the late 1970s a number of private companies had modified the input and output stages of these programs so as to make their analytical power available at low cost to anyone with what were then called micro-computers. By the mid-1980s these derivative programs saw broad use and misuse in civil and criminal litigation in the US and other countries. Indeed, they continue to appear occasionally, though much more powerful accident-reconstruction programs have emerged, programs that permit an immense amount of vehicle data and crash information to be made used in simulating crashes. Of the current applications dominating the field, one (HVE, for Human, Vehicle, Environment) can be traced directly back to the Calspan work of forty years ago. This is also true of a few other commercial applications of less prominence at this time. Other powerful modern crash-simulation programs have been built on their own platforms. These include in particular PC-Crash.

Following its launch in Austria in the mid-90s, it seems to have spread to all continents where people are paid to carry out terrestrial vehicle crash analysis. HVE also has a very widely distributed user base. Unlike HVE, which makes use of both crush damage and momentum conservation to calculate speeds, PC-Crash is essentially momentum-based. Furthermore, where HVE carries its analysis into the 50 ms or so of the crash itself, the period during which the vehicles are exchanging momentum, PC-Crash treats the crash impulse as having zero duration.

Other highly sophisticated reconstruction programs, based on various physical models, have emerged, though not had achieved such broad distribution. At least one, the German CARAT, post-dates PC-Crash. Efforts have been made over the years to "validate" the respective programs by comparing their results with results from staged crashes. To a certain extent, especially in recent years, these efforts have been successful, through rarely to the level claimed by the program vendors. Ultimately, inaccuracies in these programs should not create problems in litigation, given that the legitimate uses of these programs are limited to help analysts to check their work and to generate animations (aka scientific visualization) of the analysts' results obtained through application of basic physics. No matter how impressive "validation" test results may become, for reasons related to chaos theory the computer analysis can never be used alone. Unfortunately, through ignorance or deliberately, some persons actually proffer the computer simulation as the analysis, even in court under oath. Extending the misfortune, there are judicial fact-finders who, in their innocence of the limitations of computer programs, accept this proffer, permitting it to affect the outcome of litigation. In addition to this major error, there are smaller ones where witnesses misapply modules within the program.

What follows is a contrast and comparison of the major and some minor accident reconstruction programs, with an effort to highlight the hot spots for misuse in the respective programs.

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# DEVELOPMENTS AND CHALLENGES IN THE 21ST CENTURY (IOFOS SCIENTIFIC SESSION)

**Author(s):** Tore Solheim

**Institution(s):** UNIVERSITY OF OSLO, NORWAY

**Abstract:** This seminar is based on IOFOS' recommendations for quality assurance. Prof Solheim, Norway will introduce the concept of quality assurance and the reasons for implementing certain measures. This will be followed by a brief discussion regarding IOFOS recommendations and how they were compiled. A discussion outlining the recommendation for DVI identification will also be included. Professor Herman Bernitz, South Africa, will continue to discuss tooth mark examinations in relation to IOFOS recommendations. He will elaborate on the broader aspects of quality assurance which include adequate training, competent refereeing of manuscripts, research methodologies, crime scene investigations, case selection, tooth mark analysis and reporting. Dr Patrick Thevissen, Belgium; will continue with the discussion of cases of age estimation and his view on the IOFOS recommendation. Finally, the participants are invited to a general discussion and possible group work on specific problems in forensic odontology and how IOFOS should help forensic odontologists in quality assurance in the future. Especially, the future work with and revision of the recommendations for quality assurance will be discussed. It is not an easy task with regional, national and personal differences.

Also forensic odontologists usually have a strong opinion of how to handle cases. It is a challenge to unite all these differences under the general recommendation of IOFOS. A discussion of where IOFOS should go in the future is warranted.

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# QUALITY ASSURANCE IN FORENSIC ODONTOLOGY: DEVELOPMENTS AND CHALLENGES IN THE 21 ST CENTURY

**Author(s):** Patrick Thevissen[1]; Herman Bernitz[2]

**Institution(s):** [1]CATHOLIC UNIVERSITY OF LEUVEN; [2]DENTAL SCHOOL OF PRETORIA

**Abstract:** This seminar is based on IOFOS' recommendations for quality assurance. Prof Solheim, Norway will introduce the concept of quality assurance and the reasons for implementing certain measures. This will be followed by a brief discussion regarding IOFOS recommendations and how they were compiled. A discussion outlining the recommendation for DVI identification will also be included. Professor Herman Bernitz, South Africa, will continue to discuss tooth mark examinations in relation to IOFOS recommendations. He will elaborate on the broader aspects of quality assurance which include adequate training, competent refereeing of manuscripts, research methodologies, crime scene investigations, case selection, tooth mark analysis and reporting. Dr Patrick Thevissen, Belgium; will continue with the discussion of cases of age estimation and his view on the IOFOS recommendation. Finally, the participants are invited to a general discussion and possible group work on specific problems in forensic odontology and how IOFOS should help forensic odontologists in quality assurance in the future. Especially, the future work with and revision of the recommendations for quality assurance will be discussed. It is not an easy task with regional, national and personal differences. Also forensic odontologists usually have a strong opinion of how to handle cases.

It is a challenge to unite all these differences under the general recommendation of IOFOS. A discussion of where IOFOS should go in the future is warranted.

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# AMA GUIDES TO THE EVALUATION OF PERMANENT IMPAIRMENT (6TH EDITION) AND THE FORENSIC EVALUATION OF PERMANENT IMPAIRMENT

**Author(s):** Mohammed Ranavaya

**Institution(s):** MARSHALL UNIVERSITY SCHOOL OF MEDICINE, USA

**Abstract:** The newly revised AMA Guides to the Evaluation of Permanent Impairment, Sixth Edition, from the American Medical Association (AMA) is the new international standard to define impairment and is the most commonly used tool for Impairment and Disability evaluations/management in the personal injury claims.

The new AMA Guides 6th edition emphasizes the standardized methodology that is applied to each chapter to enhance the relevancy of impairment ratings, improve internal consistency and promote ease of application to the rating process. The sixth edition applies both terminology from and an analytical framework based on the International Classification of Functioning, Disability and Health (ICF), to generate five impairment classes, which permit the rating of the patient, from no impairment to most severe. Using the latest scientific research of the 21st Century, the evidence based diagnosis approach and clinical tests, and objective medical opinions provided by internationally recognized experts the new AMA Guides offers the forensic examiner the ability to make a decision that are both transparent and reproducible.

The lecture is designed for a multi-disciplinary audience. Anyone involved in performing, reviewing or managing forensic evaluation of permanent impairment would benefit from attending this high quality educational presentation.

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# PERMANENT IMPAIRMENT RATING IN THE ERA OF ICF

**Author(s):** François Sestier

**Institution(s):** UNIVERSITY OF MONTREAL, QUEBEC, CANADA

**Abstract:** Impairment rating has been used for many centuries for the compensation of lost body structure or function. This concept that society should compensate for the lost body integrity has resulted in a lump sum of money; this sum is never as high as the claimant would like, but is regulated by the money one society agree to pay for this loss. The first impairment rating systems were purely anatomical, and did not look at the residual functioning abilities of the injured individual.

Then came the ICIDH linear model of impairment; an accident caused a physical loss (impairment), this impairment altering the personal, social and vocational functioning of the injured invidual (disability). Then new impairment rating scales appeared at the end of last century, both in Europe and North America, based more on residual functions assessment than on the anatomical loss. Introducing a measurement of residual function means to define the way to measure the function; this exercise is easy in Cardiology, Pneumology, Nephrology, where objective tests are available to measure the organ residual degree of function, this being more difficult for some other medical conditions. The first step is to define the maximum rating for the total loss of one function, and then find objective tools to separate classes of impairment rates. The WHO ICF classification came in 2001, and created 5 classes of losses: none, mild, moderate severe and very severe.

The ICF bio-psycho-social model of impairment looked at restrictions to activity and participation, rather than to the functional limitations, a more positive look at disablement. The ICF model also included in the disability assessment personal and environmental factors.

The motivation of the injured individual, as well as the accomodations offered by his social and professional environment then became key factors altering the degree of disability. The US Insititute of Medicine model of impairment went even further, at the request of the US Veteran Affairs Administration; they included for their injured Veterans disability evaluation, not only personal and environmental factors, present in the ICF disability assessment model, but also a measure of the quality of life of the injured individual. This evolution of disability assessment models makes the societal compensation for a structural or funtional loss very different according to the coping capacities and the environmental ressources of the injured individual. Permanent impairment rating slowly became a disability assessment rating, a very important paradigm shift.

This evolution from a pure impairment rating towards a disability rating scale is a gain for the injured individual; but this paradigm shift also affects the distinction between non economic losses and future economic losses, the NELs and FELs. The medical expert should be aware of this evolution in the measurement of permanent impairment tools and use the appropriate rating system, depending of his mandate and his degree of freedom regarding his choice of a rating model.

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# DENTAL TRANSPLANT AND ODONTOLOGICAL IDENTIFICATION

**Author(s):** Guy Collet, Christophe Rallon

**Institution(s):** AFIO, FRANCE

**Abstract:** Dental transplant, despite it remains unusual, is sometimes performed. This practice, which consists in removing a tooth from one site to another, creates a dramatically new situation; a missing tooth on antemortem odontogram, suddendly reappears postmortem. However, when considering the specific situation of odontological identification, this " new natural tooth " can be either a major advantage or a strong disadvantage. Complete ante-mortem and post-mortem data are more than necessary but how will react a software such DVI software?

Based on those elements, the notions of absent tooth and present tooth have to be reconsidered.

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# COMPARATIVE IDENTIFICATIONS IN MASS DISASTER, FROM "PAPER" DOCUMENTS TO PLASS DATA DVI SYSTEM SOFTWARE

**Author(s):** Dominique Berger; Charles Danjard

**Institution(s):** AFIO, FRANCE

**Abstract:** In june 2009, during the identifications of victims of the victims of the Airbus A330 crash, Air France flight 447 from Rio de Janeiro to Paris, brazilian experts have used for the first time the Plass data DVI System.

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# EARTHQUAKE IN HAÏTI, A DVI TEAM EXPERIENCE

**Author(s):** Dominique Berger

**Institution(s):** AFIO, FRANCE

**Abstract:** On January, 12th 2010 an earthquake occured in Haiti . two forensic odontologists from France, Henri-Philippe Rateau et Dominique Berger joined the « unite nationale d'identification des victimes de catastrophe » which includes the Scientific Police Department, Crime Research Institute of the Gendarmerie Nationale, Medical doctors and dentitsts from the army. In Haiti, experts were responsible for identifying bodies extracted from different selected sites. Areas around were dramatically insecure due to both geographical and politcal unstabilities.

Based on the work done by the premortem and post mortem teams, french bodies were identified. We hereby present some examples of that work.

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# ORAL SESSION

## Session 14.1

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# MACROSCOPICALLY DETECTED GENITAL INJURY AFTER CONSENSUAL AND NON-CONSENSUAL VAGINAL PENETRATION IN WOMEN OF REPRODUCTIVE AGE: A PROSPECTIVE STUDY

**Author(s):** Lincoln C[1]

**Institution(s):**[1]CLINICAL FORENSIC MEDICINE UNIT, GOLD COAST, QUEENSLAND AND UNIVERSITY OF WESTERN AUSTRALIA, PERTH

**Abstract:** Despite a substantial body of work in the area over the last 20 years, significant questions remain about the use of medical evidence such as genital injury, to assist the courts in relation to the issue of consent in sexual assault trials. Variation in methods of genital examination across jurisdictions limits the application of research to date, especially where macroscopic genital examination of sexual assault complainants remains routine. This paper will present the results of a prospective study comparing prevalence, typology and pattern of macroscopically detected genital injury in two groups of women of reproductive age; those attending for routine gynaecological examination in a primary care setting who report recent consensual vaginal penetration, and those undergoing forensic examination after reporting recent non-consensual vaginal penetration to police. Both groups of women were examined macroscopically by forensically trained and experienced doctors. Principles of genital injury causation during vaginal penetration and factors associated with it also be discussed.

**Keywords:** Genital Injury; Consent; Sexual Assault; Macroscopic Examination

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# GENITAL LESIONS AFTER CONSENSUAL SEXUAL INTERCOURSE: THEY ARE FREQUENT AND THEY LAST FOR SEVERAL DAYS

**Author(s):** Astrup B[1]; Ravn P[2]; Lauritsen J[3]; Thomsen J[1]

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**Introduction:** The significance of genital lesions in victims of rape is currently under debate in many countries. Legal experts are pointing at the lack of comprehensive knowledge of lesions sustained during consensual sexual intercourse as a key problem. The aim of this study was to provide insight into the duration of lesions, frequency of lesions seen with different investigative techniques and to identify pitfalls in the diagnosis of lesions.

**Materials and Methods:** 98 women were examined within 48 hours of consensual sexual intercourse using the naked eye, the colposcope and toluidine blue dye application. 50 of the women were re-examined after 3 or 4 days and again after 6 or 7 days, and Kaplan-Meier plots of the duration of lacerations were produced.

**Results:** Lacerations were the most frequent lesion seen with all three techniques, seen in 31%, 41% and 49% of participants, respectively. The median survival time for lacerations was 24 hours (n=19) seen with the naked eye, 40 hours seen with the colposcope (n=28) and 80 hours seen with toluidine blue dye (n=26). Several important pitfalls in the diagnosis of lesions using the three techniques were identified. We propose a model for the interpretation of lesions

**Conclusions:** Lesions are frequently seen after consensual sexual intercourse and they last for several days. Interpretation of genital lesions is not straightforward and care must be taken in both research and praxis to make the right conclusions.

**Keywords:** Genital Lesions; Consensual Sexual Intercourse; Colposcope; Toluidine Blue Dye; Duration

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# PEER REVIEW FOR ALLEGED CHILD SEXUAL ABUSE BY VIDEO-CONFERENCING

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**Institution(s):**[1]FACULTY OF FORENSIC AND LEGAL MEDICINE, ROYAL COLLEGE OF PHYSICIANS

**Abstract:** Peer review of intimate images in cases of alleged child sexual abuse is recognised as best practice. This presentation will describe the use of secure video-conferencing between two Sexual Assault Referral Centres in the United Kingdom where peer review has been established between these centres. The problems, pitfalls and benefits of the arrangement will be described.

**Keywords:** Peer Review; Intimate Images; Child Sexual Abuse

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# SEXUAL ABUSE AND DRAWING TESTS

**Author(s):** Özmen G[1]; Yilmaz A[1]; Yalçin MA[1]; Kasikçi G[1]; Akkapulu F[2]; Yorulmaz AC[3]

**Institution(s):**[1]ISTANBUL UNIVERSITY, INSTITUTE OF FORENSIC SCIENCES, ISTANBUL, TURKEY; [2]ISTANBUL CHILD AND ADOLESCENCE COUNSELLING CENTER, ISTANBUL, TURKEY; [3]ISTANBUL UNIVERSITY, CERRAHPASA MEDICAL FACULTY, DEPARTMENT OF FORENSIC MEDICINE, ISTANBUL, TURKEY

**Abstract:** Child abuse and neglect, still continuing to be a universal problem, leaves physical and psychological damages that negatively affect well-being and life-long development of exposed children. Abuse is in different types like physical, emotional, sexual and economic. When an adult uses a child for sexual stimulation or satisfaction, this is considered sexual abuse like child prostitution or child pornography. Possible consequences of sexual abuse can be examined mainly in the following categories; effects on sexuality, emotional effects, effects on depressive mood, effects in the form of anxiety, effects on behavior, and effects on personality development. Sexual abuse of a child is usually accompanied by such traumatic dynamics as traumatic sexuality, a feeling of guilt, powerlessness, and stigmatization. The most common behavioral response of sexually abused boys is the development of aggressive behavior. In the case girls, the most common behavioral responses are a sense of inferiority and self-harming behaviors. A child conveys his feelings, inner-world signals, and unconscious wishes through his drawings. For this reason, it is an indispensable tool in the field of child psychology. Projective tests have been known for many years to contribute significantly in clinics in the assessment of mental functioning. When a symptom occurs as an expression of spiritual conflict and the origin is not obvious, then naturally there is a need for tests. The symptom is the expression of the child's distress in a coded language. The tests help resolve this code. The purpose of use of projective techniques is by analyzing a persons mental functioning to make him aware of his mental articulations, variation capacities, and the existence of mental behaviors that may arise. Karen Machover requires that human drawings as projective methods be applied in individual sessions. In addition, the results should not be used as final accurate data but instead as enriching clues that will help understand the mental process. In the drawing studies conducted with sexually abused children, it is noted that children quickly draw an image without showing attention to details. Kelley identified that these children can draw images showing mostly upper half of the body. While these children in their drawings emphasize the details of face and upper part of the body, they omit the lower half of the body. These children can even find it relaxing and hypnotic to shadow some part of their drawings. Many authors have observed that usually children did not draw images of reproductive organs or special places that may be indicative of sexual abuse. In assessing criminal cases involving sexual abuse against children, drawing methods are very helpful as they are believed to express children's inner-world and are used as a communication tool by the children. With the help of the drawings, changes in a child's suppression mechanisms and super-ego structuring are determined. The purpose of this paper is to analyze usability and effectiveness of drawing method in child sexual abuse cases. Drawing tests were applied on two groups. First group consisted of 10 children aged between 12-15 who were victims of sexual abuse and live at BSRM which is under the supervision of Social Services and Child Protection Agency. Second group consisted of 10 children aged between 12-15 who were not victims of sexual abuse and live with their families. After preliminary meetings with the children, they were asked to draw "a human", "a tree", and "a family" pictures respectively on a blank white A4 paper. They were provided with dry paint supplies, pencils, erasers, pens, razors and scissors. Once the child had finished the drawings, questions from a previously prepared list were asked to the child. In this study, "Draw A Human Being Test" form was used.

**Keywords:** Sexual Abuse; Child Abuse; Projective Drawing Tests

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# THE ATTITUDE OF PROFESSIONALS TO FALSE ALLEGATIONS OF CHILD SEXUAL ABUSE IN TURKEY

**Author(s):** Sanal Y[1]; Gonultas B[1]; Guchan AS[1]; Sayici B[1]; Firat C[1]; Karadeniz H[1]; Demircan YT[1]

**Institution(s):**[1]ISTANBUL UNIVERSITY INSTITUTE OF LEGAL MEDICINE AND FORENSIC SCIENCES

**Abstract:** Allegations of child sexual abuse have serious consequences for individuals and society. Therefore it is very important to determine if an allegation of child sexual abuse is true or false. Such false allegations leads to severe traumatic effects on childrens and also the ones who are exposed this false allegation. When there is insufficient supporting evidence to determine whether an allegation of child sexual abuse is true or false, the intention of the professionals (police officers, lawyers etc.) are to suppose that it is true. For that reason, most of the child sexual abuse cases are resulting with a conviction although there is no physical or medical evidence. In Turkey, 7,000 children abused in 2010 and the last 10 years the number of sexually abused children were found to be approximately 250,000 and child sexual abuse is sentenced to 8-15 years in prison by Turkish Criminal Code. In this study, to question the reliability of the statements given by children, a questionnaire is applied to police officers, lawyers and social workers in juvenile courts. The aim of the study is to evaluate the attitude of professionals to reliability of the child testimony which is often the only evidence.

**Keywords:** False Allegation; Child Sexual Abuse

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# ANALYSIS OF DOCUMENTED LESIONS AND TYPES OF VIOLENCE IN MEDICO-LEGAL RAPE REPORTS FROM THE DEPARTMENT OF FORENSIC MEDICINE, COPENHAGEN IN 2007

**Author(s):** Scherer S[1]; Hansen SH[1]; Lynnerup N[1]

**Institution(s):**[1]DEPARTMENT OF FORENSIC MEDICINE; UNIVERSITY OF COPENHAGEN

**Introduction:** We present basic forensic pathological data on rape victims, focusing especially on details about type of sexual assault reported and observed lesions.

**Materials:** The study was based on 197 medico-legal reports during the year 2007. 184 were women over 12 years who were examined at the request of investigating police authorities. All examinations were performed by a physician with special training in forensic medicine. The mean age of the victims was 20 years. 76% were under the age of 30 years.

**Results:** Lesions were observed among 59% of those who reported violence against their body and documented at the examination in 69% of those who did not report violence. 32% of the examined women had lesions distributed on the body and no lesions in the anogenital area and 47% of all the examined women had lesions in the anogenital area. Among these 15% had lesions only in the anogenital area and 32% had lesions on both body and in the anogenital area. 2/3 of the women reported penetration as the type of sexual assault. 66% only reported vaginal penetration, 11% both vaginal and anal penetration and 15% reported anal penetration only or together with vaginal and/or oral penetration. 75% of the women who reported anal penetration had anogenital lesions and those who reported only anal penetration all had anogenital lesions. Of all types of lesions 46% had 1-5 lesions. In these cases the assailant was a stranger or first contact in 49%. The assailant was also a stranger or first contact in 50% of the cases where the women had more than 20 lesions.

**Discussion:** We found a slightly higher rate of anogenital lesions than reported in other studies. The rate of reported anal penetration has increased, suggesting that the type of penetration is changing. We found, as in other studies, that 1/3 of the examined women had no lesions. It is still debatable whether the documented lesions can be an indicator of the gravity of the violence used. The severity of the anogenital lesions documented in the medico-legal rape reports was not graded as the lesional severity on the body. Therefore it is difficult to compare these parameters and it is still unknown how often consensual vaginal or anal penetration leads to lesions.

**Conclusions:** We found that sexual assault, including anal penetration in a majority of cases will lead to anogenital lesions and sexual assault with only anal penetration leads to anogenital lesions in all cases. The same tendency is seen in other studies. If the assa

**Keywords:** Lesions; Violence; Rape Victims; Sexual Assault Type

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# DIFFICULTIES IN CLINICAL AND FORENSIC DIAGNOSTIC OF CHILD ABUSE IN AN ITALIAN HOSPITAL ENVIRONMENT

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**Abstract:** Child abuse is one of the most frequent diseases of the childhood in Italy. In 2009 only 492 child sexual abuse were reported to law enforcement and judicial authorities (ISTAT 2009). The detection, diagnosis, care and treatment of the child abuse are intricate problems where are mixed medical, psychological, social and forensic issues all together. It was only 30 years ago that the medical community began to develop an increased awareness of child sexual abuse, and the role of the medical comunity in the evaluation of abused children has evolved significantly. However, there is still a natural hesitance to report child abuse, but clinicians have an ethical, moral and juridical obligation to address this issue. The forensic evaluation of child offenders is a very complex task. The diagnostic value of the medical examination, where the specificity of the objective findings is detectable in over the 90% of the abused children, makes essential an multidisciplinary evaluation. The evaluation process should consider: childrens motivation to deceive during forensic assessment; their perception of the assessment process and its influence on their deceptive tendencies; parental issues related to dissimulation among children and the induction of false memories (Romi JC, 2005). If abused children are to be examined in hospital emergency departments, a protocol should be developed to ensure rapid, thorough, uniform, and caring evaluation. Since 2007, the Azienda Ospedali Riuniti Ancona, activated an educational course on this issue followed by a multidisciplinary work to build up a protocol which was performed since September 2007. This protocol provides the constitution of a "Crisis Unit" for the children abuse. The observed cases in our hospital since 2007 to date are 22, of which 7 male and 15 female, 19 were accepted in Emergency department and 3 were accepted in the ward. 10 of these cases were maltreatment and 12 suspected for child abuse. The boys were mostly victims of maltreatment respect the child sexual abuse (71% vs. 29%), while in the girls the prevalence of these findings were inverted (33% vs. 67%). Following the multidisciplinary approach, activate by the Crisis Unit, 59% of the cases of suspected child abuse/maltreatment were reported to the court. In this work were discussed problems, errors and pitfalls in the diagnostic of child abuse. Our experience shows that quality of evaluations for sexual abuse of children may be improved by constant participation in continuing medical education courses with regard to sexual and maltreatment abuse of children.

**Keywords:** Child; Sexula Abuse; Maltreatment; Forensic

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# MEDICAL EVALUATION PROCEDURE FOR THE VICTIM OF ASSAULT WITH INTENT IN CHINA

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**Abstract:** The cases of violence with intent occure widely in world. Medical evaluation procedure for the victim of assault with intent is dissimilar in every country, since the difference of national judicial systems. It has special character in medical evaluation procedure of the victim in China. First of all, The clinical physician only assume diagnoses and treatment of the victim of assault, not evaluate the serious degree of injury, which determining the accusal and penalty. Forensic medicine experts evaluate the serious degree of the victim injury. The medical history by clinical doctors will be used for the basal witness of forensic medical evaluating. The medical history consist of physical inspection description, the result of medical assay and accessorial inspection, clinical diagnoses, etc. The second is that the serious degree evaluation of injury is commission by police. Two forensic medicine experts or more examine the victim and issue the report about the serious degree of injury. The format and content of report must comply with the law. The content include preliminary remarks(victim name, sexual, birthday, commission organization, examination date, medical documents, etc.), case summary, medical history summary, forensic medical examination result, analysis, conclusion, ending(signature, forensic organization signet, report date, etc.) The third is that the serious degree evaluation of injury must stand by the law criterion, which divide into severe injury ("The standard of humans severe injury evaluation"), moderate injury("The standard of humans moderate injury evaluation"), slight injury and under slight injury("The judgment of human's slight injury"). The forensic medical experts will issue conclusion of serious degree according as injury, syndrome and sequelae. The forth is that the police will determine whether to accuse suspect of assault crime with intent according as the report of forensic medical experts and case property. If the conclusion of forensic medical experts evaluation is moderate injury or severe injury, the suspect will be charged with penal offense. Then the case will be tried at criminal court. If the conclusion of forensic medical experts evaluation is slight injury or under slight injury, the suspect will not be charged with penal offense. The case will be tried at civil court.

**Keywords:** Medical Evaluation Procedure; Serious Degree Of Injury

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# SEXUAL OFFENCES UNDER 18 YEARS OF AGE: ANALYSIS OF INTRA AND EXTRA-FAMILIAR CASES AT LISBON - CIRCUMSTANCES AND TYPES OF ABUSE

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**Introduction:** Intra-familiar sexual offences are known to have an earlier onset and to be characterized by a closer relationship between the complaint and alleged abuser, translating into less physically intrusive practices and fewer physical signs, leading to particular challenges in the medico-legal examination of such cases. A retrospective analysis of the reports produced at the South Branch of the National Institute of Legal Medicine (SB-NILM), concerning victims of alleged sexual offences with less than 18 years of age was extensively done. The descriptive data was collected and analyzed in order to identify possible differences in the circumstances and types of abuse, between the cases related to intra-familiar (IF) and extra-familiar (EF) sexual offences.

**Materials and Methods:** The medico-legal reports (n=383) made at the SB-NILM in a two years period (2009-2010) concerning victims of alleged sexual offence under 18 years of age, both in emergency and non-emergency settings were identified and reviewed. The descriptive data analyzed and collected included general socio-demographic characteristics of the victim, description of the alleged sexual offence, description of the abuser(s), as well as laboratory findings and expert conclusions. These data was further screened in order to identify possible differences in the circumstances and types of abuse, between the cases related to IF and EF sexual offences. Statistics analysis was performed using the Statistical Package for Social Sciences (SPSS 11) for Windows.

**Results:** Results showed that 78.6% of the victims were female, with a mean age of 10.58 years. The abuse was classified as IF in 48.6% of the cases. A statistical significant difference was found ($p<0,001$) between physical violence in IF cases (15.1%) and EF cases (32.5%), as well as victim "consent" for the abuse (17.3% in EF, and only one single case in IF). Vaginal penetration was more common in EF cases (60.7% vs. 26.6% in IF cases, $p<0.001$), and the victims were, overall, older by 5.29 years ($p<0,001$). Fondling was more frequent in IF cases (40.9% vs. 20.8% in EF cases, $p<0.001$), and the victims younger by 1.75 years ($p<0.001$).

**Discussion and Conclusions:** In general, findings are in accordance with those of the literature. The less physically intrusive practices of IF abuse and younger age of the victims into the context of a relation of dependence and proximity between both the victim and the abuser, reinforce the importance of the interview and history of the event to support the medical legal conclusions.

**Keywords:** Child; Sexual; Abuse; Offences; Familiar; Inml

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# EXAMINATION OF PERIANAL FINDINGS WITH A DIGITAL COLPOSCOPE IN SUSPECTED SEXUAL ABUSE VICTIMS

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**Abstract:** Advantages and disadvantages of using the colposcope while evaluating the suspected sexual abuse victims is a significant stage in examination. Nowadays, digital colpomicroscopes are taking the place of classical colpomicroscopes as a result of the rapid progresses in screening technology. In our presentation, we discussed the advantages and the disadvantages of the digital colposcope with the findings and screenings in 117 suspected sexual abuse cases we examined within a year.

**Keywords:** Digital Colpomicroscope; Sexual Abuse

# 19th IAFS WORLD MEETING
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# ORAL SESSION

## Session 14.2

1

# LIVEBIRTH OR STILLBIRTH? USE OF POST-MORTEM COMPUTED TOMOGRAPHY AS A ADDITIONAL TOOL

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**Case Report:** A 22 year old student spontaneously gave birth to her baby at home. According to the mother, the baby was stillborn and said that the baby was not breathing and crying. The mother has a strict arabic family background and the relationship with her german boyfriend was a trade secret. Prior to the autopsy examination, and within 10 hours after the birth of the baby, a full body CT scan were undertaken as a part of the post-mortem examination. The imaging revealed small ventilated areas in the lungs. Smallest air bubbles were seen in the esophagus and stomach but not in the small and large intestine. The autopsy examination showed after opening the thorax markedly atelectatic lungs. Instead of this finding the lung swim test was on both sides positive. The swim tests of stomach and the intestine was negative. The external and internal examination showed no congenital or natural disease, no signs of physical force. To note was only plenty adherence of meconium on the body surface of the baby. The histological investigation could not explain the death, especially an aspiration of meconium or amniotic fluid could not be demonstrated. In the summary in difficult cases with inconsistent autopsy findings the use of post-mortem computed tomography could be a useful additional tool for the differentiation whether the child was liveborn or stillborn.

**Keywords:** *Post Mortem* Computed Tomography; Liveborn; Stillborn

2

# POSTMORTEM VIRTUAL ESTIMATION OF FREE ABDOMINAL BLOOD VOLUME

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**Introduction:** There is an internationally growing interest on using imaging modalities in forensics. Within the framework of minimally invasive autopsy, a method for estimating free fluid volume is being introduced. The purpose of this retrospective study was to examine the reliability of virtually estimated intraabdominal blood volume by using segmentation techniques on postmortem computed tomography (PMCT) data.

**Materials and Methods:** Twenty-one cases with free abdominal blood were investigated by PMCT and autopsy. The blood volume in the abdominal cavity was estimated by manually segmenting the data using segmentation software (Amira, Visage Imaging, Germany) and the results were compared to autopsy data. Six of 21 cases had undergone additional post-mortem computed tomography angiography (PMCTA). The hypothesis to be tested was that there is no significant statistical difference between virtually-estimated and autopsy-measured blood volume.

**Results:** The volumes estimated virtually by segmentation of the abdominal blood did not differ significantly from those measured at autopsy ($p>0.05$). Additionally, the presence of extravasated contrast medium in the abdominal cavity did not bias the results significantly.

**Conclusions:** Virtual estimation of abdominal blood volume is a reliable technique. The virtual blood volume estimation is a utile tool to deliver additional information in cases where autopsy is not performed or additional PMCTA potentially alters the fluid volume. Virtual estimation of free abdominal blood may even be beneficiary for management of traumatic injury in the living patient.

**Keywords:** Virtopsy; Blood Volume; Segmentation; *Post Mortem* CT

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3

# POST-MORTEM IMAGING IN FORENSIC INVESTIGATIONS: PRACTICAL APPLICATION

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**Abstract:** Multislice computed tomography (MCT) and magnetic resonance imaging (MRI) examination of deceased individuals is largely increasing in the field of forensic pathology. While CT is the technique of choice for documentation and analysis of pathological features such as gross tissues injury, skeletal fractures, foreign bodies and abnormal gas collection (air embolism, decompositions effects ecc.), RM is superior to autopsy in detecting very small abnormalities of the central nervous system allowing a thin sections of the whole brain. On these basis radiological body processing is becoming a useful guide for forensic pathologist during autoptic dissection with a reliable impact on the accuracy of conventional autopsies for many purposes. Information obtained by post-mortem imaging can be useful for the body identification, to determine the cause and manner of death or to evaluate the vitality of injuries. However, there are several post-mortem changes and decomposition patterns that may affect the appearance of the body on radiological imaging which are unusual to clinical radiologists. Occasional experiences in post-mortem imaging have a high risk of findings misinterpreting if are solely based on clinical criteria. An integrated cooperation between radiological specialists and pathologist is crucial for a correct integration of data obtained by autoptical dissection and post-mortem imaging. We report the experience performed applying radiological technologies for forensic purposes in deceased persons in Valle d'Aosta (North Italy) in order to evaluate both the critical and the useful aspects of the practical application of noninvasive imaging techniques to the classical post-mortem investigations in humans.

**Keywords:** Forensic Pathology; Multislice Computed Tomography; Magnetic Ressonance Imaging.

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# THE INFLUENCE OF POST-MORTEM CT-ANGIOGRAPHY USING ANGIOFIL ON BIOCHEMICAL INVESTIGATIONS OF VITREOUS HUMOUR

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**Abstract:** Postmortem computed tomography angiography (PMCTA) is becoming increasingly essential within the broader discipline of forensic radiology and forensic pathology. According to the protocol developed by Grabherr and coworkers and published in 2010, the vascular system of the body can be filled with a contrast agent mixture composed by the oily liquid Angiofil®, consisting of iodized linseed oil, and paraffin oil. This contrast agent mixture allows performing high-quality PMCTA and reduces the risk of misinterpretation in the radiological diagnosis thanks to a complete filling of the vascular system and to the performance of multiple phases of angiography. One of the aspects to define in PMCTA is, however, the influence of the contrast agent mixture on the results of toxicological and biochemical analysis and, consequently, the opportunity to collect samples for toxicology and postmortem chemistry before the injection of the contrast agent. The aim of this study was to compare the results obtained from postmortem chemistry analyses (30 PMCTA cases) performed on two vitreous humour samples, one obtained before the injection of the contrast agent and one obtained at the time of the autopsy, after the PMCTA. The time interval between the sample collections, before and after PMCT, was six hours. These results were compared to those obtained from postmortem chemistry analyses performed on two vitreous humour samples of 30 control cases that did not undergo PMCT. These samples were collected with an interval of at least six hours. Six markers were tested (sodium, chloride, glucose, lactate, creatinine and urea nitrogen). Our first results seem indicate that different values can be observed for each marker between the first and the second vitreous humour sample in both groups. These differences seem to be related to the time elapsed between the first and the second collection. The injection of the contrast agent seems not to influence postmortem chemistry analyses of vitreous humour, at least for the markers tested in this study.

**Keywords:** *Post mortem* Angiography; *Post Mortem* Chemistry

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# FORENSIC EXPERTISE ON TRAUMATIC BRAIN INJURY ACCORDING TO CT AND MRI IMAGING

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**Case Report:** The mechanisms of brain injuries, their timing, and their eventual consequences are often part of the expert opinion requested by the Court. We are presenting a case in which the Court requested an expert opinion of the injuries sustained by a driver involved in a traffic accident. The main question was whether the driver had first suffered a stroke which could have caused the accident. The medical documentation showed that the driver was brought to the hospital in a stuporous condition, with right hemiparesis. External examination revealed hamatomas and oedema on the left frontal region of the head and left eye. CT scans performed 3 hours after the accident show edema of left frontal and parietal lobes, and hypodense lesions of the left frontal and temporal cortices were also present, which is characteristic but not specific for contusion in CT images made 3 hours after the accident. Seven days after the accident, on follow-up CT images, hypodens lesions were better detected because the swelling of the brain had retracted. On MRI images performed 6 months after the accident, the same lesions are still present and look like encephalomalacia, gliosis and cortical reduction atrophy; which did not contribute to the forensic conclusions. According to the CT and MRI images we can not confirm or reject the possibility of stroke shortly before the accident. But the finding on CT images of hypodense lesions of the left frontal and temporal lobus which affected cortex of the brain, and comparing them with the injuries on the head in the left frontal region and left eye indicate to us that these changes of the brain are more likely to be contusions caused by the blow to the head, rather than by an stoke.

**Keywords:** Brain Injury; CT; MRI; Mechanism

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# DIGITAL AUTOPSY AND EVENT RECONSTRUCTION IN INVESTIGATION OF FATAL FALL FROM HEIGHT IN MALAYSIA: ILLUSTRATION OF 2 CASES

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**Abstract:** Fatal fall from height is quite common in forensic practice. The causes of death in these cases are mostly due to head injury or multiple injuries due to the fall itself. However, determination of the manner of death is very challenging in some cases. We present 2 cases to illustrate the difficulties to decide homicidal, suicidal or accidental manner of deaths. The digital autopsy revealed pattern of bone dislocations and fractures which predict the mechanism of injury and impact. The reenactment/reconstruction predicts the mechanism of the fatal falls. We propose the use of digital autopsy and event reconstruction to assist in determination of the manner of death.

**Keywords:** Fall from Height; Manner of Death; Head Injury; Forensic Pathology; Fracture Skull

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# PRESENCE (AND PERSISTENCE) OF CORONARY THROMBOSIS AFTER POST-MORTEM COMPUTED TOMOGRAPHY ANGIOGRAPHY

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**Abstract:** Postmortem demonstration of coronary arteries occlusions in cases involving sudden unexpected death or in cases of suspected myocardial infarction is of fundamental importance in forensic pathology. However, postmortem examination of coronary arteries can be problematic. Serial horizontal sectioning can produce crush artifact in heavily calcified arteries, whereas longitudinal sectioning may dislodge thrombi and lead to misdiagnosis. Performance of postmortem angiography before autopsy provides a permanent record for documentation of coronary arteries distribution and patency. It also allows focusing the dissection technique. The first systematic method for the postmortem study of the coronary arteries was described by Schlesinger in 1938. Many techniques have been studied since then, involving the use of different contrast agents. Grabherr and co-workers published in 2010 a standardized protocol for whole body PMCTA (postmortem computed tomography angiography) using a contrast agent mixture composed by the oily liquid Angiofil®, consisting of iodized linseed oil, and paraffin oil, and Virtangio perfusion device, called the "multi-phase post-mortem CT-angiography". The aim of this study was to investigate whether a fresh coronary artery thrombosis could still be recognized after CT-angiography. We reported four cases in which PMCTA revealed the suspicion of coronary thrombosis that could be verified during the conventional autopsy. Images obtained from PMCTA and conventional autopsy (with horizontal sectioning of the coronary arteries), as well as histology, were compared for each case. Our first results seem indicate that the presence of a coronary occlusion at the postmortem angiography is confirmed by the presence (and the persistence) of a fresh coronary thrombosis detectable at the convention autopsy and histology. These observations seem to lead to the conclusion that postmortem angiography according to multi-phase PMCTA-protocol is useful to demonstrate the presence of coronary thrombosis. Coronary thrombi are not dislodged by the postmortem vascular perfusion and radiographic images correlate well with macroscopic and microscopic findings.

**Keywords:** *Post mortem* Angiography; Coronary Arteries; Coronary Thrombosis

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# SUBARACHNOID HEMORHAGE ON ADMISSION CT: VALUE OF MINIMALLY INVASIVE, POSTMORTEM CT ANGIOGRAPHY IN DETERMINING CAUSE OF DEATH

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**Introduction:** With few exceptions, all deceased persons admitted to the VIFM since 2005 have been CT scanned on admission. Whole body postmortem CT angiography (PMCTA) was introduced in 2010 as a further tool of initial investigation. This presentation will examine the capacity of our PMCTA technique to adequately opacify intracerebral vessels and its ability to demonstrate underlying cause in cases of non-traumatic subarachnoid hemorrhage (SAH) identified on the admission CT scan. The impact of angiography on the initial investigation of SAH and its use in determining cause of death will be discussed.

**Methods:** Candidate cases for PMCTA are assessed on the preliminary CT scan and coronial permission sought for the angiographic procedure. A modified Bern technique is employed using a Dodge embalming pump to deliver 1700mL of a 1:10 iodinated radiographic contrast and PEG 200 solution. Full autopsies are performed were possible. All PMCTA case files and images were reviewed. CT scans were assessed to determine the degree of intracranial arterial opacification using a scale of poor (minimal intracerebral contrast), moderate (major intracerebral vessels but no peripheral branches), and good (major intracerebral vessels including peripheral branches).

**Results:** 18 PMCTA were performed with full autopsy correlation in 14. Of the 12 non-SAH cases, 2 were assessed as poor opacification, 2 poor/moderate, 2 moderate, 1 moderate/good and 5 good. The 2 poor and 2 poor/moderate cases were carefully examined and found to be associated with massive contrast leak from disrupted vessels outside the skull. The 6 SAH cases were assessed as 1 moderate/good, 4 moderate, and 1 poor/moderate. PMCTA detected an aneurysm in 5/6 SAH cases. In one case PMCTA was negative yet a thrombosed aneurysm was detected at autopsy. Vessel opacification was classified as poor/moderate in that case. Contrast leaking from aneurysms into the subarachnoid space was observed in 4 of the 5 cases. In one case, a giant aneurysm was detected on PMCTA but no leak seen due to contrast pooling in the lumen.

**Discussion:** Adequate opacification of the circle of Willis can be achieved in the majority of cases using the PMCTA technique adopted at VIFM. Technical failure or injuries sustained by the deceased leading to contrast leakage outside the skull explains the cases of poor opacification. Non-traumatic SAH is commonly seen on admission CT at the VIFM. In the past, exact origin of hemorrhage and thus cause of death could not be determined without an autopsy to examine the intracerebral vessels. Even at autopsy an underlying cause is not always determined. PMCTA was able to detect 5 of the 6 aneurysms in our SAH cases and point of rupture in 4 of those 5. The introduction of PMCTA at VIFM has allowed the intracranial circulation to be examined using a minimally invasive procedure and the cause of bleeding detected in the majority of non-traumatic SAH cases. In situations where a family has requested that no autopsy be performed, as allowed by the Victorian Coroners Act 2009, PMCTA provides a means by which a cause of death may be determined.

**Conclusions:** Minimally invasive PMCTA adequately opacifies the intracranial circulation, and determines cause and mechanism of death in most cases of non-traumatic SAH, with a point of bleeding detected in the majority. In concert with routine postmortem CT imaging it

**Keywords:** *Post mortem* CT Angiography; Subarachnoid Hemorrhage; Autopsy

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# VIRTOPSY AND COMPUTER EMULATION: IS THE CRANIOCEREBRAL INJURY AFFECTED BY ITS GEOMETRIC AND PHYSICAL CHARACTERISTICS?

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**Introduction:** Human's skull and brain have a irregular geometric configuration and complex physical characteristics. As produced different stress distributions, it might lead to a varied morphological change of craniocerebral injury when blunt force conducted on different cranio-position. This phenomenon can be observed in human cases of craniocerebral injury and measured by computer tomography (CT) and emulation.

**Materials and Methods:** 91 clinical and 12 autopsy cases of craniocerebral injury that suffered by blunt force were selected. The relationship between force position or direction and damage sequels, such as injury degree, fracture position and contre-coup cerebral constusion, were observed by epidemiological retrospective study. All the cases were scanned by multi-slice CT (MSCT) for virtual autopsy (virtopsy) analysis. The Digitalimaging and Communications in Medicine(DICOM) data of craniocerebral CT were then inputted into MIMICS computer software for reconstructing a digital model of three dimensional finite element. Aided by ANASYS computer software, the distribution of stress and strain on the digital skull under different blunt impact were recorded and analyzed. The result was compared with that from human cases.

**Results:** (1) Among press force from three directions, frontal, temporal and occipital, the most serious of stress and strain were observed when it impacted by occipital force. It implied occipital force more easily produced a serious craniocerebral injury because of the geometric characteristics of skull. (2) Disregard of force direction, the skull base withstood higher stress than other parts of skull because of its physical characteristics. That means there was a higher likelihood of fracture in skull base than that in other parts.

**Conclusions:** The geometric and physical characteristics of human skull may affect the distribution of stress and strain. It may then affect the serious degree and morphological changes of craniocerebral injury.

**Keywords:** Craniocerebral Injury; Blunt Force; Virtopsy; Computer Emulation; Finite Element

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# POST-MORTEM MSCT EXAMINATION IN CASES, WHERE SUBSEQUENT CONVENTIONAL AUTOPSY HAS FAILED TO PROVIDE ADDITIONAL SUBSTANTIAL INFORMATION

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**Introduction:** In collaboration with the Department of Radiology, the Department of Forensic Medicine at the Jagiellonian University Medical College leads routine post-mortem MSCT examinations since March 2009. The number of examinations performed since that time until May 31st, 2011 is 147. In most cases, evaluations of PMCT yield rich sets of data complementary to the information obtained during conventional autopsy. Due to the fact that in certain cases, subsequent conventional post-mortem examination fails to provide additional substantial information, it is necessary to evaluate the usefulness of post-mortem MSCT examinations as a replacement of conventional autopsy.

**Materials and Methods:** In two cases of corpses of: (1) a victim of a traffic accident, driving a single-track vehicle, (2) a victim of fall from a height in the setting of high mountains - post-mortem MSCTs were performed prior to proceeding with conventional autopsies. Equipment used: Siemens Somatom Sensation 16 (slice thickness: 0.75 mm for the head and 1.5 mm). DICOM files were obtained from the CT examinations, and analyzed using the Osirix software.

**Results:** The cross-section (2D) images and three-dimensional (3D) pictures and animations visualize not only the injuries resulting in deaths, but also the particular mechanism of injury. Specifically, the victim's role in the motor vehicle accident can be deduced with great certainty from the images presented. Similarly, the probability that the victim of the fall sustained "defensive" injuries in an attempt to prevent the fall is very high.

**Conclusions:** It seems that the conventional forensic autopsy will remain the primary post-mortem examination for many years. However, it is possible that in some cases it will be replaced completely by post-mortem imaging studies. This will be possible only when the results of post-mortem imaging techniques will satisfy all the needs of legal proceedings.

**Keywords:** *Post mortem* MSCT; Cross-section Images; Three-dimensional Pictures; Mechanism of Injury

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# VIRTOPSY - 10 YEARS EXPERIENCE IN SWITZERLAND

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**Abstract:** Imaging has changed the world and greatly influenced modern medicine. In the 2009 report concerning "Medical Examiners and Coroners systems: current and future needs" of the "National Academy of Science" is written, that modern imaging technologies (Virtual autopsy, Virtopsy) has a great potential to detect forensic refevant findings. The advent of high resolution multi-detector row CT scanners and fast MRI scanners in the last decade has allowed the development of imaging techniques that have greatly enhanced the diagnostic potential of these two imaging modalities. While conventional radiographs have played a valuable role in forensic diagnosis and practice for over a century, recent investigations with both CT and MRI suggest that these imaging tools are capable of much greater contributions. A major innovation is the ability to display imaging findings in 2D and 3D planes that closely replicate the findings at conventional autopsy and make the interpretation of the studies more easily understood by non-radiologists. CT and MRI may be used to supplement traditional autopsy techniques, to provide a complete anatomic assessment prior to limited autopsy, or in certain circumstances to replace it, such as in blunt accidental trauma, or drowning deaths. These studies may also provide options in the setting of religious and cultural objections to conventional autopsy. While CT has the advantage of providing rapid whole body imaging of great anatomic detail in a short time, the superior contrast resolution of MR provides soft tissue characterization that is not achievable by CT. MRI is less widely available and more time consuming but may be applied to the postmortem evaluation of specific body parts to aid in the diagnosis of specific causes of death that may be characterized by subtle soft tissue changes. Both CT and MRI provide a permanent pictorial record of anatomic findings that may be retained and analyzed for medical and legal purposes post mortem and offer advantages in quality assurance that may be difficult to replicate with conventional autopsy. The forensic science and medical examiner communities have shown interest in the use of CT and MR autopsy imaging. However, while CT and MR imaging are widely available in the clinical care of the living, forensic facilities face problems of access to autopsy imaging due to financial, technical, transportation, interpretation, and related difficulties. For the past 15 years, our Forensic Institute in Switzerland been concerned with imaging problems in forensics. In 2009 the robot-supported automated system integration of 3D surface scanning and multislice CT with postmortem biopsies was successful as a "Virtobot"developed. After what is now 5 years, the over 100 postmortem angiographies show impressive results from the research activities . In the early part of 2010, our Total Imaging Total Matrix TIM-MRI system that has been in operation since 2009 could be extended with the so-called synthetic MRI software. The advantage of this TIM synthetic MRI system lies in the fact that in one examination step various MRI sequences (such as T1-T2-PD, etc.) could be performed from tip to toe without any change of the surface traces. In the daily forensic service applications it has become evident that through applying this approach a increase in quality and a improvement in the forensic diagnostics can be achieved and the examination results based on the imaging are often quicker and, thanks to a more visual 3D reconstruction, can be displayed in a way that lay persons can understand and comprehend. Momentarily, in terms of workflow and process, this Virtopsy-system integration is the only forensic examination track in a forensic institute that has brought together all the modalities and technologies in this form for daily use and research (www.virtopsy.com).

**Keywords:** Virtopsy; Forensic Imaging; 3D Reconstruction

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# ORAL SESSION

## Session 14.3

1

# SUDDEN DEATH DUE TO NON-HODGKIN LYMPHOMA - LYMPHOBLASTIC LYMPHOMA: A CASE REPORT

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**Abstract:** Pre-existing disease conditions are an important factor while assessing the degree of damage subsequent to trauma. Undiagnosed or mis-diagnosed cases can lead to difficulty in management, increased mortality and challenges during autopsy. Although the liver and spleen are the most commonly damaged organs in blunt force trauma to the abdomen, traumatic rupture of enlarged spleen secondary to haematological conditions are rare. Trivial trauma in such cases can be fatal. During a karate competition, a 15 year old boy complained of vague abdominal pain after sustaining a punch to the abdomen. He subsequently collapsed and died within twelve hours while on treatment. Autopsy findings revealed presence of a rare pre-existing undiagnosed disease of the lymphopoietic system that is mediastinal non-Hodgkin Lymphoma - Lymphoblastic Lymphoma with multi organ dissemination which resulted in fatal outcome.

**Keywords:** Blunt Force Trauma; Enlarged Spleen; Traumatic Rupture; Non-Hodgkin Lymphoma - Lymphoblastic Lymphoma

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# SURPRISING AUTOPSY FINDING IN CASE OF SUDDEN DEATH OF MIDDLE-AGED MAN

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**Abstract:** The case of sudden death of 46 years old man is presented. Rescue after collaps on bus stop was not successful. Healthcare history of this man was almost empty. Only some nonspecific dyspeptic problems sometimes appeared. In autopsy finding important haemopericardium and infiltrating tumour of the right atrium of the heart were found. Microscopically and in immunohistology charakteristics of angiosarcoma were recognized.

**Keywords:** Primary Malignant Tumours of the Heart; Angiosarcoma of the Heart

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# UNEXPECTED SUDDEN DEATH IN A YOUNG, HEALTHY, SPORTSMAN DUE TO ASYMPTOMATIC EXTENSIVE PRIMARY PERICARDIAL LYMPHOMA

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**Case Report:** Sudden death is one of the most common causes of corps referral to forensic medicine. Manner of death may be natural or not. Its to be estimated 10% of all deaths are related to this issue. Cardiovascular, respiratory, cerebrovascular diseases are in top of the list. The occurrence of sudden death with malignancies which are asymptomatic before death is very infrequent and unusual. In this article an 18 year old, boxer man introduced who was healthy until one week before his death. At that time he developed flu like syndrome that improved with medication, but one night he felt sever sudden onset respiratory difficulty and one hour later died in spite of medical management. Medico-legal autopsy was performed in Shiraz forensic department. Amazing autopsy findings with photographs will be providing in the context of article. Pathologic studies revealed he suffered from a high grade Non-Hodgkin lymphoma (diffused small cell type). The mechanism and cause of death reported cardio-pulmonary insufficiency due to massive pleural effusion and pericardial tamponade related to pericardial lymphoma.

**Keywords:** Sudden Death; Lymphoma; Forensic Medicine

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# THE FORENSIC PATHOLOGICAL DIAGNOSIS AND EVALUATION OF SUDDEN UNEXPECTED DEATH FROM MINOR HEART LESION: 3 AUTOPSY CASES REPORT

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**Case Report:** Most cases dying of sudden cardiac death (SCD) could be determined in forensic practice after external, internal and pathological examinations. In a few cases, the minor cardiac lesions could be detected after systematic autopsy, but it is hard to make a diagnosis for the heart disease. The cause of death can not be determined based on only these minor cardiac lesions. After excluding the possibility of violent death such as injury, asphyxia and poisoning, and the cause of death can be determined to SCD combining with the investigation of case and the process of death. It cannot be considered directly as SCD by those cardiac lesions, so it's called "minor heart lesions" based on morphological features. According to the data in the recent decade of our forensic center, some of these minor heart lesions were localized, and some were cardiac pathologic changes in the early stage. These lesions include heart weight increase, heart dilatation, myocardial interstitial fibrous proliferation, myocardial focal fibrosis, inflammation cells infiltrating in cardiac conduction system, the wall thickness of myocardial small artery, myocardial bridge of coronary artery, etc. The death cases with minor heart lesions always show the inducing factors which obviously aggravate myocardial load, such as running, sentiment undulation, trauma, etc. The determination of the cause of death should be careful. Some tips we should be attention when minor heart lesions are diagnosed and evaluated: 1) systemic autopsy and histopathological examination: attention to find the minor lesions of the heart; 2) case investigation details: the process of death always is suddenly and quickly; 3) the sufficient exclusion of violence death; 4) collecting clinical data as the auxiliary evidence of the judgment to the cause of death possibly.

**Keywords:** Forensic Pathology; Sudden Unexpected Death; Cardiac Lesion; Pathological Diagnosis

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# AMMONIA INTOXICATION HOMICIDE - CASE REPORT

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**Abstract:** A 74 years old male was assaulted at his home by a group of individuals that threw him on the floor and forced a embedded tissue into his mouth. After the aggression the victim went by his own means to a Hospital Emergency Department. He presented with peri-oral equimosis, nose and tong lacerations being observed and treated by the Surgery Department. Having no one to accompany him home he stayed in the observation room waiting for the social workers to resolve that situation. In the meantime he started a clinical picture of acute respiratory failure with productive cough and raise in inflammatory parameters. Observed by the Internal Medicine Department the victim made a septic screening and started large spectrum antibiotherapy. The initial clinical investigation with physical exam, imagiology and analytical parameters excluded pulmonary thromboembolism, acute pulmonary oedema and community acquired pneumonia. Three days after the aggression the victim developed stridor with prolonged apnoea with cardiorespiratory arrest. Advanced life support was provided with recovery to sinus rhythm. A craniocephalic and neck CT scan were performed excluding trauma but revealing edoema glottis. Analitical parameters revealed leucocitosis with neutrophilia, rabdomiolisis, pre-renal acute renal failure caused by sustended hypotension, hypercalemia, acidosis, type 1 respiratory insufficiency and raised lactate. The victim was then transferred to an intensive care unit with progressive clinical worsening: haemodialysis was performed to treat renal insufficiency, severe anoxic encephalopathy developed and coma surveyed. The victim died 9 days after the aggression. At the inner mecropsy exam were found traqueal and bronchial mucosa erosions; thick, mucous and yellow secretions in all the respiratory tract; and pulmonary condensation areas in both lung lower lobes. The anatomopathological exam revealed: traqueal mucosal erosions with intense pio-necrotic exsudate; bronchial mucosa erosions with intense pio-necrotic exsudate; difuse consolidation of the lung parenchyma with exuberant alveolar neutrophilic exsudate and intense mucopurulent secretions in the bronchi, compatible with necrotizing pneumonia with abcess formation. A blood toxicologic analysis was requested but it wasn't possible to obtain as the Toxicology Service didn't have the required analytical methodology for the determination of ammonia. The Cientific Police Laboratory exam made to the wrap of tissue and a plastic bottle found at the victims house revealed the presence off ammonia. The substance was identified as ammonia (25% m/m), produced by a specific laboratory. The substance safety data shift from that laboratory revealed that the substance can produce irritation in the mucous membranes and upper respiratory tract; if inhaled it can produce cough with throat and respiratory tract aching; inhalation of higher amounts can produce laryngeal oedema and respiratory tract inflammation. The consulted literature on ammonia intoxication revealed that the substance can produce alkaline burns in the respiratory tract with short exposures to high concentrations being able to affect the entire respiratory system; tissue damage from alkali is caused by liquefaction necrosis leading, in the respiratory system, to destruction of the cilia and the mucosal barrier to infection; secretions, sloughed epithelium, cellular debris, oedema, and smooth muscle contraction cause significant airway obstruction; on physical exam may be be found tachypnoea, oxygen desaturation, stridor, cough, wheezing and rhonchi; as complications may survain aspiration pneumonia and pulmonary oedema; chest radiographic findings can vary from normal to diffuse micronodular intersticial infiltrates, however, abnormal radiographic findings may take up to 48 hours to develop, even following severe exposure; other findings to consider are acute lung lung injury, acute respiratory distress syndrome, secondary bacterial

**Keywords:** Ammonia; Intoxication; Assault; Necrotizing Pneumonia

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# A CASE OF ATYPICAL CHRONIC SUBDURAL HEMATOMA: A SPONTANEOUS RUPTURE OF DURAL LYMPHOMA NODULE

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**Case Report:** In forensic medicine, a chronic subdural haematoma is always linked to trauma, which may be minimal and go unnoticed. The case reported here is the first forensic medical description of an atypical chronic chronic subdural haematoma. A young, 40-year-old woman died following a coma of neurological origin. The autopsy and histological analyses revealed the haemorrhagic disintegration of a lymphoid nodule, a metastasis from generalized lymphoma. The combination of chronic symptomatic SDH and a tumour of the dura mater has been described, but is very rare. The possibility of trauma, even minimal, has never been excluded in these cases. In fact, the clinical picture of these patients suggested a significant movement of the brain within the cranial cavity due to the physiological decrease in brain volume. In the case presented here, this particular process was excluded since the spontaneous haemorrhagic effusion produced by the meningeal lymphoid nodule was the cause of the chronic SDH. This pathophysiological explanation was possible because the entire brain and meninges were removed for histological analysis. Trauma, even minimal trauma, is not always involved in the formation of a chronic SDH.

**Keywords:** Chronic Subdural Haematoma; Lymphoma; Effusion; Haemorrhage; Forensic Medicine

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# SUBENDOCARDIAL HAEMORRHAGE IN AN ASSISTED ABORTION PROCEDURE

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**Abstract:** Subendocardial haemorrhage is a common manifestation seen in most forensic post-mortem cases. Irrespective of the causal factors, whether it is of cardiac or non-cardiac origin, the function of the myocardium may be affected direct or indirectly. In this case, gross extensive of subendocardial haemorrhage was found on autopsy examination after an event of alleged administration of intravascular sedative medication for elective termination of an 8 week fetus in a young adult female with an uneventful antenatal history or family history of heart disease or any evidence that she abused drugs. This paper discusses and explores other possible causes relating to subendocardial haemorrhage.

**Keywords:** Subendocardial Haemorrhage; Infarction; Myorcardium; Drug; Abortion

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# A FATAL CASE OF MENINGITIS DUE TO STREPTOCOCCAL AND MENINGOCOCCAL CO-INFECTION IN A 2-YEAR-OLD CHILD

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**Introduction:** Bacterial meningitis is often a serious and potentially fatal infection that affects the central nervous system, especially in infants. Streptococcus pneumoniae and Neisseria meningitidis are among the main causes of these infections. However, the co-infection of both the pathogens is poorly reported in the reviewed literature. The onset is often insidious and consequently a late diagnosis is quite common, not rarely post-mortem, when the so-called Waterhouse-Friderichsen syndrome (WFS), also known as "purpura fulminans", appears. It is characterized by an acute and massive haemorrhagic necrosis of the adrenal glands in the setting of a overwhelming clinical sepsis, most often caused by a meningococcal infection. This clinical entity is more frequently seen in the paediatric rather than the adult population and is associated with a high morbidity and mortality.

**Case Report:** A fatal case of streptococcal and meningococcal meningitis in a previously healthy 2-year-old child presenting since 24 hours high fever (40°) of unknown origin without any response to drugs is here reported. The family doctor who examined the patient merely prescribed paracetamol. During the night the parents found the baby puffy with red/black "purpura" on the hands and under the feet. They immediately called the ambulance and the baby was transferred to hospital. He was admitted to the intensive care unit of a local hospital where he was intubated and afterwards he was moved to a regional paediatric Center. Despite resuscitation attempts, the child died an hour later in a state of shock.

**Discussion:** The lack of a clinical diagnosis and the medico-legal interest for possible professional liability profiles for the family doctor who had underestimated the childs symptoms led to a forensic autopsy performed within 48 hours after the death. External examination revealed purple marbling spread to the face, limbs, the anterior region of the chest, abdomen and thighs to the root. Internal examination showed the absence of epidural, subarachnoid, and arachnoid haemorrhage, but the leptomeninges were thin and congested; there was a marked oedema of the brain. Few cc of citrine liquid were found in both pleural cavities. Epicardium presented diffuse petechiae on the anterior wall. During sections foamy material came out of the lungs. Adrenal glands showed a haemorrhagic infiltration of the parenchima suggestive of WFS. Multi-organ vascular congestion was found. No other pathological findings were observed. Because the findings suggested meningococcemia, cerebrospinal fluid (CSF), whole blood, nasal and pharyngeal swab and pleural liquid samples were properly selected and collected for microbiological studies. All findings were confirmed by the microscopic histological study, performed by using formalin-fixed paraffin embedded tissue sectioned at 4 µm and stained with haematoxylin-eosin (HE). All tested samples resulted Neisseria meningitidis (NM) DNA and Streptococcus pneumoniae (SP) DNA positive. The NM genotyping Real-Time PCR resulted positive for NM serotype C.

**Conclusions:** The authors underline that, when a patient presents fever and petechiae (50-60% of patients), WFS must be considered, even if the patient has a non-toxic appearance. Due to the rapid progression and often devastating consequences, therapy should be instituted as soon as the diagnosis is suspected. At the same time the importance of public education programmes and of broadening the protection against meningitis through new vaccines is emphasised. From a forensic point of view, the need of a multidisciplinary and thorough approach in order to reach the correct post-mortem diagnosis in such cases, is stressed.

**Keywords:** Fatal Streptococcal and Meningococcal Co-Infection; Meningitis; Waterhouse-Friderichsen Syndrome

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# HOMICIDE-SUICIDE OF AN OLDER COUPLE INVOLVING COMPLEX SUICIDE: AN UNUSUAL CASE

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**Abstract:** Homicide-suicide events are defined by a perpetrator killing one or more victims before killing him or herself. The term ''dyadic death'' has also been used for these incidents. Homicide-suicides involve usually a male perpetrator, who commits one or more homicides and shortly thereafter commits a suicide. They normally occur within a family context and may involve children, but most cases are characterized by a spousal or love relationship between the perpetrator and victim. Homicide-suicides have been classified as spousal/consortial, familial, and extrafamilial types, with different subclassifications defined by relationship and age of individuals involved. Homicide-suicides in older couples were interpreted as dual suicide pacts, dyadic deaths, or homicide-suicide with altruistic motives attributed to the perpetrator. We present a homicide-suicide of an older couple involving a complex suicide. A 77 years old retired man who lived with his wife aged 72 was described as hot tempered by his relatives. On the day of the incident his wife reported to her neighbours that she was worried as he was acting strangely. In the evening he killed his wife by hitting an iron stick to her head. He then killed himself by cutting his abdominal region and by hanging. A detailed death scene investigation and autopsies of the couple were performed. The case presented is unique because it involves both homicide-suicide and complex suicide. The definition of complex suicide is the use of more than one method to induce death. In addition a homicide-suicide case involving complex suicide has not been reported in the literature before.

**Keywords:** Homicide-Suicide; Dyadic Death; Forensic

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# BONE EMBOLISM AND SECONDARY PULMONARY INFARCTION DUE TO A GUNSHOT TO THE HEAD

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**Introduction:** Bone embolism is very rare and occurs merely in trauma of septic bone lesions, after bone surgery, or after bone marrow transplantation and normally remains silent. To our knowledge there have not been previous reports of bone embolism after gunshot to the head. We report a case of pulmonary embolism of bone fragments after a gunshot to the head, in which the histological findings agreed with a survival time of several minutes from the gunshot.

**Materials and Methods:** Skin specimens were stained with Haematoxilin-Eosin, Alizarin Red S (ARS) and Anti-P selectin antibody, lung specimens were stained with Haematoxilin-Eosin.

**Results:** In entrance wounds specimens, ARS labelled barium of the GSR particles in ruby red and calcium of the small bone fragments in orange-red. In the lungs, numerous emboli of bone fragments were present in the vessels, sometimes surrounded by leukocytes. The areas surrounding the embolized vessels showed interstitial and intra-alveolar oedema, leukostasis and different stages of lung infarction, indicating a survival time from the gunshot of several minutes, sufficient to allow the alterations in lung microcirculation and in lung tissue. This result was confirmed by the positive reaction with Ant-P selectin antibody of the endothelial cells of many vessels in the entrance wounds skin.

**Keywords:** Gunshot; Bone Embolism; Lung Infarction

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# ORAL SESSION

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# HAIR ANALYSIS FOR PHENYLPIPERAZINES BY GC-MS

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**Abstract:** Unconventional samples are gaining more and more relevance in forensic toxicology. From those samples, hair is in a highlighted position, due to its non-invasive collection procedure and difficult adulteration. In addition, the detection window for the drugs is very wide, from months to years (depending on the length of the shaft). Piperazines represent a new group of "party drugs", and have already been detected as abused drugs, and as substitutes of MDMA in seized pills. Those substances are stimulants, and are often considered a cheaper, safe and legal alternative to amphetamines and ecstasy, and therefore their likelihood for being abused is quite high. Several methods are described in the scientific literature for the determination of piperazines in biological samples, but their detection in hair samples is scarce. Using a sample amount of only 20 mg of hair, the drugs [1-(3-trifuoromethylphenyl)piperazine (TFMPP), 1-(3-chlorophenyl)piperazine (mCPP) and 1-(4-methoxyphenyl)piperazine (MeOPP)] were extracted by incubation with 1 M sodium hydroxide at 50 ºC for 40 minutes, and the extracts were cleaned up using mixed-mode solid-phase extraction. The analytes were derivatized with N-Methyl-N-(trimethylsilyl) trifluoroacetamide with 5% trimethylchlorosilane and analysed by gas chromatography-mass spectrometry in the selected ion monitoring mode. The method was linear from 0.05 (lower limit of quantitation) to 4 ng/mg, with determination coefficients higher than 0.99 for all compounds. The method was linear from 0.05 (lower limit of quantitation) to 4 ng/mg, with correlation coefficients higher than 0.99 for all compounds. Intra- and interday precision and accuracy were in conformity with the criteria normally accepted in bioanalytical method validation, and the sample cleanup step presented a mean efficiency higher than 90% for all analytes. Furthermore, chromatographic peaks were improved by the use of MSTFA as derivatizing reagent, when compared to the use of MBTFA. Due to its simplicity and speed, this method can be successfully applied in the screening and quantitation of these compounds in hair samples, and is suitable for application in forensic toxicology routine analysis.

**Keywords:** Phenylpiperazines; Hair; GC-MS

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# COMPARISON BETWEEN MICROCHIP CAPILLARRY ELECTROPHORESIS AND CAPILLARRY ELECTROPHORESIS-MASS SPECTROMETRYY FOR THE DETECTION OF AMPHETAMINES

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**Introduction:** Microchip capillary electrophoresis, commonly known as lab-on-a-chip (LOC), is a relatively new approach to the high speed separation and detection of charged or uncharged molecules. LOC instrumentation, such as the Agilent 2100 Bioanalyzer, offers a simple, fast and portable alternative to conventional capillary electrophoresis with minimal sample and reagent consumption. Whilst the Bioanalyzer was originally developed for the analysis of biomolecules, recent method development at UTS has demonstrated its potential for the analysis of amphetamine type stimulants without modification of the hardware.

**Materials and Methods:** Micellar electrokinetic chromatography (MEKC) with laser-induced fluorescence detection (LIF) was successfully applied for the analysis of amphetamine, MDMA, pseudoephedrine and 5 amphetamine analogues. Analytes were labelled with fluorescein isothiocyanate (FITC) in 3 minutes, employing a heating block set at 90 degrees celcius.

**Results:** Results obtained with the aforementioned conditions will be presented. In contrast, capillary electrophoresis-mass spectrometry (CE-MS) is a laboratory-based technique that has been recently reported for the detection of amphetamines in the literature. A range of different ion sources, for example electrospray ionisation (ESI) have been used. Detection by MS offers enhanced detection sensitivity in comparison to UV and LIF, therefore provides an excellent reference for detection by microchip capillary electrophoresis. Current method development is ongoing in order to further optimise the CE-ESI-MS method.

**Comments:** A comparison between the rapid and portable LOC device and the laboratory-based CE-ESI-MS will be presented. Comparisons will be made in terms of the separation profiles, speed, limits of detection and quantification and suitability for the analysis of ATS. This research is in parallel with project DIRAC (funded by the European Communitys Seventh Framework Programme), which aims at developing a new advanced sensor for detecting ATS drugs and precursors. The fast detection of clandestine laboratory preparations of illicit drugs with this device will allow the collection of immediate data in-field which can be used to help lead future investigations.

**Keywords:** Amphetamine; Microchip; Capillary Electrophoresis; Mass Spectrometry; Laser Induced Fluorescence

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# DEVELOPMENT OF A TRANSFER METHODOLOGY FOR ANALYTICAL METHODS IN THE FRAMEWORK OF ILLICIT DRUGS CHEMICAL PROFILING AND MAINTAINING OF CHEMICAL PROFILES DATABASES

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**Abstract:** One major consideration of daily analyses in forensic analytical laboratories dealing with analysis of illicit drugs concerns identification, quantification as well as determination of profiling data by extracting the chemical signature of investigated samples. This approach requires the creation of databases compiling analytical results coming from validated analytical methods. Illicit drugs databases are maintained continuously and using chemical profiles it is possible to perform retrospective queries to identify previously unsuspected connections during police investigation between samples seized in different cases. These connections are dedicated to support law enforcement investigation and need to be combined with traditional police information. Nowadays, there is a clear strategy in an international level to build harmonized databases within countries in order to compare the chemical profiles in real-time. To achieve this aim and then feed a same database, it is widely advocated to use strictly the same analytical method defined by its analytical technology (i.e. separation, ionization and detection technologies), apparatus selected for performing analysis (brand and model) and analysis parameters set for technologies of separation, ionization and detection. This approach is time-consuming and problematic in the long term for a laboratory which would like to modify its analytical methods. According to this approach, it is thus impossible to apply a new analytical method or to move to a new analytical technology without creating a new database due to the different nature of results coming from different analytical methods. It is then compulsory to create a new database based on the new method and consequently reset the memory of the previous knowledge established during several years. In order to overcome this problematic, an innovative methodology for analytical method transfer is proposed allowing comparison of results coming from different analytical methods (i.e. GC-MS, Fast GC-MS, Fast GC-FID, UHPLC-MS/MS) and thus feeding of a common database using different analytical methods.

**Keywords:** Chemical Profiling; Analytical Method Transfer

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# ISOTOPE RATIO MASS SPECTROMETRY TECHNOLOGY FOR THE CHARACTERIZATION OF GAMMA BUTYROLACTONE AND GAMMA HYDROXYBUTYRIC ACID

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**Abstract:** Gamma Hydroxybutyric acid (GHB) is a drug of abuse scheduled under the regulations addressing psychotropic substances in most countries worldwide. Since GHB has been controlled in early 2000, dealers and consumers used to provide its chemical precursors, 1,4 Butanediol and especially Gamma Butyrolactone (GBL). Indeed, these substances are widely available on the Internet without any legal restrictions when purchased as cleaning or industrial solvent. GBL can be directly ingested by mixing it in a beverage, leading to a rapid conversion to GHB in the body, or it can easily be used as a precursor in the synthesis of GHB in "homemade" or clandestine laboratory before consumption. When GHB or GBL are found at the suspect's place, the judicial and law enforcement entities are often interested in knowing if the GBL could have been used to manufacture GHB specimens. In these cases, the potential link between the end-product (GHB) and the precursor (GBL) has to be assessed. Traditional analytical methods allow for detection and quantitation of these substances but the drugs source is difficult to ascertain. Through the use of isotope ratio mass spectrometry technology (GC-C-IRMS), the conservation of the carbon stable isotope ratio values between the two products is studied. For this purpose, 28 GBL samples were purchased from the Internet retailers and regular chemicals suppliers of various countries. These samples were first analyzed by GC-C-IRMS showing significant differences in the carbon isotopic ratio (d13C-values ranging from -23‰ to -46‰) and therefore, a high potential for discrimination. Then, 16 different "homemade" syntheses of GHB were performed from 4 suppliers representative of the d13C-values range. Accordingly, this study demonstrates that IRMS is an efficient tool for the characterization of precursors by analyzing the end-product.

**Keywords:** GHB; GBL; GC/C/IRMS; Precursors; Source Inference; Synthesis

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# DEVELOPMENT OF DATA PROCESSING AND MULTIVARIATE ANALYSIS METODS FOR METHAMPHETAMINE PROFILING

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**Abstract:** Methamphetamine (MA) is the most popular drug in South Korea. MA can be synthesized via various methods and the impurities included in samples showed different patterns according to the synthetic method, precursor, chemicals, etc. Many impurities were reported from illicit MA and some of them are recognized as a specific marker for a synthetic route. As the seized amount of MA in Korea was very small, it is very difficult to know the trends of illicit market, origin of samples and popular synthetic methods from MA impurity profiling. Among the purposes of the MA impurity profiling, we have mainly focused on developing the methods for sample to sample comparison to support MA related criminal cases with these limitations. In this study, 130 seized methamphetamine samples were analyzed with capillary electrophoresis (CE), gas chromatography with flame ionization detector (GC-FID) and gas chromatography-mass spectrometry (GC-MS). Microsoft Visual Basic Application (VBA) modules were developed for GC-FID data processing such as retention time correction, area normalization and peak alignment. These modules can automatically make a matrix file consisting of samples versus impurities for sample to sample comparison. Pearson correlation was used to calculate the similarity between samples. First, ten samples were tested with 5 replicates to get the cut-off values of the Pearson correlation coefficient to accept as the same samples, and then all the samples were tested to obtain the similarities between the samples. Multivariate analysis was commonly used statistical technique to classify samples. The data from GC-FID and GC-MS were analyzed with Hierarchical Cluster Analysis (HCA), Principal Component Analysis (PCA) and Discriminant Analysis (DA) using commercial software package. The original data set were converted to logarithm data set and square root data set. These three types of data sets were compared with each other. From these multivariate analyses, several impurities were selected as markers for classify samples according to their origin and synthetic routes. The markers that were selected from the statistical calculation were verified with the impurities that were identified from the experimental results. With the development of the automated VBA modules, we could get the matrix file easily for sample to sample comparison. Also, we established multivariate analysis methods to classify the seized MA samples.

**Keywords:** Methamphetamine; Profiling; Multivariate Analysis; GC-FID; GC/MS

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# RESIDUAL SOLVENT ANALYSIS OF COCAINE SEIZURES IN BRAZIL BY HS-GC-MS AND CHEMOMETRIC METHODS

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**Introduction:** Cocaine production from coca leaves comprises several steps such as plant maceration, solvent extraction, acid-base conversion, purification and dilution. Such steps will leave behind chemical traces which can be subsequently analyzed by forensic laboratories generating useful information to police investigation. As a part of the Brazilian Federal Police drug profiling program (PEQUI Project) a method for the analysis of residual solvents in cocaine samples was developed and validated. In this work, a dataset consisting of over 500 samples including cocaine hydrochloride and cocaine base coming from Brazilian Federal Police seizures were analyzed through the utilization of static headspace in association with gas chromatography and mass spectrometry (HS-GC-MS). Chemometric analysis of the data was performed in order to obtain information about drug origin and determine the possible linkage of samples. The application of this methodology to real police cases will be presented and discussed.

**Materials and Methods:** Gas chromatography conditions: HP-PONA-Methyl-Siloxane column (50m x 200um x 0.5um), split ratio (20:1), carrier gas flow (He 1mL/min) oven program (30oC for 10min, 20oC/min up to 150oC, 60oC/min up 200oC), run time: 22min. Scan mode: m/z 29-200Th. Headspace solution: 100mg of cocaine sample in 10mL of aqueous saturated solution of sodium sulfate and 10 microliters of internal standard solution (0.25% v/v Bromobenzene in Dimethyl Sulfoxide). Headspace conditions: oven temperature (85oC), loop temperature (175 oC), vial equilibration time (14min). A total of 33 different solvents were determined for chromatographic comparison. Solvent peak areas of the characteristic ions were properly integrated and normalized with respect to the internal standard and then exported for data analysis in Matlab. As a part of exploratory data investigation cocaine samples were scrutinized to look for classification patterns with the help of hierarchical cluster analysis (HCA) and principal component analysis (PCA). Sample correlation analysis was studied only for samples presenting at least 10 solvents with the aid of the cosine squared function approach and the Spearman's correlation coefficient. Linked and non-linked sample population studies in association with non-supervised dendrogram classification was looked into as an objective way to decide for correlation limiting values associated with acceptable levels of false positives (type II error) and false negatives errors (type I error).

**Results:** From the original set of 33 solvents, 19 of them were preselected based upon their occurrence in the samples and both PCA and HCA were performed. Dendrogram analysis pointed at 04 different classes in the data. It was observed that 03 principal components explained 88.9% of the total variance. PCA scores and loadings allowed visualization of sample distribution and the solvents which mostly contributed within each class indicated by HCA. A reasonable agreement with the Drug Enforcement Agency (DEA) processing method classification system was obtained. In order to establish if any two samples are considered to be linked or not, histograms for both linked and non-linked sample populations were generated based upon different number of classes suggested by cluster analysis. Histogram analysis provides a way to select correlation coefficient threshold values as a function of the number of classes. For a number of 40 classes, cosine squared threshold values were found to be 97.8% and 99.3%, for an occurrence of 2% of false negatives and 0.5% level of false positives, respectively.

**Conclusions:** Residual solvent analysis of cocaine samples with HS-GC-MS and chemometric analysis has proven to be an effective tool for the identification of processing methods and the establishment of seizure correlations. This is very important for police intelligence purposes since it provides relevant information that may indicate drug origin and trafficking networks.

**Keywords:** Drug Profiling; Ressidual Solvents; Headspace; Sample Correlation; Cocaine Processing Methods

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# X-RAY POWDER DIFFRACTION - A VERSATILE YET UNDERUSED FORENSIC ANALYTICAL TECHNIQUE

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**Abstract:** X-ray powder diffraction (XRD) has been recognised and accepted as a valuable solid state analytical technique for almost a century. Despite its versatility and non-destructive nature, however, its use in forensic science laboratories is currently not widespread. Reasons for this may range from simple economics to a lack of understanding of the technique itself, and what it is capable of. This paper will describe its use, with examples, for the identification and comparison of a variety of evidential materials. The use of databases as an aid to materials identification will also be discussed, together with choices of instrumentation appropriate to specimen type.

**Keywords:** X-Ray; Powder Diffraction; XRD; Analytical Technique; Drugs; Excipients; Polymorphs; Inorganic; Metal

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# DEVELOPMENT OF A VOLTAMMETRIC METHODOLOGY FOR DETERMINATION OF Δ9-THC IN APPREHENDED SAMPLES

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**Introduction:** Nowadays, the presence of illicit substances can frequently be found in crime episodes: they usually appear in biological fluid exams made in people involved in car crashes, suicides and others. These problems generate considerable costs for society and government. Being this the case, police institutions need constant actualization of their methodologies of analyses, in order to provide better conditions of criminal investigation. Among the different kinds of illicit drugs apprehended by police, it is possible to find cocaine and cannabis as the major components. The conventional analytical methods of chemical analysis in police laboratories constitute, in the majority of cases, in chromatographic and spectrometric techniques (HPLC, GC, FTIR, among others). On the other hand, presumptive chemical tests carried out in crime scene, are constituted in most part for colorimetric tests (spot tests). Electroanalytical methodologies of analyses constitute an important class of instrumental techniques, which can offer a broad variety of information about the chemical species studied, being employed in different areas of actuation, such as clinical, industrial and forensic purposes. In this context, it is possible to cite the application of voltammetric modalities in the analysis of some drugs of abuse, such as cocaine and MDMA (ecstasy). Although there are several scientific articles about voltammetric analyses of substances of forensic interest, it has not been observed in the literature the voltammetric study of ?9-tetrahydrocannabinol (Δ9-THC), the main psychoactive component of cannabis, being observed only indirect determination studies for this substance. So, the aim of this work was to investigate the voltammetric behavior of Δ9-THC in organic/water mixed medium.

**Methods:** The voltammetric measurements were carried out by differential pulse modality of voltammetry, in a DMF/water (90/10 w/w) solution containing TBATFB in 0.1 mol L-1 as supporting electrolyte. After a preconcentration step of 30s in -1.2V (vs. Ag/AgCl), it is possible to observe a well defined anodic peak current (iap) in 0.0V. A linear dependence of iap against Δ9-THC concentration was obtained in the work range from 6.1 10-10 mol L-1 to 3.1 10-9 mol L-1, being observed a linear correlation coefficient of 0.999 and a limit of detection in 2.0 10-10 mol L-1.

**Keywords:** Forensic Chemistry; Voltammetry; Tetrahydrocannabinol; Electroanalysis

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# "OXI" COCAINE IN BRAZIL: A NEW DRUG?

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**Introduction:** Recent information from various sources suggests that a new illicit drug, named "oxi", is being spread across Brazil. It is used in the smoked form and is very similar to crack cocaine: usually yellowish or light brown small stones. As released in the media, "oxi" would differ from crack cocaine in the sense that crack would contain carbonate or bicarbonate salts whereas "oxi" would contain calcium oxide and kerosene (or gasoline). This work presents a comparative study between "oxi" street samples seized by the Civil Police of the State of Acre (CP/AC) - a state in northwestern Brazil which borders with Bolivia and Peru - and regular cocaine samples seized by the Brazilian Federal Police in Acre (FP/AC) from international and interstate drug trafficking.

**Materials:** In this study a total of 20 "oxi" samples sent by the CP/AC and 23 samples of cocaine from FP/AC were analyzed. All samples were presented as stones, with color ranging from white, pale yellow to light brown.

**Methods:** Chemical profiling of the samples was conducted by means of ATR-FTIR, TGA, GC-FID, Headspace (HS)-(GC-MS) and elementary qualitative analysis (cations, anions and sugars). Cocaine, cis- and trans-cinnamoylcocaine (all expressed as bases) and adulterants (benzocaine, phenacetin, caffeine, lidocaine, levamisole, hydroxyzine and diltiazem) were quantified using methods of the Chemical Profiling program of the Brazilian Federal Police (PeQui Project). Classification of oxidation levels was performed applying DEA/USA criteria: samples containing less than 2% of total cinnamoylcocaines with respect to cocaine are classified as "highly oxidized"; 2-6% are "moderately oxidized"; more than 6% are "not oxidized".

**Results:** FP/AC samples exhibited cocaine purities in the range of 50-85% (mean 73%) and are mostly (57%) composed of "not oxidized" cocaine, in the form of coca paste. The remaining FP/AC samples were oxidized, and were classified as coke base. Regarding the "oxi" samples from the CP/AC, cocaine contents in the range of 29-85% (mean 60%) were obtained. Among these, 04 samples presented lower levels of cocaine (29-47%) and significant amounts of carbonates, which is quite typical of crack cocaine. Six additional samples are in the form of cocaine salt (hydrochloride), which is not normally consumed in smoked form (57-85% of cocaine). Among the 10 remaining "oxi" samples, 07 were composed of "not oxidized" cocaine, and then classified as coca paste (55-85% of cocaine) and the last 03 samples were classified as coke base, since they have undergone an oxidation process (43-73% of cocaine). The only organic adulterant identified in this study was phenacetin, ranging from 0,4-10% in 05 FP/AC samples and 0,4-22% in 07 CP/AC samples. Furthermore, the results obtained from TGA, HS-GC-MS and qualitative analysis did not revealed significant amounts of calcium oxide or hydrocarbon fuels (such as kerosene and gasoline) in "oxi" samples seized by the CP/AC. Thus, this work has not confirmed the information currently available in the Brazilian media regarding the relevant addition of such substances in the formulation of so-called "oxi".

**Conclusions:** Chemical profiling analysis of "oxi" samples seized in the State of Acre indicate that there isn´t a "new drug" in the illicit market. The "oxi" samples analyzed in this study cannot be classified as a "new form of cocaine" since their major/minor compone

**Keywords:** Oxi; Cocaine; Quantification; Chemical Profiling; Pequi; Crack; Pasta Base; Coke Base; Hydrochloride

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# A NEW TECHNIQUE FOR RAPID AND SENSITIVE FORENSIC SCREENING BY USING MATRIX-ASSISTED LASER DESORPTION/IONIZATION (MALDI)

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**Introduction:** Matrix-Assisted Laser Desorption/Ionization (MALDI) is one of the most rapid and sensitive ionization methods for mass spectrometry (MS). However, MALDI is not utilized in forensic analysis since it has been evaluated to be not suitable for the analysis of small molecules because of interference of matrices peaks, and for biological specimens because of ion suppression by salts. In order to utilize MALDI technique for forensic analysis, we carefully examined the ionization for screening of small molecules with MALDI. We also investigated the automatic detection and simultaneous qualitative analysis of them by MALDI - high-resolution tandem mass spectrometry (MALDI-HR-MS/MS).

**Methods:** [Analytical Target] Drugs, medicines and toxic compounds (natural toxins and household chemicals etc., more than 100 compounds in total). The standard compounds were dissolved in 50 % aqueous acetonitrile at the concentration of 1 ppm and used for the experiment. [Organic Matrix] alpha-Cyano-4-hydroxycinnamic acid (CHCA), 2,4-dihydroxyacetophenone (DHAP), sinapinic acid (SA) and 2,5-dihydroxybenzoic acid (DHBA). All the matrices were dissolved in 50 % aqueous acetonitrile with 0.1 % trifluoroacetic acid at the concentration of 3 mg/mL and used for the experiment. [MALDI Sampling] 0.5 uL of 1-ppm sample solutions were spotted on MALDI sample plate, then to this were added 0.5 uL of matrices solutions. The spots were left to dry up and then analyzed by MALDI-MS/MS. [NALDI Sampling] 0.5 uL of 1-ppm sample solutions were spotted on NALDI sample plate (Nanosys MSP 96 NALDI Targets) and were left to dry up, then analyzed by MALDI-MS/MS. [Pre-treatment of Biological Specimen] To 10 uL of 1-ppm fortified serum or urine in 1.5-mL disposable test tube was added 20 uL of acetonitrile, then the mixture was shaken with Vortex mixer and centrifuged for 10 seconds, and 0.5 uL of the supernatant was used for analysis. [Instrument] MALDI-MS/MS: Micromass MALDI-Q-Tof Premier, excitation laser: Nd:YAG (355 nm), resolution: 17500/10000.

**Results:** [Analysis of Standard Compound] If Nd:YAG laser (355 nm) was employed for excitation, two organic matrices, CHCA and DHAP, enabled sensitive automatic detection and qualitative analysis of more than 90 % of the compounds tested. NALDI, a kind of MALDI that does not require organic matrices, also showed similar results as CHCA/DHAP-MALDI. CHCA and DHAP might interfere in the detection of small molecules by their own matrices peaks, but it could be avoided by combination analysis using these two matrices. If the resolution is more than 10000, m/z of monitoring ions of almost all the compounds tested could be separated from matrices peaks. If NALDI plate is available, NALDI+CHCA/DHAP-MALDI on NALDI plate enabled detection of the maximum number of compounds. Even in the case that m/z of a compound was close to matrices peaks, it was detectable if the interval was more than 0.1 Da. Especially, basic, cationic and anionic compounds showed high sensitivities in the detection by MALDI and NALDI. [Pre-treatment of Biological Specimens] A simple pre-treatment using acetonitrile dilution also enabled MALDI analysis of biological samples such as serum and urine. The required time for the pre-treatment was ca. 1 min. [Qualitative Analysis] By employing MALDI-HR-MS/MS instrument, most of the compounds tested were automatically detected and also gave HR-MS2 spectra automatically. Those HR-MS2 spectra were registered in library file, and it also enabled rapid qualitative analysis before GC/LC-MS qualitative/quantitative analysis. For example, some isomers, like promazine and promethazine, or digoxin and gitoxin, were readily distinguished by MALDI-HR-MS/MS.

**Conclusions:** MALDI is quite useful for rapid and sensitive forensic screening of drugs and toxic compounds. A combination of CHCA-MALDI-, DHAP-MALDI- and NALDI-HR-MS/MS enabled automatic detection and simultaneous qualitative analysis of a large number of drugs and toxic compounds.

**Keywords:** MALDI; NALDI; Small Molecules; Forensic Screening

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# ORAL SESSION

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# THE LEGAL THRESHOLD OF 18 YEARS : THE USE OF SOFT-EVIDENCE FOR DENTAL AGE CLASSIFICATION IN AN ITALIAN SAMPLE

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**Introduction:** The age assessment of sub-adult is one of the most actual field of forensic odontology given the usefulness of dental maturity to establish if a subject has reached a legal threshold of age. Methods using dental evidence, observed through orthopantomographs (OPG), proved to be useful to assess an adolescent's age. The aim of the study is to verify the performances (precision and reliability) of a modified Naïve Baive classifier to assign a subject to a class of age (minor , adult) studying the calcification of third molars.

**Materials and Methods:** To estimate the model we considered a sample of 559 OPGs of Italian youths aged between 16 and 22 years (307 males and 252 females). The age is expressed in year. The OPGs , 449 analogue and 110 digital, have been examined by two experts: a forensic odontologist and a dentist. All available third molars are classified according to Demirjian 8-stages classification. The experts are allowed to use the soft-evidence so that they can assign two different stages with percentage of probability (e.g: G 30% , H 70%) when tooth has and intermediate stage of maturation respect to the Demirjian classification. We introduced a procedure to learn the parameters of the NaÏve-Bayes model. A proper statistical model is assessed for each expert. First we introduced a classification of individuals as adults or minors (dichotomous analysis), then, in the second phase of the statistical analysis, we experimented a threefold age partition, with the introduction of a central class of age, as an indecision class to improve the results for the external classes of age. The results are provided for thresholds of probability (TT) that vary from 50% to 99%, so that the more suitable TT can be chosen: criminal cases require the highest values (90 % to 99%), while for civil case also a TT = 60% could suffice. The results are considered for the single tooth (T1= tooth n. 18, T2= tooth n. 28 ,etc) or the combination of teeth (T1-T2; T3-T4; T1 -T3; etc and all teeth together T1-T2-T3-T4). Also the intra and the inter operators variability has been assessed.

**Results:** The increasing of TT causes a lower percentage of subject that are classified (SC), but yields also a lower percentage of false adults (FA). The FA is the worst and less desirable error especially for criminal ascertainment of age and deserves a particular consideration. Both for dichotomous analysis and for trichotomous one, all teeth together (T1-T2-T3-T4) gain better results with respects to couples or the single tooth. As illustrative results for the dichotomous analysis we can report that for TT = 50% the combination of T1-T2-T3-T4 produces SC= 81% and FA =25% ; for TT= 90% the same combination of teeth shows SC = 74 % and FA = 14 %. The trichotomous analysis implies the introduction of central class (CC) of age as non decision class. Since the age of our sample was expressed in year, the narrower CC we could chose was 17 < age < 19 . The results show an improvement of correct classification and the reduction of FA (FA is 2.5% for Expert A and 7.8% for Expert B). The expert with a wider forensic experience, made more extensively use of soft evidence than the dentist with clinical experience, and got better results. The classification model allows the experts to provide the probabilities for age assessment as performance indexes that seem to be useful for a judge, or authorities, to choose the most appropriate and reliable expert.

**Conclusions:** We found the influence of training and experience of the expert, but it has to be proved in a larger sample of experts. The trichotomous analysis is more reliable especially for age assessment in criminal cases than dichotomous one, but a reduction of the CC has to be experimented in a future researches with sample whose age is expressed in days. The measuring the classification model's performances for each expert contributes to reach high standards of quality in forensic odontology.

**Keywords:** Forensic Odontology; Dental Age Estimation; Third Molar

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# AGE ASSESSMENT OF UNACCOMPANIED ASYLUM SEEKING CHILDREN IN NORWAY

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**Abstract:** In the past decade there has been a considerable increase in the number of unaccompanied asylum seeking children (UASC), many of whom appeared to be older than their given age. For eight years dental age assessment has been included as part of the asylum seeking process in Norway. In the autumn 2009 the age estimations were expanded to include both dental age-assessments and age evaluations from hand-wrist evidence. The results from the two independent age evaluations were compiled by a paediatrician. The presentation compares two independent methods for age estimations. The aim is also to find the frequency of UASC with dental and osteological evidence of being older 18 years. From October 2009 to the end of December 2010 (15 months) age estimations have been performed on 963 UASC whose given ages were queried by the Norwegian Directorate of Immigration. The dental development was studied on ortopantomograpic radiographs (OPG) and the developing teeth staged from the tables according to Liversidge (2008), Kullman et al.(1992) and Haavikko (1970). If the dental development was complete, the dental age was estimated from Kvaal et al (1995). The osteological age was estimated from stages of ossification of the epiphysial cartilage of the distal radius according to Greulich Pyle (1959). The majority of the UASC came from Afghanistan (61%) and Somalia (11%). Only 10% percent were women. The majority gave the age as being 16 or 17 years (75%). In 86% the dental and osteological age estimates were within ± 1 year difference. In 7% the dental age was retarded in relation to osteological age (>1 year) and in 7 % the osteological age was retarded in relation to dental age (>1year). Eightyone percent were found to be 18 years or older by the combined methods. Fifty percent were in need of dental treatment. Age estimations by two independent methods show that there are good correlations between them. There are adults misusing the system which is designed to protect children.

**Keywords:** Dental Age Estimation; Osteologiacal Age Estimation; Minors

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# COMPARISON OF FOUR METHODS FOR AGE EVALUATION IN A SAMPLE OF ITALIAN ADOLESCENTS.

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**Introduction:** The methods relying on dental calcification of the teeth up to the second molar result very reliable for the evaluation of age in childhood. The methods available nowadays are sensible to the genetic of the populations and therefore are ethnic-specific. It is therefore necessary to compare the reliability and accuracy of the methods in every different ethnic community. The aim of the research is to compare the reliability of four common methods for the odontological age evaluation (Demirijan, Willems, Cameriere, Haavikko) in a sample of Italian adolescents aged between 11 and 16.

**Materials and Methods:** The sample is composed of 501 digital OPGs, of Italian children (257 females and 244 males), aged from 11 yrs 0 days to 15 yrs and 364 days, taken for clinical purposes. The staging in the calcification of the teeth has been evaluated according to Demirjian's (D), Willems' (W), Haavikko's (H) and Cameriere's (C) method by three independent examiners. The sample had an equal distribution in chronological age groups and has been statistically analyzed. To evaluate the accuracy of each method, the statistical analysis provided the mean error (ME) and the mean squared error between the estimated age (EA) and the chronological age (CA), for each gender and age cohort. In order to assess the significance of the differences between EA and CA, a two-sample paired t test was applied for each method, gender and age cohort. The inter-operator variability has also been assessed.

**Results:** The four methods present different performances. We can especially say that the methods H and C show a tendency to underestimate the age in the considered sample. On the contrary, the methods D and W show a tendency to overestimate the child's age. If we observe the mean error and the mean squared error, the method W produces for each operator, gender and age group, the most accurate evaluations (the ME range is between 0,2 and 0,51 yrs). Moreover the W's is the only, among the four examined methods, which gives, in general, a CA-EA difference of no statistical significance. In the case of the D method, the ME varies between 0,44 and 0,87 yrs. In the case of method H, the ME varies between -1,69 and 0,85 yrs. The ME value, using the C method, varies between -1,26 and 0,8. Given the special relevance of false attribution in age assessment in criminal cases, we have focused our attention on the problem of overestimation that characterizes some of the analyzed methods. Considering the age expressed in years, and the 13 yrs age cohort, we have observed that in the female sample group the methods H and C never produce false attributions, while in the male sample group method H is the only one that do not produce false attributions. Finally, a non-negligible variability among the estimations produced by the different operators was observed. However, W and in general D are the only methods that do not originate differences statistically significant between operators' estimates. The collected data confirm the good applicability of the examined methods.

**Conclusions:** When comparing chronological and dental age according to the different methods applied, the results of our study show that in every age range/group of the Italian male and female children, the Willems' method offers the best accuracy. The evaluation and the choice of the method is to be considered according to the field of interest (civil or criminal law) and the different burden of proof, taking into account the possibility to adopt two different methods in the age evaluation of the same case in the aim to provide a stronger evidence.

**Keywords:** Odontological Age Evaluation; Forensic Odontology; 14 Yrs Legal Threshold

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# THE EXPLORE OF THIRD MOLAR FOR CHRONOLOGICAL AGE ESTIMATION IN TEENAGERS OF SHANGHAI HAN POPULATION

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**Introduction:** To study the applicability of third molar for age estimation in teenager of Shanghai Han population in China.

**Materials and Methods:** The third molars of 501 Han population teenagers of Shanghai from Shanghai ninth hospital were classified with Demirjian's classification method according to their orthopantomograms. There were 168 males and 333 females involved in this study and the chronological ages were from 11 to 20 years. Wilcoxon test and correlation analysis was performed to find the difference between third molars. Mann-Whitney and T-test were performed to find the difference between the males and females. The regression models were built for estimating dental age according to the number and classification of the molars.

**Results:** (1) Mann-Whitney and T-test showed that there is no difference between males and females. (2) Pearson and Wilcoxon test illustrated that there was a high correlation between 18 and 28, 38 and 48 (girl R=0.90 and 0.92, boy R=0.91 and 0.92, P<0.01) and no statistical significance in Wilcoxon (P>0.05), while there was a low correlation between 18 and 48, 28 and 38 (girl R=0.57 and 0.51, boy R=0.53 and 057, P<0.01) and outstanding statistical significance in Wilcoxon (P<0.01). (3) In the group of Demirjian's classification C of third molar, more than eight-three percent of the persons is less than 14 years old. In the group of classification D, more than ninety-seven percent of the persons is less than 16 years old. In the group of classification G, more than fifty-seven percent of the persons is more than 16 years old and more than fifty percent is less than 18 years old. (4) The main regression models are as follows: Y1=9.149+0.345X1+0.784X3 (X1=classification of 18, X3=classification of 38), Y2=9.058+0.302X1+0.841X4 (X1=classification of 18, X4=classification of 48), Y3=9.138+0.314X2+0.820X3 (X2=classification of 28, X3=classification of 38) and Y4=9.533+0.508X3+0.506X4 (X3=classification of 38, X4=classification of 48). After the test we found accuracy rate was 65% (error < 1.5 years old) and 82% (error < 2.0 years old).

**Conclusions:** Third molar could be used to estimate the age of teenagers. But there is different accuracy rate for the different classification of the third molar.

**Keywords:** Forensic Dentistry; Age Determination; The Third Molar; Demirjian's Method; Adolescent

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# AGE ESTIMATION FROM ORTHOPANTOMOGRAPH USING DEMIRJIAN'S METHOD IN SHANGHAI OF CHINA

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**Introduction:** Developing teeth are used to assess maturity and estimate age in a number of disciplines. The aim of this study was to determine the accuracy of Demirjian's method (Panoramic radiographs were examined and seven mandibular teeth staged according to Demirjians dental maturity scale) in the forensic clinical medicine.

**Methods:** Tooth formation was assessed from orthopantomographs of healthy children attending a dental teaching hospital(Shanghai 9th people's hospital). The sample was 828 children (279 boys, 549 girls, aged 11-19 years) with similar number of children from Shanghai. The mean difference (±S.D. in years) between dental and real age was calculated and tested using t-test.

**Results:** All permanent teeth of the lower left jaw except the third molar were rated, The Demirjian's method overestimated age between 11 and 14 years of age and understimated age between 15-19 years. Therefore, the French-Canadian standards were not considered suitable for shanghai children. Each population of children may need their own specific standard for an accurate estimation of chronological age.

**Conclusions:** Demirjians method is useful for forensic age determination within the Shanghai children(aged 11-16 years), but its dental maturity scale must be updated.

**Keywords:** Forensic Science; Odontology; Age Determination; Demirjian Method; Shanghai

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# VALIDITY OF DEMIRJIAN'S AND MODIFIED DEMIRJIAN'S METHODS IN AGE ESTIMATION FOR KOREAN JUVENILES AND ADOLESCENTS

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**Abstract:** In estimating age of juveniles and adolescents, the teeth are employed primarily because of its low variability and less affection by endocrine and nutritional status in development. Demirjian established criteria for evaluating maturity of teeth and his method has been used throughout the world. However, several studies showed the inappropriateness of Demirjians method on populations other than the one it is based on. Consequently some researchers modified Demirjians method using data of several different populations. Demirjian himself also published a revised method to overcome other shortcomings of his original method. The aim of this study was to test the validity of Demirjians and the modified methods (Demirjian's revised, Willems', Chaillet's and new Korean methods) for Korean juveniles and adolescents. 1483 digital orthopantomograms which consist of 754 males and 729 females in the age range of 3 to 16 years were collected. New age estimation method based on Korean population data was calculated. Dental age was estimated according to each method and the validity was evaluated using the differences between chronological and dental age. The inter- and intra- observer reliability was evaluated to be excellent. Statistically significant difference was observed between chronological and dental age in all the methods for both sexes except new Korean method for both sexes and Demirjian's revised method for males. However, when analyzing absolute and squared value of difference, Willems' method was found to be most accurate followed by new Korean method with slight difference for Korean population for both sexes. In conclusion, both Willems' method and new Korean method conducted by present study were proven to be suitable for Korean population.

**Keywords:** Age Estimation; Validation; Korean; Demirjian; Willems; Development

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# BITE MARKS ON DIFFERENT MATERIALS AND SURFACES: ANALYSIS WITH TEETH FEATURES USING 2D AND 3D METHODS

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**Introduction:** Bite marks are disclosed at the scene of crime on different materials and surfaces #8211; cheese, fruits, skin of dead or living persons, paper. Bite mark left at the scene of a crime can be a highly helpful way to lead investigators to criminals. The first challenge is to recognize bite marks, next - to secure them as evidence. Bite marks identification by physical characteristics of both - the bite mark wound and the suspects teeth - included: the distance from canine to canine, the shape of the mouth arch, the evidence of tooth rotation, teeth width, reciprocal high and thickness, spacing between teeth, the curves of biting edges, unevenness of teeth edges.

**Materials and Methods:** Authors carried out experiment on simulated cases. Ten volunteers bit various materials with different surfaces. Experimental bite marks were taken with stress to differentiations of materials. In next step impressions were taken from ten volunteers in order to prepare sets of dental casts (maxilla and mandible). Impression of biting edges of teeth were taken into wax to create an imprint. The samples of dental casts, corresponding wax bite impression and bite marks from different material were scanned with 2D and 3D scanners and photographs taken. All of these were examined in detail and then compared using different methods 2D and 3D.

**Results:** 1) Bite marks exhibit variations in accuracy of impression on different materials. The most legible reproduction of bite marks was seen on cheese. 2) Application of 3D method in comparison of bite marks and 3D scans of dental casts is a highly accurate. 3) Application of 3D method help to eliminate secondary photographic distortion of bite marks.

**Keywords:** Bite Marks; Teeth; Identification; 3D Methods

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# AN INVESTIGATION TO DETERMINE THE SUITABILITY OF USING THE RENISHAW DENTAL SCANNER IN BITE MARK ANALYSIS

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**Introduction:** The aim of this study was to develop a quantitative and objective method of bite mark analysis using a Renishaw Dental Scanner (RDS).

**Methods** A master model and a series of duplicate models of bite marks from the master were digitized using the RDS, with a 1 mm diameter probe tip at 500 mm/min scanning speed and 10 m scanning interval. Digitized images were super-positioned using Cloud software (UCL, UK). The difference between images was presented as colour difference maps next to the 3-D subtracted image. Zero difference represented by sea blue colour illustrates excellent similarities between the compared images. Green yellow colour illustrate a +10 to +20 m difference and a difference of -10 to -20 m represented by purple colour.

**Results:** Maximum difference between the master working model and various corresponding models fell below the Renishaw Dental Scanner uncertainty 20 m. 75% of the registered diffrences fell within the RDS tolerence.

**Conclusions:** This method has the potential of increasing the accuracy and reduce the operator variability of bite mark analysis.

**Keywords:** Ranishaw Dental Scanner; Bite Mark; Superposition

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# HOW IMPORTANT IS THE ROLE OF TEETH IN THE DETERMINATION OF HUMAN IDENTITY

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**Introduction:** Forensic dentistry plays a major role in body identification. The dental examination is very accurate and also nowadays, in the time of a comprehensive fingerprint and DNA assessment, objectively supported. The identification, which is based on the dental documentation, leads up to 43 - 89 % of a successful process. The purpose of the study is to describe the techniques employed by forensic odontology to identify human remains and also to provide details of some of the novel developments within this area.

**Materials:** Case reports based on comparative method of dental identification, x-ray images, implant presence, superimposition and DNA analysis confirm identity of the individuals.

**Results:** Dental identification of a person is based on unique individual characteristics of the dentition and dental restorations, relative resistance of the mineralized dental tissues and dental restorations to changes resulting from decomposition and harsh environmental extremes such as conditions of temperature and violent physical forces. Implant insertion, dental material chemical composition, photographic superimposition and DNA analysis can have most important role in the process of identification.

**Discussion:** Dental identification of an individual can be made mainly by two methods namely comparative method of dental identification and post mortem dental profiling. When ante mortem dental records are unavailable and other methods of identification are not possible, the forensic dentist can assist in limiting the population pool to which the deceased is likely to belong and thus increase the likelihood of locating ante mortem dental records. This process is known as post mortem dental profiling.

**Conclusions:** It was shown that dental identification of a person is based on unique individual characteristics of the dentition and dental restorations, relative resistance of the mineralized dental tissues and dental restorations to changes resulting from decompositi

**Keywords:** Forensic Science; Anthropology; Dentistry; Superimposition; DNA

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# ORAL SESSION

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# NUDETECTIVE: AUTOMATIC DETECTION OF CHILD AND TEEN PORNOGRAPHY AT CRIME SCENES

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**Introduction:** The crimes of sexual exploitation of children increase every day, especially with the use of the Internet to exchange child pornographic files. In order to combat this type of crime, the possession of these files is already a crime in many countries. Requests for forensic examination to identify this type of content are becoming increasingly common, including at crime scenes. The authors experience shows that the major difficulty in such cases is to identify illegal files among millions of files that can be stored in a modern computing device. The NuDetective Forensic Tool was developed to help the forensic examiners to find child and teen pornographic files in a timely manner at crime scenes. The Tool, developed with the Java Standard Edition, uses automatic nudity detection in images, file name comparison and also hash values to reduce the files to be analyzed by the forensic examiners. The nudity detection algorithms implemented by NuDetective, called Image Analysis, was based on two main principles: high processing speed and reduced number of false negatives. The NuDetective uses the RGB color space for representing digital color space, due to the ease and speed in color processing. The calculation suggested by Kovac et al. (2003) was used by NuDetective to relate the three components of RGB color space in order to identify human skin colors. For nudity detection, the Tool used the algorithm described in Ap-pid (2005), which was based on computational geometry. The Tool also performs filename comparison with a list of terms commonly used to exchange child pornography over the Internet. This feature, called FileName Analysis, is very efficient in searching for illegal files that were shared in peer-to-peer networks. The NuDetective also performs hash value comparison of files stored in the suspect material with a list of known hash values (Hash Analysis).

**Materials and Methods:** For all experiments, a laptop Lenovo ThinkPad T60, Intel Centrino 2.33 GHz, 2 GB of RAM, running Windows XP, was used. Since the performed experiments measured runtimes, the authors warn that the results are directly dependent on the hardware configuration used. Two evaluation experiments were carried out to measure the nudity detection rate and the total runtime of the Tool. In the first experiment, one controlled database (890 images) was created with several images obtained at imageafter.com and with nudity images obtained from random access of Internet sites, including human nudity of Asian, Black, and Caucasian people. The second experiment used an 80GB real hard disk drive seized during an operation to combat pedophilia in Brazil. The hard disk drive was placed in a write blocker device, which was connected to one laptop USB port, to ensure the preservation of all data.

**Results:** The results of the first experiment proved the ability of the Tool to automatically recognize suspicious nudity files, spending only 1 minute and 14 seconds. The results of the second experiment proved that the use of NuDetective is feasible and significantly reduces the time spent by forensic examiners to detect illegal content, with a high degree of reliability. The Tool took less than 13 minutes to search and analyze all files on the evidence drive, and was able to reduce dramatically the files to be analyzed by the forensic examiners (from 330,595 to only 183 suspicious files). The experiments results showed nudity detection rates around 95%, combined with fast processing.

**Conclusions:** The identification of child pornography files through automatic nudity detection proved to be applicable on practical forensic cases, especially at crime scenes. With low rates of false negatives and quick runtime, the NuDetective proved to be very effective to help combat the sexual exploitation of children and adolescents. The NuDetective Forensic Tool is free and available to law enforcement and public entities. For more information, please contact the authors.

**Keywords:** Child Pornography; Nudity Detection; Skin Detection; Forensic Computing; Crime Scene Analysis

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# FINGERMARK DETECTION USING ANTI-STOKES LUMINESCENCE GENERATED BY FUNCTIONALIZED UPCONVERTERS

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**Abstract:** Luminescence techniques show high sensitivity and selectivity for the detection and enhancement of latent fingermarks on a wide range of surfaces. However, background luminescence can be problematic depending on the substrate. Upconversion, also called anti-Stokes luminescence, is the phenomenon by which long-wavelength radiation (e.g. near-infrared; NIR) is absorbed and light is emitted at a shorter-wavelength (e.g. green). This results from a two-photon absorption - one photon emission system by materials that generally contain rare-earth complexes. This property is very rare in the consumer products commonly encountered in casework. Previous studies by our research group have indicated that upconverters are effective for the detection and enhancement of latent fingermarks when used as dry and wet powders using different surfactants or homogenized formulations (Ma et al., Forensic Science International, 207, 2011, 145-149). However, most upconverters are not soluble in water, which considerably limits their application as a stain for fingermark detection. The current research aims to address this challenge by functionalizing three types of upconverters (NaYF4:Er,Yb; NaYF4:Tm,Yb; and NaYF4:Ho,Yb) with azelaic acid. The results demonstrate that the functionalized upconverters tested can be effectively dispersed in water, with visible anti-Stokes luminescence under NIR illumination. The functionalized upconverters show great potential for use as cyanoacrylate stains for the detection of latent fingermarks on non-porous surfaces.

**Keywords:** Fingermark Detection; Anti-Stoke Luminescence; Upconverters

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# WIND-DRAG ESTIMATION IN A NON-CONTACT TRAFFIC ACCIDENT

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**Institution(s):**[1]NATIONAL FORENSIC SERVICE

**Introduction:** The speed limit of vehicles was recently increased in Korea under consideration of improved vehicle performance. In order to make changes to the speed limit for roads having narrow lanes also it is imperative to consider pedestrian, bicycle, and motorcycle traffic, which can be influenced directly by the speed of vehicles via wind-drag, especially in the case of children and the elderly. This case report describes a non-contact traffic accident involving a motor scooter and a tractor-trailer with a focus on the wind-drag effect.

**Methods:** We used load cells to measure the drag force acting on a substantially similar motor scooter when a substantially similar tractor-trailer passes by it, taking into consideration various speeds of the tractor-trailer and distances between the two vehicles. The motor scooter and the dummy operator were installed on rigid frames that were fixed to the ground. Two rigid rods, each equipped with a load cell, were used to attach the motor scooter to the frame, and were fixed to the center of mass of the motor scooter and the dummy operator. The dummy was fixed to the saddle of the motor scooter, and the weight was set to 60 kg. One rod with a load cell was installed in the direction of the motor scooter movement, viz., the y direction, and the other rod with a load cell was attached in the direction of the left-hand side, viz., the x direction. A three-dimensional steady-state flow analysis was also performed by using the CFX program for computational fluid dynamics to examine the streamlines and the pressure distribution around the tractor-trailer at various speeds.

**Discussion and Conclusions:** From the experiment, for a separation distance of 1.0 m and a speed of 90 km/h, the maximum resultant drag force is 124.5 N; this constitutes a degree of force that could abruptly disrupt the stability in maneuvering by an operator who is unaware of the approaching tractor-trailer. The resultant forces almost linearly increased at low speeds as the distance decreased. As the speed increased to 80 km/h or higher, the resultant forces increased steeply as the distance decreased. The results of a flow analysis shows that flow separation occurs at the front and back of the trailer. Because of the separation at the front of the trailer, the air flows separate, and this can increase the drag force on the motor scooter with the operator. As the air velocity increases, flow separation at the front face of the trailer and the domain of positive pressure at the front face of the tractor increase. A single equation that relates the tractor-trailer speed to the drag force that acts on the motor scooter was derived on the basis of the Reynolds number (Re) and the wind-drag coefficient (Cd ) : Cd = 1.298 × 10-7 Re. The current report has been carried out only for the specific case of an accident involving a tractor-trailer and a motor scooter. We plan to undertake further work considering various vehicles and relative objects, including pedestrians, in order to generalize the correlation. It has been submitted to JFS.

**Keywords:** Forensic Science; Traffic Accident; Wind-drag Coefficient; Reynolds Number; Flow Analysis; CFX

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# FORENSIC AUTHENTICATION OF EMAILS

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**Abstract:** With the wide use of email in social and business activities, disputes about the authenticity of emails often arise in civil cases. In the study, the mechanism and process of email communication are reviewed; the possible falsification traces are analyzed; and the examination approaches are suggested. Emails can be authenticated at the client by email based analysis and by client oriented analysis. Email based analysis is an approach that focuses on the email content, including the message header, message body and attachments. In the message header, information about mail's routing, sending time, unique ID, sender's name, sender's domain, and mail format can be analyzed. In the message body, if the field "Content-Type" has the value of multipart/mixed or multipart/alternative, the email may contain two copies of text/plain type and text/html type, and the two copies should be identical if the email is genuine. In the email attachments, the metadata can be extracted to contrast with the information in the mail header. Client oriented email analysis is an approach that mainly concerns about the client's behavior. Different clients have different local file organization methods. For Windows Live Mail, emails are stored in eml format and can be opened and edited directly. The eml file has a unique naming system, and the consistency between the file name and receive time can be used for authentication. For Outlook Express, emails are stored in dbx format by blocks. Each block has a maximum length of 512 bytes and records offset of the next block. Emails can be analyzed by its position in the dbx file and the relation with emails received in the same period. For Foxmail, emails are stored in INDX and BOX files. Each inbox and outbox is related to an INDX file and a BOX file, consistency between the two files is required for genuine emails. Besides, a special internal value in Foxmail is found to be linearly related to email's local arrive time.

**Keywords:** Electronic Evidence; Email; Authentication; Email Based Analysis; Client Oriented Analysis

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# A STUDY ON THE HEIGHT MEASUREMENT FROM THE SERVEILLANCE VIDEO IMAGE

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**Abstract:** Over the past few years, computer-based image processing has become more prominent in forensic science. The image quality from many CCTV systems has been too poor for facial recognition, yet there are other human characteristics which allow us to recognize individuals from a distance. One of these parameters is a humans height. In this paper, we propose useful height measurement method by auto position, size adjustment which uses image superimposition, edge detection regardless of lens distortion and 3D measurement technology, not using conventional photogrammetry calibration methods

**Keywords:** Serveillance Video Image; Height Measurement; 3D Measurement

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# FACE RECOGNITION TECHNOLOGY AND FACIAL EXPRESSION

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**Introduction:** Facial expression plays an important role in expressing human emotion. As a kind of nonverbal language, facial expression conveys person's inner activities and emotion status. Several research efforts have been performed regarding facial expression recognition in the recent years. The facial expressions are usually classi?ed in one of the six basic facial expressions (anger, disgust, fear, happiness, sadness and surprise)

**Materials and Methods:** Image capture : The captured images are input into the computer and classified by the expression of happiness, fear, sadness and anger. Image processing: The images with different expression of fifteen people which accord with the conditions of measurement are selected from the image database. Adobe Photoshop 7.0 is used to process the images. Firstly the images are resized to the same size, and then adjust the brightness and hue properly. The head portrait of the images are extracted and rotated until the line between the external corners of the eye is level. Facial feature extraction : In this paper, 12 feature points are selected for the method of locating the key feature and the geometry characteristic is applied to express the facial expression,. Measurement : By comparing the relative position of key feature points of facial expression, the algorithm for confirming the position of facial expression point is made and realized by software automatically. The feature points are lined out, such as the interior corner of the eye, the external corner of the eye, left and right wings of nose, left and right mouth corners, and so on.

**Results:** According to the data of the measurement, we can obtain the distance (L1, L2, L3,, L4,L5 ,L6)of five basic facial expressions (happiness, fear, sadness, anger, neutral). L1is the distance between the interior corner of the eye and the interior corner of the eyebrow; L2 is the distance between the interior corner of the eye and lower nose; L3 is the distance between the external corner of the eye and lower nose; L4 is the distance between the central eyebrow and lower jaw; L5 is the distance between left and right wings of nose; L6.is the distance between left and right mouth corners; L7 is the distance between upper and lower lips; L8 is the distance between upper lip and lower jaw.

**Conclusions:** The experiment shows which part of the face is more important for every facial expression. For anger facial expression, eye, mouth and forehead play the most vital role. The eyes region should be the one that plays the most vital role in sadness expression. The mouth is important for happiness expression and the forehead can provide the signal of fear. Thus, the eyes region seems to play a more vital role for the expressions of sadness and surprise, while mouth region seems to play a more vital role for the expressions of happiness and sadness.

**Keywords:** Face Recognition; Facial Expression; Facial Features

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# FORENSICS ENGINEERING EXAMS IN BRAZILIAN HISTORICAL BUILDINGS

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**Abstract:** Brazilian forensic engineers are using simple techniques to analysis damages in the structure of some historical Brazilian buildings to make quick technical reports to support police investigations. In particular, an investigation of damages in building from Pirinópolis City located in the Brazilian state of Goiás was one example of success. The performance of brazilian federal police helped the city of Pirenópolis, Goiás, recovering part of its history. It was from the investigations and forensic examination carried out by two federal criminal experts from National Institute of Criminalistics. The building examed was the ancient House of Chamber and Chain, a portuguese typical design. The building, which had been listed as National Historic Landmark, was built in the early 20th century, and was serving a local jail. This, according to assessments by experts, was causing damage. After realizing the problems resulting from this type of occupation the brazilian forensics experts immediately into contact with the mayor, with the representative of Brazilian National Institute of National Historical and Artistic Heritage (IPHAN) and the Head of Local Civil Police Station. According to the local head office of the IPHAN in Pirenopólis City, Paulo Sérgio Rio, with the realization of the problems identified by the experts was able to throw the authorities and obtain resources needed to carry out the restoration work, whose design dates back to 1999. The space was renovated and became the local Museum of Printing. This success has led to requests for similar forensic engineering applications in other types of criminal investigations. The exams consist of photographic reports. The objective is to establish damage to structure, walls, floors, roof or other parts of the historic buildings. Also, it is examined if the historical characteristics of the building are preserved. This article was the support by the following institutions: Brazilian Federal Police, National Association of Federal Criminal Experts - APCF and Research Support Foundation of the Brazilian Federal District - FAP / DF.

**Keywords:** Forensic Engineering; Historical Building; Damage

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# UNDERSTANDING THE IMPACT OF HUMAN FACTORS ON LATENT PRINT EXAMINATIONS

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**Abstract:** Fingerprints have provided a valuable method of personal identification in forensic science and criminal investigations for more than 100 years. However, several high profile cases in the United States and abroad have highlighted the fact that human errors can occur. While human error is an inevitable part of everyday life, in circumstances, such as forensic analysis, where errors may lead to the loss of life or liberty, error prevention is imperative. The forensic science community can benefit from the application of the substantial body of research being conducted in the human factors domain to advance our understanding of the nature of errors, enhance productivity and quality in latent print examinations, and reduce the consequences and likelihood of human error in the interpretation of evidence. This presentation will provide an overview of the field of human factors and describe the efforts of the Expert Working Group on Human Factors and Latent Print Analysis charged with conducting a scientific assessment of the effects of human factors on forensic latent print analysis.

**Keywords:** Human Factors; Latent Prints; Fingerprints; Human Error

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# ORAL SESSION

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# WHAT TYPE OF EVIDENCE PRODUCES THE BEST "TOUCH DNA?"

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**Abstract:** In the United States during the past few years, there has been a dramatic increase in the requests of forensic DNA analyses. This is largely due to the success of the CODIS national DNA database. Investigators have gone beyond the routine blood, semen and saliva samples to look for additional opportunities to use DNA. Consequently, they are now submitting items that may contain skin cells. Police routinely refer to these samples as "Touch DNA." They apparently perceive DNA as some magic pixie dust that is transferred to an object when the suspect merely touches it. Administratively, this produces a large backlog of cases that clogs the already overloaded DNA section of our laboratory. Many of these submitted items do not contain sufficient amounts of nucleated cells to generate useable DNA profiles. In October 2009, Cecelia Crouse of the Palm Beach County Florida Sheriff's Laboratory reported, at the National Institute of Justice Grantees Summit, a review of the cases processed by her DNA section. Her purpose was to provide feedback to investigators so they could collect the best evidence. We conducted the same type of study in our own laboratory in 2010 and found similar results. For example, we both found that 50-60% of items stained with saliva produced useful DNA profiles. On the other hand, swabs from the interiors of vehicles produced useful DNA profiles less than 15% of the time. Guidance provided to Hamilton County investigators however, did not result in self-limiting behavior and officers continued to submit evidence with a low probability of success. We repeated our review in 2011 and imposed limitations on what we would accept. This presentation will discuss the results of our study, and how we used the information to control the DNA case backlog

**Keywords:** Touch DNA; Backlog

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# WHICH VARIABLES DETERMINE THE NATURE OF EPITHELIAL ABRASIONS? A STUDY ON THE INFLUENCE OF SKIN DISEASES ON THE FORENSIC GENETIC ANALYSIS OF HANDPRINTS

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**Abstract:** In crime scene investigations the analysis of low copy number DNA has become increasingly important. Despite the ability to create a full profile out of a single cell by micro dissection techniques and highly sensitive short tandem repeat (STR) amplification in principal, the percentage of reliably analysable samples varies even if the nature of the stains appears to be similar. Many parameters might influence the amount and quality of DNA left on a surface, e.g. the condition of the surface. Additionally, the individual skin status may has a considerable impact on the integrity of the DNA profile. Therefore we investigated DNA from hand prints of patients suffering from atopic dermatitis, psoriasis and skin ulcer before and after therapy using PowerPlex® ESX17 kit in comparison to 22 healthy controls and 10 children. DNA quantification was done by real time PCR using the QuantifilerTM Kit. Hand prints from atopic dermatitis patients showed a correct and reliable DNA profile in 90 % before therapy and 40 % after therapy. In psoriasis patients, full DNA profiles were found in only 64 % and 55 % of hand prints before and after therapy, respectively. In ulcus patients and controls full DNA profiles were obtained in much lower numbers. Interestingly, we found an aged linked effect in the investigated children, showing better amplification results in the younger children. Our results propose that active skin diseases and the age (both linked to an increased rate of cell proliferation) are important parameters for the amount of amplificable DNA left by skin contact with surfaces. Since up to 7 % of adults in European countries suffer from atopic dermatitis or psoriasis, this could explain at least partially the varying quality of epithelial abrasions.

**Keywords:** STR; PCR; Low Copy Number DNA; Trace DNA; Dermopathy; Crime Scene Investigation

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# MOLECULAR AUTOPSY; GENETIC INVESTIGATION OF SUDDEN UNEXPLAINED DEATH

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**Introduction:** Sudden cardiac death is a major cause of premature death in children and young adults in developed countries. Standard forensic autopsy procedures can be unsuccessful in determining the cause of death. Molecular autopsy (postmortem molecular genetic screening), however has revealed that a number of these deaths are caused by inherited cardiac diseases. The aim of this investigation was to study pathogenic mutations in a forensic cohort of sudden unexplained death suspected of inherited heart disease in persons below 40 years.

**Materials and Methods:** The Study material consisted of 161 cases of sudden death aged 0-40 years that died in the period 1998-2008. They were screened for inherited heart diseases including premature coronary heart disease, cardiomyopathies and malignant channelopathies using molecular genetic methods. The material was selected from the forensic database by age and cause of death categorized as cardiovascular or unknown cause of death at autopsy. Manual selections of cases were then performed based on autopsy findings and patient histories were provided from autopsy, police and, in some cases, from hospital reports. Genomic DNA was isolated from whole blood. Mutational screening was performed by DNA sequencing, high resolution melting and PCR-based SNP genotyping.

**Results:** Approximately 10 % of the examined cohort had a pathogenic mutation. Family follow-up are ongoing.

**Conclusions:** Based on our results and the ongoing development in technology for identifying the causes of sudden unexplained death we recommend regional centres for autopsy of sudden unexplained death victims. These centres should serve as centres for expert pathological evaluation and molecular autopsy. National and international guidelines concerning molecular autopsy and transmission of the results to the family members should be proposed for cases of sudden cardiac death.

**Keywords:** Molecular Autopsy; Sudden Unexplained Death; Inherited Heart Disease

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# STUDY ON TYPING OF DNA EXTRACTED FROM DANDRUFF

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**Abstract:** Dandruff is composed of epidermal skin cells with different differentiation level and his diameter size varies between 0.4-2mm. Since some cells in the process of incomplete keratinization may leave which causes the possibility of existing nucleated cells in dandruff and the STR typing of dandruff can be applied into forensic cases as effective complement method. To test the applicability of dandruff in forensic DNA testing , in this study, 10 dandruff and control samples from adult volunteers were examined. Genomic DNA was extracted using the chelex method and was quantified by Quantifiler human DNA Quantification Kit. The DNA content varied between 1.2-7.8ng. The 15 STR loci were tested with the IdentifilerTM kit. The 3-5 STR loci could be successfully detected after storing 10 days and no STR loci could be detected after storing 20 days. The 9-11 STR loci were successfully detected for the dandruff stored at 10 days through a series of treatments including purified enrichment with microcon-100 and re-amplification using Minifiler kit which greatly improved the success rate of genotyping for dandruff.

**Keywords:** Forensic Genetics; Dandruff; STR

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# TRANSFER OF DNA: ACQUIRING AN UNDERSTANDING OF ASPECTS RELEVANT TO CRIMINAL INVESTIGATIONS

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**Abstract:** Understanding of the likelihood of transfer of DNA in a criminal offence scenario is becoming more relevant both during investigation processes and court proceedings. Limited investigations have been conducted to provide the data required to make a reliable assessment of the likelihood of a specific transfer event. This assessment is even more difficult when multiple transfer events are to be considered within a given scenario. Data relating to factors such as biological source, freshness of sample, substrate on which the biological substance resides, substrate of the secondary surface with which the primary substrate and biological sample come into contact, and the manner of contact, have shown that these factors play a significant role in transfer events. It is also clear that variables within sub-factors, such as the composition and weave of fabric substrates, can significantly influence the likelihood of transfer. Other factors whilst not influencing transfer itself could influence the assessment of a transfer event. These include differences in sampling, DNA extraction and DNA concentration methodologies, as well as the impact of substrate and/or sample on the efficiency of DNA extraction. Here we highlight the benefits of developing a framework for transfer rate likelihood estimates, illuminate some of the findings relating to the impact of various factors, and allude to some of the areas requiring further investigation in order to develop a reliable and accurate framework applicable to a wide range of possible transfer scenarios.

**Keywords:** Transfer; DNA; Trace; Criminal Investigations

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# UTI PREVENTING DNA DEGRADATION OF STORING URINARY SAMPLES FOR GENOTYPING

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**Abstract:** In forensic practices, individual identification of urinary samples is necessary when sample switching or handling are suspected. DNA degradation with time elapsing and the low yield of extracted urinary DNA prevent its application. Storage of urine prior to analysis is increasingly advocated yet no best practice has emerged. To improve the genotyping based on storing urinary samples, we employed UTI (Urinary Trypsin Inhibitor) to prevent urinary DNA degradation. Urinary samples from 10 (5 females and 5 males) healthy volunteers from China were stored at -80? with different concentrations (0-0.8 μg/mL) of UTI. Urinary DNA was extracted and quantified by Quantifiler Human DNA Quantification Kit. Genomic DNA was genotyped with Identifiler Kit at days of 1,3,7,9 and 30 after storage. 30 alleles were all detected in all urinary samples in the first day with or without UTI. Loci losses were observed after 3 days and no loci were detected after 9 days of female urinary samples preserved without UTI while all loci were detected when preserved with UTI during 9 days. No loci were detected after 7 days of male urinary samples preserved without UTI while mean 18 alleles were detected after 7 days when preserved with UTI. There were no significant differences among the average detection rate of STR loci in female urinary samples preserved with UTI at different concentrations. Detection rate of urinary samples preserved with UTI increased significantly, which result in prolonging the storage periods of urinary samples for personal identification.

**Keywords:** Forensic Genetics; Urine; UTI; DNA Genotyping; Individual Identification

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# COMPARISON OF FOUR METHODS FOR DNA EXTRACTION FROM PARAFFIN-EMBEDDED TISSUES

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**Introduction:** Because of the damage of formalin-fixed paraffin-embedded tissue (FFPET) to DNA during the production and preservation, it is difficult to extract high quality and sufficient DNA for the following research such as polymerase chain reaction(PCR). Therefore, it is essential and urgent to investigate an effective and economic method for extraction of DNA from FFPE. The aim of this study is to investigate the influence of four DNA extraction methods for FFPET on DNA quality, and to identify the optimal method for DNA extraction from FFPET.

**Methods:** Twenty formalin-fixed, paraffin-embedded non-small cell lung cancer(NSCLC) tissue specimens were selected and divided into four groups according to the method for DNA extraction. Four methods included xylene dewaxing and phenol-chloroform method, improved TES dewaxing with water-bath and phenol-chloroform method. Genomic DNA extraction kit improved TES dewaxing with water-bath and genomic DNA extration. The quality of obtained DNA was analyzed by electrophoresis and PCR amplification

**Results:** For paraffin-embedded tissue specimens, better DNA fragments could be obtained by using the improved TES dewaxing with water-bath and phenol-chloroform method and improved TES dewaxing with water-bath and genomic DNA extraction kit. The A260/A280 ratio of DNA obtained by using improved TES dewaxing with water-bath and phenol-chloroform method and improved TES dewaxing with water-bath and genomic DNA extraction kit were statistically different from genomic DNA extraction kit ($P<0.01$). There was no significant difference in efficiency among four methods ($P>0.1$). The aim trips were as bright as the positive control when using the DNA extraction by improved TES dewaxing with water-bath and phenol-chloroform methods as the template. The results demonstrated that improved TES dewaxing with water-bath and phenol-chloroform method is an optimal method for extraction DNA from FFPET.

**Keywords:** Formalin; Paraffin-embedded Tissue; DNA Extraction

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# INSIDE MOSQUITOES GUT: HUMAN SOURCE IDENTIFICATION AND QUANTIFICATION OF HUMAN DNA

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**Introduction:** Mosquitoes are occasionally important in forensic context, where mosquitoes found at the crime scene could be useful source of evidence DNA and be helpful in criminal investigation. In such cases of forensic interest is to prove that mosquitoes have been feeding on human and to ensure reliable identification of a source of blood meal. Along with identification of human donor, post-feeding interval could be useful in unraveling circumstances at the crime scene.

**Materials and Methods:** We collected 174 blood-engorged mosquitoes. Abdomen of 10 mosquitoes was squashed onto the Whatman® - FTA® Bloodstain Card within 30 min. Other mosquitoes were kept alive in laboratory at room temperature and sacrificed in the same way after 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96 or 112 hours. Before sacrifice, mosquitoes were sedated by chilling, photographed and species were determined. DNA was obtained by Chelex® 100 extraction. Amplification of human DNA was performed by multiplex PCR using AmpFlSTR® Identifiler® PCR Amplification Kit and AmpFlSTR® MiniFiler™ PCR Amplification Kit. STR alleles were separated electrophoretically on the ABI PRISM® 310 Genetic Analyzer and data was analyzed using GeneMapperID v3.2 software. Quantity of human DNA was determined using Quantifiler® Human DNA Quantification kit. Amplification data were collected and analyzed with an ABI Prism 7000 Sequence Detection System instrument.

**Results:** Out of 174 mosquitoes, 14(8%) were specimens belonging to subfamily Anophelinae, while 162 belonged to subfamily Culicinae (with Aedes vexans as dominant species). Complete DNA profile at 16 STR loci was obtained in all mosquitoes sacrificed before and after 48 hours. After 56 hours profile was obtained from 9 out 14 (64%), after 64 hours from 3 out 14 (21%) and after 72 hours from 3 out 11 mosquitoes (27%). Full profile was obtained from one mosquito after 88 hours. In samples where only partial profile was obtained using AmpFlSTR® Identifiler® PCR Amplification Kit, nine STR loci (complete) DNA profile was obtained in five samples using AmpFlSTR® MiniFiler™ PCR Amplification Kit. Quantity of human DNA reduced gradually after ingestion. Due to large differences in metabolizing rate, Anopheles mosquitoes were excluded from quantification study. Immediately after sucking concentration of human DNA ranged from 0.16 - 0.72 ng/µL, and the minimal concentration that yielded full DNA profile was 0.00512 ng/µL (from specimen sacrificed 56 hours after feeding). Lower concentrations of human DNA in sample yielded partial or blank DNA profile.

**Discussion and Conclusions:** Results showed that genetic profile sufficient for reliable identification of a person was obtained from all mosquitoes that lived 48 h after the blood meal, belonging to both major subfamilies (Anophelinae and Culicinae). Complete STR profile was obtained up to 88 hours after feeding, especially when PCR Kits optimized for detection of heavy degraded DNA were used. These results indicate that collecting mosquitoes from the interior of the crime scene even 3 days after alleged crime could yield valuable evidence DNA. Anopheles mosquitoes had much faster rate of metabolizing blood meal than specimens belonging to Culicinae subfamily. Results of quantification of human DNA isolated from Culicinae mosquitoes gut could serve as rough predictor of post-feeding interval in potential casework.

**Keywords:** Mosquito; Forensic Entomology; Human Identification; DNA Quantification; *Culicinae*

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# GENOTYPING OF 67 X-SNPS BY MULTIPLEX AMPLIFICATION AND IPLEX CHEMISTRY ON A MATRIX-ASSISTED LASER DESORPTION/IONIZATION TIME-OF-FLIGHT MASS SPECTROMETER FOR FORENSIC APPLICATION

**Author(s):** Li L[1]; Liu Y[1]; Lin Y[1]; Li C[1]; Zhang S[1]; Shao W[1]

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**Introduction:** Single nucleotide polymorphisms (SNP) typing on X chromosome was found to be high informative and suitable for forensic identification. In order to develop an accurate, high-throughput, cost-effective method and get the basic data of allele frequencies of SNP markers, we screened 67 SNP loci on X chromosome.

**Methods:** Primes were designed by MassARRAY Assay Design software. Blood samples from 295 unrelated Chinese Han individuals were obtained. Genomic DNA was prepared and multiplex PCR was carried out. Polymorphic sites were analyzed by allele-specific primer extension followed by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS). A panel of genomic DNA samples previously genotyped by SNPlex and TaqMan assay was detected simultaneously for quality control.

**Results:** According to the results of population studies, no deviations from Hardy-Weinberg equilibrium could be found. 64 X-SNP loci were found to be high informative in Chinese Han population. The combined discrimination power (CDP) in females and males, the accumulative exclusion probabilities (CPE) in duos and trios of the X-SNPs that showed no deviation from linkage disequilibrium were all above 99.9999%.

**Conclusions:** The data demonstrated that X-SNP typing by multiplex amplification and iPLEX chemistry on a matrix-assisted laser desorption/ionization time-of-flight mass spectrometer was a useful technique for paternity testing and individual identification. The 64 highly informative SNP loci on X chromosome yield the similar power in forensic identification as STR markers currently used. It may be concluded that the X-SNP panel is highly valuable in forensic identification.

**Keywords:** SNP; X Chromosome; Multiplex PCR; MALID-TOF Mass; Polymorphism

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# INCREASED EFFICIENCY OF MITOCHONDRIAL DNA EXTRACTION FROM HUMAN SKELETAL REMAINS: A PROTOCOL CHANGE LEADS TO REDUCED SAMPLE SIZE REQUIREMENTS

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**Abstract:** The Mitochondrial DNA Section of The Armed Forces DNA Identification Laboratory (AFDIL) works with the Joint POW/MIA Accounting Command - Central Identification Laboratory (JPAC-CIL) to identify the remains of missing US service members from past military conflicts. By generating mitochondrial DNA (mtDNA) sequences from recovered skeletonized, human remains and comparing the profiles those of associated family references, AFDIL provides additional evidence to support other avenues of identification, such as anthropology and odontology. With the inception of the AFDIL in 1991, a sampling developed that involved removing 2.5-5.0g of bone from a single skeletal element for mtDNA processing. This bone segment would be cleaned, pulverized, and the DNA extracted using a phenol/chloroform organic protocol (Edson, et. al 2005). While this protocol was effective at an approximately 82% success rate, the removed segment was destroyed, and re-sampling involved further destruction of the remains. A new extraction protocol was employed at the AFDIL in 2007 (Loreille, et. al 2007). While an organic extraction purification continued to be used, the amount of bone to be pulverized was reduced over 10-fold, from a minimum of 2.5g to a maximum of 0.5g. In the four years since full implementation of this modified protocol, success rates have risen to 92% (Edson, et. al 2009). Not only have success rates increased at AFDIL, but the sampling strategies employed by JPAC-CIL have radically changed. Remains previously considered unable to be sampled because of size or overall quality may now be sent for DNA testing. While the size of samples sent to AFDIL has decreased markedly, overall efficiency, measured by number of samples reported on a yearly basis, has remained level. This stability in overall efficiency was unexpected in light of the increase in success rates. One possible explanation is that the smaller required sample size has allowed JPAC-CIL to sample a greater number of severely fragmented cases. While it is possible to recover mtDNA from these samples, the overall yield may be less and require additional testing to generate a successful result. Samples such as these superficially decrease overall success rate.

**Keywords:** DNA; Mitochondrial Dna; Anthropology; Skeletonized Human Remains; Identification

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# ORAL SESSION

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# CLINICAL ANGER SCALE AMONG CLIENTS REFERRED TO FARS(IRAN) LEGAL MEDICINE CENTER SINCE 2011

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**Abstract:** Background: Almost everyone at some time experiences anger in some forms. Most of us have played the role of an angry actor, been the target of someone elses anger, or witnessed expressions of anger between other individuals in real life, on stage, or in the media. Anger provides drama; rage enlarges and expands it. A central question for sociologists is: What can we learn about social life by studying anger? The focus on anger provides unique knowledge about social relationships and conditions, the norms and expectations that occur within those domains, and dynamics in the wider societies , so it may be very helpful in order to communicate with clients reffered to legal medicine centers who have positive history of fighting and other offensive behaviors. Methods: the Clinical Anger Scale (CAS) [by Snell,W.E] : Twenty-one sets of statements were prepared for this purpose. In writing these groups of items, the format from one of Becks early instruments was used to design the Clinical Anger Scale (Beck et al., 1961; Beck, 1963, 1967). The following symptoms of anger were measured by the CAS items: anger now, anger about the future, anger about failure, anger about things, angry-hostile feelings, annoying others, angry about self, angry misery, wanting to hurt others, shouting at people, irritated now, social interference, decision interference, alienating others, work interference, sleep interference, fatigue, appetite interference, health interference, thinking interference, and sexual interference. Subjects were asked to read each of the 21 groups of statements (4 statements per group) and to select the single statement that best described how they felt (e.g., item 1: A = I do not feel angry, B = I feel angry, C = I am angry most of the time now, and D = I am so angry all the time that I cant stand it). The four statements in each cluster varied in symptom intensity, with more intense clinical anger being associated with statement "D." Each cluster of statements was scored on a 4-point Liker scale, with A = 0, B = 1, C = 2, and D = 3. Subjects responses on the CAS were summed so that higher scores corresponded to greater clinical anger (21 items; range 0 - 63). A scoring procedure similar to Becks (Beck et al., 1996). Is used with the Clinical Anger Scale (CAS)--where a clinical anger score in a particular range is labeled in a manner similar to Becks procedure. That is, clinical interpretation of the CAS scores is accomplished through the following interpretive ranges: 0-13 - minimal clinical anger; 14-19 - mild clinical anger; 20-28 - moderate clinical anger; and 29-63 -severe clinical anger. .The study was performed on a sample of 300 clients who referred to Shiraz (Iran) legal medicine centers by convenient sampling. The variants between the study are Income, Education, Age, Sex, Residence, Marriage status, Job and The reason of referral to legal medicine centers. In this study a is equal to 0.05. The relation between CAS and Variants of Income, Education and Age is calculated on the basis of Spearman Correlation Coefficient .The relation between CAS and Variants of Sex, Residence and Marriage status is calculated on the basis of Mann-Whitney test.The relation of between CAS and Variants of Job and the reason of referral to legal medicine centers is calculated on the basis of Kruskal-Wallis test. Results : 55% of the clients have minimal anger scale , 16% of them have mild anger scale, 16.7% of them have moderate anger scale and 12.3% of them have severe anger scale. P-Value of The relation between CAS and income is 0.026 (Spearman Correlation Coefficient = -129 , with ) and so there is a meaningful relation between anger and level of income. Higher the level of income is, lower the anger scale is. P-Value of the relation between CAS and education level is 0.137(Spearman Correlation Coefficient = -0.037) and so there isnt any meaningful relation between anger and educatio

**Keywords:** Clinical Anger Scale Among Clients; Legal; CAS; Iran; Shiraz

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# DOES CRIMINAL PROFILING WORK IN PRACTICE: EXAMINING THE LIMITED EMPIRICAL RESEARCH?

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**Abstract:** In this paper the limited empirical research on the practical validity of Criminal Profiling (CP) was examined. The most disturbing finding of this review was the fact that to date no empirical evaluations of profiles compiled in real-life investigations had been undertaken by impartial researchers. With respect to the utility/usefulness of CP, as measured by surveying law enforcement agencies that have received CP services about the perceived benefits of these services, studies revealed that the high reported satisfaction with CP is due to reasons unrelated to the main goals of CP. Similarly, studies that have examined the accuracy of profiles, as measured by evaluations of profiles compiled within the scope of quasi-experimental studies, revealed that such assessments are likely to be biased by the ambiguous nature of profile content and thus an unreliable measure of genuine accuracy. Overall, it was concluded that practical validity of CP is currently unsupported.

**Keywords:** Criminal Profiling; Criminal Investigations; Practical Validity

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# INVESTIGATING THE INFLUENCE OF CRIMINAL PROFILING-BASED EXPERT TESTIMONY ON JUROR ATTRIBUTIONS OF GUILT IN CRIMINAL TRIALS

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**Abstract:** One kind of Criminal Profiling-based expert testimony relates to Linkage Analysis (LA) - an assessment of the likelihood that two or more crimes have been committed by the same person. This study examined how expert testimony on LA (control, implicating, counter) in combination with two levels of implicating evidence influenced mock-juror attributions of guilt in criminal trials. Mock-jurors who received unchallenged implicating LA testimony rendered more guilty verdicts than controls and the presentation of counter expert testimony significantly reduced the impact of implicating LA testimony. The provision of additional implicating evidence also resulted in an increase in guilty verdicts. It was concluded that, given that the validity of LA is yet to be established, LA expert testimony is likely to have serious prejudicial effects and thus its admittance into criminal courts is premature.

**Keywords:** Criminal Profiling; Linkage Analysis; Expert Testimony; Criminal Court.

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# SERIOUS MENTAL DISORDER AND CRIMINALITY - THE SIGNIFICANCE ON IMPLEMENTATION OF PREVENTIVE MEASURES

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**Institution(s):**[1]HML/ISMAI/ICBAS; [2]HML

**Abstract:** Serious mental disorder and criminality - the significance on implementation of preventive measures Fernando Almeida, Helena Moura Daniela Carvalho Every year incompetent individuals who served a safety measure in an appropriate institution (most of them considered socially dangerous), namely in the Clinic of Psychiatry and Mental Health in Santa Cruz do Bispo (CPSCB) are set at liberty. They're mainly serious mental patients who often stop the medical treatment when set at liberty, which leads to a decompensation of psychotic symptoms; therefore, these patients show behavioral changes and fall back into crime and they eventually go back to CPSCB. The High Commissioner for Mental Health has thus decided to support an innovative project on mental health named "OUTPATIENT PSYCHIATRIC FOLLOW-UP FOR INCOMPETENT PATIENTS", in order to prevent decompensation and recurrence of crime. The purpose is to make known the work done so far.

**Keywords:** Crime; Psychosis; Prevention

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# DANGEROUSNESS IN FORENSIC PSYCHIATRY - CURRENT TRENDS IN THE CENTER OF PORTUGAL

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**Abstract:** The concept of dangerousness has deserved little attention in the Portuguese psychiatric context. Moreover, there is the notion that the concept is often not being properly used in forensic psychiatry. We analyzed Portuguese data, namely from the Center and Autonomous regions from 2007 until 2009, to evaluate: first, the prevalence of cases that were considered guilty, not guilty by reason of insanity (NGRI), and dangerous; second, which treatments have been proposed (ambulatory pharmacologic treatments or hospital admissions); and third, the frequency of technical errors (e.g. considering dangerousness in individuals reported as guilty). It would be relevant to have access to data from other regions and to study the evolution of the concept in forensic psychiatry throughout the years. Future studies should address these questions to have a better understanding of the use of the concept.

**Keywords:** Dangerousness; Forensic Psychiatry; Not Guilty by Reason of Insanity

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# CAN CRIMINAL PROFILING WORK IN THEORY: ARE THERE RELATIONSHIPS BETWEEN OFFENCE BEHAVIOURS AND OFFENDER CHARACTERISTICS?

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**Abstract:** In this paper the logic of Criminal Profiling (CP) was examined and one necessary condition of CP was identified to be the existence of relationships between offence behaviours and offender characteristics. It is argued that this necessary condition needs to be established before any other research on CP is undertaken and that this should be done through attempts to derive taxonomies that identify groups of offenders that are statistically different with respect to offence behaviours and offender characteristics. In the current study, a taxonomy was derived that classified offenders into nine groups that are statistically different with respect to specific offence behaviours and offender characteristics. Although this finding is preliminary, it suggests that the necessary condition of CP is in place and paves the way for replications of this finding and further CP research.

**Keywords:** Criminal Profiling; Offender Taxonomy; Offence Behaviours; Offender Characteristics

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# AN EPIDEMIOLOGIC STUDY OF TRANSSEXUAL PATIENTS REFERRED TO FARS LEGAL MEDICINE CENTER IN SOUTH OF IRAN DURING 2006 TO 2010

**Author(s):** Zarenezhad M[1]; Hedjazi A[1]; Hassanzadeh R[2]; Salehi M[2]; Rahimi M[3]; Ghorbanzadeh M[3]

**Institution(s):**[1]IRANIAN LEGAL MEDICINE RESEARCH CENTER; [2]SHIRAZ UNIVERSITY OF MEDICAL SCIENCES; [3]SHIRAZ PAYAM-NOOR UNIVERSITY

**Introduction:** Sexual identity disorders are a group of diseases with unknown epidemiology in which opposite sexuality is preferred and is accompanied with feelings of being born in wrong sex. Transsexuals demand biological treatments (surgery, hormonal) for changing their biological sex and also for acquiring anatomic sex characters of the opposite sex. According to scientific resources, the incidence rate of trans sexuality is one in 1000 males compared with one in 30000 females.

**Methods:** In an analytical cross sectional study , all transsexuals referred to Fars Medical Register office in the years 2006-2010 who requested consent for changing sexuality, and received at least 6 months of psychotherapy and passed all legal stages to receive the psychology committee approval before sex change, were studied. Some psychological tests used in the psychology committee interviews were MMPI, Rorschach test and TAT. Finally, the data of the project questionnaires were recorded by SPSS version 14. Descriptive statistics were used to reveal the results and statistical tests were used for analyzing the data. The PV measures less than 0.05 were considered to have significance.

**Results:** In general, 44patients with the average age of 27/6 years with primary sexual dissociation of 18women and 26 men were entered in the study. From the population studied, 41patients were single and three were married. Out of the 25 patients, 19 persons did not have any job (equal to 43/1%). Almost 10 persons had high school or lower certificates. 16 persons had junior college diploma, 8 had bachelor's degree and ten persons had the master or doctorate degree. 35 patients preferred to have the opposite sexuality and 9 persons had the sexual intercourse experience. Psychological tests of all patients revealed psychological disorders. Sexual identity was opposite to the current sex of the patients.

**Discussion:** In total, psychological diseases, especially borderline personality or depressive disorders and also suicide are often seen in the transsexuals'. Furthermore; transsexuals commonly injure their genitalia in order to make surgeons perform transformation procedures. Considering high rates of joblessness in the population studied and also the high rates of sexual contacts among this group, it is important to pay more attention to psychotherapeutic programs. In addition, as female numbers are considerable in the study, it is necessary to do more comprehensive studies and educate their family members more than before.

**Keywords:** Transsexual; Psychological; Identity Adjustment Disorders; Shiraz; Iran

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# NEONATICIDE AS AN EVOLUTIONARY ADAPTIVE STRATEGY: A STUDY ON ITALIAN CASES.

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**Abstract:** Neonaticide is a special kind of infanticide, committed in the very first hours after the birth, always by mothers. Several authors claim that this behavior is caused by psychopathology. In our work, according to evolutionary psychology theories, we state, instead, that this behavior has an adaptive origin. We analyzed 35 cases of neonaticide in Italy, from 1976 to 2006, and we find out recurrent variables in order to identify risk factors, and build neonaticide mother profile. To analyze possible risk factors, all data have been normalized, based on the actual frequency of the reference populations, in order to have more reliable values, estimated on the population characteristics. The first result of this research is that the woman single and in poor socio-economical condition, who can't raise her offspring and did not have an abortion, kills her newborn, following a conscious strategy of "comprehensive reproductive instinct" rather than following the "maternal instinct". These women, usually young, poor, without a partner, decide to not invest their energies in the nurture of a child in the present, preserving energies for future pregnancies. As an example, confirming this interpretation, Immigrated single mothers resulted with a risk factor for neonaticide ten times higher than Italian woman. The women who commit neonoaticide in our sample are nevere affected by psychopathology, and never commit suicide, suggesting the intention to live and reproduce again contrary to other parental infanticide. The profile of these women suggests that they are 1) normally at their first birth and are 2) usually very young with 3) a great residual reproductive potential. These conclusions might have implications in therapeutic assessment, as the identification of risk factors, and to offer and promote adequate socio-psychological support to at risk future mothers.

**Keywords:** Neonaticide; Evolution; Profiling

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# FAMILIAL CHARACTERISTICS AND PSYCHOLOGICAL CONSEQUENCES ASSOCIATED WITH INTRAFAMILIAL AND EXTRAFAMILIAL CHILD SEXUAL ABUSE

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**Abstract:** Child sexual abuse studies show that most frequently the offender is someone close to the child and someone whom the child trusts, like parents, siblings or other members of the family, but also people outside the family who know the child and can easily get in touch with the child, for instance neighbors, parents friends, teachers, etc. This study intended to identify some familial risk factors which differentiate children victims of intrafamilial from those of extrafamilial sexual abuse, as well as to compare psychological consequences between these two groups children victims. Data were collected in the Child protection Centre, a specialized institution for providing help to traumatized children and their families. The subjects were 443 sexually abused children, 88 boys and 355 girls, aged between 2 and 18. In most cases sexual abuser was the father, or a person outside the family known to the child. Results showed that the children who were sexually abused by a family member, in comparison to the children who were sexually abused by a person outside the family, more often come from divorced families or families which are still in divorce proceedings, families in which the father has a lower educational level and from single parent families. Children who were sexually abused by a family member were younger than those who were abused by someone outside the family. Results also showed that there are no significant differences in psychological consequences between the children whose perpetrator was a family member and the children whose perpetrator was not a family member. However, in comparison to a normative sample, they both showed higher rates of depressive and anxiety symptoms. These results can be used for planning child sexual abuse prevention programs and treatment.

**Keywords:** Child Sexual Abuse; Intrafamilial; Extrafamilial; Psychological Consequences

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# THE ROLE OF INDIVIDUAL DIFFERENCES IN PREDICTING THE TYPE OF IMAGES COLLECTED BY INTERNET CHILD PORNOGRAPHY CONSUMERS

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**Abstract:** The current study was the first to analyze whether or not personality or psychological characteristics are significantly related to or predictive of the types of images preferred or collected by self-reported consumers of Internet child pornography. This study had four specific aims: (1) to explore the personality differences between self-reported consumers and non-consumers of Internet child pornography, (2) to examine whether the self-reported male and female consumers of Internet child pornography exhibited different personality characteristics and traits from the non-consumers, (3) to assess the types of images preferred by the self-reported consumers of Internet child pornography, and (4) to determine whether or not there was a predictive relationship between the personality characteristics and the types of images preferred by the self-reported child pornography consumers. This study was conducted electronically using an Internet-based survey targeting respondents from the United States, United Kingdom, Australia, and Canada. Exploratory analyses were used to assess the predictive patterns between personality characteristics and child pornography use. Descriptive statistics assessed the image content preferred by the self-reported consumers of Internet child pornography.

**Keywords:** Child Pornography; Internet-Based Research; Image Preferences

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# ORAL SESSION

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# MEDICO-LEGAL EVALUATION OF VICTIMS OF VOLUNTARY VIOLENCE: A COMPARATIVE STUDY OF THE LEGISLATION IN SIX EUROPEAN COUNTRIES WITH ROMANO-GERMANIC LAW

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**Abstract:** The goal of this study is to compare different approaches in the medicolegal evaluation of the severity of voluntary violence in six countries where the legislation derives from romano-germanic law: Italy, Spain, Portugal, France, Switzerland and Germany. Each country uses different and complex medical criteria at times obvious and objective, other times very specific and peculiar. Certain countries such as France base the severity of the act of violence solely on the incapacity to perform the daily acts of common life (ITT), other countries consider the nature of the lesions, their probable evolution, type of treatment, risks which were undergone, the length of time required for recovery. Yet other countries consider the incapacity to work. Finally each country has specific aggravating conditions, which sometimes refer to old cultural conditions and influences such as the Italian "sfregio". After a brief comparative overview of legislations the authors will discuss through real cases the different European approaches and the respective relevance of each method of evaluation in order to extrapolate some general principles.

**Keywords:** Victims of Assault; Voluntary Violence; Seriousness of Injurie Evaluation; Compared Legislation

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# TANGLED SKIN

**Author(s):** Mclay D[1]

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**Abstract:** Over a period of 24 years, while acting the part of a registered medial practitioner, Harold Shipman contrived to murder more than 200 of his patients. That suspicion did not crystallize until near the end of that lengthy period is evidence of personal cunning, but also of failure in the process of certifying the cause of death and the proper disposal of bodies. Since, the medical profession has been subjected to minute examination, its probity questioned. We are accused of carelessness, paternalism, disregard for our patients and their relatives. We are subjected to a damaging indictment coming, of course, from the press, but also from official inquiries.

**Keywords:** Investigation of Death; Registration of Death; Disposal of Bodies; Cremation

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# THE CURRENT SITUATION AND DEVELOPMENT DIRECTION OF CLINICAL FORENSIC MEDICINE IN CHINA

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**Abstract:** 1. The status of clinical forensic medicine in China Clinical forensic medicine already have developed for about 30 years in China.Now ,it is an important branch subject of forensic medicine,solving any problem of living body injury which related to law. This subject mainly involves to appraise "the degree of living body's injury"in the criminal cases, and to evaluate the disability of personal injury victim in civil cases, And it also involves to identify the relationship between injury and diseases, to speculate the injury manner, to appraise the extent on being nursed for personal injury, and to estimate medical malpractice and so on.

2. Main academic achievements In order to adapt to the judicial demand, clinical forensic medicine has obtained as follows academic achievement these years.

(1) Assessing the human body function objectively in many field,including to assess vision function?hearing function and the male sexual function, assessing the spirit intelligence and surrounding nerve injury by advanced detecting techniques of nerve electrophysiology.

(2) Having formed the unique way of thinking which differed from clinical medicine, to match the evidence law of thinking.

(3) Study on the appraisal criterion of personal injury,Such as the criterion of "Assessment for body impairment of the injuried in road traffic accident"?"Assessment of the extent on being nursed for personal injury"?"The guideline for appraisal of working time loss of personal injury victims"etc.

(4) Study on medical malpractice theory and technique and having solved many problems for the courts.

(5) Having made substantial progress in living body's age estimation combined with anthropology research. A new special field which established today is the estimation of age with regard to the criminal responsibility of suspects who have no identity papers, etc. 3. The development direction of clinical forensic medicine

The future academic direction of clinical forensic medicine will launch from the following aspect:

(1) In the technical level, we need to build up and consummate academic structure of clinical forensic medicine.

(2) To revise and make appraisal standards.

(3) To follow clinical new technique development, and to provide new technical guarantee for clinical forensic medicine.

(4) Crossover study with other academics , such as with evidence law etc.

As mentioned above, we can see that clinical forensic medicine in China has formed the following characteristics:

(1)Combining with current law and justice rather closely.

(2)Having a great capacity of appraisal cases.

(3)Owning huge Social enormous influence.(4)Having large amount of employee.We can say that clinical forensic medicine in China has become the most active branch subject of forensic medicine,and will have a good future.

**Keywords:** Clinical Forensic Medicine; Living Injury Body; Appraisal; Impairment

4

# ZOLPIDEM INDUCED SOMNAMBULISM: AN EXCUSE FOR ANYTHING?

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**Case Report:** Zolpidem, a short acting hypnotic used for the treatment of insomnia, has been associated with reports of somnambulism including "sleep driving" and other complex behaviours whilst apparently "asleep". These behaviours commence when the blood concentration is high and rising and when zolpidem is in the blood stream exerting an effect i.e. during the time the person would expect to be asleep. Zolpidem induced somnambulism is now being used successfully as a defense in criminal cases, including traffic offences such as driving under the influence of alcohol and drugs. A case where the incident is alleged to have occurred some 21 hours after reported consumption will be presented followed by a discussion: Is this possible? Is there another possible explanation? What did the expert say? Were they found guilty? If zolpidem does cause these behaviours why is it still being used?

**Keywords:** Zolpidem; Somnambulism; Sleep Driving

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# AN INJURED HOUSEHOLD MAID - AN ASSAULT OR SELF-INFLICTION?

**Author(s):** Gall J[1]

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**Case Report:** A case, that gained significant local and international media attention, is presented of an alleged repeated assault on a household maid. It was alleged that over a several month period the maid was frequently hit with a cane, hit a few times with a metal cup to the face, had hot water splashed all over her body and both her legs, was ironed with a hot iron and, in particular, a hot iron was used on both her breasts, and her back was ironed and pierced using the sharp edge of a hot iron several times, was hit with a coat hanger, slapped across the face and scratched on the face. From the material made available for an opinion, the subject had a number of old injuries which had scarred and had a complex series of more recent injuries of varying ages including bruises, abrasions, burns, lacerations, a ruptured ear drum, and a nasal fracture. Significant specific recent injuries included the fractured nose, bruising and swelling to the face, patterned burns to the back and chest (mainly the breasts but including the nipples and areola), and burns to the back, forearm, thigh and feet. The maid provided a description of how these injuries occurred to police in a statement and provided further information in her evidence to the court. The description by the subject of the implement/material that caused her injuries in most instances was consistent with the injuries she sustained. In other words, some of the injuries sustained could have been caused by the iron, coat hanger, hot water and mug as alleged by the subject. of concern, however, was that the mechanism of injury and timing of the injuries was not consistent with the subject's allegations. The issue of self-infliction was raised by legal counsel. Many but not all of the injuries, both healed and recent, could have occurred as a result of self-injury. The burning of sensitive areas of the breast such as the nipple and the areola was unusual as were some of the burn injuries on the subject's back which were considered to be difficult for the subject to reach. Although the injuries sustained by the subject did not necessarily fit the classical picture of self-infliction, the very significant discrepancy between the medically assessed mechanism and timing of the injuries and the subject's allegations as to the mechanism and timing of the injuries, and the presence of old scars most probably the result of self-infliction, raised the probability that the injuries sustained by the subject were either self-inflicted or caused under other circumstances than those alleged. In the absence of an alternative explanation being available, the injuries were concluded to appear to be the result of self-infliction, albeit an unusual case of self-infliction.

**Keywords:** Maid Abuse; Self-Infliction; Physical Assault

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# PELLET EMBOLISM TO THE LEFT PULMONARY ARTERY - CLINICAL MANAGEMENT AND MEDICO-LEGAL EVALUATION CASE REPORT

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**Case Report:** Embolisation of the left pulmonary artery by a migratory pellet is a rare occurence in the medical and medico-legal practice as the vast majority of the projectiles that migrate through venous system stop in the right ventricle. If the projectile manage to reach a pulmonary artery, it can change location with the victim's movements. In this paper the authors present a case of a 12 years old girl who sustained a shotgun injury in the left inguinal region. She was hospitalized immediately after the incident, in a good general condition. X-ray investigation showed a pellet in the left inguinal region, anterior and lateral to the first sacral vertebra. In the 8th day of hospitalization the pellet migrated to the inferior branch of the right pulmonary artery. During the attempt to remove the pellet with a Fogarty probe, the pellet migrated again in the inferior branch of the left pulmonary artery. The medical team have considered that the position of the pellet is stable and due to the major risk of complications of a new surgical intervention (possible rupture of the pulmonary artery followed by massive hemorrhage), conservatory strategy has been chosen. From the medico-legal perspective, due to the potential unfavorable evolution of the injury it has been assessed that the injury endangered the victim's life. This case also raise important social issues as the patient belongs to a Roma community where she might not be considered a proper wife anymore due to the presence of the pellet in her body.

**Keywords:** Migratory Pellet; Shotgun; Left Pulmonary Artery; Conservatory Approach

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# SELF-INFLICTED (SELF-HARM) INJURIES, THEIR PSYCHOLOGICAL PROFILES AND MANAGEMENT

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**Abstract:** Self-inflicted (self-harm) injuries are not uncommon presentations in clinical forensic medicine. They are an important group in the forensic setting as they require a considerable amount of investigative time to assist in determining the veracity of the allegations. They also require appropriate medical recognition and management to minimise adverse outcomes. From a forensic clinical perspective, there are a number of different groups of self-harmers which may be encountered and include:

- those who have survived a potentially lethal suicide attempt ;
- those who self-inflict where the injury is the goal (e.g., cultural practices, body piercing and ritualistic mutilation);
- those where the individual is making a 'cry for help';
- those with psychiatric disorders including Munchausen's syndrome; and
- those that are designed for secondary gain.

It is those in the last group who falsely allege to be the victims of a crime and self-inflict injuries to embellish their allegations, or do so for some form of secondary gain, that are particularly pertinent to clinical forensic practice. The types of perceived gain for these persons varies considerably but includes claims for compensation, revenge, to escape prosecution, to claim some form of advantage in adverse situations such as in the custodial system, to gain financial benefits, and to divert attention. By contrast with self-harm associated with factitious disorders, this group perhaps fits within the definition of malingering, as listed in DSM IV TR, as the "intentional production of false or grossly exaggerated physical or psychological symptoms, motivated by external incentive such as avoiding military duty, avoiding work, obtaining financial compensation, evading criminal prosecution or obtaining drugs." From a psychiatric perspective, the above classification of self-harmers is not entirely adequate and a specific and fully accepted classification does not exist. There continues to be a long-standing debate over the significance of self-harming behaviour. When it occurs in the context of clearly articulated suicidal intent, there has been no hesitation in referring to it as attempted suicide. When suicidal intent has been minimal, or even absent, the psychiatric terminology used has varied enormously but the simplest is deliberate non-fatal self-injury with no suicidal intent. This is in stark contrast to examples of severe self-harm such as self-castration or self-enucleation of the eyes as may occur in people with a profound psychosis. As to be expected, there is a wide spectrum of self-inflicted injury (from 'classical' to the more atypical), with diverse motivations, and it is fair to state that the more severe the self-inflicted physical injury may be, the more there is the likelihood that an illness such as severe schizophrenia or psychotic depression may be present, whereas lesser degrees of physical injury are more usually associated with personality disorders, particularly the borderline personality disorder, although any psychiatric disorder may be implicated. As there is a diverse range of potential contributing factors to self-harm, and the distinction between factitious disorders and malingering, where relevant, may not be at all clear, the only firm recommendation for the safe assessment and management of self-harm is to emphasise the importance of a full individual medical (including physical) and psychiatric assessment. Even when obtained, there will be cases where it is not possible to either determine whether the injuries examined are the result of self-infliction, accident or assault. The assessment may, however, assist in determining the veracity of the allegations. This content was recently published as part of a chapter in: Gall J, Payne-James J. Current Practice in Forensic Medicine. Wiley-Blackwell, 2011.

**Keywords:** Self-Infliction; Self-Harm; Mental Health; Psychiatry

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# ORAL SESSION

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1

# A PROFILE OF NON-NATURAL DEATHS IN THE AREA OF TRANSKEI - SOUTH AFRICA

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**Institution(s):**[1]WALTER SISULU UNIVERSITY

**Introduction:** Each year non-natural (injuries) deaths account for more than 5 million globally. Traffic collisions, falls, drowning, burns and deliberate acts of violence against oneself and others are among the causes of these injuries. The poor are at high risk for non-natural deaths because they faced with hazardous situations on a daily basis. The poor also have less chance of survival when injured because they have less access to health services (WHO, 2001). To assess non-natural deaths and their causes, in Mthatha area.

**Methods:** This is a retrospective review from the data collected at Mthatha Hospital Mortuary between 1996 and 2005. The age, gender, occupation and the cause of death have been recorded. Using SPSS statistical program, data were analyzed.

**Results:** There were 9304 non-natural deaths referred to the mortuary for autopsies between 1996 and 2005. The mean age of subjects was 32.7 years. The mean age of male victims was 32.2 years while in females, 34.9 years and this difference was statistically significant (P<0.001). The mean age of women was more than in males in most categories of causes of death except in poisoning, drowning and collapse. Majority (78.8%) of victims were male. Of this 2064 (23.3%) were between 21 and 30 years of age group. There were 7049 (75.8%) traumatic deaths. Of this 4647 (49.9%) were homicides. Road Traffic Collisions (RTC) 2402(25.8%) was the most common traumatic cause of death followed by those due to firearm injuries 2159(23.2%), stab wounds 1489(16%) and blunt trauma 999(10.7%). In the ages younger than 10 years and older than 50 years RTCs was the most common cause of death. On the other hand in the 11-20 year age group, the most common cause of death was stab wounds. Firearm injuries were common in 20-50 years age group. There were 2255 (24.2%) non-traumatic deaths. They are poisoning 203 (2.2%), gas suffocation 64 (0.7%), burns 184 (2%), hanging 484(5.2%), lightning strike 157(1.7%), drowning 401(4.3%), falls 140(1.5%), concealed birth 34 (0.4%), collapse 482 (5.2%), and decomposed bodies106 (1.1%). Firearm injuries (OR: 2.54-3.62),) and stab wounds (OR: 1.71-2.49) were more common among adults than children, and the difference was statistical significant (p<0.001). Road traffic collisions (OR: 0.57-0.72), gas suffocation (OR: 0.19-0.54), burns (OR: 0.36-0.70), lightning strike (OR: 0.34-0.72) collapse (OR: 1.39-2.69) and drowning (OR: 0.14-0.22) were less common in adults than in children, and the difference is also statistically significant (p<0.001).

**Conclusion:** Non-natural traumatic deaths are higher among males in the younger age groups.

**Keywords:** Unnatural; Homicide; Suicide; Accidents

2

# FORENSIC EYE ON JANUARY REVOLUTION CASES REFERRED TO KASR ALAINY MEDICAL SCHOOL HOSPITALS, CAIRO-EGYPT

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**Introduction:** Kasr-Alainy medical school is one of the main pillar in management of cases injured during 25th of January, 2011.

**Methods:** Pattern of cases referred to Kasr Alainy hospitals were studied as regard to age, sex,occupation, residence, place of injury, injuries sustaind, period of hospital stay and outcome. Results: This study included 433 cases referred to Kasr Alainy from 25th of January to 11th of February.

**Results:** Revealed that most of cases (52%) were gunshot injuries while the least were thermal injuries. Deaths constituted 0.3% of cases. recommendations: When applying standards of legal documentation of injuries, Data presented showed some sort of deficiency so we have to stick to such standards to protect both patients and doctors rights.

**Keywords:** January Revolution; Egypt; Cases Referred to Kasr Alainy Hospitals; Injuries; Outcome

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# SPECTRUM OF ACUTE POISONING IN CHILDREN ADOLESCENTS IN CHANDIGARH ZONE OF INDIA - A 25 YEARS AUTOPSY EXPERIENCE FROM TERTIARY CARE HOSPITAL OF NORTH-WEST INDIA

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**Introduction:** Objectives: 1) To analyze the incidence of acute poisoning in children and adolescents as seen in a hospital setting 2) To study the types of poisons involved and also the various factors influencing their changing trend 3) To study the intent of poisoning 4) To suggest the preventive measures which possibly could reduce the mortality due to acute poisoning 5) To provide a base line data to the health policy makers so that they can equip the health care institutions accordingly

Increasing incidence of mortality and morbidity due to acute poisoning is a world wide phenomenon. While poisoning in adults has been the cynosure of some academicians but such scenario in childhood and adolescents generally suffer because of sub-optimal parental supervision and accessibility of product with hazardous potential. According to W.H.O. mortality due to poisoning in children up to 4 years varies between 3 to 7 per 10,000 population in different countries. In India, in spite of a fair perception of the magnitude of the problem, no such data either regional or nation-wide is available. The present autopsy based study is an attempt to quantifying this problem in Chandigarh zone of India.

**Material and Method:** Present study is an analysis of the autopsy records of 869 unnatural deaths of children and adolescents (<19 years) occurred in Postgraduate Institute of Medical Education and Research, Chandigarh between 1st Jan., 1975 to 31st Dec., 2010. Postmortem examination of these cases was conducted by the department of Forensic Medicine, PGIMER, Chandigarh. Information regarding age, gender, demographic profile, type and manner of poison consumed was recorded from the postmortem and hospital records, which also had further confirmation regarding manner of poison derived from reports of victims' relatives, friends and police. Type of poison consumed was also verified from chemical examination reports for which various specimens from these subjects were sent for analysis.

**Results:** Fatalities among children and adolescents (< 19 years) constituted 37.6% of all deaths due to poisoning and its proportion with male preponderance showed a study rise of 6.7% to 10.5% per five years between 1975 and2005 then had a steep rise of 19.4% in 2005-2010. Peak incidence of poisoning was observed in the age group of 16-19 years (53%) and least in 6-10 years (4.8%). A distinct shift of intent from accidental to suicidal poisoning was observed with advancing age and 10 years was found to be the most important landmark i.e. usually accidental (77.4%) below 10 years and mostly suicidal poisoning (61.2%) above this age. Between 1975 and 2000, proportions of accidental death (68.5%) were more than suicidal deaths (29.4%) but after that trend reversed and 59.3% subjects consumed poison with self intent followed by accidental (37.1%) and homicidal (3.6%) deaths. Organophosphorus compounds(36%)alcohol(18%),Datura(16%), arsenic(16%), Copper sulphate(14%) were the common poisons between1975 to1985 in1985 to 2000,aluminum phosphide (59.2%) and organophosphorus compounds (34.5%) were the common poisons causing mortality between. Since then aluminum phosphide- a fumigant alone was responsible for 68% of total poisoning death among the children and adolescents.

**Conclusion:** Present autopsy based study has highlighted a distinct shift of intent from accidental to suicidal poisoning was observed with advancing age and in this age of 10 years was found to be the most important land mark. Incidence of fatalities in accidental poisoning has decreased from 68.5% in 1975-2000 to 37.1% in 2000-2010 whereas that of suicidal poisoning increased from 29.4% to 59.3% during this period. Between 1975 and 2000, proportions of accidental death (68.5%) were more than suicidal deaths (29.4%) but after that trend reversed and 59.3% subjects consumed poison with self intent followed by accidental (37.1%) and homicidal (3.6%) deaths.

**Keywords:** Spectrum; Acute Poisoning; Children Adolescents

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# ABANDONMENT OF NEWBORN INFANTS: A DANISH FORENSIC MEDICAL SURVEY 1997-2008

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**Introduction:** Concealment of pregnancy and newborn infant abandonment are closely associated with neonaticide, the killing of an infant within the first 24 hours of life or less than 28-30 days, all depending on the jurisdiction. Abandonment of newborn infants occurs throughout the world and often the outcome is the death of the newborn infant. Together with neonaticide it is felt to be one of the least preventable crimes.

**Methods:** In this retrospective study we present all forensically known Danish cases of abandoned newborn infant corpses, covering the period from 1997 to 2008. Eleven newborn infant corpses were found, and we registered characteristics of the newborn infants and the circumstances of the cases based on the autopsy reports. One further newborn infant was included, dating back to 1992, as it turned up to be connected with one of the later cases.

**Results:** The mean age for the women having abandoned the newborn infants was 22 years of age and five of the autopsied newborn infants were probably alive when abandoned. In two cases the newborn infants were half siblings and abandoned by the same mother. The time span from when the abandonment was committed until finding the newborn infant was from hours to seven years. Two thirds of the newborn infants were girls (66, 6%). The most common means of disposal was in a plastic bag (ca. 60%) and only one newborn infant was wearing clothes when found. Cause of death was usually given as asphyxia, brain injury or simply unknown. Two thirds of the newborn infants showed signs of violence. None of the newborn infants had congenital malformations.

**Keywords:** Neonate Abandonment; Neonate Disposal; Cause of Death

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# ANALYSIS OF 188 HOMICIDE DEATHS AMONG MINORS IN SHANGHAI FROM 1999 TO 2009

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**Abstract:** Minors are of important stage in the development, death among them is the important reasons of potential life lost to the family and society, and to some extent it reflects a national, regional, social and economic situations and medical health care level. Especially, the juvenile victims of those homicide cases directly reflect area social order and stability situation. 188 cases of homicide deaths among juveniles in Shanghai from 1999 to 2009 were collected. The data were from the Institute of Forensic Science, Shanghai Security Bureau and were reviewed to provide scientific evidence for preventing juveniles from harms. 188 cases were divided into 5groups according the age: <1y, 1y-4y, 5y-9y, 10y-14y and 15y-18y. The cause of death (COD), mechanism of death and the background of the victims were analyzed. The data shows that although the mortality of homicide deaths in juveniles decreased recently, homicide is the second manner of violent death (the first is traffic accident) among juveniles in Shanghai. 188 minors were killed during 11years, 36.1% of the total 520 juvenile victims due to violence. Male were slightly more than female (male: female=1.3:1). All 188 victims were Han Chinese. 87 victims were Shanghailander and others were stranger from other provinces. There was 17 persons ( 9.04%) in the group of infant; 11 in the group of 1y-4y and the number increased with the age and in the group of 15y-18y to the most, 110 (58.51%). Data shows 177 victims were killed by single method and mechanical injury( 97 cases, 51.6%) and mechanical asphyxia (74 cases, 39.36%) were much common causes of death in 188 cases. In the lower year group, asphyxia was most common cause of death. 11 infants (64.7%) were killed by strangle and smothering. Mechanical injury was the most common cause of death among the group of 15y-18y. 70 minors (63.64%) out of 110 cases were killed by mechanical injury, 47 were by sharp instruments, 22 by blunt objects and 1 by gun shot. Most victims 5 victims out of 188 cases were killed by poisoning (2 to CO, 2 to pesticide chemistry, and 1 to nitrite). Among another 12 cases, 7 by 2methods (4 cases associated with strangle), 1by electricity, 4 by unknown method (all were dismembered body). It is essential to establish the protective system, enhance the education level among juveniles to prevent then from harm.

**Keywords:** Homicide; Juveniles; Cause of Death

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# INDIGENOUS AUSTRALIANS, SUICIDE AND THE AUTOPSY

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**Abstract:** In a recent study of adolescent asphyxial deaths in South Australia a disproportionately high number of Aboriginal victims were identified. Specifically, the proportion of Aboriginal victims aged between 10 and 18 years was 19.4%, compared to the general South Australian community where this group represented only 2.2 to 3.2% of the population in this age range. A retrospective review of all cases of suicide in the community involving Australian Aboriginal or Indigenous victims registered at Forensic Science SA was therefore undertaken over a 5-year period, from January 2005 to December 2009 to examine this issue. A total of 28 cases were identified, consisting of 21 males (age range 16-44 years, mean 29.9 years) and 7 females (age range 23-45 years, mean 17.3 years). Suicide notes were found in only three cases, with a suicide message left on a mobile phone in a further case. Full autopsies had been performed in 27/28 cases (96.4%), with an external examination only performed in one case (3.6%). Deaths in all cases were caused by hanging. Injuries were consistent with the reported events and there were no underlying organic illnesses or diseases that could have caused or contributed to death. Eleven victims (39.3%) had consumed alcohol, with nine (9/11, 81.8%) having ethanol levels > 0.05g/L. Cannabinoids were also found in eleven cases. In a minority of victims, psychoactive medications including benzodiazepines, opiates and antidepressants were detected. This study has demonstrated that the method of suicide overwhelmingly preferred by indigenous victims in South Australia is hanging. Elderly victims were not encountered. The precise reasons for this preference are uncertain, however, if a case of an Indigenous person in South Australia presenting as a suicide involves a method other than hanging, the possibility of alternative manners of death should be considered. Specific cultural issues in traditional Australian aboriginal communities has resulted in modification of local autopsy practices.

**Keywords:** Suicide; Indigenous; Australia; Hanging

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# POVERTY AND SUICIDE IN TRANSKEI REGION OF SOUTH AFRICA

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**Introduction:** Poverty leads to many social ills including suicide. Hanging is the method of choice for a poor person in committing suicide. Transkei is one of the poor regions of the Eastern Cape in South Africa. Objective: To study the trend of suicides in Transkei region and to follow the link between suicide and poverty.

**Method:** This is a retrospective study from 1996 to 2006, carried out at Mthatha (Umtata) Hospital Complex mortuary. More than 1000 medico-legal autopsies are conducted annually, catering to a population of 400 000 of former Transkei region.

**Results:** Ten thousand one hundred and thirty eight medico-legal autopsies were conducted between 1996 and 2006. Of this 552 (5.4%) were hangings. The average of hangings is 13.3 per 100 000 population annually. The number has increased from 6.7 per 100 000 population in 1996 to 21.7 in 2006 ($p=0.05, X2=17$). Males outnumbered females 5.9:1. The highest percentage (33.9%) of deaths were between 21 and 30 years. There is circumstantial evidence that growing financial difficulties along with HIV/AIDS have been contributory to these deaths.

**Conclusion:** There is an increasing incidence of suicides in Transkei region of South Africa. Poverty appears to be contributory to these deaths.

**Keywords:** Self-Harm; Hanging; Poisoning; Firearm; Poverty and Financial Constraints

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# O CONSENTIMENTO INFORMADO E OS DILEMAS ÉTICOS PERICIAIS PSIQUIÁTRICOS

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**Introduction:** O consentimento apresenta-se hoje como uma das grandes preocupações da bioética não só pela quantidade de trabalhos que se pode encontrar acerca do tema, mas por ser uma questão que exige um debate mais delicado e melhor fundamentado.

**Methods:** Revisão da literatura e analise crítica do assunto.

**Results:** A bioética principialista pauta pela autonomia, beneficência, justiça e não maleficência. O consentimento decorre do princípio da autonomia e possui alguns requisitos, que, sem os quais, não são se pode ter uma legitimidade jurídica para o procedimento em questão, são eles: competência, informação e voluntariedade. Esses princípios, assim como os requisitos do consentimento serão determinantes para a conduta ética dos médicos, em especial a do psiquiatra. A emissão de laudos periciais possui um contexto bastante peculiar em relação ao psiquiatra, pois, diferentemente das demais ciências forenses que prestam um trabalho de cunho científico, o psiquiatra pelo fato de haver uma relação médica que é balizada por um código de conduta próprio acaba por se deparar com situações atípicas e que chegam a ir contra o exercício da sua profissão.

**Conclusions:** Como constatado no início, o tema do consentimento, que daqui para frente será tido por informado, suscita dilemas, principalmente, quando se foca no consentimento informado de incapazes. Nesse sentido, se propõe a realização de estudos de campo no intuito de conhecer a percepção dos peritos psiquiatras a cerca dos conflitos em potencial do exercício da sua profissão, em especial do consentimento informado.

**Keywords:** Psiquiatria Forense; Bioética; Consentimento Informado; Ética Médica

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# ATRIBUIÇÃO DO PARÂMETRO "PERIGO PARA A VIDA" EM DIREITO PENAL E SUAS IMPLICAÇÕES JUDICIAIS

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**Abstract:** Na alínea d) do artigo 144º do Código Penal Português (com a epígrafe "ofensa à integridade física grave"), encontra-se previsto, como um dos resultados do tipo legal de crime, um parâmetro de dano de grande importância na avaliação do dano corporal em Direito Penal, denominado "Perigo para a Vida" (PV). A valoração deste parâmetro, da competência do Magistrado (Ministério Público, na fase de Inquérito e Judicial, na fase de Instrução e de Julgamento), mediante a informação pericial, constitui matéria de particular importância médico-legal, além de frequentemente assinalável complexidade. Tal complexidade resulta da dificuldade na interpretação da gravidade do quadro lesional e da subjectividade que envolve a avaliação e atribuição do PV, tendo em conta a inexistência actual de critérios clínicos objectivos e padronizados. O objectivo do presente trabalho é contribuir para uma melhor caracterização, na perspectiva médico-legal e jurídico-penal, dos casos analisados, em que o parâmetro PV foi contemplado, sob a forma de perigo concreto ou perigo potencial. Apesar do previsto no Código Penal Português se referir, em nosso entendimento, apenas ao perigo concreto para a vida, este estudo procura esclarecer o impacto da atribuição deste parâmetro, em termos periciais, no desenlace do processo judicial. A amostra estudada incluirá os relatórios médico-legais em que foi atribuído o PV (concreto ou potencial), no âmbito dos processos penais, elaborados no Serviço de Clínica Forense da Delegação do Centro do Instituto Nacional de Medicina Legal em Portugal, no período de 2004 a 2010 e a partir dos quais será feita uma análise dos relatórios e das correspondentes decisões judiciais.

**Keywords:** Perigo para a Vida; Código Penal Português; Decisões Judiciais

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# AVALIAÇÃO PERICIAL NOS ESTADOS ALTERADOS DE CONSCIÊNCIA - REFLEXÃO NEUROLÓGICA

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**Abstract:** Pretende a análise da avaliação pericial nos estados alterados de consciência quer de forma definitiva quer transitória e implicações no exame pericial que coloca o perito perante um grande desafio com recurso às avaliações multidisciplinares e ao exame neurológico e psiquiátrico. Tem relevância na demência, nas doenças psiquiátricas, traumatismos cranianos, abuso sexual e sob influência de estímulos externos.

**Keywords:** Estados de Consciência; Reflexão Neurológica; Exame Pericial

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# NEUROBIOLOGIA DO SUICÍDIO: FUNDAMENTOS TEÓRICOS

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**Abstract:** A neurobiologia do suicídio representa uma via de investigação, que encontra, na prática médico-legal, uma via de acesso a populações de suicidados e ao seu estudo, quer através da autópsia e dos respectivos exames complementares de diagnóstico, quer através da autópsia psicológica. São vias complementares, ainda insuficientemente exploradas, que poderão contribuir para um melhor conhecimento do suicídio, e, consequentemente, para uma intervenção e prevenção mais eficazes. O suicídio pode ser visto como a expressão de uma ruptura a vários níveis do funcionamento, um fenómeno complexo e multidimensional, decorrente da interacção de múltiplos factores. Desde os anos 80, com Gorge Miller e Emichael Gazzaniga, passou a considerar-se a existência de uma importante ligação entre o capítulo das Neurociências e o da designada, desde então, Ciência Cognitiva. No decorrer dos últimos anos, diversos estudos constatam a evidência de que o comportamento suicida é um tipo de comportamento com um forte determinante neurobiológico. Estando o córtex pré-frontal e a região órbito frontal envolvidos nas funções cognitivas do processamento de tomada de decisão e execução da função inibitória, ganham particular importância no estudo dos processos que conduzem ao acto suicida. Sabe-se hoje que existe uma hiperligação neurobiológica entre factores de risco para o suicídio e o sistema transmissor serotoninérgico, sendo o receptor 2A da serotonina um biomarcador de vulnerabilidade. Estudos recentes têm demonstrado um aumento do binding de agonistas serotoninérgicos no córtex pré-frontal a receptores pos-sinápticos de serotonina, principalmente a nível do receptor 2A. Tal, sugere a existência de uma up regulation compensatória em resposta a uma actividade serotoninérgica reduzida nesta região cerebral. A neurobiologia específica dos comportamentos suicidários envolve, assim, uma diminuição da neurotransmissão serotoninérgica no córtex pré-frontal com diminuição da ligação aos receptores 5-HT2a. Lesões nesta área resultam em desinibição do impulso e num comportamento agressivo o que em algumas instâncias, poderá resultar na manifestação de um comportamento suicida. Estudos neurobiológicos têm sido desenvolvidos em vários grupos de populações. Os dados acerca dos receptores 5-HT2, nas perturbações do humor, são controversos. É nosso propósito estudar o que se passa na população portuguesa. Para tal desenvolvemos um protocolo de estudo para esta população, tendo por base as alterações neurobiológicas conhecidas em populações já estudadas e os seus fundamentos teóricos.

**Keywords:** Suicídio; Córtex Pré-Frontal; Sistema Serotoninérgico; Receptores 5-HT2a

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# A BALÍSTICA TERMINAL NOS PROJÉCTEIS DE ALTA ENERGIA

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**Introduction:** A indústria bélica, ao fazer frente à guerra moderna, vem produzindo armamentos com alto poder de destruição, sempre mais potentes, utilizando projécteis de alta velocidade, deformáveis e com capacidade de produzir graves lesões, geralmente incompatíveis com a vida. Tem sido muito comum no Rio de Janeiro o emprego dessas armas militares , com projécteis de alta energia, no confronto entre os próprios traficantes de drogas, como no enfrentamento com policiais. O objetivo do presente trabalho é demonstrar os principais efeitos causados pelo impacto dos projteis de alta energia nos tecidos, que são basicamente: deformidade, desintegração, grave e extensa destruição tecidual pela transmissão de energia à distância.

**Methods:** Foram utilizadas fotografias de casos reais, que foram examinados no Sector de Necropsia do Instituto Médico Legal Afrnio Peixoto. Foram também utilizadas esquemas e tabelas com demonstração da formação das cavidades temporária e permanente, bem como a ficha técnica do fuzil AR 15. Resultados: Nos dias atuais encontramos na cidade do Rio de Janeiro, em poder de bandidos e traficantes de drogas, armamento militar, de última gerao, incluindo fuzis, submetralhadoras, pistolas automáticas e até granadas utilizadas na guerra do Iraque. A balística terminal estuda os movimentos e os efeitos dos projécteis após o impacto contra o alvo. Também chamada de balística das feridas. Tal estudo vem-se tornando um assunto extremamente útil, não só sob o ponto de vista médico-legal, mas também na avaliação e abordagem médico-cirúrgica. Tais achados são bem demonstrados, em casos fatais, que foram examinados detalhadamente em relação ao tipo e extensão das lesões nos diversos segmentos e rgos.

**Conclusions:** A divulgação científica do tema é de suma importância, sob a ética médico-legal e assistencial objetivando estabelecer uma melhor padronização do atendimento das equipes de sade e estudar as feridas produzidas por disparos de projécteis de alta energia cujo o aspecto, dinâmica e características diferem daquelas comummente produzidas pelas armas convencionais.

**Keywords:** Balística; Feridas; Alta Energia; Projécteis

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# "MULAS HUMANAS" NO NARCOTRÁFICO INTERNACIONAL BOLÍVIA-BRASIL - SUICIDAS EM POTENCIAL

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**Introduction:** O tráfico internacional de cocaína é um grave problema legal e social de proporções crescentes. No Brasil, é conhecida uma das principais rotas utilizadas pelos narcotraficantes que usam os "mulas humanas", pessoas aliciadas pelos comerciantes de drogas e enviadas através da fronteira da região Oeste do Estado de Mato Grosso (17 "trilhas" documentadas). Na manufatura das cápsulas de cocaína "engolidas" para o transporte, os fabricantes prensam a pasta base em formas específicas e as envolvem em materiais mais resistentes para evitar a ação dos sucos digestivos e o risco de vazamentos e também com a intenção de burlar e/ou confundir a confirmação da presença das cápsulas no tubo digestivo através do uso de equipamentos para o diagnóstico por imagens (RX Simples e a Tomografia Computadorizada). Nos cinco anos da pesquisa feita pelo autor foram presas 104 "mulas", com cápsulas recobertas por: papel carbono, "dedos de luva cirúrgica", "bexiga" de borracha usadas em festas, filme alimentar do tipo PVC, películas de insulfilm automotivo, plástico de "sacos de lixo", saquinhos plásticos de sorvete e papel alumínio. Investigar experimentalmente a capacidade de alteração da densidade radiológica, na radiografia convencional e na TC dos diversos tipos de invólucros, considerando seu potencial de dificultar a detecção de cápsulas "engolidas" em narcotraficantes; analisar experimentalmente algumas das diversas possibilidades de combinação dos materiais na manufatura das cápsulas de cocaína ingeridas por "mulas humanas"; identificar as formas de repressão realizada na fronteira Brasil -Bolívia; identificar e registrar as trilhas utilizadas pelos narcotraficantes e apresentar alguns tipos de esconderijos das drogas > "mocós", conhecidos pelos policiais.

**Methods:** No experimento in vitro utilizaram-se tubos de ensaio preenchidos por soro fisiológico a 0,9 %, vedados com rolhas plásticas, em seguida envolvidos com materiais idênticos aos utilizados pelos traficantes, que foram numerados e radiografados em equipamento de Raios-X TFX 15, GE, EUA, com técnica automatizada para extremidades com uso de câmara de ionização, manipuladas as imagens em aparelho digital CR Kodak, EUA e impressas em impressora Laser Dry-view 8900, Kodak, documentadas em filme radiológico e em arquivo digital. Após foram scaneadas em Tomógrafo Computadorizado Multislice, modelo Brightspeed, GE, com espessura de corte/reconstrução de 3,75 mm, manipuladas com diversas regulagens de contraste e impressas em impressora do mesmo tipo e modelo (Laser Dry-view 8900, Kodak) e documentadas em filme radiológico. Um radiologista experiente analisou as imagens e a tomografia quantitativamente através do ROI - Região de Interesse. O experimento in vivo foi realizado na emergência do Hospital Regional de Cáceres, em vários suspeitos de terem engolido cápsulas de cocaína, após a realização de Raio-X simples de abdome total, nos quais as imagens não foram precisas para o diagnóstico. Com a realização da TC as cápsulas ficaram bem visíveis. Para a eliminação das cápsulas foi utilizada a mesma rotina (protocolo) do preparo pré-colonoscopia (ingestão da mistura de suco de laranja + manitol).

**Results:** Como resultado da pesquisa in vitro é possível afirmar que nenhum dos invólucros testados mostrou qualquer tipo de diferença nas imagens da Radiologia Simples e apresentou pequenas alterações nos métodos tomográficos empregados. O resultado da pesquisa in vivo pode-se afirmar que o método de imagem por Tomografia Computadorizada é a técnica mais confiável e precisa para o diagnóstico da detecção de cápsulas de cocaína no interior do aparelho gastrointestinal dos chamados "Mulas Humanas", independente do tipo do material utilizado como invólucro.

**Conclusions:** Os diferentes invólucros na forma em que foram testados não apresentam capacidade de alterar significativamente a densidade radiológica do objeto envolvido, quer no RX simples ou na Tomografia Computadorizada.

**Keywords:** Mulas Humanas; RX; TC; Pasta Base de Cocaína; Tráfico Internacional de Drogas; Cocaína

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# UMA VOZ VINDA DA MORGUE CENTRAL DE LUANDA

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**Introduction:** Desajuste do processo funerário num país em guerra. Processo funerário como conjunto de etapas e momentos que devem ser cumpridos na íntegridade, em volta do cadáver, para que a sua inumação seja um acto transparente, sem que na sua execução haja momentos prejudicadores da saúde pública e ambiental. Este trabalho tem como objectivo fazer o levantamento sobre a problemática dos aspectos não acautelados e normativos sobre as etapas de um processo funerário. Quere-se trazer à luz à comunidade académica e estudantil o verdadeiro papel do processo funerário como factor preponderante em saúde ambiental, Saúde pública e Medicina Legal em Particular e Ciências Forenses de uma forma geral. Abordar de forma apelativa as possíveis consequências a longo prazo das etapas não cumpridas.

**Methods:** Para a realização deste trabalho, foi efectuado um estudo descritivo e observacional sobre o desajuste e a não aplicabilidade de um processo funerário, usando imagens fotográficas que retratam alguns momentos reais, não recomendados e não abordados até a data. (Medicina Legal, Saúde Pública e em Ciências Forenses)

**Results:** Foram encontrados resultados sobre a não observância de normas de biossegurança, campos santo (cemitérios) desprovidos do essencial, cujos locais são potenciais bairros residenciais, Valas comuns sem normas ambientais. Exumação massiva dos corpos enterrados em jardins residenciais e público dos cadáveres cujos enterros foram em menos de uma hora post-mortem durante o conflicto armado.

**Keywords:** Morgue; Cadáver; Medicina Legal

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# PORTUGUESE ASSESSMENT OF A FORENSIC VETERINARY MEDICINE UNIT

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**Introduction:** Lately, a great concern with the Animals Rights and welfare has been increasing, leading to the need of Veterinarian active involvement in forensic work. The fields where the Veterinarian may act as an expert are plenty. The present work aims to identify and characterize the multiple areas of Forensic Veterinary Medicine in Portugal, which are relevant to the Community. The authors point out, not due to their importance but because they have more impact in the society, situations involving animal violence - either as victim or as perpetrator of a crime against humans or other animals. Moreover, importance as given to the necropsy, not only for being often requested to the veterinary medical class but also for being one of the specialization areas, through which Veterinarians Pathologists may contribute to medico-legal issues.

**Methods:** This study was performed through two questionnaires. In the first one the target was the general Veterinarian population from Portugal. The second questionnaires specifically aimed to Veterinarians Pathologists, since they, somehow, already have a role in situations involving medical-legal issues.

**Conclusions:** To conclude, we present, in the form of diagrams, protocols for action in situations that may be worthy of the Law´s attention.

**Keywords:** Forensic Veterinary Medicine; Cruelty to Animals; Bites; Forensic Autopsy

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# LEGAL IMPLICATIONS OF AND CURRENT ANALYSIS STRATEGIES FOR CANNABIMIMETIC AMINOALKYLINDOLES IN HERBAL MIXTURES - FOLLOW-UP OF THE "SPICE" PHENOMENON

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**Abstract:** Starting from 2004 herbal mixtures like 'Spice' were sold in many European countries mainly via internet. Although declared as incense, they are smoked by the consumers as a Cannabis substitute. In 2008 the popularity of these herbal drugs increased dramatically in Germany and other countries as they were widely sold by head- and smart shops to consumers without age restriction. Drug users reported intense cannabis-like effects after smoking and denied detectability by commonly used drug tests. Although some of the indicated herbal ingredients are potentially bioactive, the suspicion was raised that synthetic cannabimimetic adulterants could be responsible for the reported psychotropic effects. After the identification of the first two synthetic compounds of this kind in ´Spice´ and related products in late 2009, the non-classic cannabinoid CP47,497-C8-homolog and the cannabimimetic aminoalkylindole JWH-018, and their subsequent submission to the controlled substance acts of many countries, an ever increasing number of new cannabimimetic designer drugs, mainly aminoalkylindoles, have been identified in follow-up "herbal" products (JWH-250, JWH-081, JWH-122, JWH-210, AM-694, RCS-4 and many more) in 2010 and 2011. The controlled substance acts often lag behind this accelerating new drug phenomenon and the forensic laboratories sometimes can only identify new surfacing substances by chemical structure-eludidating, cost-intensive and not commonly available analytical techniques like NMR and HR-MS. In this presentation, two different approaches of the prosecution of drug crimes related to the new cannabimimetic designer drugs in herbal mixtures will be discussed and counterbalanced - the violation of the medicinal products act by illicit trade of precarious pharmaceutical preparations and the amendment of the controlled substance act with respect to the possibility of submitting complete classes of stucturally related substances (in advance of their actual appearance on the drug market). Furthermore, strategies will be presented, how large seizures of these new types of illicit drug products can be processed in the forensic laboratories. New rapid screening procedures for cannabimimetic aminoalkyldindoles with ion mobility spectrometry are presented as well as cost-effective high-throughput techniques for these cannabimimetics like thin layer chromatography coupled to desorption-electrospray-ionization-mass spectrometry (TLC-DESI-MS) will be presented and their suitability for forensic casework demonstrated by examples of currently seized and analyzed samples of new herbal products.

**Keywords:** Synthetic Cannabinoids; "Spice" Products; Designer Drugs; DESI-MS; Ion Mobility Spectrometry

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# A ROADSIDE SURVEY OF ALCOHOL, DRUGS AND BENZODIAZEPINES USE AMONG DRIVERS IN PORTUGAL

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**Introduction:** Driving performance is easily impaired as a consequence of alcohol, drugs and medicines use. Although alcohol is the most frequently detected compound among accident drivers, illicit drugs and psychoactive medicines have also gained considerable attention during the last years. Most epidemiological studies on illicit drugs and medicines among drivers are difficult to compare due to the lack of standardized protocols (e.g. selection of subjects, biological matrix, diversity of compounds included in the analytical program and their cut-off limits). An important project in this field is the European Union project DRUID (Driving Under the Influence of Drugs, Alcohol and Medicines). The participation of the Portuguese National Institute of Legal Medicine in this study allowed, for the first time, to obtain data on the prevalence of alcohol, drugs and medicines among drivers in Portugal.

**Materials and Methods:** To ensure comparability between results from different countries, uniform design and protocols for the roadside survey were used. A list of core substances as well as analytical cut-off values for oral fluid and blood, were adopted by all countries participants in this study. In Portugal 3965 samples of oral fluid were analyzed by LC-MS/MS for screening and quantification of 26 substances, 23 of which were common to all participant countries.

**Results:** The presence of at least one psychoactive substance was detected in almost 10% of drivers. Alcohol alone was detected in 4.93% of the cases. Benzodiazepines and THC with a prevalence of 2.73% and 1.38% respectively, were the substances most prevalent after alcohol. The prevalence of cases with alcohol-drugs combination (0.42%) was approximately twice of those with multiple drugs (0.23%). THC was present in more than half of the cases with alcohol-drug combination, while cocaine or its metabolite were present in all cases of multiple drugs involving illicit drugs. In all illicit opiates positive cases, a direct marker of recent use of heroin, 6-acetylmorphine, was detected. Methadone was detected in 80% of the positive cases for medicinal opioids. Benzodiazepines detected with the highest prevalence were nordiazepam (59%) and alprazolam (26%). The prevalence of alcohol in male (6.21%) was more than two times higher than among female drivers (2.59%). In both groups, the age group 18-24 showed a higher prevalence: 9.76% in male and 8.00% in female drivers The age groups 18-24 and 25-34 are those with higher prevalence of THC. Benzodiazepines use was significantly higher among females (4.75%) than among males (1.68%). Drivers in the age group 50+ showed a higher prevalence of benzodiazepines (4.58%). Prevalence of alcohol-drugs and multiple drugs is much higher among male (0.64% and 0.32% respectively), than in female drivers (0.01% and 0.08%). With the exception of medicinal opioids, all substance groups showed a higher prevalence at night-time (22:00 to 3:59), being alcohol (9.00%), cocaine (0.37%), THC (3.25%) and illicit opiates (0.37%) more prevalent on weekend nights and benzodiazepines (4.58%), alcohol-drugs (0.51%) and multiple drugs (0.53%), on week nights.

**Conclusions:** The evidence of this survey, based on a random sampling mechanism that allocates equal probabilities for selection of non-drinking or drinking drivers, would be different if data had been based on the results of the usual enforcement actions. These actions are usually focused on road sites and time periods, whose probability of selection drinking drivers are higher than non-drinking. For this reason the information provided by this study is of particular relevance for planning drug-driving prevention and enforcement activities in the future.

**Keywords:** Roadside Survey; Drivers; Alcohol; Drugs; Benzodiazepines

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# EMERGING DRUG THREATS - SYNTHETIC CANNABINOIDS, CANNABIMIMETICS AND SUBSTITUTED CATHINONE DESIGNER DRUGS

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**Introduction:** After attending this lecture, attendees will have been presented with an overview of emerging drug threats confronting the United States and other nations around the world. Topics covered will include synthetic cannabinoids, cannabimimetics, and substituted cathinones. Such materials are currently sold in smoke shops, convenience stores, and on the Internet as "legal" products, not for human consumption. However, several of the compounds in the products are now controlled substances, and those that are not specifically controlled may still be subject to treatment as controlled substance analogues under United States law. The strategy to control these substances at the state and federal level in the United States will be discussed.

**Comments:** The forensic analysis of such compounds may pose challenges due to the lack of certified reference materials and the requirement to characterize unknowns or synthesize and authenticate reference standards. Also challenging is the nomenclature of these compounds with respect to their IUPAC names, specific stereochemistry, and the way they are identified in controlling statutes. Analytical methodologies utilizing instruments available in most forensic laboratories and characterization strategies via advanced instrumental techniques will be discussed. The "designer" nature of these drug compounds and the challenges associated with investigating, analyzing, and prosecuting cases will be discussed. Their marketing names such as "Spice," "K2," and "Bath Salts," will be addressed. Also discussed will be Internet reports from those allegedly experimenting with the use of these compounds as well as Internet discussion that a series of slightly altered additional cannabinoids, cannabimimetics, and substituted cathinones are already in the pipeline to take the place of the compounds that have been, or are to be controlled. Such discussions forecast the ongoing nature of these emerging drug threats.

**Keywords:** Emerging Drug Threats; Designer Drugs; Cannabinoids; Cannabimimetics; Substituted Cathinones

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# FORENSIC ASPECTS IN TEARGAS TOXICITY "A THOUGHT OUT OF THE BOX"

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**Introduction:** Teargas is a non-specific term for any chemical used to cause temporary incapacitation through irritation of the eyes and/or the respiratory system. This study is not only concerned with the traditional analysis of tearing materials in biological samples but also of the products of thermal decomposition when the solid content of the grenades converted to gas "smoke" form. The thermal composition forms about 50%-70% of the teargas grenade volume. Potassium chlorate/perchlorate and nitrocellulose commonly used in teargas devices and are classified as explosive materials. This study attempts to relate the analyses of post-explosion chemicals and teargas components.

**Materials and Methods:** From each of three persons said to be exposed to teargas one blood sample was collected after exposure. CS "o-Chlorobenzylidene Malononitrile" a crimator agent and its metabolites were extracted by liquid-liquid extraction method. Extracts were concentrated and analyzed using gas chromatography with electron impact mass spectrometry (GC/EI-Ms). Hp-5 column (30.0 x 25 cm x0.25 µm) with carrier He gas was used at a flow rate of 0.8 ml/min. Carboxyhemoglobin and cyanohemoglobin are two of the toxic compounds formed after exposure to teargas. Ultraviolet spectrophotometry was used to detect carboxiyhemoglobin. Detection of Cyanide was carried out by blood distillation followed by colorimetric test of ferrocyanide complex formation (Prussian blue color). Experimentally three rats were exposed to the combustion of the thermal composition in a closed area. A blood sample was collected from each rate separately after exposure. The thermal decomposition products perchlorate, chlorate, chloride and nitrite were extracted in the blood serum by centrifuge. The serum was deproteinized using acetonitrile deproteinization procedure. The deproteinized extract was concentrated and analyzed using ion chromatography with a conductivity detector (IC-CD). Ionpac AS 19 column (4 x 250 mm) with eluent 10-40 mmol KOH at a flow rate of 1 ml/min.

**Results:** CS "o-Chlorobenzylidene Malononitrile" and its metabolite 2-Chlorobenzaldehyde were detected in the blood sample of one person. Carboxyhemoglobin was detected in another person's blood sample, while cyanohemoglobin was not detected in any of the three analyzed human blood samples. Thermal decomposition products were not detected in the blood of exposed persons. As for samples collected from rats; perchlorates, chlorates, chloride and nitrites were detected by ion chromatography-conductivity detector in addition to the anions found in normal blood IC analysis.

**Conclusions:** Analytical toxicologists and forensic chemists are interested in detecting Carboxyhemoglobin, cyanohemoglobin and o-Chlorobenzylidene Malononitrile metabolites in biological samples. The present study stresses the importance of detecting the thermal decomposition inorganic products, since they are known to form methemoglobin causing lack of oxygen which when severe may lead to death.

**Keywords:** Teargas Toxicity; Methemoglobinemia; CS Teargas; O-Chlorobenzylidene Malononitrile

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# ESTIMATING COCAINE CONSUMPTION IN THE BRAZILIAN FEDERAL DISTRICT BY SEWAGE ANALYSIS: QUANTOX PROJECT

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**Introduction:** Estimating the amount of illicit drugs used by a certain population is one of the main challenges to forensic scientists working with law enforcement. The indicators normally used to follow up and evaluate the results of the police efforts are usually "out of perspective" and not reliable to estimate the total amount of drugs that really reaches the illicit market. An alternative to the epidemiological tools is the utilization of sewage epidemiology to measure concentrations of illicit drugs and their metabolites to provide objective, quantitative, and near real-time profiles of illicit drug consumption as well as to estimate and compare consumption patterns.

**Materials and Methods:** This work was carried out in the Brazilian Federal District (FD). This region has relatively high percentage (> 93%) of wastewater collection and treatment. The raw sewage samples were collected from six selected WTP, namely Melchior, Asa-Sul, Samambaia, Asa-Norte, Paranoá, and Riacho-Fundo, serving an equivalent population of approximately 1.5 million inhabitants and were collected in March and June 2010. The raw sewage samples were filtered, the pH was adjusted and the solid-phase extraction of cocaine (COC) and benzoylecgonine (BE) was carried out using HLB Oasis cartridges. Analytes were recovered with methanol and the eluates evaporated to dryness with N2 flow. The analytes were diluted to 1.0 mL in a 0.1% formic acid solution in water:methanol, 90:10 (v/v). The LC-MS-MS was performed in a QqQ mass spectrometer with ESI source in MRM mode, measuring the fragmentation products of ions [M+H]+ for COC and BE. Quantification was performed using, at least, 6-point analytical curves and recovery tests showed percentages for both compounds between 95 and 105%.

**Results:** Among the WTP studied, samples from Samambaia showed higher concentrations (from 3866 to 2477 ng/L of BE and 805 to 579 ng/L of COC) and doses per inhabitants (more than 13 doses/year/inhabitant). The Paranoá and Asa-Norte WTP also showed relatively high consumption (5 and 6 doses/year/inhab., respectively), especially when compared to Asa-Sul, Melchior and Riacho-Fundo WTP (both 3 doses/year/ inhab.). The extrapolation to the whole FD population points out to an annual consumption reaching 1.0 ton of free base cocaine, or 1.1 tons of cocaine hydrochloride (100% of purity). The work also addresses the influence of the cocaine presentation form (free base or hydrochloride) and the integration with chemical profiling results in a more realistic estimate, mainly concerning the viewpoints of forensics and law enforcement.

**Discussion and Conclusions:** Collaborative work involving a team of environmental and analytical chemists guided by a forensic approach broadens the possibility of this type of work, as well as allowing a more comprehensive discussion, not only about illicit drugs but also about other emerging contaminants From the total estimated consumption of 1.0 ton of free base cocaine in FD, the sampling strategy used in this research provided an additional means of detecting areas with higher consumption in the region covered by the sewage network. As the annual cocaine seizures conducted by Federal Police in the FD are around 450 kg (approximately 30% of the total estimated by this work). Seizures of street samples, which are conducted by Brazilian FD state or military police, are not considered, since no chemical profile data are available yet to establish a common basis for comparison. The importance of the data obtained using sewage epidemiology in forensic, law enforcement, health and public education initiatives led the authors of this paper to propose a broader project called Quantification of Toxic Analytes (QuAnTox) to determine the quantities of cocaine, key metabolites and other illicit drugs in the Federal District, also addressing issues of seasonality, including all WTP and collaborating with a discussion about the increasing tendency observed for the use of smoked crack cocaine.

**Keywords:** Cocaine; Sewage; Estimate; Illicit Drug; Brasilia; Quantox

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# NEW SYNTHETIC PSYCHOTROPIC DRUGS - ONE STEP AHEAD OF THE LAW

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**Abstract:** Since 2008, Cyprus has seen a large number of new synthetic psychotropic drugs on the market, namely synthetic cannabinoids and cathinones sold as herbal air fresheners and bath salts. Large classes of legal compounds have been created by making minor chemical modifications to existing controlled drug molecules. Analysis and identification of these has proved challenging to the forensic drug laboratory due to the unknown nature of the active ingredient, the lack of reference standards for the majority of these compounds and their continuously changing composition. In 2010, the synthetic cannabinoids JWH- 018, JWH- 073, HU-210 and CP 47,497 were placed under control as Class B drugs in the Cyprus Drug Legislation. This was followed by the synthetic cathinones, methylone, mephedrone, MDVP, and methedrone. Examples of these compounds together with their analysis is given. The recent trends in the production of new synthetic drugs has resulted in the production of over 40 new drugs in 2010 according to the EMCDDA. In order to avoid always being one step behind the producers and dealers of these drugs, a generic legislation for synthetic cannabinoids, cathinones and naphyrones, piperazines and phenethylamines was passed in Cyprus in 2011 based on their chemical structure. This legislation covers the majority of drugs in these classes which have been prepared to date and those which can foreseeable be prepared in the future and which may be subject to abuse eg 86 synthetic cannabinoids. Examples of the legislation and the compounds it covers is given. Whereas this legislation goes a long way to blocking the production of the majority of these possible new drugs, it appears that there are no limits to the ingenuity of the drug producers, as recently, products have appeared with unpredicted modifications to existing structures eg by replacement of the alkyl sidechain in the cannabimimetic napthoylindoles with an alkylhalide. It appears that the drug producers will always be one step ahead of the legislation!!!

**Keywords:** New Synthetic Drugs; Cannabinoids; Cathinones; Legislation

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# DEMONSTRATION CONTROL AGENTS; EVALUATION OF 64 CASES AFTER MASSIVE USE OF THESE AGENTS IN ISTANBUL

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**Abstract:** An uncontrolled use of demonstration control agents has recently been common practice in Turkey. Several killings and severe injuries, including skull fractures resulting from a close range impact of gas canisters, and a few deaths caused by after effects of the agents occured during the last 10 years. One of the first occasions of massive use of these agents have took place during the demonstrations against a meeting of NAC, NATO in 2004 . Sixty four of these cases were evaluated, and treated by Human Rights Foundation of Turkey (HRFT). The files of these 64 cases have been reviewed retrospectively and were classified regarding age, gender, physical and psychological findings as well as other injuries, and this study has been carried out to reveal the short and long term after effects of demonstration control agents mainly Oleasin Capsicum(OC) The applicants were received 1 to 9 days after the tear gas attack. Among 64 cases , 48 were male and 16 were female.Their ages were between 15- 45 with a mean age of 24,9. Maximum referral was 35 applications on the day of the gas attacks. The latest application was 9 days after the attack . Complaints and physical findings due to the teargas chemicals were highest during the first 3 days. No physical finding were observed with 6 cases who applied during the 8th and 9th days. Demonstration control agents have been widely used recently, and announced to be safe with only short term effects to resolve in 24 hours. However, persisting physical findings for at least 3 days should be considered seriously. The safety and effects of tear gas chemicals known as demonstration control agents were discussed, based on our findings and existing references.

**Keywords:** Demonstration Control Agents; Gas Bomb; Tear Gas; Pepper Gas; Gas Canister; Toxic Injury

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# ORAL SESSION

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# A DISCRIMINANT ANALYSIS ON A CONTEMPORARY SPANISH POPULATION: SEX DETERMINATION FROM THE TALUS AND RADIUS VOLUME

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**Abstract:** A discriminant analysis based on the talus and radius volume has been studied on a contemporary Spanish reference collection. A total of 182 talus and 159 radius, coming from 98 and 91 individuals, respectevely, have been 3D scanned using the Picza 3D Laser Scanner. The total volume of both bones has been calculated using the Geomagic 3D program and classification functions have been stablished using the statistical program PASW Statistics 18. The functions have classified correctly the 90,1% of the talus and the 96,2% of the radius. The volume of different regions of the bone has also been calculated, showing special sexual dimorfism the posterior region of the talus and the diaphysis of the radius. A validation test has been done on a sample of 20 talus and 20 radius from the same collection that has not taken part of the main study, and on a sample of 20 talus and 20 radius from another contemporary Spanish reference collection. The functions have classified correctly the 95% of the radius and the 90% of the talus.

**Keywords:** Talus; Radius; Sex Determination; Volume; Classification Functions

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# MODIFICATION OF FACIAL MORPHOLOGY IN CHILDREN AGED BETWEEN 6 AND 10 YEARS: A PILOT STUDY FOR A NEW MODEL OF FACE AGING

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**Abstract:** Every year a high number of missing people includes subadults: among 24111 missing persons recorded in Italy in 2010, 9336 were subadults (38.7% of all missing people). Missing subadults in time are more difficult to recognize since their facial morphology is still changing - and growing; photos taken before they went missing will therefore loose identification potential with time, since the face of the missing subject changes with age. In these cases, great importance is given to the so-called "face aging" models, which are supposed to develop the hypothetical face of the missing subadults several years after they went missing. In some cases, the face aging procedure is stressed up to the adult age. In most cases, face aging processes are based on aesthetical and subjective criteria, without a scientifically valid base. The few methods based on mathematical models are developed from cranial measurements taken on subjects recruited within different age ranges. Face aging is therefore considered a procedure of adjustment of the original facial morphology to a hypothetical standard, specific for each age. However this approach does not take into account the individual modification of facial characteristics, and does not consider the real facial changes observed with growth in the same individual. An experimental has been developed in order to verify the progressive modifications of facial morphology in a samples including 11 children aged between 6 and 10 years: 24 cranial measurements were taken on each subject. A 3D acquisition of the face with a 3D optical digitizer was performed, and the same measurements were taken on the 3D facial model. The craniometric analysis and 3D acquisition were repeated on each individual taking part in the experimental project at regular time intervals (twice a year) for several years. This study presents the results of a re-evaluation of face aging through the comparison of facial changes examined on the 3D facial models and in vivo on the same individuals at different times and proves that much scientific data still has to be acquired before reliable face aging images can be guaranteed.

**Keywords:** Missing People; Subadults; Face Aging; 3D Optical Digitizer

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# AN UNIDENTIFIED SKELETAL ASSEMBLAGE FROM A POST-1755 MASS GRAVE OF LISBON - DENTAL MORPHOLOGY

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**Abstract:** Dental morphology means different things to different people. Some authors consider tooth size one aspect of morphology, whereas others include shape under this rubric. We distinguish size from morphology because the methods of study and general underlying principles for each are distinct. Although morphology and shape have more in common than morphology and size, shape also shows noteworthy differences. Methods developed for ascertaining "tooth shape" for dental anthropological and forensic purposes have not been adopted widely, partly because they are difficult to replicate, diminishing their utility in comparative studies. In this investigation report, we focus on what most forensic experts refer to as dental morphology; that is, distinct features or traits of the crowns and roots that are present or absent and, when present, exhibit variable degrees of expression. Common examples include shovel-shaped incisors, upper and lower molar cusp number, Carabelli's cusp, three-rooted lower first molars, and more. In this study 1210 disarticulated teeth, 179 jaws, and 65 skulls from a skeletal assemblage of commingled remains belonging to the 1755 Lisbon earthquake victims, excavated in 2004 at the Lisbon Academy of Sciences were analysed. The main goal of this study was to contribute to the paleodemographic and paleopathological characterization of one of the world's biggest catastrophic population by forensics' dental and osteological, qualitative and quantitative methods. Morphological and anthropometric parameters from teeth and cranial bones have been considered. To attain our purpose, the isolate teeth and jaws' teeth were studied for dental morphology, according to the Museum protocols, defined by us according to Arizona State University Dental Anthropology System or ASUDAS . During the project laboratory investigation some problems were addressed. Such as: How many traits? Casts or Skulls? Permanent or deciduous? - and those were the background to improve the protocol of dental morphology from the Museum and provided additional guidelines for future projects of human dental morphology, more than primary results from the original project, paelodemographic characterization of a mass disaster population from 1755. This project is currently inserted in a wider project for research and technological development entitled "Percurso Cientifico do Património Museológico da Academia de Ciências de Lisboa", with reference HC/0074/2009, supported by a National Project 3599, task 1: "Human Dental and Physical Anthropology". Since 2009 until 2011.

**Keywords:** Forensic Dentistry; Dental Morphology; Earthquake of Lisbon 1755 .

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# TAPHONOMY AND ANTHROPOMETRY: THE POST MORTEM FATE OF MEASUREMENT. A PRELIMINARY STUDY ON BURIED SKULLS

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**Introduction:** The aim of the study is to describe the connection between which portions of the skull are usually more preserved and the implications of these findings for understanding which measurements can be statistically useful to create discriminant functions for sex, ancestry and biological analysis.

**Materials and Methods:** The analysis has been conducted on a sample of 644 historical buried skeletons of adults (376 males; 268 females) from Italy. The context did not show any peculiar environmental condition that could influence the bone preservation or increment lack of any specific cranial district. The skull was divided in 7 different districts: basis, neurocranium (basis + calva), calva, splanchnocranium, orbital region, nasal region, palate, mandible; the proposed division is based not only on anatomy, but also on the possibility to perform measurements that describe each specific area. To identify the measurements, the author used Martin Saller standards (1957) and also an identification number frome a nex standards method developed at the University of Rome "Tor Vergata".

**Results:** The first step of the present research was the identification of the most preserved measurements. Taphonomic processes seem to have the least influence on maximum cranial breadth and the breadth of the mandibular body, which are readable in 64% of the whole sample. The other measurements that are feasible in more than 60% of the sample are: the maximum cranial length (61%), the bimenatl breadth (61%) and the mandibular minimum ramus breadth (63%). The measurements most affected by taphonomic factors are the maximum breadth in the middle of the face (10%), while other measurements readable in less than 15% of the sample are the nasion-gnation height (13%) and the porion-vertex height (13%). As a conclusion, after examining all of the measurements and their preservation, it is possible to say that a third of the chosen measurements can be read in more than 50% of the whole sample, while only 9 of them are readable in less than 25% of the cases. The least affected area is the mandible, where six measurements of the chosen ten are readable in more than 50% of the samples, only one is readable in only 31% and the others between 40 to 50 %. The neurocranium also appears to be well preserved: it has eleven measurements of twenty-four readable in more than 50% of cases and only three less than 25%. The worst preserved area seems to be the nose region, where two measurements are readable in 33% of the cases and the other two only in 22% (nasal-malar cord) and 16% (nasal - malar breath) of the samples. For the second part of the analysis, to create a statistical representation of the preservation of each area as a whole, only individuals that show all selected measures of each zone are counted. Worse than expected, the complete skull, in which all measurements can be read in all selected areas, represents less than 1% of the whole sample; notwithstanding this remarkable result, every single area appears more frequently accessible for anthropometric purposes: basis 25%, calva 23%, orbital region 17%, nasal region 18%, palate 19%, mandible 14%. The combination of several areas leads to worse results : neurocranium, consisting of calva and basis, represents only 8%; in a similar way splanchnocranium, which include palate, facial area and nasal area, is completely measurable in 7%. These results on measurability seem to be not predictable and not subordinate to any specific taphonomic law and a statistical analysis of the interdependencies between the measurabilities of different aspects of the cranium remains to be done.

**Discussion and Conclusions:** Considering this pattern of dispersion in the measurement record, it is necessary to ponder future statistical analysis: the predominance of some single measurements or small cranial zones can suggest the development of a single strategy for each anatomical unit or individual measurements.

**Keywords:** Anthropometry; Taphonomy; Identification; Statistic

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# COMPUTER-ASSISTED PHOTO-TO-PHOTO COMPARISON AND PHOTOGRAPHIC AGE-PROGRESSION IN SUBADULTS

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**Abstract:** The human face is one of essential biological features which possess individually specific characteristics commonly used in the course of personal identification throughout methods such as portrait identification or photo-to-photo comparison. It is of general knowledge that a complex of group or individual specific facial traits undergoes age-related modifications which may interfere with the process of identification. These modifications are particularly extensive when one has to deal with sub-adult individuals at various ages. In these cases general growth rates and developmental trends may easily obscure individually specific traits and increase the difficulty of assessing dis/similarities accurately and reliably. The presentation aims at introducing a statistical model and simultaneously software application that predict a direction of age-dependent changes in those facial traits which are relevant in the process of photo-to-photo comparison between individuals of unequal ontogenetic stages. The project originated in photographic portrait documentation associated with an extensive longitudinal study running in the Czech Republic in a time-span of 20 years. The methodology of age-adjustment in photographic portraits usable for sub-adults was adopted mainly from landmark-based and deformation approaches (Procrustes superimposition, thin-plate spline) and computer graphics (blending, warping). The software application named FIDO was designed specifically for purposes of the Czech Police. It is comprehensive software running under Windows platform which enables to calculate a magnitude of dissimilarity between two portraits (based on shape distances), to age-progress a photograph and to create a simple portrait composite.

**Keywords:** Photographic Comparison; Age Progression; Subadults

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# THE POTENTIAL OF FORENSIC ANALYSIS ON HUMAN BONES FOUND IN RIVERINE ENVIRONEMENT

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**Case Report:** Despite a great number of forensic cases related to the aquatic context, knowledge of human decompositional processes underwater are still limited. Until recently, most research has focused on terrestrial decompositional changes and taphonomic data from these environments are typically used as the reference for studies related to aquatic contexts (fresh and salt water). However. water is a very important variable in the preservation and dispersal of human remains. In aquatic contexts, the decomposition process is highly variable and depends on a number of factors including "temperature, water depth, currents, tides, season, dissolved oxygen, sedimentation, geology, salinity, acidity, interactions between chemical and physical processes, and insect and scavenging activity"(Heaton et al., 2010). Human remains found in aquatic contexts are frequently recovered incomplete and badly decomposed, and therefore present a challenge for medico-legal institutes as their possibilities of analysis for identification and investigation of cause and manner of death are limited. This case report aims to demonstrate the potential of forensic examination and analysis (toxicology, limnology, entomology, DNA) on a set of bones recovered from a river in Strasbourg and the possibility to trigger identification of the victim and circumstances of death despite the state of decomposition and incompleteness of remains.

**Keywords:** Forensic Anthropology; Aquatic Context; Decomposition Process; Diatom; Toxicology; DNA Extraction

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# DENTAL DIVERSITY IN A SPANISH MILITARY POPULATION. USEFULNESS FOR DENTAL IDENTIFICATION.

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**Abstract:** Dental identification is established when dental antemortem data is compared to postmortem dental charts and a high number of coincidences is found. Moreover, if any discrepancies are detected, they have to be explained. Therefore, there are some limitations to achieving a consistent dental identification probability due to the fact that there are not enough epidemiological data bases about dental treatments or dental pathologies for each tooth obtained from different origin populations where we could estimate accurately the likehood ratio for a dental identification. In order to contribute to a better understanding of dental characteristics in Spain, a dental data base from a Spanish military population has been constructed. A codification system has been developed and 3920 cases have been introduced into the system. Results presented in this paper show the frequencies and distributions of dental treatments and pathologies in the explored population. It is concluded that it is of great importance the development of those dental data bases for application on estimation of probabilities for dental identification.

**Keywords:** Forensic Odontology; Dental Diversity; Human Identification

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# SYSTEMATIC ANALYSIS OF BLUE BALLPOINT PEN INK BY RAMAN SPECTROSCOPY, FTIR SPECTROSCOPY AND LC-MS/MS

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**Abstract:** Ink analysis is a important part of forensic examinations of questioned documents and inks for ballpoint pens are encountered frequently. Ballpoint pen inks contain a variety of components including dyes, additives and solvents. These components are analyzed by Raman spectroscopy (RS), infrared spectroscopy (IR) and liquid chromatography-tandem mass spectrometry (LC-MS/MS), and these three techniques for a variety of blue ballpoint pens are evaluated and compared in this work as well. 100 blue ballpoint pen inks written on paper were examined nondestructively by Raman spectroscopy with three excitation wavelengths varying from 514nm, 633nm to 785nm and 18 inks were chosen for further research. All these 18 inks could be discriminated by the combination of data of three different laser wavelengths. Raman spectra at 514nm did not provide adequate discrimination power and the tested inks could be divided into 5 groups. With slight differences, spectra of 3groups with 10 inks were dominated by methyl violet derivatives, which were dyes often used in blue ballpoint pen inks. Spectra of 2 groups with 8 inks were dominated by Basic blue 7, another common dye in inks, which could be divided because of the different bands at 1175 cm-1 and 1197 cm-1. Upon excitation at 633 nm and 785nm, the inks were separated into 7 groups and 8 groups according to both the Raman shifts and the course and shape of the background curve which corresponds to the fluorescence intensity. Although the discriminative power by 633nm and 785nm laser was higher than that by 514nm, it was difficult to conclude the main components from their Raman spectra. IR spectra of the chosen 18 inks written on KBr plates were recorded in the transmission mode on the microscopic stage of the spectrometer. The main IR peaks showed that 8 inks contained epoxy resin and methyl violet derivatives, but only spectra of two samples were consistent, difference caused by monomer of resin or other additives resulted different small peaks in spectra of the other 6 samples. Two samples with epoxy resin and basic blue 7 as main dye could not be discriminated, while two samples with alkyd resin and methyl violet derivatives as main dye could be discriminated by bands at 1521 cm-1 and 1509 cm-1. There were 6 inks contained alkyd resin and basic blue 7 and 5 of them could not be separated. For these 18 inks, IR gave a lower discrimination power than that by Raman, because Raman could differentiate all the samples while there were still 12 pairs samples remained undivided depending on the IR data. But IR could reveal the compositions such as resins and additives in inks as well as dyes, and the dyes determined by 514nm laser of Raman and IR were the same. Discriminative power fell sharply when inks written on paper were analyzed by a germanium ATR microscope objective of IR. ATR spectra of inks in the region 1430-1380 cm-1 and 1160-950 cm-1 were influenced by the peaks of calcium carbonate and cellulose in paper and inks could be divided into 5 groups depending on different resins and dyes. Analysis of inks extracted from paper were performed by LC-MS/MS and inks were discriminated effectively based on the appearance and relatively amounts of basic dyes including crystal violet, methyl violet, basic blue 7 and Victoria blue, leaving only 12 pairs samples indistinguishable, which were same as the undivided pairs by IR partially. Results of Raman and IR could be demonstrated by LC-MS/MS, relative amounts of methyl violet derivatives in samples whose spectra were dominated by these dyes were at least 60%, while spectra of samples were dominated by basic blue 7, and relative amounts of this dye were all over 90%. Relative amounts of victoria blue varied from 30% to 0%, but the spectra were not affected by the dye obviously. The results of this study indicate that Raman, IR and LC-MS/MS could provide different information of components used in blue ballpoint pen inks.

**Keywords:** Blue Ballpoint Pens; Raman Spectroscopy; Fourier Transform Infrared Spectroscopy; LC-MS/MS

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# EVALUATION OF THE AGING BEHAVIOR OF CRYSTAL VIOLET IN BALLPOIN PEN INK ENTRIES BY LC-MS/MS

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**Abstract:** Dating ink entries on questioned documents remains one of difficult problems in the field of document forensic examination. Crystal violet was one of most commonly used dyes in ballpoint ink. Therefore, its aging behavior is of fundamental importance in the practice of dating ballpoint ink entries. In this study, strokes of nineteen ballpoint pens were artificially aged by daylight to observe the aging behavior of crystal violet and its six de-methyl products in those inks. In detail, strokes were drawn on one sheet of print paper and two different sheets of stationery, and were stuck to a westward window inside the laboratory to accept the daylight exposure. The counterpart was stored in a drawer in the same laboratory, kept in the darkness. The artificial aging process was continued for three months, and ink samples were collected once a week: four hole punches (0.5 mm i.d.) of samples were removed from ink lines. Collected samples were extracted with 100 µL of acetonitrile at ambient temperature for 20 minutes. After further dilution, 5 µL of prepared solution was injected into the LC-MS/MS system, which was operated in ESI positive mode and data was collected with an established MRM (multiple reaction monitoring) method. When the artificial aging process was over, the color of ink strokes on three sheets of paper faded dramatically. During three-month observation, the relative amount of crystal violet extracted from ink strokes kept decreasing. Before aging, the original relative amounts of crystal violet in fresh ink strokes of nineteen inks on print paper were 54.1±7.8%. After three-month light exposure, they experienced an average loss of 48.8±7.0%. The aging curves of crystal violet were best fitted to exponential functions. The first four de-methyl products (M5~M2) of crystal violet in most ink samples went to their peak amounts successively and then decreased. The last two de-methyl products (M1 and M0) kept increasing in three months. The variance of degrading speed between nineteen inks was significant, as two ink samples degraded so fast that the concentrations of analytes were below the limit of detection in one week, while the relative amounts of crystal violet in three longest lasting inks were still around 10% after three months. Apart from ink formula, different kinds of paper also affected the degradation of crystal violet. The color of ink strokes on print paper stayed longer than those on two sheets of stationery. On the other hand, crystal violet in the counterpart samples stored in the drawer had very limited degradation during three months, which showed the influence of light exposure on crystal violet's aging was really significant. In contrast, controlled aging experiment with heat alone indicated that a temperature as high as 50º, which was the highest sample temperature observed in the study, had little influence on crystal violet's aging. In conclusion, under direct daylight exposure, crystal violet kept degrading. The first four de-methyl products of crystal violet went to their peak amounts successively and then decreased. The last two de-methyl products kept increasing in three months. Under given conditions, the aging curves of crystal violet in nineteen ink entries could be expressed as exponential functions, which were different from one another due to different ink formula. Besides, the influence of different types of paper should also be taken into consideration. Further work is needed to examine whether or not the present results are suitable to describe the aging behavior of crystal violet and its six de-methyl products in ink strokes under natural aging conditions.

**Keywords:** Crystal Violet; Degraded Products; Ink Entries; Artificial Aging; Questioned Document; LC-MS/MS

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# THE MICRO-MORPHOLOGICAL CHARACTERISTICS OF PRINTING IN DETECTION OF ALTERED PRINTED DOCUMENTS

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**Abstract:** With the popularization of office automation, more and more documents appear in the form of printed documents, and consequently requests about detection of printing alteration by addition and page replacement are encountered frequently. Many approaches can be used in revealing printing alteration, such as alligement measurement, printing defect examination, paper analysis, ink analysis and so on. In this presentation, we focus on the comparison of micro-morphological characteristics of printing inks and toners. The micro-morphological characteristics refers in particular to the distribution and structure of inks and toners on paper observed under a microcope. Due to the different printing mechanism and processes, the micro-morphology of different machines might take different patterns. Even for the same machine, due to the changing of printing synchronization and condition, the micro-morphology of non-simultenious printing might show dissimilar appearance. The difference of micro-morphological characteristics between different parts of printed documents could be an effective indicator to reveal printing alteration. Some typical micro-morphological characteristics for different printing methods are summarized. For laser-jet printing, the micro-morphological characteristics are exhibited mainly by toner density, fused state, light spot and scattered particles around lines. For ink-jet printnig, the micro-morphological characteristics are reflected mainly in ink density, spot distribution, and splattered pattern and direction of ink around lines. The application of micro-morphological characteristics in detection of alteration is illustrated by practical cases. Factors that could affect the micro-morphological characteristics are also discussed, including font setting, printing setting, and printers' state.

**Keywords:** Printed Document; Alteration; Micro-Morphological Characteristics; Laser Printing; Ink Jet Printing

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# STUDY ON THE METHOD OF STAMP IMPRESSION DATING

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**Abstract:** Stamps are commonly used in China in social economic activities involving documents publishing, contracts signing, and certificates or other files issuing, official or personal stamps are always required for approving the documents. The forming time of a stamp impression on a questioned document usually provides key evidence for the authentication of the document. It is therefore urgent to solve the problem of dating stamp impressions in the forensic document examination practice. Many materials could be used to make a stamp, such as wood, rubber, plastic, mineral stone, various types of ink pad storage, and so on. The physical and chemical stabilities of a stamp depend on its material. In addition, using and preservation conditions and other artificial factors could make the characteristics of one stamp change with time of use, which are known as "phase change characteristics". Based on studying cases of stamp impression dating in our institute, the present paper assigns the phase change characteristics of stamp impression into two categories: qualitative and quantitative ones. Qualitative phase change characteristics formed in the use and preservation include strokes and lines abrasion,defects and other morphological changes, ink distribution changes, and stamp surface attachments changes. The appearance, change, and even disappearance of these characteristics could indicate some qualitative evidence for judging the forming time of a stamp impression. Quantitative phase change characteristics include stamp size changes (e.g. the width, height and frame area, etc), the penetration of ink after stamping and so on. Figures(Two stamps Scatter diagram of stamp frame area and stamping time)illustrate data from two cases: the frame area of impressions of two stamps reduced with time. How to use these quantitative phase change characteristics in estimating the forming time of stamp impressions? In this paper, we formulate this problem into an inverse prediction problem in statistics and then illustrate the solution in the simplest assumptions of linear regression with homogeneous zero-mean errors. Finally, certain potentials to improve and refine this type of forensic document examination problems are concisely discussed.

**Keywords:** Stamp Impression; Stamp Impression Dating; Statistic Analysis

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# SIMULTANEOUS DETERMINATION OF ORIGINAL CONTENT OF FE(II) AND FE(III) IN HANDWRITING OF GALL INK FOR POTENTIAL USE IN FORENSIC ANALYSIS OF RELATIVE AGE VIA CAPILLARY ELECTROPHORESIS

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**Introduction:** The identification of handwriting or signature is of great importance for forensic science and historical document. Since many criminal cases involve confirmation of forged documents with regard to whether an entire document is as old as be purported, or whether the whole of writing was written at the same time; or if not, which portion was written originally. Hence, the detection of relative age of gall ink in paper has special significance to court science.

**Materials and Methods:** Our main purposes are to focus on the feasibility to perform such studies on the sample treatment and CE-based separation, to show the fidelity and reliability of sample treatment, to propose preliminary assessment criteria for relative age of handwriting. In order to evaluate the applicability of the method developed for the identification of iron speciation, two kinds of iron gall ink was performed for detection of Fe(II) and Fe(III) in handwriting paper. The two ions of Fe(II) and Fe(III) in the above oxidation-reduction can be detected with UV detector at 254nm. Ink blots were cut out of gall ink handwriting paper (contracts or loan notes), and further cut into small handwriting pieces. Then, the handwriting pieces and magnetic stirrer bar were put into 2 ml Eppendorf tube. After that, first 0.5 ml 5.0 mM 1.10 phen and then 0.5 ml 20 mM CDTA were added to respectively combine Fe(II) and Fe(III). The Eppendorf tube was strongly vibrated by hand for 2 min and fixed in the magnetic stirrer agitating for 20 min and then centrifuged at 10000r/min for 20 min. The supernatants were moved into another tube for further detection. The optimized conditions for the separation of Fe(II) and Fe(III) are: 100 mM pH 9.2 H3BO3-Na2B4O7 buffer, benzonic acid as internal standard (IS), 20 kV applied voltage, 0.2psi 5s sample injection, fused-silica capillary of 40.2 cm × 75 μm i.d. (30 cm to detector) and 254 nm detect wavelength.

**Results:** The result shows that two major peaks corresponding to the complexes of [Fe(II)-(phen)3]2+ and [Fe(III)-(CDTA)]- were detected by the proposed method. It is clear that relative age of iron gall ink handwriting depends on the changes of peak areas of Fe(II) and Fe(III) in an electrophoregram of CZE. The ratio of peak areas of [Fe(II)-(phen) 3]2+ (A1)and [Fe (III)-CDTA]- (A2) is the most suitable assessment parameter. The ratio of A1/A2 become small as the handwriting age is lengthened. The A1/A2 of Ink1 and Ink 2 change from 1.79 to 0.45, from 2.67 to 0.3, respectively. The reason of different ratio of A1 and A2 is that the ingredients of Ink 1 and Ink 2 and each time the sample amount are different.

**Conclusions:** The developed method was used to determine the relative content between Fe(II) and Fe(III) in two real samples. The results demonstrate that the developed method is a straightforward one for forensic analysis of relative age of gall ink written on papers.

**Keywords:** Relative Age of Handwriting; Fe(ii) Ions; Fe(iii) Ions; Capillary Electrophoresis

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# A DISCUSSION ON PROBLEMS AND SOLVING-STRATEGIES OF FORENSIC QUESTIONED DOCUMENT EXAMINATION PRACTICE IN MAINLAND CHINA - LEGAL AND PRACTICAL ASPECTS

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**Abstract:** Currently in China Mainland, as the development of technology and new means of forging or altering the document evidence, the quantity of request for Forensic Questioned Document Examination(QDE) Services in Legal litigation and the difficulties of the case are increasing. This new Trend had been bring new challenges to the legal procedure and QDE practice. As an technically-effective-countermeasure, QDE work needs to innovate the concept of examination and identification which has been called "Systematical Examination of Questioned Document"(SEQD) and apply new technology and new instrument into practice. The SEQD is also the new "Jurisprudence" of QDE in China mainland and mainly taking the document itself as a whole-and-correlational system that can be constructed by two main parts of "Material-oriented Elements"(MoE) and "Relationship-oriented Elements"(RoE). Examing the MoeE and RoE and their relationship must be important and necessary especially on an forging document.examination procedure. In legal aspect, under the present framework and system regulated by the forensic science service administration Law and Litigation Law of China Mainland, the Investigator and Judicial officers must have to increase the level and improve the capacity of forensic science service delegations, especially on noticing to collect and fixing the "forming evidence" of the Questioned Documents, in which to crack down on forger. Correctly using the QDE to cope with document evidence forgeries and altering under scientifically and working technical-legal strategies is helpful to enhance the efficiency-and-effectiveness of legal litigation and ensure the fairness-and-justice of the court decision.

**Keywords:** Questioned Documents; Practical Problems; Systematical Examination; Legal Solving-Strategies

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# ISOTOPE AND DNA ANALYSIS OF TEETH TO FACILITATE IDENTIFICATION OF UNKNOWN DEAD BODIES

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**Introduction:** The characterization of unknown dead bodies or suspected human remains is a frequent task for forensic investigators. To identify an unknown body, comparison of ante- and postmortem dental radiographs and DNA profiling are the predominating methods in the routine casework. However, any method used requires clues to the identity to allow for comparisons. If such clues are lacking, the year of birth, sex and geographical origin of the subject can limit the search for possible matches. Current methods suffer from substantial imprecision. We have recently reported that analysis of so-called bomb-pulse 14C levels in teeth can be used to estimate the year of birth with a good precision, and that 13C levels can give information about the diet and thereby give indications of the geographical origin.

**Materials and Methods:** 62 teeth from 35 individuals raised in different parts of the United States and Canada were obtained from dental clinics. Each tooth was divided by cutting away the crown from the root at the cervical line. The enamel was isolated by repeated 10N NaOH immersion in a water-bath sonicator and blunt dissection. Enamel splits were hydrolyzed to CO2, evacuated, heated and acidified with concentrated orthophosphoric acid at 900C and finally converted to graphite. The levels of 14C and 13C were measured using accelerator mass spectrometry and isotope ratio mass spectrometry, respectively. The roots were divided into two portions for both analysis of 14C and 13C analysis and DNA-analysis using the AmplifilerTM kit.

**Results:** The 14C analysis provided information of the year of birth with an average absolute error of 1.8 ± 1.3 years regarding dental enamel. All teeth with an estimated enamel formation time showed pre-bomb radiocarbon values. The average d13C in the enamel of the teeth was -10.4. DNA analysis was performed on 28 of the teeth, and provided a full, individual-specific profile in most cases. From two cases two teeth were analyzed and showed identical profiles. The sex could be determined by this analysis in all cases analyzed. Roots from the same teeth were also analyzed for 14C, 13C and 18O. The results are still pending.

**Discussion:** The precision of the birth dating was similar to that previously reported (1-3). The d13C in the enamel was on average lower than in teeth from any other geographical region previously examined, although most similar to those in teeth from South America (3). The differences in d13C in teeth is explained by differences in diet, which typically contains more C4 plants such as sugar cane and corn among children raised in America compared with children in e.g. Europe and Asia. Even though fast food over time might blur this picture, it obviously can be used to give a hint of geographical origin. The need for characterization of unknown dead victims, for whom clues to the possible identity are lacking, is apparent considering the large number of unsolved cases registered in the Doe Network. The average age range estimation of these was15 ± 12 years, which is a too wide window to be helpful in the search for matches. A more precise estimation of the year of birth, the sex and the geographical origin is expected to facilitate the identification of many of these cases. Hence, the analysis of 14C and 13C in tooth enamel (and roots) as well as DNA analysis of tooth roots may help in the efforts to find possible matches

**Keywords:** Forensic; Odontology; Medicine; Teeth; Radiocarbon; DNA

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# THE STR ANALYSIS OF TWO CONGENITAL CHIMERAS IN PATERNITY CASES

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**Abstract:** A congenital chimera is an organism possessing two genetically distinct cell lines either in the whole body or limited to the haemopoietic tissues, which are called as "whole body chimera" and "twin chimera" respectively. Human chimerism is more common than imagined and a DNA test can give incorrect results for a chimera because different tissues might have different DNA patterns. We will describe two paternity cases in which two phenotypically normal alleged fathers' blood sample showed abnormal STR profile that more than two imbalance alleles hold one locus. To clarify the chimeric form or origin of the mixed genetic patterns and evaluate its consequence in forensic purposes, we additionally take this two male chimeras' hair follicles, buccal mucosa, semen and urine samples for test and bring their biological parents involved in paternity study. DNA was extracted with Chelex 100 and was analyzed the autosomal and heterosomal STR typing. The autosomal STR profile generated from all tissues of both male chimeras revealed the presence of two maternal and two paternal alleles at some loci, indicating the chimerism was not restricted to the blood and could be characterized as a "whole body chimera" who derived from the fertilization of two maternal nuclei and two sperms. This also be defined as tetragametic or dispermic chimerism. It was deduced that the chimera involved in the first case was formed by the merge of male and female twins due to existence of paternal X allele at some X-STR loci. In the second case, the chimera could have been formed from the merge of two nonidentical male twins due the absence of paternal X alleles, while there were but double maternal X alleles. The Y-STR profiles of both male chimeras showed a normal Y haplotype coinciding with their fathers, respectively. Different intensity of allelic imbalance was also observed in different kinds of tissues and allele could have drop out by significant peak height imbalance (<70%) in some tissue whereas it did not in other tissue. This might lead to a false interpretation in paternity test or crime investigation.

**Keywords:** STR Typing; Paternity Cases; Human Chimerism

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# COMPARISON STUDY IN DETERMINATION OF FULL SIBLING WITH IDENTIFILER MULTIPLEX SYSTEM BETWEEN ITO METHOD AND IDENTITY BY STATE SCORING METHOD

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**Abstract:** The usual determination of full sibling can be more difficult than parentage testing in that there are no obligatory alleles between full siblings. According to Mendelian genetics, the probability of autosomal STR allele sharing between full siblings is higher than those between unrelated individuals, which indicates that identity by state scoring system (IBS method) can be utilized in determination of full sibling. In this study, 2003 pairs of unrelated individuals (UI group) and 280 pairs of full siblings (FS group) were genotyped with Identifiler system. Cumulative full sibling index (CFSI) and the IBS score of Identifiler system (IBSi) between each pair of individuals were calculated with ITO method and direct counting method, respectively. Curve fitting analysis revealed that Log10CFSI was approximately fitted to normal distribution in UI and FS group (R2=0.9974, 0.9682, respectively). Distribution of IBSi was similar to those of Log10CFSI with R2=0.9974 in UI and 0.9653 in FS group. Difference of Log10CFSI or IBSi between the two groups was statistically significant (P<0.0001). Consequently, two groups of discrimination functions were developed with Fisher discriminant analysis based on Log10CFSI and IBSi, respectively. Total false conclusion probabilities of the two groups of functions were 3.48% with ITO and 2.98% with IBS method, respectively. High consistency of the two different method was indicated with Kappa index=0.8841 (P<0.0001). Results of this study suggested power of IBS method similar to those of ITO method, with advantages of convenience in calculation and independence on the allele frequency of STR loci.

**Keywords:** Forensic Genetics; Short Tandem Repeat; Full Sibling; Discriminant Analysis; ITO Method; IBS Method

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# EVALUATION OF KINSHIP IDENTIFICATION SYSTEMS BASED ON STR DNA PROFILES

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**Introduction:** Our interest is in personal identification through DNA evidence, more precisely in kinship analysis based on STR loci markers. Genetic evidence is used to establish whether a certain person (named candidate) occupies a specific position in a familial pedigree or is a random person from the population. The aim of the research is to evaluate the identification system performance before carrying out an identification trial. We want to give guidelines for planning an identification experiment for what concerns the number and the identity of the familial donors of genetic evidence and the number and type of loci used as markers.

**Methods:** The starting point of our proposal for the system evaluation consists in the masking of the genetic evidence of the candidate, and thus considering the LR as random variable, varying conditionally on which hypothesis is assumed to hold. Our proposal is to measure the expected loss for each identification system by the probability of giving support to the hypothesis that is not assumed to hold. We want also to consider how some violations to standard assumption1 for population or segregation models (i.e. Hardy-Weinberg equilibrium and Mendelian Segregation laws), such as coancestry, identity by descent, inbreeding or uncertainty in allele frequency in the population, affect the expected performance of the identification system. Bayesian Networks were used to make inference by probability propagation methods. The flexibility of the BNs is helpful to introduce complexity due to violation of standard assumptions. To handle the huge dimensionality of the probability distributions involved and to correctly treat the various sources of uncertainty implied, the use of MC or MCMC simulation methods was required to make our proposal computationally tractable. This methodology has been applied to a real case study, concerning a very indirect identification, which seems to take advantage of it.

**Final Comments:** Even if the LR depends on the whole available evidence, we demonstrate that its distributions only depend on the genotype of the candidate, conditionally on the evidence provided by the family donors. Taking into account Daubert vs Merrell Dow Pharmaceuticals sentence2, which requires that a scientific technique should have known error rates and standard of performance to be considered valuable in a court of justice, our proposal applies this principle and should be carried out every time a kinship identification is attempted. The proposed technique allows us also to specify the required performance of the identification experiment for any specific case, according for instance to the civil or criminal nature of the trial. Currently standards of performance are only required for laboratory procedures but they are not defined to assess the effectiveness of the information for identification experiments. In our opinion, this lack of legislature has to be corrected and legislative proposals could be put forward following suggestion from this work and future developments. There are only few studies concerning the evaluation of the identification system. However, unlike our work, they are not case-specific and propose measure of loss not related to the expected error rates of the system.

**Keywords:** Kinship Identification; DNA STR Markers; Likelihood Ratio Distribution; Bayesian Networks

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# DNA PATERNITY TESTING IN AN INFERTILE CASE

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**Introduction:** Infertility means that within a year, a mating couple are failed to get the sibling. This situation can be resulted from the male as well as female bad reproduction causes. In the case of the infertility has been known from the male causes, the man usually cannot accept if his couple (wife) was pregnant and delivered a baby.

**Case Report:** In this case the male will suspected that the wife has a scandal to the other man. A 42 years old male, has been diagnosed infertile by his androlog. He was very upset after knowing that his wife (28 years old) was pregnant and delivered a baby girl. He asks for the paternity testing to prove that the baby is not his daughter. The blood samples were collected from the man, the mother and the baby (3 years old). The DNA was extracted from the samples, amplified and then typed for 9 Short Tandem Repeats (STR) loci.

**Results:** The analysis showed that the DNA profile of the man, the woman and the child were all matched. The Paternity Index was 1,349,861 and the probability was 99.9999 %, proved that the baby is the daughter of the man. The sperm analysis showed that the man was infertile but, he still has a small amount of normal sperm (oligospermia).

**Conclusions:** This case showed us that in the case of infertility, the sperm analysis is very important to be conducted to find whether the man is azoospermia or oligospermia.

**Keywords:** Paternity Testing; STR; Paternity Index; Infertile

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# PARENTAGE TESTING: ARE WE STATISTICALLY ACCURATE? A RETROSPECTIVE ANALYSIS OF PARENTAGE CASES IN THE LEBANESE POPULATION

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**Abstract:** Parentage probability and likelihood ratio calculations use STR allele frequencies in a given population or ethnic group. The Lebanese population is characterized by the presence of 18 religious communities with a relative genetic isolation where the endogamy rate is 88% and consanguinity rate 42%. Therefore, the use of STR allele frequencies that are in Hardy-Weinberg equilibrium and have low coefficient of ancestry (Fst), could potentially introduce a statistical bias. Also, the Lebanese population social characteristics challenge the discrimination power of the usually used profiles as to the number of included STR systems, which are often 15. The present study aims to: 1. Establish the Lebanese STR allele frequencies and test the coancestry coefficient (Fst) and Hardy-Weinberg equilibrium. This was achieved by amplifying 24 STR regions (Amelogenin, D3S1358, THO1, D21S11, D18S51, Penta E, D5S818, D13S317, D7S820, D16S539, CSF1PO, Penta D, vWA, D8S1179, TPOX, FGA, D19S433, D2S1338, D22S1045, D1S1656, D10S1248, D2S441, D12S391 and SE33) using PowerPlex 16 HS and ESI 17 (Promega Corporation; Madison, WI, USA), in 507 healthy unrelated Lebanese individuals representative of the Lebanese population as to the religious and geographical distribution. Deviations from Hardy-Weinberg (exact test $p<0.05$) equilibrium were observed in two markers (D13S317 and D22S1045). The mean coancestry coefficient value is 0.02, ranging from 0.00007 (D8S1179) to 0.103 (D22S1045). The Fst value calculated per community showed a range of 0.008 to 0.029. Statistically significant differences were observed between Lebanese STR allele frequencies compared to the Caucasian STR allele frequencies and among the different Lebanese communities. In addition, a high frequency of STR microvariant alleles was observed. 2. Based on this novel Lebanese STR allele frequencies, retrospective analysis of 443 paternity cases previously performed in our laboratories were retested by i) assessing the variations in the combined paternity index (CPI) using the Caucasian STR allele frequencies versus the Lebanese STR frequencies, ii) using variable number of STR systems (15 Identifiler markers versus 10 SGM markers) and iii) assessing the probability of false inclusions occurrence of 23 paternity exclusion cases upon simulating "Duo" (mother not available) from "Trio" (mother available) families. Also, inconclusive cases, presenting one mismatch between the alleged parent and the child, were cleared by using additional STR systems and showed unambiguous exclusions. On the contrary, some Trio families showing a clear paternity exclusion showed a complete inclusion when simulating Duo families. Moreover, inconclusive cases helped determining the Lebanese STR mutation rates. These results will be used to gauge proper corrections by mathematical procedures and to recommend appropriate profile size as to the number of genetic systems in the Lebanese populations and similar populations with endogamy or consanguinity. Increasing the number of systems per profile raises the issue of how many mismatches should be observed before concluding to exclusion. Similar recommendations were also reached by a different study conducted in our laboratory, where the effect of consanguinity and endogamous marriage in the Lebanese population was tested (See abstract entitled "Assessment of Endogamy and Consanguinity Effect on DNA Profiling in the Lebanese Population").

**Keywords:** Parentage Testing; Lebanese Population; Endogamy; Consanguinity; STR Allele Frequencies; Paternity

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# MIXED MARKER APPROACHES TO FORENSIC ANCESTRY INFERENCE: COMBINING DATA FROM STRS, SNPS AND INDELS

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**Abstract:** Ancestry informative single nucleotide polymorphisms (AIM-SNPs) can provide valuable data on the possible ancestry of a DNA donor. Standard identification STR genotypes obtained from the same DNA sample also have some ancestry information but are not routinely used to infer ancestry. We previously developed several AIM-SNP sets genotyped using SNaPshot single base extension assays. This system has good forensic sensitivity but is hindered by an inability to reliably detect and dissect mixed-source DNA. To overcome this problem we have developed two further ancestry informative marker sets with robust mixture detection properties: a single multiplex of 46 ancestry informative indels and a 12-plex of ancestry informative STRs. Both sets were built from the ground up and were chosen for their informative allele frequency distributions across the five population groups of Africa, Europe, East Asia, America and Oceania, so they offer good population differentiation, used individually or in combination with AIM-SNPs. We have adapted the Bayesian ancestry classifier, originally developed to interpret AIM-SNP data, in order to combine and analyze binary SNPs or indels with multiple allele STR data - whether from standard identification STRs or the novel ancestry informative STR set developed. The classifier accesses allele frequencies input by the user and reference population data is available from the CEPH Human Genome Diversity Panel samples for all the above marker sets. This allows an inference of ancestry to be made from a three group comparison of African-European-E Asian extending to a seven group comparison with Middle East and Central South Asian allele frequencies added to those of the five main groups. We report the performance of each multiplex and their individual component loci in terms of ancestry informativeness and ability to detect mixed source DNA. Lastly we explore use of structure software and principal component analysis with different combinations of marker sets to examine patterns of mixed ancestry in individuals from populations showing admixture.

**Keywords:** Ancestry Analysis; SNPs; STRs; INDELs; Structure; Population Admixture; AIMs

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# ORAL SESSION

## Session 15.8

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# READING BETWEEN THE LINES: AN ASSESSMENT OF FORENSIC PSYCHOLOGICAL AND PSYCHIATRIC REPORTS

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**Abstract:** The involvement of psychologists and psychiatrists in the forensic realm compels practitioners to adjust their knowledge to this specific context. This is particularly important in debriefing judges and other judicial actors about the results of psychological and psychiatric assessments. However, failure to recognize this as their core activity results in reports that do not meet standards defined by international and professional associations and, ultimately, leads to undesirable misinterpretations. Our research aims at a thorough assessment of writing practices of forensic psychologists and psychiatrists within the Portuguese National Institute of Legal Medicine (NILM). A mixed method approach will be put forward to meet two objectives of assessing the form and the inherent logic of forensic reports. To meet the first objective, we will survey 70 experts (35 psychologists and 35 psychiatrists); as for the second, a content analysis of 270 reports will be conducted. Interviews with the intended audience of forensic reports will complete the methodological design (i.e. judges, parole officers, lawyers). Considering that the NILM is, according to the Portuguese jurisdiction, the official nonpartisan institution that performs psychiatric and psychological assessments, and given that, in practice, most of these assessments are performed under the auspices of the NILM, this research should provide a fair portrait of the current practices and perceptions of forensic report writing in Portugal.

**Keywords:** Forensic Psychology; Forensic Psychiatry; Report Writing; Practice Assessment; Improvement.

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2

# PROFICIENCY TEST ON FORENSIC PSYCHIATRY IN CHINA

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**Abstract:** Forensic psychiatric expertise is recognized as experiential identification activity, and the scheme and mechanism to assess the critical steps of forensic psychiatric expertise such as mental status examination, analysis, report writing and the effective methods to compare, supervise the proficiency of the forensic psychiatric institution are scarcity. In present, proficiency test is not only an effective method to supervise and evaluate the capacity of the forensic psychiatrist and institution, but also an important supplemental approach for the institution to control qualification. Participation proficiency test is a compulsive requirement for the accreditation forensic institution. Two proficiency test activity on forensic psychiatric expertise were undertaken. Qualitative and partial-processes blue-print were combined during the tests, criminal responsibility assessment was adopted as the reviewed items. Firstly, the typical forensic psychiatric expertise case, which is moderate difficult, was selected as the prototype. Secondly, the specialist modified the relative data. Lastly, the test scheme was ascertained after the discussion of the proficiency test experts. The reports from the participation institution were evaluated by the experts blindly. Not only the opinion was considered, but also the analysis of the opinion-make process was evaluated emphatically, every item concludes substantial and logistic parts. In the 2010 forensic psychiatric expertise proficiency test, there were 5 considering points about substantial part of diagnosis analysis: symptom criteria, severity criteria, course criteria, exclusion criteria and appraisal of the foregoing report, every point may be divided into 4 grades: satisfactory, general, bad and no. To substantial part of the criminal responsibility, the mental status during the committed behavior, cognition, control and the effect of the psychiatric symptom to the offender's cognition and control capacity of the committed behavior, every point may be divided into four grades: excellent, satisfying, general and bad. About substantial part of the opinion, diagnosis, mental status during the committed behavior and criminal responsibility must be mentioned, there were 3 grades on the diagnose and mental status during the committed behavior: satisfactory mental status during the committed behavior, not mentioned and wrong diagnose, and there were also 3 grades on the criminal responsibility: satisfactory, general and wrong conception. There were 4 points on the logistics: clearance, arrangement, special definition and emphasis, every point may be divided into 4 grades: excellent, satisfactory, general and bad. The expert give marks to every points, and the weight marks were calculated lastly. The weight of the substantial diagnose, logistic diagnose, substantial criminal responsibility, logistic criminal responsibility, substantial opinion and logistic opinion were 0.224, 0.096, 0.336, 0.144, 0.140, 0.060 respectively. 123 Forensic psychiatric institutions submit their reports for the test within the required time, according to its weight marks, 12 institutions received satisfactory evaluation, 101 institutions received pass evaluation and 11 institutions received failure evaluation. In the end, the authors analyzed 3 major existing problems about proficiency test, and gave the rectified methods to proficiency test on forensic psychiatric expertise.

**Keywords:** Forensic Psychiatry; Proficiency Test; Accreditation

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3

# DOING AWAY WITH MENS REA IN CANADA

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**Abstract:** In Canada, in order to obtain a criminal offence conviction the prosecution must prove beyond a reasonable doubt that a particular criminal event or state of affairs was caused by the accused's conduct (actus reus) and that this conduct was accompanied by a particular state of mind (mens rea). The requirement of mens rea is in place so that an accused cannot be convicted for simply doing something criminal without intending to do so (as in accidents, etc.), as this is seen as unjust. However, it is argued that this requirement may introduce more injustice than it seeks to prevent. An alternate legal approach, doing away with the doctrine of mens rea, is proposed.

**Keywords:** *Mens Rea*; Criminal Responsibility; Criminal Offence; Expert Testimony; Mental Disorder

4

# CHILDREN LIVING IN SOME INSTITUTIONS (PROTECTED BY LAW) AND THE CONCEPT OF SELF-ESTEEM

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**Abstract:** The concept of "Self" is an individual's style of opinions towards his own personality. The skeleton of "Self" is formed in the early years of childhood; develops in the puberty and after all it directs the person all through his life. Self-esteem is one of the main parts of "Self" and has an important role in the development of a child. Self-esteem can be defined as a person's emotion of accepting himself, being pleased with his own personality and a style of subjective respect for himself. In literature, many researchers have been done to specify the factors that affect the self-esteem of children in the period of Primary School. The aim of this research is to evaluate the scores of self-esteem of 9- 12 year old children who are left under the custody of institutions owing to various reasons such as neglecting, misuses or socio- economic privations and the children - at the same age range- who live with their parents. Also, with this study, differences between some personal characteristics and self respects have been tried to be specified. The sample of the research is formed by "the Experimental Group" in which 30 9- 12 year old children, who are living in institution in Turkey, because of various reasons and "the Control Group" in which 30 children - at the same age range- who live with their parents in Istanbul. In the research, "Children's Self Concept Scale" which is developed by E.V. Piers and D. Harris aiming to measure the 9- 16 year old children's ideas, sensations and attitudes in U.S. and "Personal Data Forms" which include the children's information about their personal and parental characteristics have been used as assessment instruments. The feasibility and solidity studies of the scale is done in a wide age range which is from the Primary school students to the University students have been done by Oner in Turkish. The scale consists of 80 questions in total and the questions have been being answered with "Yes" or "No". The high score refers to "High Self-esteem" and the low to the "Low Self-esteem". In the step of evaluating the collected data, Self concept scores of the experimental and the control groups have been compared and a significant difference has been found between groups statistically. As a result, our research has presented that the children who are under the custody of institutions and need to be protected have developed lower Self-esteem than the children who are with their families. In the literature survey which was done before shows that the findings support the results of this study.

**Keywords:** Protected Children; Self; Self-Esteem; Turkey

5

# HOMICIDE LANGUAGE ANALYSIS AND PERSONALITY PROFILING USING THE KLIWC PROGRAM

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**Abstract:** This study compared the writing of murderers to common people by using Korean-Linguistic Inquiry Word(KLIWC). Sixty-one murderers and one hundred fifty-nine college students(comparing group) wrote a self introductory essay for imaginary person. KLIWC yielded counts and percentage of word categories using the parts of speech of the Korean language and psychological (emotional, cognitive, sensory/perceptual, social, physical/functional and metaphysical process) criteria. Furthermore, based on the premise that PAI might be useful for criminal profiling, PAI scores of murderers were also compared with comparing group and analyzed about correlation patterns between two groups. The result of the study are as follows: First, The noticeable differences in the clause, sentence, morpheme was observed which homicide group use more than comparing group. Most of all, while homicide group use more demonstrative pronoun, the first person, postposition than comparing people, comparing group use more general adverb, the endings, the third pronoun than homicide group. Further more, the writings of homicide group also showed meaningful differences in emotion, social, cognitive, physical/functional processes(psychological criteria) with comparing group and the fourteen of twenty-two PAI scales showed the meaningful differences between two groups. As well as, some of KLIWC criteria variously correlated with PAI scales and the pattern of correlation showed different in kind between two groups. The facts present us valid insight that the analysis of language pattern could be roled as tool to give useful or concrete information such as psychological condition and cognitive characteristics of murderers

**Keywords:** Murderer; KLIWC(Korean-Linguistic Inquiry Word Count); PAI(personality Assessment Inventory)

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# TARGET SELECTION AND MODUS OPERANDI OF RAPISTS AND CHILD MOLESTERS: AN ENVIRONMENTAL CRIMINOLOGY APPROACH

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**Abstract:** Although there has been an increase in research on sex offenders' modus operandi, geographic decision-making, and victim selection, most studies still tend to emphasize criminal motivation while overlooking the role of situational and environmental factors. Studies of mixed samples of rapists and child molesters typically neglect to conduct comparative analyses. Consequently, the full nature of their distinction is not clear. This is particularly problematic for the understanding of crossover or polymorphous sex offenders, who target victims from various age groups. Using a sample of 216 incarcerated sexual offenders, target selection patterns were identified and tested to establish which target selection patterns were associated with each type of offender. Relationships between modus operandi, geographic decision-making, and target selection were also examined. Three types of offender were identified: (1) manipulative; (2) opportunist; and (3) coercive. The manipulative offender is typically a child molester. The coercive offender is typically a rapist. The opportunist offender includes both rapists and child molesters. These findings emphasize the relevance of polymorphous, crossover, or versatile sex offenders, and suggest new ways of conceptualizing sex offenders and their study.

**Keywords:** Target Selection; Modus Operandi; Geographic Decision-Making; Sex Offenders

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# ORAL SESSION

## Session 15.9

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1

# INJURY INTERPRETATION IN ADULT AND PAEDIATRIC FORENSIC MEDICINE. POTENTIAL FOR ERRORS AND FALLACIES AND HOW TO AVOID THEM

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**Abstract:** Injury interpretation forms the basis of forensic medicine. Everyone has sustained and is personally familiar with injuries and doctors tend to see more injuries than most lay persons. This familiarity, however, does not equip one with the necessary broad knowledge and understanding to cautiously interpret an injury before them. Not surprisingly, errors are made by non-forensically trained practitioners but, disappointingly, also by forensic practitioners. Such errors may result in a conviction of the innocent and acquittal of the guilty with potentially far reaching ramifications. Requirements for competent injury interpretation What then is required to enable a competent interpretation of an injury. There are four key elements:

1. A good view of the injury - either personal direct examination under ideal conditions of the injury or lesion or a clear and accurate description or representation (diagram, photograph, video, DVD, radiograph) of the injury or lesion;
2. An understanding of injury causation mechanisms - including a knowledge of the types of injuries and the mechanisms of how they may be caused;
3. Clinical experience - a firm understanding, knowledge and experience of clinical medicine and specifically of normal human anatomy, anatomical variations, pathology, injury management and healing, and medical imitators of injury;
4. An understanding of the bounds and limitations of an injury interpretation opinion and the avoidance of bias.

Common errors: What are considered common errors varies but generally they consist of diehard traditions, of ongoing, uncorrected concepts and of gaps in our individual knowledge. A number of common errors with examples will presented under these general headings:

- Nomenclature
- Photography
- Age of injury
- Force used to cause an injury
- Medical imitations
- Genital myths
- Child abuse
- Other specialist opinions

How to avoid errors: Of considerable concern in the field of clinical forensic medicine is the lack of formal teaching to medical undergraduates and the downgrading of the assessments to less educated personnel. Given that errors occur even with those doctors undertaking formal education in this field, downgrading of the service is likely to increase these errors. To avoid this and improve the quality of the service, a change in jurisdiction medical and bureaucratic mindsets is required. Despite being in existence for decades, the field has not really been formally recognised and funding for desperately required research remains limited and seems to be almost solely in the field of paediatric forensic medicine. To reduce errors, not only in the interpretation of injuries but in all other areas of the discipline, practitioners require appropriate education, peer review and a knowledge base developed through quality research. To achieve this, appropriate specialist qualifications in clinical forensic medicine and of the establishment of university academic departments are essential. With the ongoing inadequate training of clinical forensic medicine worldwide coupled with the downgrading of practitioners, the absence of uniform standards and the dearth of quality research, the quality of medico-legal advice being offered will continue to be of variable quality, errors will recur, families will be disrupted, children abused, the innocent found guilty and the guilty released to repeat their offences. This content was recently published as part of a chapter in: Gall J, Payne-James J. Current Practice in Forensic Medicine. Wiley-Blackwell, 2011.

**Keywords:** Injury Interpretation; Errors; Child Abuse; Sexual Abuse

2

# BIO-MATHEMATICAL MODEL OF BRAIN LESIONS DUE TO CAR ACCIDENTS

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**Abstract:** The diversity of producing traumatic lesions due to car accidents causes a large injury polymorphism. Among them, the most frequent causes that lead to the victim's death, in the case of a survival of hours or days, are cerebral lesions with hemorrhagic character. Between the clinic and the anatomopathological perspective over the notion of 'craniocerebral trauma' (CCT) there is a difference of interpretation, justified through the examining position, namely clinician-therapist or forensic doctor. Additionally, the analysis of the correlations between the diagnosis from the survival interval and the necropsic assessments during the forensic/medico-legal autopsies represent another method for identifying the error sources of both clinical and imagistic diagnosis in politrauma, and of the possibilities of improving the surgery treatment. By using an interdisciplinary approach, the study aims to identify errors brain imaging with CT images of traumatic brain injury by nonlinear analysis of the images correlated with reading and converting them. The data obtained are processed statistically, being correlated with those obtained from the autopsy study of 500 cases with road-accidents politraumatisms in order to obtain meta-euristics algorithms and a bio-mathematical model of brain injuries. The findings of the analysis focus on establishing the fidelity limits of the CT investigations in different evolutionary stages of cerebral politrauma and the significance of magnetic resonance imaging (MRI) in the imagistic investigation of cerebral trauma in the acute phase, the relationship between the elastance and the compliance, namely the individual reactivity of the brain to the traumatic aggressiveness, develop a new scale of evaluation of the severity of the cranial trauma in politrauma and recommendations for emergency medicine and neurosurgery.

**Keywords:** Car Accidents; Cerebral Lesions; Imaging Errors; Nonlinear Analysis; Bio-Mathematical Model

3

# FORENSIC AGE ESTIMATION PORTUGUESE APPROACH

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**Introduction:** In recent years, a worldwide boost in cross-border migration has increased the need for forensic age estimation of undocumented migrants and asylum seekers, particularly in cases of unaccompanied adolescent and young adults, involved in criminal proceedings or requesting asylum, who do not have valid identification documents, do not know their age or are suspected of not giving their correct age. In these cases, forensic age estimation is often requested by the authorities in order to determine if the suspect is of an age in which he may be charged with a crime or granted asylum. Recently, the Study Group on Forensic Age Diagnostics has issued recommendations on forensic age estimation methodology, which should consist of a physical examination, an X-ray of the hand, and a dental examination which records dentition status and evaluates an orthopantomogram. When establishing whether a person has attained 21 years of age is required, a radiological or CT examination of the clavicles is recommended. Careful consideration should be given to ethnical, socio-economical and health factors when interpreting findings.

**Materials and Methods:** The authors present and discuss the methodology of forensic age estimation being implemented in the North of Portugal by the North Branch of the National Institute of Legal Medicine.

**Discussion and Conclusions:** Contrary to some other EU countries, in Portugal the relevant age thresholds in criminal proceedings are 16 and 18 years, thus posing some difficulties in age estimation, as most age estimation studies are oriented to the 14, 18 and 21 years thresholds. In order to overcome these difficulties, further studies are needed, with relevance to the 16 year threshold. Another relevant issue is derived from the time period during which the subject can be detained (48h). In order to provide an adequate and on-time response its necessary a better articulation between the different institutions involved. In spite of the mentioned issues, the forensic age estimation methodology being implemented in Portugal is already contributing to a more accurate judicial decision-making.

**Keywords:** Age Estimation; Criminal Age; Forensic Evaluation

4

# ASSESSMENT OF BRUISE AGE ON DARK SKINNED INDIVIDUALS USING TRISTIMULUS COLORIMETRY

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**Introduction:** Studies on the aging of bruises have been reported on Caucasians or individuals of fair ethnicity. This study focuses on bruise changes in dark-skinned individuals using Tristimulus Colorimetry for forensic analysis in such individuals.

**Methods:** Eighteen subjects of South Indian or Sri-Lankan ethnicity were recruited. Subjects were bruised using a vacuum pump and then daily colour measurements were taken of the bruise using a Tristimulus Colorimeter. The L*a*b* readings were recorded of a control area and the bruise until it disappeared. Two Caucasians were used for comparison.

**Results:** This study showed that, using colorimetry, bruises on dark skinned individuals can be measured and analysed even if the bruises are unclear visually. As the bruise is beneath the skin, to carry out comparison analysis of individuals, the colour difference ?L*, ?a*, and ?b* were calculated. All values showed a trend, indicating the L*a*b* measuring technique is a reliable method to analyse bruises on dark skinned individuals. Comparisons of Asian subjects and Caucasian subjects were performed. The largest difference was seen in the b* value. Statistical analysis showed that ?L* colour difference was the most consistent (95% C.I. -4.05 to -2.49) showing a significant difference between days 1-4 and 5-8.

**Conclusions:** Objective assessment of bruises on dark skinned individuals using the L*a*b* method of measuring was found to produce reproducible results. Furthermore, the study showed that the yellowing of a bruise cannot be seen or measured with a Tristimulus Colorimeter on dark skinned individuals due to the pigmentation of the skin. With further studies and more subjects, the age of bruises could potentially be assessed for use in forensic analysis.

**Keywords:** Forensic; Bruising; Tristimulus Colorimetry; CIE System; L*a*b*

5

# PROTEOMICS TO DETERMINE THE AGE OF HUMAN BRUISES

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**Abstract:** Evidence of physical abuse is often left on victims, with bruising being its most common symptom; however, bruises are also the most frequent injury-type encountered in sports-related incidents and everyday accidents, leading to abusive injuries sometimes being misinterpreted as accidental ones. Despite its prevalence, bruising remains a much neglected field of study with most of our knowledge to date deriving from post-mortem human investigations and animal studies, which have a limited application to real-world situations involving living individuals. Bruise biomarkers, as signs of physical abuse, can provide vital evidence in legal cases concerning suspected abuse. This could be particularly valuable in cases involving vulnerable individuals, such as children, elderly people or victims of domestic violence, who may be unable to provide an accurate account of the circumstances or timing of an assault. In this study, proteomic techniques such as 2D gel electrophoresis and MALDI-TOF mass spectrometry will be used to identify biomarkers specific to bruises present in the interstitial fluid of living individuals. Western blot analysis will allow for the detection and relative quantity of specific proteins present as the bruise evolves. Samples will be collected using a non-invasive, ultrasound skin permeation system (SonoPrep®, Echo Therapeutics Inc.) which induces micropores in the stratum corneum, linked to a miniature pump system. The work completed to date to identify candidate biomarkers using these techniques will be discussed here, along with the potential applications of this project to the forensic science field.

**Keywords:** Physical Abuse; Bruises; Proteomics; Interstitial Fluid

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# ORAL SESSION

## Session 15.10

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1

# VITREOUS POTASSIUM TO DETERMINE POST MORTEM INTERVAL

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**Abstract:** The determination of time of death is facilitated by the development and improvement of several methods regarding the early post mortal period, such as temperature, electro-muscular and mechanical excitability, and chemical reactivity of the iris. After about 24-48 hours, these methods cannot be used. Vitreous analysis may then be helpful to estimate the postmortem interval. We have consistently collected and analyzed vitreous fluid from cases taken to the Department of forensic medicine in Stockholm for a forensic autopsy, and collected vitreous fluid as soon as possible upon arrival. Approx. 0.3 mL of vitreous fluid was collected from the center of the eye, and was immediately analyzed with a blood gas instrument. The potassium concentration, previously reported to rise linearly with the postmortem time was found to rise more rapidly in the early phase and then to slow down after 1-3 days, displaying a ceiling effect at a maximum of about 35 mmol/l. In extreme cases, the levels were higher due to evaporation. We evaluated the impact of age, agony (short or long), alcohol levels and temperature on the postmortem rise of potassium in more than 400 cases, where the true postmortem interval was determined with a certainty of less than 5%. We observed that age of the subject had the highest influence on the rise of potassium, accounting for about 16% of the general variability, followed by temperature (5%), whereas agonal time and alcohol could explain for only 1% or less of the variability in potassium rise. An adjusted, non-linear, equation for the rise in potassium with postmortem interval with and without correction for these factors is suggested.

**Keywords:** Vitreous; Potassium; Time of Death; Age; Temperature

2

# IMMUNOSTAINING FOR PLAKOGLOBIN: A DIAGNOSTIC MARKER OF ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPHATY?

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**Introduction:** Arrhythmogenic right ventricular cardiomyopathy (ARVC) is a heart muscle disease characterized pathologically by progressive fibro-fatty replacement of ventricular myocardium. Mutations in genes encoding desmosomal proteins have been identified in approximately 40 % of patients with ARVC. These proteins include plakoglobin, which is involved in cellular adhesion. The disease is uncommon but may account for up to 20 % of cases of sudden death among young adults. Many of these cases are seen in forensic pathology. At postmortem examination most cases present without any prior medical history of heart disease. Macroscopically, the structural changes of the heart can be sparse and the disease may easily be missed at autopsy. Also, on microscopic examination the diagnosis may be challenging. Currently, there is no histological staining method available to definitively confirm the diagnosis of ARVC. Since the disease frequently is familial, a correct diagnosis is of utmost importance, possibly having implications to family members of the deceased. Recently, reduced plakoglobin levels at the intercalated disks have been demonstrated in endomyocardial biopsies from patients with ARVC, thus suggesting immunohistochemical staining for plakoglobin as a possible new diagnostic marker for ARVC. We found it of interest to examine this in the setting of forensic pathology, applying this method to a forensic autopsy material. The objective of the present study was to examine the immunoreactive plakoglobin level in myocardium with histomorphologic changes consistent with AVRC compared to a control group.

**Materials and Methods:** Formalin-fixed, paraffinembedded cardiac tissue samples from 25 subjects were included. Myocardial samples with histomorphologic changes consistent with ARVC were obtained from autopsies of 15 cases of sudden unexpected death. These were compared to control myocardium from 10 subjects with no prior medical history or pathological finding consistent with heart disease. Immunohistochemical analysis was performed with monoclonal anti-plakoglobin antibody using a stepwise dilution technique.

**Results:** A marked reduced plakoglobin level was seen in 13 out of 15 ARVC samples (87 %). The two remaining ARVC samples had plakoglobin levels inseparable from controls. No control samples showed reduced plakoglobin levels.

**Discussion and Conclusions:** These preliminary data showed a reduced plakoglobin level in most myocardial samples with histomorphologic manifestations of ARVC in our series of forensic cases, thereby supporting previously published data. The results suggest that immunohistochemical staining for plakoglobin might serve as an additional diagnostic marker of ARVC in forensic pathology, but further research is required.

**Keywords:** Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC); Plakoglobin; Immunohistochemistry; Diagnostic

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# HEAT SHOCK PROTEIN EXPRESSION (HSP 70) IN KIDNEYS IN SUDDEN INFANT DEATH

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**Abstract:** Risk factor of sudden infant death is sleeping in prone position, but also hyperthermia seems to be an important factor. The circumstances of discovery, e.g. high ambient temperature, warm covering, increased body temperature or sweating may be indicative. Morphological findings of premortal hyperthermia do not exist, but heat shock protein expression can increase in case thermal influence of the body. Heat shock proteins are well known as important proteins with an increased expression in case of exogenous and endogenous cell stress. In 54 cases of sudden infant death renal tissue was examined regarding to Hsp 70 expression in comparison to 29 deaths of fire or fire-related heat. In all cases of sudden infant death competitive pathomorphological and chemical-toxicological findings could be excluded. The expression of Hsp 70 was negative, in contrary to positive reaction in all cases of the control group. The cause of lack of expression of Hsp 70 in cases of sudden infant death is discussed.

**Keywords:** Heat Shock Protein; Hyperthermia; Sudden Infant Death

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# THE SPEED OF CEREBRAL SWELLING FOLLOWING BLUNT CRANIAL TRAUMA - AN ANIMAL MODEL

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**Abstract:** An important consideration in the evaluation of victims of blunt craniocerebral trauma in a forensic context is the speed with which symptoms and signs of raised intracranial pressure (ICP) develop. Eight 2-year-old sterilised male Merino sheep were anesthetised by an intravenous injection of thiopentone. Injury was induced using a humane stunner according to standard methodology approved by the local animal ethics committee. After injury, animals were stabilised and an ICP monitor probe was inserted within 10 min of trauma. Transient systemic hypertension followed by sustained hypotension was noted. Normal ICP in sham (non-injured) animals was 8 ± 2 mm Hg. At 10 minutes after TBI, which was the earliest time point at which the craniotomy was completed and the ICP probe successfully implanted in all injured animals, ICP was 56 ± 7 mm Hg. The ICP gradually decreased to 25 ± 2 mm Hg by 60 minutes after TBI, before again increasing to 32 ± 2 mm Hg by 4 hours after injury. Thus, ICP demonstrated a biphasic response, being 7 times baseline values of 8 ± 2 mm Hg 10 min after injury, decreasing to 25 ± 2 mm Hg by 30 min, and then increasing to values exceeding 30 mm Hg by 4 h post-injury. ICP was always significantly higher than baseline values, which combined with hypotension, reduced cerebral perfusion pressure to less than 60% of normal. This early and sustained increase in ICP after craniocerebral trauma acutely alters cerebral perfusion pressure and brain oxygenation, and provides a potential pathophysiological explanation for immediate clinical manifestations in humans following significant TBI.

**Keywords:** Blunt Cranial Trauma; Impact; Edema; Brain Swelling; Intracranial Pressure

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# POST MORTEM INTERVAL ESTIMATION BASED ON CORNEAL IMAGE CLASSIFICATION

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**Introduction:** The estimation of postmortem interval has been one of the most important and difficult issues in the field of criminal science and forensic medicine. It is of great importance to estimate PMI accurately and quickly for criminal cases and civil cases. During the past decades, many new methods have been proposed to estimate PMI, both by theoretical and technologic means involving physics, chemistry, biology, immunohistochemistry and other basic sciences. Here, we therefore prefer to go back to the direct observation method and try to find quantified data by image analysis. Image processing and analyzing technique are employed to find features representing the quantified relationship between changes of corneal opacity and postmortem intervals. We applied K-Nearest Neighbor classifier, Adaptive Boosting classifier and Support Vector Machine classifier to evaluate the estimating result.

**Materials and Methods:** 1. Pre-experiment: One healthy rabbit was sentenced to death by air embolism. The body was put in a dark room with temperature of about (25±1)°C and relative humidity of 20%-60%. The cornea was exposed to air and was lighted by a desk lamp. From the time point of pronounced death up to 47 h, videos was taken continuously at cornea by employing digital camera and was sectioned by every 15 minutes to obtain digital images of rabbit's eye. The images gotten from 15 minutes to 47 hours after death were labeled with numbers. 2. The eye images were segmented with gray level histogram method to divide into object region and nonobject region, then the object region was used. 3. 9 features were extracted with Matlab software, including GF, EL, G, S, C, J, Mean, Var and Ske. 4. The features of all the images were classified with K-Nearest Neighbor classifier under 4-folds cross validations where the mean value was taken as accuracy rate. For each mission the experiment went through 5 rounds. The postmortem period from 15 minutes to 47 hours was divided into 3 intervals, 4 intervals, 5 intervals, 6 intervals, 8 intervals, 10 intervals and 14 intervals. The accuracy rate and predicting precision were evaluated under different interval. 5. Four healthy rabbits were labeled with R1, R2, R3 and R4. Their videos were taken and the images were obtained and analyzed with the same method stating in preliminary experiment. KNN classifier were applied as mentioned above. 6. The predicting results were compared by using KNN classifier, Adaptive Boosting classifier and Support Vector Machine respectively with all features from images of four rabbits. 4-folds cross validation methods were used and each experiment went 5 rounds.

**Results:** 1. The gray-level histogram based method effectively carried out segmentation in our experiment. Few images should be selected out and modified manually since the shadow under eye and the region of haemostatic forceps presents. 2. All the nine features were capable for classification and the combination use of 9 features improved the performance greatly. 3. As the amount of intervals increased, the accuracy rate decreased in each postmortem period by KNN classifier. While using features from each rabbit, the average accuracy rate was 97.1% with 3 intervals, 88.5% with 8 intervals and 81.5% with 14 intervals. While using features from 4 rabbits, the accuracy rate was 96.9% with 3 intervals, 87.6% with 8 intervals and 80.9% with 14 intervals. 4. By adapting Adaboost classifier, the accuracy rate was 85.1% with 3 intervals and 64.7% with 14 intervals, which were lower than KNN classifier. 5. By adapting SVM classifier, the accuracy rate was 78.9% with 3 intervals and 30.2% with 14 intervals. They were all much lower than the former two classifiers.

**Conclusions:** The classification model by using 9 features have been established successfully to estimate PMI. In these experiments, KNN classifier is better than Adaboost classifier and SVM classifier.

**Keywords:** *Post Mortem* Interval; Image Processing; Corneal Opacity; Classifier; Machine Learning

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1

# PROGRESSES IN THE JUDICIAL EXPERTISE PRACTICES AND QUALITY CONTROL OF MEDICAL FAULTS IN CHINA

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**Abstract:** Now in China, medical malpractice lawsuits showed a sharp upward momentum. The judicial expertise about medical faults often become the key evidences in such cases. The evaluation of medical act involved with higher difficulties and risks. In China people mainly take two ways to strengthen the quality control in the appraisals of such cases recently. The first is special legislation, unified the evaluation standard. 2009, China promulgated the "Tort Liability Act." The medical malpractice was explicitly put into its adjustment range for the first time. Six kinds of circumstances were defined as medical treatment fault in the new law. Those medical actions are including: 1.The medical behavior that is contrary to the obligation to inform patients of illness conditions and medical measures and obtain written consent from the patients or patients' family. 2.The hospitals and doctors failed to provide the same level of medical services.3. The hospitals and doctors violate laws and regulations and medical conventional. 4.The hospitals and doctors could not accurately fill in, maintain and timely provide information of medical history. 5.A breach of confidentiality obligations. 6.Conducting unnecessary examinations. Thus it has provided a legal basis to the identification of medical faults in the process of judicial expertise of the medical tangle. Secondly, the governments and relevant departments vigorously carry out competence accreditation of forensic institutions. Until the end of 2010 ,about 50 forensic medical institutes with high reputation, strong technical force had established the quality management system, in accordance with (ISO/IEC17020: 1998 and ISO/IEC17025: 2005, passed the China National Accreditation Service for Conformity Assessment's document review, site assessment, and accessed to the identity of the authorized use of internationally recognized qualifications. In accordance with the requirements of accreditation criteria, the appraisal bodyies take effective measures to strengthen the quality control of medical faults appraisals from the 6 factors as "people, machine, material, method, conditions, measure".

**Keywords:** Medical Faults; Judicial Expertise; Tort Law; Quality Control

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# CONSCIENTIOUS OBJECTION TO ABORTION IN MEDICAL CIVIL SERVANTS IN SPAIN: IS IT POSSIBLE?

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**Introduction:** Conscientious objection is a fundamental right and it is collected in our Spanish Constitution of 1978 (art. 16.1). In 1985 is was promulgated a law that permitted abortion in three cases, but this act was considered a crime. Our Constitucional Court in 1985 determined that objection to abortion of health workers must be protected by the State (STC 53/1985). In 2010 there has been a new regulation in Spain that considers abortion a "right" of the women and determines that it will be performed in public centers, although conscientious objection is allowed to those health workers that "directly" cooperate in its procedure. What happens if the family doctors and other medical civil servants do not want to colaborate in any way to the consecution of a termination of the pregnancy? Do they have also the right to conscientious objection? Supported by: Asociación Española de Mujeres Investigadoras y Tecnólogas (AMIT).

**Materials and Methods:** We have developed a review of the main ethical and deontological documentation about abortion and medical science, and conscientious objection. We have studied two recent court controversial decisions over the conscientious objection of family doctors in Spain.

**Results:** Our main findings show that our international deontological codes protect the embryo and human fetus as a patient. Gynaecologist, anaesthetist and nurses are the health workers that practice conscientious objection in Spain, and jurisprudence has confirmed the legality of it. Moreover, Resolution 1763 (7 October 2010) of the Parliamentary Assembly, which title is "The right to conscientious objection in lawful medical care", states that "No person, hospital or institution shall be coerced, held liable or discriminated against in any manner because of a refusal to perform, accommodate, assist or submit to an abortion, the performance of a human miscarriage, or euthanasia or any act which could cause the death of a human foetus or embryo, for any reason." There is one administrative court in Spain, Castilla La Mancha, that has allowed in September 2010 family doctors not to give information in order to develop abortion, whereas in Andalucía in April 2011 it has been forbidden. In this communication we explain the main motivations for these two opposite court decisions.

**Conclusions:** To our consideration, the state has the obligation to ensure respect for the right of freedom of thought, conscience and religion of healthcare providers, even civil servants, being directly or indirectly implicated in the abortion procedure.

**Keywords:** Conscientious Objection; Abortion; Spanish Law; Civil Servants; Termination of Pregnancy

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# THE RESEARCH OF MECHANISM OF ENSURING THE EFFECTIVENESS OF THE EXPERT CONCLUSION - THE QUALITY CONTROL OF THE PRODUCTION AND JUDICIAL APPLICATION PROCESS OF EXPERT CONCLUSION

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**Abstract:** The expert conclusion, taking a role of determining the truth of the case precisely, is one of the evidences regulated by the civil procedure of China, so the quality of the expert conclusion is very vital and the judge should take a serious and discreet attitude in admitting the expert conclusion.China has carried out a series of reforms in improving the system of the judicail expertise, management of experts, judicial proceeding in order to enhance the quality of the expert conclusion and strenghen the effectiveness of verifying the truth of the case precisely.However, during the judicial expertise procedure and the cross-examination and attestation procedure in the court which are two crucial links in deciding the effectiveness of expert conclusion, there still remains some problems such as: the scientificity of the expert conclusion influenced by the mediocrity of the expertise skill; the credibility of the expert conclusion influenced by the non-transparency of the identification process and the reasoning simplicity of the expertise report. Furthermore, the litigants' weak cross-examination about the expert conclusion and the judges' improper reliance on the expert conclusion influenced the quality of the expert conclusion. Therefore, we are making such efforts in the following aspects: Firstly, a series of measures will be taken in order to ensure the valitidy, scientificity and transparency of the production process of the expert conclusion through the recognition system of the laboratory qualification and quality system certification, the establishment of the universal system of technical standards, the mechanism of the open supervision of the identification process, the improvement of the content and form of the expertise testimony and the implementation of the regulation of the Liabilities of Illegal Adjudication of the experts etc. Secondly, a series of measures will be taken to ensure the application of scientific expert conclusion and the exclusion of the illegal and unscientific ones in the judicial practice,such as following : the technological department of the court helps the judges to verify the conclusion; the experts assistant the litigants to cross-examination and question the expert conclusion, and the judges take some trainings in the aim to improve their identifying capacity etc.

**Keywords:** Expert Conclusion; System of the Judicial Expertise; Quality System Certification

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# FORENSIC NURSE EXAMINER RESPONSE TO TORTURE: CONTEMPORARY HEALTHCARE CONCERNS AND FORENSIC RESPONSIBILITIES

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**Abstract:** Human violence is the major cause of trauma worldwide. Consequently, tragedies such as apartheid, ethnic cleansing and genocide are now viewed as a global health dilemma rather than merely a legal or moral one. Contemporary nursing professionals have been challenged to contribute their skills to health and human services involving torture, sexual genocide and gender based violence with scrutiny to human rights violations. Nurses were seen as a humanitarian force as the caring role was integrated into the privations and suffering of military conflict. As nursing becomes more complex the depth of the ethical framework reflects this commitment to human rights. This complexity is reflected in the forensic education and expertise attained in specialty of forensic nursing science through the role of the forensic nurse examiner (FNE). Due to the caustic consequences of intentional violence inflicted by government agents involving rape and revolution, atrocities that stem from socio-cultural degradations and political aggression greater forensic expertise is essential to combat violations of individual human rights. From a human rights perspective, 3 elements of nursing ethics assume a high priority: commitment to patient care and respecting the patient's dignity; avoidance of doing harm; and commitment to non-discrimination. The International Council of Nurses (ICN) enshrines these imperatives within their codes of ethics and policy statements. The primary responsibility of the FNE is to identify trauma, accurately document findings, recover evidence, report to the legal authority and testify in court These skills are primarily applied in the assessment and documentation of trauma and recovery of evidence from blunt and sharp injury, human bitemarks, best specimen collection of biological fluids and trace particles, association of gunshot wounds with extent of internal damange, patterned injury related to type of weapon, and proper forensic documentation. The FNE is trained in court room textimony and may be qualified as an expert witness based on education, experience, qualifications, publications, and organizational membership. A professional partnership is maintained with the forensic physician known as a Forensic Medical Examiner (FME) or Forensic Medical Officer (FMO). Considering the paucity of forensic clinicians throughout the world, and the insufficient education of many, it stands to reason that the opportunity for the emerging role of the forensic nurse examiner will help provide the forensic expertise historically absent in most of the world. As a result, nurses from many countries have assisted organizations such Amnesty Iinternational, Physicians for Human Rights, the International Association of Forensic Nurses and the Indo Pacific Academy of Forensic Nursing Science in opposing torture. Forensic nurse examiners are vital to help ensure a scientific investigation, examine victims of torture or fatal injuries in custody, and documentation of other medicolegal trauma. In a milieu of militarism, racism, and a massive migration of refugees, FNEs can and are providing clinical forensic evaluations, help document crimes against humanity, identification of human remains in cases of armed conflict, and examination of victims of sexual violence or sexual torture in living and deceased individuals. Opportunities for forensic nurses reduce and prevent human rights violations are further identified by the ICN in The Nurse's Role in the Care of Prisoners and Detainees, which states that: "Nurses who have knowledge of ill-treatment of detainees and prisoners must take appropriate action to safeguard their rights". Incalculable responsibilities to identify and document cases of torture exist, specifically in military nurse corps. Abuses that occurred in Abu Ghraib prison in Iraq and Guantánamo Bay naval base in Cuba hav

**Keywords:** Forensic Nurse Examiner; Human Rights; Sexual Violence; Torture; Death Investigation; Global Health

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# ANALOGUES OF ILLICIT DRUGS - A NEW GLOBAL CHALLANGE

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**Introduction:** Although the phenomenon of marketing the analogues of illegal substances created to get around existing anti-drug laws is known for more than 20 years, it seems to increase at an unprecedented speed in recent years. This is connected with the development of worldwide trade market leading to improvement of goods transport and easier availability of cheap chemicals for synthesis. The increased use of the Internet for aggressive marketing and selling new drugs have led to enormous popularity of legal highs in many countries around the world, including Europe (mainly Poland, the Great Britain, Germany), the United States, Japan and Australia. The aim of the study was to identify the active ingredients of legal highs preparations and to analyze how the grey market has reacted to control measures.

**Materials and Methods:** More than 650 different preparations were analyzed in the Institute of Forensic Research, Krakow, Poland, in 2008 - April 2011 period. Nearly half of them were herbal preparations, whereas the remaining were in a form of powders, tablets and capsules. A variety of analytical methods, including GC-MS, LC-QTOF/MS, NMR, HPLC/DAD and FT-IR, were applied in order to identify the ingredients unequivocally. Samples were usually prepared by homogenization and dissolution in an appropriate organic solvent (methanol, acetone, chloroform) or ultrasonic-assisted extraction with ethanol (herbal materials).

**Results:** In the first period (before 8 May 2009), benzylpiperazine (BZP) and other piperazines (TFMPP, mCPP, MeOPP, pFPP) were the most popular components of legal highs. Two psychoactive herbs, Salvia divinorium and Kratom, were also identified. JWH-018 and CP 47,497 were detected in herbal highs. After the first amendment of anti-drug law in Poland banning possession of BZP, JWH-018 and 16 psychoactive plants, the market moved to cathinones, mainly mephedrone, but still piperazines were identified. JWH-018 was replaced by its analogues, JWH-073, JWH-081, JWH-250, JWH-251 and CRA13. The second amendment, which entered into force on 25 August 2010, banned mephedrone and 9 synthetic cannabinoids. In a meantime a vast variety of new substances were marketed, mostly cathinones (methylone, butylone, 4-MEC, buphedrone, pentedrone, pentylone, flephedrone, naphyrone, MDPV, MDPBP, MPBP, BMDP, MPPP), phenethylamines (M-Alpha, 2C-E, fluoroamphetamine) and other cannabinoids (e.g. AM-694, JWH-007, JWH-019, JWH-122, JWH-210, RCS-4). Therefore, by the Decision of Chief Sanitary Inspector dated on 2 October 2010, nearly 1400 stationary shops were closed and the sell or marketing new drugs substitutes was banned. As a consequence of the studies, more than 20 substances were added to the list of illicit drugs. But the problems was not completely solved and nowadays the preparations are ordered via Internet and delivered from the Czech Republic and other countries. New drugs analogues are still marketed, including analogues of cocaine such as dimethocaine and pFBT (3-(p-fluorobenzoyloxy)tropane), and phencyclidine such as methoxetamine. What is more, banned drugs have been found in many investigated preparations, causing possible problems to the purchasers.

**Conclusions:** The study revealed vast variability of novel substances sold via Internet. The market is flexible, and reacts quickly to different actions circumvent to tackle the problem of legal sale of psychoactive substances. It clearly indicate that new global approach to control of drugs of abuse is required and the analogue or generic law systems respond better to this challenge.

**Keywords:** Legal Highs; Designer Drugs; Illicit Drugs; Drug Analogues

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# FATAL DIFENACOUM POISONING: AUTOPTIC AND TOXICOLOGIC FINDINGS

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**Introduction:** Anticoagulant pesticides are widely used in agricultural and urban rodent control. The emergence of warfarin-resistant strains of rats led to the introduction of second generation long-acting "superwarfarins" rodenticides, as Brodifacoum, Bromadiolone, Difenacoum, Flocoumafen and Difethialone. At present, most of the cases reported in the literature deal with pediatric acute poisoning by ingestion of small amounts, or chronic intoxication due to surreptitious intake of large quantities by adults. Occupational exposure has also been reported. In a forensic setting, suicides due to oral ingestion have occasionally been described, while no fatal poisoning by intravenous injection has ever been reported.

**Case Report:** A 33 years old male, with personality disorder and severe history of alcohol and multiple drug dependence entered ER with sialorrhea, sweating, tachycardia, hypertension, and miosis. Circumstances indicated recent intravenous intake of rodenticides, and paraphernalia were also detected inside his car compartment. Clinical course showed gastrointestinal bleeding, hematuria, shock and multiorgan failure unresponsive to intensive care life support and vitamin K administration. Death occurred 31 hours after hospital admission.

**Methods:** Forensic autopsy was performed 35 hours after death, and toxicological analyses were carried out on blood and urine samples coming from ER, and postmortem specimens (blood, vitreous humor, bile, liver, spleen and brain). Paraphernalia (cup with blue and brown powder mixed with other fluid compounds) were also examined. General unknown toxicological screening was performed and the more common first and second generation anticoagulants were searched in non-biological samples, and both in "in vivo" and in "post mortem" specimens. Methods based on Ultra High Performance Liquid Chromatography, Ultra High Resolution/High Accuracy Mass Spectrometry (U-HPLC/HR-MS) were applied.

**Results:** Autopsy showed: cutaneous emorrhages in the sites of injection; widespread visceral petechiae; emothorax; signs of gastrointestinal and upper respiratory tract bleeding; pulmonary and cerebral edema; epatic cirrhosis and splenomegaly. At histology: active hepatitis and acute centrilobular necrosis; acute tubular necrosis; multivisceral emorrhages (lungs, liver, spleen, adrenals, and thyroid). Toxicology revealed: a) presence of Difenacoum in the cup mixture and in vital urine; no Difenacoum or other rodenticides were detected, neither "in vivo" nor in "post mortem" samples; b) absence of drugs of abuse and other xenobiotics of pharmaco-toxicological interest in all samples, except for Diazepam, Lormetazepam, Lormetazepam glucuronide, Furosemide Droperidol and Lidocaine in vital blood and urine.

**Discussion and Conclusions:** In the described case death was referable to acute multiorgan failure in the context of an acute hemorrhagic disease due to Difenacoum intake. Autoptical and circumstantial data were strongly suggesting intravenous intake of Difenacoum by the subject. Any

**Keywords:** Rodenticides; Superwarfarins; Difenacoum

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# THE PHYSICAL AND CHEMICAL FEATURES OF INGESTED NARCOTIC-CONTAINING FOREIGN BODIES: STUDY PROTOCOL

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**Introduction:** In Paris, the frequency of toxic and surgical complications after ingestion of drug packets, notably cocaine packets, has risen since October 2009. This increase of the life-threatening risks run by body-packers is probably related to changes in drug packaging, which is why we propose to study the physical and chemical characteristics of both packet content and packet packaging.

**Materials:** 1-2cm fragments of the outer packaging of narcotic-containing packets (cocaine, cannabis, opiates, and amphetamines) ingested by body-packers examined at the Hôtel-Dieu hospital UMJTr. Note between October 1st 2011 and September 30th 2016. The study material will include three types of packet: first and last defecated packets, vomited packets, first and last packets to be extracted by surgery.

**Methods:** • Physical and chemical analysis of packet outer packaging • Chemical analysis of packets content retrieved from the forensic science laboratory. Study variables include the time from packet ingestion to packet sampling, the characteristics of packaging layers, porosity, the nature of the narcotic substance carried and cutting agents. Statistical analysis Comparison of physical and chemical narcotic packet characteristics associated with a given complication will be made using the ?² test or, if need be, Pearson's test. All analyses will be performed using the STATA 11.0/SE (College Station, TX) software.

**Comments:** As the narcotic packets are neither health-related products, nor human-derived products, their packaging can be studied without requesting the body packer's consent. The physical and chemical composition of their outer packaging makes an interesting study endpoint, particularly since it is a well established risk factor for toxic complications. The packet samples will be labelled anonymously. Given that these packets are legal exhibits, their custody and the use of destructive testing techniques will require prior judicial authorization.

**Keywords:** Body Packers; Drug Packets; Outer Packaging Specifications

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# HAIR AS A SPECIMEN TO DOCUMENT TETRAMETHYLENE DISULFOTETRAMINE EXPOSURE

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**Introduction:** Tetramethylene disulfotetramine (tetramine) is a rodenticide that has been banned for many years in China, but is still in use in certain areas, especially in the countryside. Since 2005, inhabitants of a village in the Henan Province have been suffering from grand mal seizures. To investigate the possibility of tetramine as the cause, we developed a method to determine tetramine in human hair.

**Methods:** Sample preparation involved external decontamination, frozen pulverisation and ultrasonication in 2 ml ethyl acetate in the presence of cocaine-d3 as an internal standard. The method exhibited good linearity; calibration curve was linear over a range of 0.1-20 ng/mg hair. The limit of detection for the assay was 0.05 ng/mg hair. Hair specimens were collected from villagers in the village.

**Results:** Except for one subject No. 4, all head and pubic hair samples were positive for tetramine. The concentrations of tetramine in pubic hair were significantly higher than those in the same subjects' head hair samples.

**Final Comments:** Tetramine has a cyclical or ring-like molecular structure and is lipophilic enough to penetrate membranes and diffuse from blood capillaries into growing cells between the matrix cells and end of the end of the keratinization zone of the hair follicle. Tetramine can also be deposited into hair by diffusion from sweat or sebum secretions into the completed hair shaft. Tetramine is stable in a wide variety of matrices and is not easily degraded. Once incorporated into hair, concentrations of tetramine declined slowly along the hair shaft. Because of a long retention in body, segmental head hair analysis cannot provide an accurate exposure history of tetramine in the body.

**Keywords:** Forensic Toxicology; Tetramethylene Disulfotetramine; Hair; GC-MS; Exposure

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5

# ENVIRONMENTAL MODELLING OF METHYLAMPHETAMINE WASTE

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**Abstract:** The clandestine manufacture of methylamphetamine has been detected in over 60 countries worldwide. Methylamphetamine can be manufactured easily using a variety of common household chemicals and several different methods, or routes. Information on how to synthesize methylamphetamine is readily available on the Internet, publically accessible scientific journals, chemical patents and published books. The illicit manufacture of methylamphetamine produces a substantial amount of toxic waste. This waste is often dumped illegally, creating a source of environmental pollution. Environmental crime is perceived by criminals as low risk, high profit crime due to low detection and prosecution rates. In 2004, the European Commission put into place a directive (2004/35/CE) aimed at punishing polluters financially. This directive came into force by member states in 2007 and promotes the "polluters pay" principle. By determining the fate of methylamphetamine waste products, detection of pollution will be feasible. It is important to understand the partitioning behavior of the waste in order to ensure samples are collected from the appropriate environmental compartment (air, water, soil and sediment). Additionally, knowledge of how long the waste will persist in the environment will give information as to the age of a dumpsite, and whether or not waste can be detected. Using the principles of environmental science and justice, clandestine chemists can be prosecuted to the fullest extent of the law. While much work has been completed investigating the reaction impurities of clandestine methylamphetamine manufacture, little research has been conducted into profiling the waste. In this work, we present data on the environmental fate and distribution of methylamphetamine waste. Components of the waste were identified using gas chromatography-mass spectrometry and subsequently input to a computer modelling programme. A fugacity model was produced using the United States Environmental Protection Agency's computer modelling programme, EPISuite. A fugacity model calculates the tendency of a compound to partition into each environmental compartment at equilibrium. In order to improve on the default model, which uses inherent chemical and physical properties, a more accurate model can be obtained by measuring experimentally the partition coefficients Kd, Koc and Kow. This allows a site-specific model to be developed using the sediment-water partition coefficient and the octanol-water partition coefficient and other parameters that affect those values. This will aid in the understanding of the behavior of methylamphetamine waste in the environment and will provide information for the investigation of a suspected dumpsite.

**Keywords:** Environmental Forensics; Clandestine Drug Lab; Episuite; Environmental Modelling; Emerging Pollutant

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# ORAL SESSION

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1

# VIRTUAL ANTHROPOLOGY: ADVANTAGES AND LIMITATIONS OF MULTI-DETECTOR COMPUTED TOMOGRAPHY AND DEVELOPMENT OF ADEQUATE PROTOCOLS FOR DATA ACQUISITION

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**Abstract:** The University Center of Legal Medicine in Lausanne has started a project for developing a forensic-anthropological data base of "virtual skeletons". Therefore we have conducted three studies concerning the improvement of technical requirements for bones scanned by multi-detector computed tomography (MDCT). Study I deals with the comparison of the surface of real bones versus the one of virtual bones. The purpose was to detect the limits in applying anthropological methods on virtual skeletons as well as to test scanning parameters. The results indicate both, on the one hand an inevitable development of a special scanning protocol for dry bones and on the other hand modifications of classical anthropological methods for using the reconstructed surface of virtual bones. The aim of Study II was to compare the performance of MDCT with the golden standard (conventional X-rays) for its use in investigating the trabecular structure of long bones as well as in taking metrical data. At the same time, we wanted to test the reliability of the applied methods and their validity for MDCT data. This study outlines the limitations and the advantages of MDCT images for using age estimation methods based on trabecular structure. The tested methods showed a comparable validity for conventional X-ray and MDCT. While measurements present a high reliability, the application of the method for age estimation depends on the experience of the observer. In Study III a protocol for MDCT acquisition of bones in-situ and bones ex-situ has been developed to fulfil the technical requirements for a database of virtual skeletons. We learned that the 3D-reconstruction of the surface depends on its surrounding medium. With bones in-situ, artefacts caused by the surrounding tissue have to be avoided, while interferences with dry bones can be reduced by the help of a copper cylinder. Therefore, different scanning protocols are essential for both, bones in-situ and bones ex-situ. Our presentation will discuss the entire results and will show the advantages and limitations of bone imaging by MDCT.

**Keywords:** Virtual Anthropology; MDCT; Scanning Protocol; Bone Imaging

2

# SKELETAL PRESERVATION AND TIME SINCE DEATH IN A NEW PORTUGUESE IDENTIFIED SKELETAL COLLECTION (CEI/XXI)

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**Introduction:** After attending this presentation, attendees will be presented with a new Portuguese identified skeletal collection (CEI/XXI) from a public cemetery that provide the opportunity to analyze skeletal preservation and this relation with time since death, burial time, age at death and sex of the individuals. This presentation will impact the forensic science community by presenting for the first time the observed stages of skeletal preservation for a specific burial condition in Portugal. A taphonomic approach by means of analyzing cadaveric stages and skeletal preservation is of paramount importance in several fields. In Forensic Anthropology, recognize cadaveric changes and skeletal preservation is important both for time since death estimation, to better understanding of influence of the context and the relation between ante, peri and post mortem events, and also to identified pseudopathologies. The knowledge of decomposition process, of its timing and variability, is also relevant in public cemeteries management in countries like Portugal, whose cemeteries are overflowing.

**Materials:** A Portuguese identified skeletal collection from Santarem's public cemetery was studied. This new collection is housed in Life Sciences Department (University of Coimbra) and is composed by 77 individuals. For the present study 7 individuals were excluded because those skeletal remains were cleaning by cemetery's staff before our analysis. Our sample is composed by skeletal remains of 70 individuals of both sex (38 males and 32 females) and age at death between 33 and 97 years (84.3% died with more than 60 years). Date of decease (between 1995 and 2001), date of inhumation and date of exhumation (between 1999 and 2007) are known.

**Methods:** The skeletal remains arrived to Life Science Department in plastic bags labeled with the serial number, individual's name, grave number, and exhumation date. Inside the bag, beside the skeleton not cleaned, hair, nails, dry soft tissues, clothes (socks were very common), pace-markers, portions of coffin wood, and grave sediment are also present. All of the bag content was observed and photographed. Individual form was elaborated in order to record individual data and skeletal preservation. Skulls and femurs were weighing. Skeletal preservation was both recorded by means of a skeleton drawing and by scoring different portions of skeleton and bones. A "general preservation index" (GPI), with 6 scores, was developed.

**Results:** The time since death range between 92 and 184 months. The majority of the individuals had been buried around 6 years. Regarding the presence of soft tissues, these were generally remains of adipocere and also mummified remains of ligaments, which are preserved mostly in the posterior region of the vertebrae and sacrum, in the areas of muscle insertion of coxal bone, and the in posterior region of the femur. Inside the skull was also common to find, mixed with sediments, dry remains of the brain in the form of a hard and dry mass of dark gray color. Skeletal preservation is generally quite reasonable, with a few pieces of bone missing, and with most types of bones with a percentage of "complete" higher than "fragmented", except for the ribs, coxae bones and scapulae. The majority of the individuals show a good or a reasonable GPI, 20% a weak GPI and 4.3 an excellent GPI. None of the skeletons show the two inferior scores of GPI. No relation was found between skull or femur weight and the fowling variables: GPI, time since death, burial time, age at death or sex.

**Conclusions:** With this research we expect understand the relation between skeletal preservation and the fowling variables: time since death, burial time, age at death and sex of the individuals.

**Keywords:** Taphonomy; Time Since Death; Portuguese Identified Skeletal Collection

3

# THE TAPHONOMIC STUDY OF LIME BURIALS: DETECTING LIMED AND UNLIMED GRAVES WITH GROUND-PENETRATING RADAR

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**Abstract:** Lime has been evidenced in Roman and early Christian burials, in medieval burials, in post-medieval burials and during modern times in mass graves or clandestine graves. The custom of burial in lime is interpreted as a preservation rite for physical resurrection in early Christianity, linked to disposal practices associated with safeguarding against disease and contagion but also associated with criminality. It is a commonly held belief that lime can be used to enhance the speed of decay, to reduce the likelihood of detecting a body, to destroy evidence and that lime will lead to the rapid and total destruction of human remains. However, contrary to popular belief, burials subject to liming show that lime retards the rate of decomposition. It is clear that the effects of lime on the decomposition of human remains are poorly understood with the available information rather limited and often conflicting. Research is ongoing at the University of Bradford into the effects of hydrated lime and quicklime on the decay of human remains and the associated micro-environment. The study here presented will discuss and interpret GPR monitoring of experimental limed and unlimed burials in Belgium in combination with a geophysical survey of the historic graveyard of the High Royds Psychiatric Hospital in Menston, UK. Preliminary results indicate that limed graves act as stronger reflectors than unlimed graves. We will be showing the results of a GPR survey on limed experimental burials 3 months, 6 months, 15 months and 40 months post-burial in relation to the geophysical survey in Menston. This cemetery is the resting place for over 2800 unclaimed patients buried between 1888 and 1969. Historical evidence suggests that lime was applied to the graves. This study will demonstrate how controlled research involving experimental burials is a necessity to understand taphonomy and grave characteristics, and how it can help with the interpretation of geophysical and historical evidence. Knowledge of the effects of lime on decomposition processes has bearing on practices involving burial of animal carcasses and potentially the management of mass graves and mass disasters by humanitarian organisations and DVI teams.

**Keywords:** Taphonomy; Ground-Penetrating Radar (GPR); Lime; Pig Cadavers; Differential Decomposition; Cemetery

4

# MICROSCOPIC AGE CHANGES IN THE HUMAN CLAVICLE

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**Abstract:** The studies results identified microscopic analysis of the ground preparations of the clavicle body as the procedure to estimate the age of human remains. Analysis of microscopic patterns in ground preparations of left clavicles originating from 64 dead bodies demonstrated that in the entire group and for either gender the best predictors of the remains age using univariate linear regression function involved the mean diameter of the Haversian canal, number of osteons with Haversian canal of >70µm in diameter, ratio of the number of osteons with Haversian canal of >70µm in diameter to the total number of osteons, the fraction of the ground surface occupied by interstitial lamellae and the surface fraction occupied by fragments and the remains of transformed osteons. The complex results obtained by the microscopic analysis of the left clavicle bone and comprising the above listed measurable parameters allowed one to appraise the age of the remains using the suggested equations of linear univariate regression (age = ß0 + ßX + e). The results demonstrated that the highest correlation coefficient (reaching almost 82%) was obtained using the mean diameter of Haversian canals. For even more accurate results it proved to be advantageous to use the suggested extended equations of linear multivariate linear regression (age = ß0 + ß1X1 + ß2X2 + …+ ßiXi + e), since in prediction of age using all statistically significant parameters the corrected coefficient if multivariate determination proved to be very high, reached even 95.5% accuracy.

**Keywords:** Age Estimation; Clavicle; Microscopic Patterns

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# JUVENILE FACES AS SUITABLE AGE INDICATORS IN CHILD PORNOGRAPHY CASES? ACCURACY AND APPLICABILITY OF A MORPHOLOGICAL, METRIC AND AUTOMATED APPROACH

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**Introduction:** In cases of suspected child pornography the age of the victim(s) represents a crucial factor for legal prosecution of the offenders. However, conventional methods, such as evaluation of the developmental status of secondary sexual characteristics provide unreliable age estimates, particularly if teenage victims are concerned. In this paper, the potential of age estimation based on images of juvenile faces is explored.

**Methods:** A morphological, a metric and a software-based automated approach for estimating age on facial images are tested with regard to their accuracy and applicability. To test the morphological approach frontal facial images of 50 females aged 10-19 years were presented for age estimation to experts and non-experts, and were also analysed by the software. The accuracy of the estimates was established by calculation of the mean absolute error (MAE) between the estimates and the real ages of the portrayed females. In a pilot study concerning the metric approach, age-specific indices were identified on a sample of frontal and lateral facial images of 353 females and 20 males from four age groups (6, 10, 14 and 18 years). All images used in this study were collected in Germany, Italy and Lithuania during the implementation of the EU-funded international projects STOPII and AGIS 2005.

**Results:** The software achieved the lowest MAE (1.47 years) for the 50 test images. Decreased image quality had no significant impact on the performance and classification results. The experts delivered slightly less accurate mean estimates (1.63 years) than the software. Throughout the tested age range from 10 to 19 years both the morphological and the automated approach led to reliable age estimates within the limits of natural biological variability. The additional advantage of the software is its ability to rapidly scan through large numbers of images. For the metric approach, discriminant analysis showed that by using age-specific indices 60.3 % of the facial images were correctly classified into the respective age group. The percentage of correctly classified cases for respective country samples was as follows: 69.9 % for Germany, 69.4 % for Lithuania, and 80.5 % for Italy.

**Conclusions:** The morphological and metric analyses of the face produce reasonably accurate age estimates up to the age of 18 years, which is the legally relevant age threshold for victims in cases of juvenile pornography. Therefore, these approaches can be applied in conjunction with conventional methods for age estimation of children and juveniles depicted on images and videos. Nonetheless, more work needs to be done in order to verify the reliability of these findings on larger samples. The ability of the automated procedure to perform a rapid and successful search for juvenile faces will be particularly beneficial in cases, in which large numbers of images need to be viewed and analysed.

**Keywords:** Age Estimation; Children; Face Growth; Images; Europe

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1

# DEFYING GEOGRAPHIC PROFILING: A CASE STUDY IN POACHING BEHAVIOR

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**Abstract:** Geographic profiling, as developed by D. Kim Rossmo (1997, 2000), is based on Brantingham and Brantingham's Crime Pattern Theory (1984, 1991), but applies it in the opposite direction than was originally intended: rather than predicting crime locations from suspects home or workplace, it predicts the suspect's home or workplace from known crime locations. It is an appropriate and useful complement to criminal investigations when there is a series of crimes and traditional investigative techniques have not proven useful. The geoprofile is based on existing reports (investigation reports, autopsy reports, and, if available, psychological profiles) and on the analysis of the crime scene, crime-related locations, the neighborhoods' criminal statistics and demographics, the street layout, zoning, and main arteries. The use of geographic profiling is, however, subject to a number of conditions: most importantly, it should not be used, as it will perform poorly, on Poachers. In his hunting typology, Rossmo (2000, p. 139-140) describes a Poacher as a predatory offender who "sets out specifically to search for a victim, basing the search from an activity site other than his or her residence, or who commutes or travels to another city during the victim search process." The challenge for investigators lies, therefore, in the timely identification of reliable indicators of the offender being a Poacher. As an example of such indicators, it is widely accepted that it is reasonable to assume the offender is a Poacher when the crimes occur in a very small area, when there is a specific but rare target type, or a patchy target backcloth, or when spatial displacement has occurred (as a result of increased police presence or target hardening in the offender's neighborhood). Poaching is also suggested by previous experience with local crime patterns. This case study aims at illustrating the predatory behavior of a Portuguese serial rapist, whose uncommon geographic behavior and decision-making make him a prime example of Rossmo's Poacher type. By operating in several different, yet very small areas, and alternating crime locations while maintaining the exact same modus operandi throughout his series, this offender constitutes not only a unique case study in Poaching behavior, but also in spatial displacement, two of the most relevant challenges in the use of Geographic Profiling.

**Keywords:** Geographic Profiling; Hunting Behavior; Poaching; Spatial Displacement

2

# ENVIRONMENTAL AND GEOGRAPHIC INFLUENCES ON TARGET SELECTION PATTERNS IN RAPE

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**Abstract:** Both theoretical and empirical studies of decision making in target selection have shown that this process is highly dependent on the physical environment. However, research specifically investigating decision-making in sex offenders' target selection is scarce. The aims of the current study were to (1) identify target selection patterns in a mixed sample of 78 Canadian and Portuguese adult rapists, (2) investigate how geographical decision-making influences target selection patterns, and (3) test the influence of the type of environment on target selection patterns. The results indicate that Canadian and Portuguese rapists exhibit different target selection patterns but that their geographical decision-making is congruent and consistent with the environment within which they operate.

**Keywords:** Target Selection; Geographic Decision-Making; Rape; Environment; Urban Planning

3

# ANALYSIS OF DEMOGRAPHIC AND CRIMINOLOGICAL CHARACTERISTICS OF CHILDREN IN CONFLICT WITH LAW AND VICTIM CHILDREN

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**Abstract:** Istanbul is the largest and the most crowded city in Turkey with 18% (13.255.685 person) population. According the data of 2010-2011, the number of children under 18 age is 31, 7% (4.196.986). 48, 5% (2.034.957) of them are female, 51, 5% (2.162.029) of them are male. 7 age and above of these children are in educational system. There are varied approaches on defining child concept and childhood cycle in literature. The United Nations Convention on the Rights of the Child defines a child as "a human being below the age of 18 years unless under the applicable law to the child, majority is attained earlier. Cycle of childhood encloses dynamic and active process. In this period, children can tend to criminal behavior because of individual (mental and developmental deficiency) and environmental (structure of family and structure of morality, emigration, economical and social alternations) factors. This case imply (is defined as) child crime. The most important feature differentiates child crime and adult crime is adolescence, which is called problematic and transition phase (period), coincides with childhood. Committing crime of children as forensic in Turkey is defined as the crime actions of children between 12-18.The victim children is defined in Turkish Criminal Code and Code of Criminal Procedure as child who subjected to crime. Juvenile Police is an employee of Turkish National Police who is trained on developmental characteristics, communication skills. Interview techniques and behavior forms of 12-18 age range children. The purpose of this paper is to analyze demographic and criminal features of children, who came and made come to Turkish National Police Istanbul Juvenile Police Division. The files of children who came and made come to Istanbul Juvenile Police Division between the dates 01/01/2010 to 01/01/2011 were analyzed. These children's identities were kept secret. Social demographic features like age, gender, and educational level, and family structure, cause of coming, region, and former criminal cases were analyzed. 29866 children came to Juvenile Police Division between the dates 01/01/2010 - 01/01/2011. 16.13% (4819) of them are female, 83.86% (25047) of them are male. 77.19% (23055) of them are children in conflict law and 22.80% (6811) of them are victim children. The result of these data, it is tried to bring new offers to Juvenile Police Division to work more efficiently about children crime system and to bring new ideas and offers to Istanbul Juvenile Police Division operational process in accordance with children's benefit.

**Keywords:** Children in Conflict with Law; Victim; Juvenile Police

4

# SELF-INJURY AND CHILDREN IN CONFLICT WITH LAW

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**Abstract:** Self-injury is defined as deliberate harming or alteration of one's own body without consciously intending to commit suicide. Research shows that attempt to self-injury begins in adolescence starting from about 13 to 19 years. In a study carried out in Turkey, it is shown this age is from 16 to 20 years. It is reported that drug use and self-injury are found more frequently in the same individual. Of these who harmed themselves, about 90% have used drugs and 71% are addicted. In Turkey psychiatric, socio-demographic and personality characteristics of children who have been in conflict with law have been analyzed. Yet their behavior involving self-injury has not been analyzed. The purpose of this paper is to compare children with self-injuries with those who have not had self-injuries. Factors included in the comparison are demography, drug use, number of siblings they live with, place of residence, form of crime, immigration, and educational status. The sample consisted of 105 children with an age range of 10 to 18 years, who all had conflicts with the legal system between the years from 2009 to 2011 and made to come court. They were confidentially interviewed by a psychologist in relation to the background of their involvement with the crime. In this study sections of these reports were analyzed. The number of children that involved study was 105, of all children 88 (83.8%) were males and 17 (16.2%) was females. Males (30) and females (11) reported that they had experienced self-injury. Age average for females was 14.94 years and for males 15.63 years. In females who had experienced self-injury, the average age was 14.7 years. In males this number was 15.7 years. The most common forms of self-injury were cutting (52.23%) (as by glass, knife, razor blade), hair plucking (14.92%), biting (13.43%), hitting himself (10.44%), and hindering of self wound healing (8.95%). Because of the similarity in the socio-economic levels this aspect of the subjects could not be compared with self-injury cases. As determined from reports most subjects belong to a low socio-economic level. The probability of self-injury in children with legal problems was high with drug use, type of crime, and place of residence. Yet this observation was similar to those found in the literature. The relationship between gender and self-injury was not found similar to previous studies. . The number of females committing crime was less than those of males and this could bring out the difference.

**Keywords:** Self-Injury; Children; Crime

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5

# OFFENCE BEHAVIOURS AS PREDICTORS OF OFFENDER CHARACTERISTICS IN SEX OFFENDERS

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**Abstract:** Criminal Profiling (CP) is an investigative tool used to assist with suspect prioritization in criminal investigations by providing a profile of offender characteristics that can be used to select a number of viable suspects from a large potential suspect pool. CP is used despite lacking empirical support. Profilers claim to predict the background characteristics of an offender, based solely on his or her behaviour during the commission of one or more crimes. Thus, logically, a necessary condition of CP is the existence of relationships between offence behaviours and offender characteristics. We argue that it needs to be established through attempts to identify groups of offenders that are different with respect to offence behaviours and offender characteristics. In the current study, an attempt was made to derive a taxonomy that classified the population of male Portuguese incarcerated sex offenders into groups that are different with respect to offence behaviours and offender characteristics. The participants in this study were 216 male Portuguese incarcerated offenders, convicted for sexual offenses involving direct physical contact with their victims. Data were gathered using an instrument built to collect information from the participants' institutional records and guide in-depth, semi-structured interviews with offenders. In case of any discrepancies between the offender's account and the institutional records, information from the institutional records was used. The variables that were coded were divided into two sets, the first set consisting of 156 offence behaviour variables (the kind of information that would be available for profile generation), such as: victim selection (child versus adult), approach strategy, weapon use, and levels of coercion and injury inflicted on the victim, and the second, 45 offender characteristics variables (the kind of information that should be contained in a profile), such as: age, employment status, criminal record and psychiatric/psychological problems. Initially, a Categorical Principal Component Analysis (CATPCA) was applied to the 156 offence behaviour variables to reduce their dimensionality to the number of dimensions that accounted for 90% of the variability in the data. The resulting principal component variables were retained for input into a Hierarchical Cluster Analysis (HCA). The type of HCA used was Ward's method; the optimal number of clusters was selected by inspecting the dendrogram. Finally, each cluster was described in terms of the offence behaviour and offender characteristics variables. Thus, in this study, a sex offender taxonomy that supports the necessary condition of CP identified, namely the existence of relationships between offence behaviours and offender characteristics, has been derived. Although this finding is preliminary, it suggests that the necessary condition of CP identified is in place in Portugal and paves the way for replications of this finding and further CP research.

**Keywords:** Sex Offenders; Criminal Profiling; Offence Behaviours; Offender Characteristics; Offender Taxonomy

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1

# ASSESSMENT OF ENDOGAMY AND CONSANGUINITY EFFECT ON Y-STR PROFILES AND ESTABLISHMENT OF Y-CHROMOSOME STR FREQUENCIES IN THE LEBANESE POPULATION

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**Introduction:** Y-STR analysis complements the robust autosomal STR markers used in forensic, paternity and human identification testing. It would be informative to assess the probability of occurrence of the Y-STR haplotype in the Lebanese population where consanguinity and endogamous rates are 41% and 88% respectively. The present study aims to evaluate the discrimination power of Y-STR haplotypes in this population. Remedial procedures and recommendations would be established.

**Materials and Methods:** Two multiplex kits were used: Y-Filer® (Applied Biosystems) and an in-house Y-Profile having an ultra high discriminatory multiplex of 14 loci: DYS444, DYS446, DYS449, DYS459, DYS481, DYS508, DYS522, DYS527, DYS549, DYS552, DYS570, DYS576, DYS607 and DYS627. Males were randomly sampled from four different villages with high consanguinity and endogamous practices: villages A, B, C and D with 6011, 1406, 15318 and 3774 inhabitants respectively. 12, 20, 22, and 45 male samples were collected randomly from villages A, B, C and D respectively.

**Results:** In village A (12 samples), two Y-STR haplotypes differing in only one allele, were observed. In village B (20 samples), 4 different haplotypes were observed. Unrelated individuals carrying the same family name showed the same haplotype. Most importantly, this haplotype is also common among males carrying different family names. It should be noted that children receive only their father's family name in the Lebanese society. Samples of villages C and D are under study.

**Conclusions:** The preliminary results showed that there is a high rate of Y-STR profile match among unrelated individuals belonging to the same village that is showing high rate of endogamy. Taking into consideration the fact that the Lebanese population in general has a high level of consanguinity and endogamy, it would be important to establish the allele and haplotype frequencies in the Lebanese population. 500 unrelated males representative of the Lebanese population have already been sampled and Y-STR profiling is ongoing in our laboratories.

**Keywords:** Y-STR; Haplotype; Consanguinity; Endogamy; Allele Frequencies; Lebanese Population

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# GENETIC ANALYSIS OF 30 INDEL MARKERS FOR FORENSIC USE IN FIVE DIFFERENT CHINESE POPULATIONS

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**Abstract:** In this study, a total of 1250 samples obtained from 941 Northern Hans Chinese (549 females and 392 males) and 309 Xingjiang Uighur (231 females and 78 males) were successfully analyzed using a homemade new multiplex polymerase chain reaction (PCR) system which can analyze simultaneously 16 X-STR markers including DXS10011, DXS101, GATA165B12, DXS6795, DXS6800, DXS6801, DXS6803, DXS6808, DXS7132, DXS7133, DXS7423, DXS7424, DXS8377, DXS8378, DXS9898 and HPRTB. The allele frequencies and statistical analysis were performed using Powerstats and Arlequin software. A total of 105 alleles for all the loci were observed by this multiplex PCR system. Polymorphism information content was 0.3864-0.9004, and power of discrimination in females was 0.6317-0.9841. Hardy-Weinberg equilibrium tests demonstrated no significant deviation from expected values (P>0.05) for all of the 16 X-STR loci in Xinjiang Uighur and Northern Han population from China. There were no statistically significant differences between Xinjiang Uighur and Northern Han populations in allele distribution of the 16 X-STR loci, in line with the results of AMOVA. The results show the 16 X-STR loci in the multiplex systems may provide high polymorphism information for kinship testing.

**Keywords:** Insertion/Deletion Polymorphism (INDEL); Forensic Genetics; Allele Frequency; Population Genetics

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3

# THE NEED OF POPULATION CODIS-13 DNA DATABASE FOR PATERNITY INDEX CALCULATION: COMPARISON BETWEEN ASIAN AND INDONESIAN DATABASE

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**Abstract:** Since the recommendation CODIS-13 as the target of choice for forensic caseworks, up to now more than 300 forensic laboratories all over the world have followed the recommendation. By then, the international comparison of DNA typing are possible. One of the applications of the CODIS-13 analysis is for paternity testing. In this kind of case, the calculation of Paternity Index and Probability are important to evaluate the tightness of relationship and accuracy of the testing. In order to get the more accurate Paternity Index and Probability, the calculation need the allele frequencies recovered from the same population. In 2009 Indonesia has its own population CODIS-13 database. Before 2009, the calculation of Paternity Index in Indonesian paternity testing used the Asian STR database and since 2009 we begin to use our own DNA database. The calculation of Paternity Index on Indonesian cases by using Indonesian DNA database will be more accurate than those using Asian DNA database. Calculation the Paternity Index, by using Asian as well as Indonesian DNA database, on 10 Indonesian Paternity cases showed that the value of both Paternity Index was significantly different. This finding confirms that every population need to use their own DNA database.

**Keywords:** CODIS 13; Forensic; Paternity Index; Indonesia

4

# ASSESSMENT OF ENDOGAMY AND CONSANGUINITY EFFECT ON DNA PROFILING IN THE LEBANESE POPULATION

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**Abstract:** How strong is the evidence? The use of DNA evidence in forensic cases, alleged kinships and human identification should take into consideration the rate of genetic relatedness, endogamy and consanguinity. Eighteen religious communities constitute the Lebanese population where endogamous marriages amount to an average of 88% and that of consanguineous marriages to 42%. Ignoring these facts might introduce statistical bias and/or false inclusions. To assess the effect of genetic relatedness, we performed random sampling from four Lebanese villages with high rates of endogamy and consanguinity: villages A, B, C and D with 3774, 15,318, 1406 and 6011 inhabitants respectively. 102, 51, 36, and 21 samples were collected randomly form villages A, B, C and D respectively. Profiles were established using PowerPlex 16HS and PowerPlex ESI17 kits (Promega Corporation; Madison, WI, USA). Analysis was performed using different number of genetic systems (from 10 up to 24 STR loci). The analysis was done at three main levels: (1) Matching each profile against all other members of the same village to assess the probability of full match. Remarkable results were obtained among related individuals. For instance, two individuals shared eight out of 16 systems and seven out of the remaining eight systems were homozygous. A DNA mixture of these two individuals showed a unique profile where all systems showed one or two alleles only. This represents a challenging case in forensics or bone marrow transplantation. (2) Full and half sibling-ship studies were performed within the same village to evaluate the rate of false positive sibling-ships. 49 percent of unrelated individuals showed positive full sibling-ship when analyzed using 16 STR markers. Increasing the number of markers to 24 reduces the positive relatedness to only 12 percent. (3) Assessing the discriminating power of DNA profiles among members of the same village by performing parentage testing with members other than the biological parent. For instance, in a paternity study using 16 STR markers two unrelated individuals revealed a single mismatch, whereas three mismatches appeared with 24 STR markers. These results will be used to gauge proper corrections by mathematical procedures and to recommend appropriate profile size as to the number of genetic systems in the Lebanese populations and similar populations with endogamy or consanguinity. Increasing the number of systems per profile raises the issue of how many mismatches should be observed before concluding to exclusion. Similar recommendations were also reached by a different study conducted at our laboratory where retrospective analysis of parentage testing was performed. (See abstract entitled "Parentage testing: Are we statistically accurate? A retrospective analysis of parentage cases in the Lebanese population").

**Keywords:** Forensic Case; Kinship; Human Identification; Endogamy; Consanguinity; STR; Sibling-Ship

5

# GENETIC ANALYSIS OF 16 X-STRS LOCI IN XINJIANG UIGHUR AND NORTHERN HAN POPULATION FROM CHINA

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**Abstract:** In this study, a total of 1250 samples obtained from 941 Northern Hans Chinese (549 females and 392 males) and 309 Xingjiang Uighur (231 females and 78 males) were successfully analyzed using a homemade new multiplex polymerase chain reaction (PCR) system which can analyze simultaneously 16 X-STR markers including DXS10011, DXS101, GATA165B12, DXS6795, DXS6800, DXS6801, DXS6803, DXS6808, DXS7132, DXS7133, DXS7423, DXS7424, DXS8377, DXS8378, DXS9898 and HPRTB. The allele frequencies and statistical analysis were performed using Powerstats and Arlequin software. A total of 105 alleles for all the loci were observed by this multiplex PCR system. Polymorphism information content was 0.3864-0.9004, and power of discrimination in females was 0.6317-0.9841. Hardy-Weinberg equilibrium tests demonstrated no significant deviation from expected values (P>0.05) for all of the 16 X-STR loci in Xinjiang Uighur and Northern Han population from China. There were no statistically significant differences between Xinjiang Uighur and Northern Han populations in allele distribution of the 16 X-STR loci, in line with the results of AMOVA. The results show the 16 X-STR loci in the multiplex systems may provide high polymorphism information for kinship testing.

**Keywords:** X-STR; Multiplex PCR; Population; Northern Han; Xinjiang; Uighur

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1

# PLANE CRASH IN THE BRAZILIAN AMAZON RAINFOREST WITH 154 FATAL VICTIMS - A DISASTER VICTIM IDENTIFICATION STUDY

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**Abstract:** In September 2006 a plane crash between a Boeing 737 and a jet in the Brazilian Amazon rainforest caused 154 fatal victims. In this event, the Brazilian Air Force coordinated the operation and a Disaster Victim Identification (DVI) team from the Civil Police of Federal District was responsible for the victims' identification. The aim of this study is to show the main challenges of a disaster in the Brazilian Amazon rainforest, how to get access and transport to the rainforest incident area, the work of the forensics' team during the event, the components of the response to the disaster and how the victims' identification was performed. In this incident many variables shaped the response. The following aspects will be discussed: coordination of the DVI, geographic area of the disaster, kind and magnitude of the event, logistic, climate conditions, number of victims, condition of bodies and remains, degree of decomposition, search and rescue appropriate teams, integrated professional of forensic sciences and physical resources. Concerning victims' identification, all 154 victims were identified and fingerprinting analysis, forensic odontology, DNA analysis, forensic anthropology, personal description and medical findings played an important role which will be discussed in this study. This work will also show the process of ante mortem and post mortem data collection and sample collection for DNA testing, according to the condition of the bodies and degree of decomposition, chain of custody, DNA exams and matching. The integrated work between the Brazilian Air Force and Army, the firefighters´s rescue team, the DVI team of the Civil Police of Federal District and all professionals and agencies played a decisive role in the incident management, search and rescue and victims' identification.

**Keywords:** DVI; Disaster; Plane Crash; Rainforest; Fingerprinting; Odontology; DNA; Anthropology

2

# ARMED CONFLICT AND WATERBORNE DISEASES IN TURKEY

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**Introduction:** As a humanitarian emergency, political conflict may lead to inadequate food and shelter, unsafe water and poor sanitation. Such conditions can facilitate the transmission of communicable diseases, especially waterborne diseases. Since 1984, there has been an ongoing armed struggle in southeast Turkey. However, although terrorism is a major problem in Turkey, there is a lack of information possible health effects of terrorism. Therefore, we conducted this study to evaluate the effects of terrorism on water borne diseases such as amoebic dysentery, typhoid fever and paratyphoid fever in southeast Turkey between 1984 and 2004.

**Materials and Methods:** This is a registry based ecological study. The relationship between terrorist acts and outbreaks of waterborne diseases were assessed based on a review of time series data collected between 1984 and 2004. Time series analysis was conducted in three steps, crude numbers, incidence and relative risk.

**Results:** When the relative risks were analyzed, the risk of typhoid fever was found to be related to the population, the relative risk of terrorist acts and the relative risk of amoebic dysentery. Time series analysis of the incidence of amoebic dysentery demonstrated that there was a significant relationship between amoebic dysentery and typhoid fever. However, there were no other significant relationships observed. Finally, the time series analysis did not reveal any relationships between paratyphoid fever and any other variables.

**Discussion and Conclusions:** We found that there was a significant relationship between relative risk of typhoid fever and the risk of terrorist acts. These results suggest that there has been a deficiency in the municipal water supply system in southern Turkey. Hence, due to the persistent armed conflict that has been occurring for the last 30 years, establishing a proper water supply may not have been seen as a priority. Another indirect result of continuous armed conflict is migration. Indeed, migration has resulted in uncontrolled urbanization and population displacement in areas affected by terrorism. Previous studies have shown that uncontrolled urbanization and population displacement leads to concentrations of human populations in conditions that favour major epidemics such as urban slums. Therefore, the uncontrolled urbanization and population displacement that has occurred in southern Turkey as a result of armed conflict may also have played a role in the increased rates of typhoid fever observed in this study. Finally, our results showed that there was no significant relationship between armed conflict and amoebic dysentery or paratyphoid fever. Salmonella Typhi has some differences from Salmonella paratyphi and Entamoeba histolytica that are "water-washed diseases". So these diseases caused by the lack of adequate quantity of water for proper maintenance of personal hygiene. Hence different characteristics of Salmonella paratyphi and Entamoeba histolytica would be the cause of non significant relationship between armed conflict and these diseases. Although the major contributing factors to armed conflict are political instability and social upheaval, forensic services can play an important role in preventing them. Forensic services should be encouraged to improve its facilities in politically instable areas in especially following points: - Forensic examination standarts; Minnesota and Istanbul Protocol - Crime scene investigation - Mass disaster management

**Keywords:** Amoebic Dysentery; Conflict; Paratyphoid Fever; Terrorism; Typhoid Fever; Waterborne

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# FLOODS AND MUDSLIDES IN RIO DE JANEIRO - THE BIGGEST NATURAL DISASTER IN BRAZIL - A DISASTER VICTIM IDENTIFICATION STUDY

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**Abstract:** In January 2011 floods and mudslides in the mountainous region of the State of Rio de Janeiro caused the biggest natural disaster in Brazil, with more than 900 deaths. In this event, the Brazilian National Force of Public Safety aided the State of Rio de Janeiro and played an important role in the search and rescue and in the victims' identification, assisting the forensics and the search and rescue local teams. The Brazilian National Force of Public Safety worked in the cities of Teresopolis and Nova Friburgo, where the most important damage occurred. The aim of this study is to show the work of the forensics' team during the event, the components of the response to the disaster, how the victims' identification was performed and the main challenges of this catastrophe. In this incident many variables shaped the response. The following aspects will be discussed: coordination of the Disaster Victim Identification (DVI), geographic areas of the event, kind and magnitude of the disaster, climate conditions, number of victims, condition of bodies and remains, degree of decomposition, access and transport to the incident areas, search and rescue appropriate personnel, integrated professional of forensic sciences and physical resources. Concerning victims' identification, fingerprinting analysis, forensic odontology, DNA analysis, forensic anthropology, personal description and medical findings played an important role which will be discussed in this study. This work will also show the process of ante mortem and post mortem data collection and sample collection for DNA testing, according to the condition of the bodies and degree of decomposition. In events of this magnitude cooperation between institutions and teams is very important. The integrated work between the Brazilian National Force of Public Safety and the State of Rio de Janeiro´s teams proved decisive in the incident management, search and rescue and victims' identification.

**Keywords:** Disaster; Victim; Identification; DVI; Fingerprinting; Odontology; DNA; Floods; Mudslides

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# MEDICO-LEGAL ASPECTS OF TERRORIST SUICIDE BOMBINGS IN SRI LANKA - A REVIEW OF THREE DECADES

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**Abstract:** Suicidal bombing in strict medico-legal sense means committing suicide by causing an explosion. However suicide bombings as referred by media and public at present in relation to terrorist acts are not pure suicidal acts. They should be rephrased as suicide-homicide bombings as all such incidents have both suicidal and homicidal components in it. Terror acts have diverse manifestations and when it is associated with suicidal component its end result could be devastating. Suicide terrorism or more specifically suicide homicide bombings are an extreme manifestation of terrorism in the modern era. It is experienced in increased frequency in many countries around the globe and the threat of such bombings has forced many developed and developing countries to draft urgent strategies to counter it. As suicidal-homicidal bombing inevitably results multiple deaths some times leading to mini or major disaster situations the forensic aspects of such incidents cannot be underestimated. Sri Lanka has experienced the effects of terrorism since mid-1970s and the impact was increased over the years. Sri Lanka has been plagued by terrorism for the past 25 years. It was the Liberation Tigers of Tamil Eellam with acronym of LTTE, a tamil militant group which marked its origin in late 1970s in northern Sri Lanka that reshaped conventional warfare by introducing suicide bombers. The LTTE, which was defeated militarily in 2009, was arguably a global leader in suicide terrorism, carrying out two-thirds of the worlds suicide attacks during their operational period. Between July 1987 and February 2000, the LTTE carried out approximately 168 suicide attacks in Sri Lanka and India killing two world leaders and wounding thousands of innocent bystanders. Medico-legal investigation of bomb explosions is one of the challenging tasks of the modern day forensic pathologists. In our experience it is one of the incidents that forensic pathologists must take part in the crime scene investigation in order to resolve the major medico-legal issues related to the blast incident. A suicidal bomber presents a unique medico-legal case in each occasion as the strategies adopted by various suicidal bombers vary according to the circumstances. Professor TK Marshall was a pioneer in studying injury pattern due to explosions occurred in Ireland since seventies and he had described 6 types of injuries which could typically observe on victims subsequent to a blast. These injuries are: complete disintegration, explosive injury, masonry Injuries, injuries due to flying missiles, burns and blasts. This injury pattern was often quoted by other authors during the latter part of the twentieth century. However it is evident that clinicians more often categorized blast injuries based on body regions and the nature of the injury. In more recent forensic publications the blast injuries have been frequently categorized into primary, secondary, tertiary and quaternary groups. It should be noted that all above descriptions are related to injuries observed only on blast victims. As terrorist suicidal bombings were not commonly observed during pre-1980 era, injuries sustained by suicidal bombers themselves were not recorded in literature until recently. When the present scenarios of suicidal bombings are analyzed the terrorist suicidal bombers involved in all incidents could be categorized into two main groups. These groups are identified as suicidal bombers who have the explosives attached to the body via a special suicidal kit (strapped human bomb; person-borne bomb) and suicidal bombers who drive a vehicle packed with high explosive material (vehicular human bomb; vehicle-borne bomb). Accordingly we have identified a specific pattern of injuries on terrorist suicidal bombers involved in previous attacks over the last three decades. This paper intends to discuss medico-legal issues related to Sri Lankan suicidal bombers in detail.

**Keywords:** Terrorism; Suicide Bombing; Injury Pattern

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# THE FAITH OF LJUDEVIT JURAK (1881-1945) AND EDUARD MILOSLAVIC (1884-1952) TWO CROATIAN FORENSIC EXPERTS OF MASS GRAVES AT KATYN AND VINNITSA.

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**Abstract:** Ljudevit Jurak (1881-1945) and Eduard Mi1os1avic (1884-1952) were two eminent Croatian physicians who paved the way of the foundation of pathology and forensic medicine in Croatia. The field of pathologic anatomy in Croatia actually opened with Ljudevit Jurak's appointment as a prosector in Public Health Institutions of the city of Zagreb in 1913. Twenty-two years later, in 1935, Eduard Miloslavic founded the Department of Forensic Medicine of the Zagreb School of Medicine. Due to the fact that both were involved in the investigation of Soviet Union war crimes during World War II, their fate was not investigated during the fifty years of Communist regime it was risky even to mention their names. Consequently, references to Jurak and Miloslavic are fairly sparse, and most archive sources and documentation are unbalanced. The majority of the documentation on Jurak is missing, because his property and every trace of his existence have been carefully destroyed. Miloslavic, on the other band, lived and worked in several countries, leaving behind a larger body of documentation on which to base a study of his life and career. Several papers have been published on their lives, although their lives and careers still need searching. This presentation aims to concentrate on their role and involvement in the investigation of war crimes in Katyn and Vinnitsa during the World War II. In 1943, Miloslavic was invited as a medicolegal expert in an International Committee to investigate the massacre in the Katyn forest near Smolensk, and Jurak to investigate the mass grave in Vinnitsa near the Ukrainian river Bug. Both medicolegal investigations proved that crimes were committed by Soviets. However, Jurak and Miloslavic's part in those investigations had a dramatic impact on their future. Jurak was arrested by the Yugoslav political police in 1945, deprived of human rights, and condemned to death. To this date, his burial place is unknown. Miloslavic's fate would probably not be much different if he did not managed to escape from Yugoslavia never to came back. Those two personalities of Croatian history, because they were not prepared to settle for the falsification of history, demonstrate how professional integrity collided and was finally destroyed by a political regime. After the Second World War, the Soviet responsibility for the Katyn Massacre was either widely disbelieved or ignored, not only in Croatia. Many western journalists and scholars were unable or unwilling to report accurately on crimes of Katyn and Vinnitsa and their importance for human rights and freedoms to which all humans should be entitled.

**Keywords:** Mass Graves; War Crimes; Investigation

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# DEAD VICTIM IDENTIFICATION OF MERAPI VOLCANO ERUPTION.

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**Introduction:** Merapi volcano is located in the nothside of Yogyakarta,in the center part of Java Island , Indonesia. As one of the most active volcano in the world, regularly, Merapi erupts in about 4 years. Merapi has a characteristic eruption with danger piroclastic flows. This 2010 eruption is believed as the largest since 1855, with twice erution on 25 October and 11 November. Although the goverment had many efforts to manage the disaster, however, hundreds victims were burnt dead. In this study the author will present the management of dead victims identifiaction.

**Methods:** The data were taken from the document of body examination (until 20 December 2010) in Department of Forensic Medicine, Dr Sardjito Hospital, Yogyakarta.

**Results:** Totally we examined 234 dead victims, 115 male , 80 female, and 39 undetermined. Twenty five bodies from the first eruption, all were identified. However, for second eruption, 78 bodies of 209 were unidentified due to lack of ante mortem information.

**Keywords:** Volcano Eruption; Mass Disaster; Dead Victim; Identification

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# EMOTIONAL STRESS INDUCED CARDIAC DEATH AND ITS LEGALS IMPLICATIONS IN THE UNITED KINGDOM

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**Abstract:** Background Various terms have been used in the literature to describe the phenomenon of sudden cardiac death caused by high levels of emotional stress brought on by an altercation, be it physical or verbal. These include 'Homicide by Fright', 'Homicide by Heart Attack' and 'Scared to Death'. This review aims to bring together our medical understanding of stress and emotionally induced sudden cardiac death and frame it in the context of the current legislation around this area in the United Kingdom. Specifically we wish to assess our current understanding of what constitutes homicide where an altercation has taken place involving the defendant and the deceased. Pathophysiology The link between sudden cardiac death brought on by emotional stress elicits scepticism from many in the medical profession as most of the evidence to date is anecdotal and it is difficult to demonstrate a well recognised pathophysiological pathway. The most widely accepted hypothesis is that of exaggerated sympathetic stimulation secondary to stress with subsequent imbalance of the supply and demand of oxygen to the myocardium which can lead to ischaemia, thrombosis and subsequent atherosclerotic plaque rupture. The increased autonomic sympathetic drive also causes surges in blood pressure and heart rate which can exacerbate this problem. In addition this neuro-hormonal reaction can also lead to electrical abnormalities and fatal arrhythmias. Other postulated mechanisms of stress induced cardiac death include the development of the recently recognised Takotsubo cardiomyopathy (or broken heart syndrome) where intense stress, be it emotional or physical, can lead to left ventricular apical ballooning and can mimic myocardial infarction. Other factors which may be involved in some way include the effect of stress on platelet aggregability leading to a hypercoagulable state and the effect on the endothelial wall function of the coronary arteries e.g. leading to spasm. Legal position There is well established legal precedent in the United States for what constitutes homicide in such circumstances. Flannery et al in 2010 outlined eight cases and highlighted some of the main developments in this field i.e. there can even be no physical contact. In addition there can be a substantial time-lag between the altercation and the death, so long as there is a proximate act which is linked to the death. Earlier following on Daviss landmark publication in 1978, the National Association of Medical Examiners (NAME) in 2004 set out clear guidelines specifically around this issue. In the United Kingdom, the legal process is conducted on the basis of case law. A number of case examples will be cited which have led us to the current position. References - Davis JH. Can sudden cardiac death be murder? Journal of Forensic Sciences 1978; 23(2):384-7 -NAME 2004 'Guide for Manner of Death Classification -Flannery et al. Homicide by fright: The intersection of cardiology and criminal law. Am J Cardiol. 2010;105: 136-138

**Keywords:** Sudden Cardic Death; Homicide; Emotional Stress and Sudden Death

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# DIAGNOSIS AND CERTIFICATION OF ENVIRONMENTAL HEAT-RELATED DEATHS

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**Abstract:** Environmental heat-related deaths are a common occurance, however, only demand the attention of public health authorites when these deaths occur en mass. In 2003, for example , the European heat wave caused an estimated 70,000 deaths, 15,000 occurring in Paris alone. The diagnosis of environmental heat-related deaths is not well known by practitioners of forensic medicine. Following the 1995 heat wave in the U.S. Midwest, the National Assoication of Medical Examiners (NAME) developed formal criteria for the diagnosis of environmental heat-related deaths. This presentation will discuss the criteria for the diagnosis and certification of heat-related deaths. Additional topics related to heat deaths will be discussed include: the role of neuroleptic medications, vitreous chemistry findings, and the mechanisms of death in hear-related deaths.

**Keywords:** Heat Deaths; Vitrous Chemistry; Neuroleptic Medications

3

# SURGICAL MALPRACTICE IN OPERATED CONGENITAL HEART DISEASES: THE FORENSIC PATHOLOGIST'S APPROACH

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**Introduction:** The forensic pathologist who evaluates autopsy specimens of operated congenital heart diseases must function as an "archeologist", identifying alterations associated with the underlying cardiac malformations (hypertrophy, dilation, hypertensive pulmonary vascular disease), surgical procedures (closure, creation, opening, repair or replacement of the various abnormalities of the type or mode of connection) and post-operative complications (cardiac and extracardiac ischemia or infections). In a consecutive series of 15 legal autopsies on operated children with congenital heart diseases who died within a month after surgery, we report the cases in which, for the inexplicable persistence of macroscopic defects, there was a professional responsibility of the cardiac surgeon.

**Materials and Methods:** Fifteen autopsies of children operated for congenital heart disease were performed between January 2000 and December 2010. The patients aged from one day to one year (mean age of thirty days). 9 male and 6 female. The postsurgical death occurred after three hours (1 case), one week (8 cases), between 2 and 4 weeks (4 cases) and after one month (2 cases). The operation was corrective in 14 cases and palliative in one. The operated congenital heart diseases were: univentricular heart (3 cases); pulmonary valve stenosis (3); Fallot's tetralogy (3); pulmonary valve atresia (1); complete atrioventricular canal (1); transposition of great vessels (1); double outlet right ventricle (1); coarctation of the aorta (1); joined hearts in Siamese twins )(1).

**Results:** Autopsy highlighted an evident cause of death in 15 cases; in 9 cases this was extra cardiac, while in 6 cases localized in the heart. The causes of cardiac death in 1 case were represented by myocardial fibrosis secondary to infundibular resection in Fallot's tetralogy, while in 5 (35.7%) depended on the persistence of anatomical defects hemodynamically important: infundibular stenosis in one operated person of pulmonary valve stenosis with intact septum (2 cases), IVD in operated subject of a complete AVC (1 case), peripheral pulmonary artery stenosis in subject operated of Fallot's tetralogy (1 case), total anomalous pulmonary venous return in Siamese twins with joined hearts, operated for cardiac remodelling in the course of separation. (1 case).

**Discussion and Conclusions:** The postmortem forensic investigation of "suspect" surgical malpractice in operated complex congenital heart disease implicates a profound knowledge of both the anatomy of those malformations and the modern and sophisticated surgical procedures including the closure, creation, opening or repairing of the various abnormal cardiac connections and the repairing or replacement of regurgitant valves.

**Keywords:** Surgical Malpractice; Operated Congenital Heart Diseases; Autopsy

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# VENTRICULAR PREEXCITATION AND SUDDEN DEATH: THE IMPORTANCE OF THE CONDUCTION SYSTEM EXAMINATION

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**Introduction:** Sudden death (SD) is a symptom, not a disease. The clinical condition causing it, is frequently missed, so postmortem examination (autopsy, toxicological tests, genetic studies) is mandatory to unveil the concealed morbid substrate (anatomic and/or genetic). Cardiac substrates of SD concern usually working myocardium, conduction system and cardiac ion channels. In this study we show 7 cases of sudden cardiac death (SCD) due to accessory AV connections (aAVc), in which the morphological substrate was revealed by histological examination of the cardiac conduction tissue, performed after the exclusion of working myocardial diseases.

**Materials and Methods:** From January 1990 to December 2010, at the Institute of Legal Medicine of Palermo 609 autopsies of SCD cases, were performed. In 118 cases (19.3%) death occurred in the first year of life (infant SCD), in 245 cases (40.3%) between 1 and 35 years (juvenile SCD), in 234 cases (38.4%) between 36 and 69 years (adult SCD), and in 12 cases (2%) after the age of 69 (elderly SCD). In 21 cases (3.5%), the SCD was due to disorders of the conduction system, occurred in the first year of life in 5 cases, and at a young age in 16 cases.

**Results:** The pathology of the conduction tissue in 6 cases (28.6%) was due to aAVc, and SCD occurred in the first year of life in 1 case, at a young age in 5 cases. The aAVc were characterized by: Kent septal fascicles (2 cases with micro-Ebstein disease) and outlet Mahaim fibers (4 cases) of type "node - ventricular" (upper) in 3 cases, and fasciculo-ventricular (middle) in 1 case.

**Discussion and Conclusions:** Ventricular preexcitation is usually a congenital disorder characterized by rapid impulse transmission to the ventricles due to accessory AV connections (aAVc) which lead to hyperkinetic ventricular arrhythmias and sudden death, because of the absence of the physiological retardation in the AV node. The aAVc may be subdivided into two main types: 1) direct AV connections (consisting of ordinary myocardium which directly connect the working atrial and ventricular myocardium); 2) mediated AV connections (consisting of anomalous connections between the septal atrial myocardium with the His bundle or the Tawarian system with the ventricular myocardium). Our study demonstrates the importance of the conduction system examination in infant and juvenile SCD without a working myocardial disease.

**Keywords:** Sudden Cardiac Death; Conduction System; Accessory AV Connections

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# DESTRUCTIVE HOSTILITY: THE JEFFREY DAHMER - A PSYCHIATRIC AND FORENSIC STUDY OF A SERIAL KILLER

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**Abstract:** In July 1991, personnel from the Milwaukee, Wiscosin U.S.A. medical examiner office investigated the partially skeletonized remains of ten men found in the apartment of Jeffrey Dahmer. This presentation will review the scene, autopsy findings, identifcation of remains, and special problems encountered during the investigation of one of Americas most notorious killers. The findings support the thesis that at the basis of the serial killers behavior were primary unconcious feelings of hate channeled into a sadistic programmed destruction of seventeen young men.

**Keywords:** Serial Killers; Jeffrey Dahmer; Sadism

6

# ALCOHOL INTOXICATION AND BLUNT CRANIAL TRAUMA - A BIOCHEMICAL RELATIONSHIP?

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**Abstract:** It is proposed that high levels of alcohol may act synergistically with blunt cranial trauma, resulting in a worse clinical outcome following less severe impact. Suggested mechanisms have centered around interference with brainstem cardiorespiratory centers with depressed respiratory drive, impaired hemodynamic response with reduced cerebral perfusion, and elevation of brain and cerebral venous blood lactate levels. Illustrative case: A 39-year-old man died after a fight during which his head hit furniture and a tiled verandah. Neuropathological evaluation however showed only minor patchy subarachnoid hemorrhage with small cerebral contusions that were considered to be insufficient to account for death. Toxicological studies showed a blood alcohol level of 0.2%. Death was, therefore, attributed to blunt cranial trauma associated with an elevated level of blood alcohol. As reduction in free magnesium levels within the brain has been associated with the development of neurological deficits following blunt cranial trauma in animals, phosphorus magnetic resonance spectroscopy was used to examine changes to brain free magnesium concentration after blunt cranial trauma in a group of alcohol-intoxicated rats. Rats (N = 12) exposed acutely or chronically to alcohol sufficient to increase blood alcohol levels to between 150 and 350 mg/dl demonstrated a brain free magnesium level that was 20-50% less than in non-intoxicated animals (N = 6) ($p<0.01$). After injury brain free magnesium levels declined more rapidly and to a greater extent in alcohol-affected animals than in non-intoxicated control animals ($p<0.001$). Since both pre-injury depletion of magnesium and degree of magnesium decline after brain injury have been associated with poor recovery, these findings suggest that moderate to severe alcohol intoxication may predispose the brain to a worse outcome by reducing brain free magnesium levels, both before and after injury. It may be that the adverse effects that elevated alcohol levels have on outcome following blunt head trauma are initiated by a more complex cascade of events involving an interplay of both biochemical and hemodynamic processes.

**Keywords:** Alcohol; Blunt Cranial Trauma; Impact

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# THE RELATIONSHIP BETWEEN BODY MASS INDEX AND PULMONARY THROMBOEMBOLISM (PTE) IN AN AUTOPSY POPULATION

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**Abstract:** Obesity has become a major health concern in Western countries in recent years reaching 'epidemic' proportions. The association of obesity and PTE has not, however, been extensively studied in a forensic setting. One hundred and sixty autopsy cases where sudden and unexpected death had been attributed to PTE were randomly selected from the case files at Forensic Science SA, in addition to one hundred and sixty age and gender matched controls. All of the cases had full autopsies with complete coronial and police investigations. Case files were reviewed, and the gender, age, height and weight were recorded. BMI was calculated for each case (as the weight in kilograms divided by the square of the height in meters) and classified as underweight, normal, overweight, obese or morbidly obese according to the World Health Organization definitions: BMI < 18.5 underweight; 18.5-24.99 normal; 25-29.99 overweight (pre-obese); 30-39.99 obese; and =40 morbidly obese (obesity class III). The mean age of the 160 cases with fatal PTE and the 160 controls was 66 years (range 26 - 98 yrs), with a male to female ratio of 74: 86. The mean BMI of the cases with PTE was 30.88 (range 14.95 - 79.51) which was significantly higher than in the controls where the mean BMI was 25.33 (range 12.49 - 61.84) ($p<0.0001$). In the group with PTE five (3.1%) were underweight, 39 (24.4%) had a BMI in the normal range, 49 (30.63%) were overweight, 43 (26.88%) were obese, and 24 (15.0%) were morbidly obese. In the age and gender matched control group 20 (12.5%) were underweight, 67 (41.88%) had a BMI in the normal range, 43 (26.88%) were overweight, 24 (15%) were obese and six (3.75%) were morbidly obese. In each category of above normal BMIs there were significantly greater numbers in the groups with PTE: overweight - $p<0.01$, obese - $p<0.001$, and morbidly obese $p<0.0001$. Given that the prevalence of obesity is rising in many Western countries the current study indicates that the number of cases of both fatal and nonfatal pulmonary thromboembolism may also be expected to increase.

**Keywords:** Obesity; Thrombosis; Pulmonary Thromboembolism; Risk Factor

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# ORAL SESSION

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1

# BIOETHICS PROBLEMS IN FORENSIC MEDICINE

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**Abstract:** Progress of a biomedical science and introduction of the newest technologies in public health services practice has defined modern problems of bioethics: Mutual relation with wildlife (ecological aspects of development of biomedical technologies); Abortion, contraception and new reproductive technologies (artificial insemination, fertilisation "in a test tube" with the subsequent implantation of an embryo in a uterus, substitute motherhood); modern genetics (gene diagnostics, gene therapy and engineering); manipulation of stem cells; cloning (therapeutic and reproductive); rendering assistance to dying patients (hospices and the organization of the palliative help); suicide and euthanasia (passive or active, voluntary or violent); conducting experiments on humans and animals; protection of the rights of patients (including a HIV of the infected, psychiatric patients, children, etc. patients with the limited competence); justice in public health services; transplantation; development of criteria of diagnostics of death. In the production expertise medicolegist faced with the last three issues. 1. Bioethical problems of justice in public health services include the informed consent to medical intervention, questions of medical secret and medical errors. 2. Bioethical problems of transplantology. Technical aspects of transplantology dont cause the big difficulties while legal, moral and psychological side to this day remain problematic. The basic problem of any transplantology is the donor service. 3. Bioethical problems of developing criteria of diagnostics of death. Expanding of indications to various kinds of transplantations conducts to "deficiency of donor organs". It forces experts-transplantologists to search for "ways" to stable sources of a donor material. One of ways leads to necessity of definition of "moment of death" that considerably will expand, from the point of view of specialists, the possibility of reception of organs for transplantation. "Early ascertaining of death of a brain" and revealing of "potential donors" becomes one more way.

**Keywords:** Bioethics; Bioethics and Forensic Science; Transplantology; Medical Errors

2

# CADAVERIC EXPLANTATION

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**Abstract:** Transplantation, definitely is a method of choice for a treatment of serious health problems occurring as a result of various organ failure. During open discussions about legal and ethic aspects of justification for cadaveric explanation, series of questions are opening, which are impossible to be seriously and realistically explained with existing legal and ethical postures. Primarily, the issue of human rights of the death body, than issue of demanding agree from the family of deceased and many other similar issues. First issue which is imposed: human rights of the cadaver!? We can discus about human rights only when a man is satisfying all the criteria of a life being, socially and biologically. However, when death occurs, whether all the criteria of a life being are still satisfied, whether the deceased are still a man or he is just material remaining of something that previously was a man. Second essential issue is receiving an agree to explant part of the body or organ for the purpose of transplantation in other body, more precisely, giving the right from the relatives for explantig the part or the tissue from the deceased. Opposing is will of any person who must be respected, because it concerns of his body, the remaining of himself after deceasing. On that account, I think if a explicit ban for using organs after death did not exist, and every positive criteria for possible implantation are satisfied, final decision should be made only on the base of medical criteria. From ethical view is completely unacceptable, demanding an agree from each patient, while he is hospitalized, for using organs in transplantation purposes if the death occurs during the treatment.

**Keywords:** Cadaver Explanation; Human Rights; Legal Issues; Ethical Issues

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3

# ANALYSIS OF FATAL ACT IN IRANIAN LAW

**Author(s):** Jafarizadeh F[1]; Zarenezhad M[1]; Ghorbanzadeh M[2]; Arami A[3]; Fereidooni M[1]; Rahimi M[2]

**Institution(s):**[1]IRANIAN LEGAL MEDICINE RESEARCH CENTER; [2]SHIRAZ PAYAM-NOOR UNIVERSITY; 3TEHRAN ISLAMIC AZAD UNIVERSITY

**Comments:** This essay describes the analysis of fatal act in Iranian law. It explains the murder and different types of homicide and explains death. It defines offences against the person and the thin skull test. This means that if for example a defendant hits a person over the head with the kind of blow which would not usually kill, but the victim has an unusually thin skull which makes the blow fatal, the defendant will be liable for the subsequent death. The principle has been extended to mental conditions and beliefs as well as physical characteristics. Has come to mean either on intention to kill or an intention to cause grievous bodily harm. Direct intent corresponds with every day definition of intention and applies where the accused actually wants the result that occurs and sets out to achieve it. Oblique or indirect intention is less straightforward. It applies where the accused did not desire a particular result but in acting as he or she did realized that it might occur.

**Keywords:** Fatal Act; Iranian Law; Iran

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# STUDY OF RISK FACTORS IN BODY PACKERS CARRYING INGESTED DRUG PACKETS: LEGAL AND REGULATORY ISSUES

**Author(s):** Médiouni Z[1]; Bécour B[1]; Hammache A[1]; Rey C[1]; Pourriat J[1]

**Institution(s):**[1]ASSISTANCE PUBLIQUE - HÔPITAUX DE PARIS

**Abstract:** About one hundred individuals are apprehended each year in Paris by customs or law enforcement officials for transporting internally concealed narcotic substances, a practice also known as body packing. The considerable medical implications of this practice stem from its potentially life-threatening complications. Body packers are monitored in a secure hospital ward where they benefit from medical management under police supervision until the complete evacuation of the foreign bodies ingested. A monocentric analytical prospective cross-sectional study is currently under way. This study investigating the prognostic factors presented by body packers who have ingested drug-containing packets aims to improve their medical and surgical management. Legally speaking, this observational study comes under the label of "usual care" studies. One of its specificities is that it is, perforce, conducted on a population of detainees. The French legislation is particularly attentive to the rights of detainees participating to biomedical research projects. The validity of their consent to participate to the study is carefully scrutinized, notably regarding possible language-barrier issues or the intelligibility of the information provided. By law, three administrative authorities have to be approached, based on the following legal fundamentals: The protection of persons in health-related matters comes under book 1 of the French Public Health Code (Livre 1 du Code de la Santé Publique). Biomedical research issues come under section 2 of the same book. Legislative aspects are covered by articles L.1121-1 to L.1123-14 and L.1126-1 to L.1126-11 of the Public Health Code; regulatory aspects are covered by articles R.1123-1 to R.1125-13. The elements to be included in the request for advice from the Committee for the Protection of Persons (Comité de Protection des Personnes) included in research aimed at assessing "usual care" mentioned in the second paragraph of article L.1121-1 of the Public Health Code, are listed in the decree dated March 9th 2007. Under these rules and regulations, the person sponsoring the research work must consult the French Agency for the Safety of Health Products, the AFFSAPS (Agence Française de Sécurité Sanitaire des Produits de Santé) and the Committee for the protection of individuals of the region where the study is to be conducted. The third administrative authority to validate such study protocols is the French National Commission on Information Technology and Liberties, the CNIL (Commission Nationale de l'Informatique et des Libertés), as dictated by article 25 of law number 78-17, dated January 6th 1978 and modified in 2004. This restrictive legal frame aims to reconcile the human right to free will with the imperatives of biomedical research. If we are to ensure legal consistency, standards should be developed to harmonize the obligations that currently weigh down medical research investigators.

**Keywords:** Body Packers; Drug Packets; French Research Regulation; Regulatory Issues

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# STUDY OF RISK FACTORS IN BODY PACKERS CARRYING INGESTED DRUG PACKETS: ETHICAL ISSUES

**Author(s):** Bécour B[1]; Médiouni Z[1]; Hammache A[1]; Dumas F[1]; Rey C[1]; Pourriat J[1]

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**Abstract:** In Paris, about one hundred individuals are apprehended by customs or law enforcement officials for transporting internally concealed narcotic substances, i.e. after having ingested drug-containing packets, a practice also known as body packing. Given its potential life-threatening complications and the lack of antidote for certain drugs, this practice has major medical implications. Body packers are monitored in a secure medical unit where they benefit from hospital-based medical management under police control until all the ingested foreign bodies have been excreted. We are conducting a monocentric cross-sectional prospective analytical study to determine which prognostic factors are associated with toxic or mechanical complications (digestive obstruction, perforation) in body packers carrying ingested drug packets. Our aim is to improve the medical and surgical management of these drug-packet carriers. One of the specificities of this study is that our subjects are, perforce, detainees; most often asymptomatic, these persons can neither be considered, nor consider themselves, as presenting with a disease. They are, however, at risk of life-threatening complications, notably in case of packet rupture, which raises the issue of whether they should benefit from plain ambulatory monitoring or be admitted to hospital. The fact that these individuals are held in custody has several consequences which lead one to query the validity of their consent to be treated and participate to the study. It also enhances the asymmetry of the patient/physician relationship inherent to the discrepancy in medical knowledge, further disrupted by the inability of these patients to choose their physician. The validity of the patient's consent becomes even more ethically questionable when one considers the frequently encountered language barriers and the fact that the physician is answerable to the requesting authorities. In France, the fact that a study subject is held in custody makes it necessary to obtain the agreement of several authorities. In secure medical units, ethical considerations play a major part in medical practice. The basic principle "Primum non nocere" forbids putting patients at inconsiderate risks. A fine benefit/risk analysis is required in any cases. For instance, digital examination of the rectum is contraindicated because of a bad benefit/risk. The latter procedure could indeed be construed as detrimental to the person's physical integrity. The incident pathologies, or incidentalomas, revealed by the imaging studies trigger further ethical considerations, notably concerning the communication of the diagnosis, the explanation of the issue and the initiation of medical and/or surgical care, particularly in the case of these patients who generally have no health insurance and frequently come from emerging countries. If we are to harmonize practices and the management of body packers so as to ensure consistent medical decisions and provide quality care, standards need to be drawn up, and respected.

**Keywords:** Body Packers; Drug Packets; Ethical Issues; Free Will

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6

# FORENSIC THEOLOGY: A NEW BREAKTHROUGH IN THE RESOLUTION OF CONFLICT IN INDONESIA

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**Abstract:** Indonesia has adopted the system of positive law in the administration of the state as consequence of the Republic based on Pancasila. However, the settlement of various disputes in various fields were solved over many by religion or custom outside from the court. People should have attitude with the increasing number of conflicts that arise due to wrong understanding of religion or God believe system then requires a new approach for completion. As the country that has put the first principle of Pancasila is becoming the most important consideration to draw decision making on legal issues so that it should be efforts to involve religious leaders and religious knowledge to assist law enforcement. With a majority Muslim population approximately 200 million people and a problem of bias interpretation of religious deviations and deviations in the practice of religion in society have demanded a new discipline of forensic theology or religion of forensic science. Forensic theology is a real discipline for religious scholars to help law enforcement in investigating and preventing crime, and assist justice system to decide cases involving religious freedom and distorted interpretations of religious doctrine that led to the criminalization, social conflict and loss wealth especially regarding the state of Indonesia. In addition, the involvement of forensic theology to other forensic science is very important to reveal the actual facts in each case for instance in the case of criminalizing the Anti-Corruption Commission, Indonesian Islamic State, pornography, terrorism and corruption. An important role of forensic theology is to reveal the presence or absence of factors or religion claims on behalf of God (Allah), which encourages illegal acts, corruption and treason as well as terrorism. One example is the trial case of Abu Bakar Ba'syir (one of Moslem scholar fight against government) considered infidel against the president of Indonesia because He (as Moslem) does not run Islamic law in Indonesia even though Indonesia is not the state of religion. Moreover the different groups and organizations often cause unrest and anarchist action. Whether the statement of Basyir was considered as the part of freedom of religion or an erroneous belief of the religion. Whether the anarchist action was part of the freedom of religion or an erroneous belief of religion. It is expected that the theologians forensics can help sort out all the conflicts in the real Islamic terrorists from the people who issued a statement that sounded similar. Polemic can be overcome by new breakthroughs using forensic theology including to the Obama versus Osama conflict.

**Keywords:** Forensic Theology; Religious Scholars; The Judicial System; Freedom of Religion

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# DISCUSSIONS ON NEW PATIENTS RIGHTS LEGISLATION IN AZERBAIJAN

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**Abstract:** New patients rights legislation is under discussion in Azerbaijan. Purpose of it is to establish the rights and duties of the patient, the specifics of the patient's representation, as well as grounds for the investigation of the patient's complaints and for compensation for the damage caused to his health. New Law shall be based on the underlying assumption that the relations between the patient and health care professionals or health care institutions shall be built on the following principles: mutual respect, understanding and assistance; ensuring the patient's rights according to the health care conditions recognised by the state in the prescribed manner; prohibiting to restrict the patient's rights on the grounds of gender, age, race, citizenship, nationality, language, origin, social status, religion, belief, views, sexual orientation, genetic qualities, disability or on other grounds, except for the cases specified by laws, without prejudice to the general principles of human rights. Chapters on informed consent, patients representative, patients request and patients complaint are discussed now for being included into new legislation. Case reports according to the topics of these chapters will be given during oral presentation.

**Keywords:** Patients Rights; National Legislation; Informed Consent

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# ORAL SESSION

## Session 15.19

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1

# FREEFALL TRAUMA: ANALYSIS OF FRACTURES WITH REGARD TO HEIGHT AND CAUSE OF FALL

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**Introduction:** Trauma analysis has become one of the new key areas of forensic anthropological research. Freefall trauma represents a specific form of blunt force trauma which results from the impact of a body on a surface. Due to numerous factors that affect it, freefall trauma is one of the hardest to interpret. Although the frequency and severity of freefall injuries has been studied by numerous authors, they have most often focused on soft tissue and organ injuries and many have not examined realtionship between fractures and height of fall. The aim of this study was to focus exclusively on skeletal fractures resulting from freefalls by examining their relation to the height and cause of fall.

**Materials and Methods:** 179 autopsy reports of fatal freefalls of known height were analyzed. The location, type and frequency of fractures, the number and distribution of fractured regions was analyzed with regard to height and cause of fall. Statistical analysis was performed using correlation matrices and difference tests. Logistic regression was used to attest the relationship between the frequency of fractures and selected independent variables such as height, cause of fall and age.

**Results:** The area more susceptible to fractures has shown to be the thorax, followed by the head, spine, lower, upper extremities, and pelvis. The frequency of all fractures, excluding head fractures, increased with altitude, supporting logistic regression data. Thorax, upper and lower extremities showed the most significant increase. The frequency of specific head, thoracic, pelvic and arm fractures and the distribution of fractures changed also in dependence on height. Victims of falls sustained mostly fractures of more than 1 body region, and the number of injuried regions correlated significantly with height. The comparison between victims of suicides and accidental falls was performed on cases belonging to the same height group. Although no statistical difference was found in the number of fractured regions or frequency of fractures, a higher affection of lower body parts was noted in suicide victims, supporting the results of logistic regression analysis.

**Discussion and Conclusions:** Height has demonstrated to be the major factor influencing freefall fractures. Frequency of fractures, type of fracture and number of fractured regions vary with regard to it. Although differences found between suicide victims and accidental falls cannot be considered significantly discriminating, the results emphasize the need for further investigation of the influence of behavior on freefall injuries.

**Keywords:** Forensic Anthropology; Falls from Height; Fractures; Suicide

2

# AGE ESTIMATION BY PULP/TOOTH RATIO IN MONORADICULAR TEETH

**Author(s):** Cameriere R[1]; Deluca S[1]; Nuzzolese E[1]; Pagliara F[1]; Wasterlain S[1]; Cunha E[1]

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**Abstract:** Age estimation is one of the most important problems both in forensic and anthropology matters. Teeth are the body parts most commonly used for age determination. The apposition of secondary dentine has been particularly used, especially in recent years. Previous studies have focused on the use of canines. This study will evaluate the possibility of estimating age using the apposition of secondary dentin in monoradicular teeth. A hundred individuals from the identified skeletal collections of Coimbra University provided a total of 780 teeth, which constitute the analysed sample. The preliminary results show a good correlation between the apposition of secondary dentine and age, in particular for larger teeth, with greater pulp chambers. Lower incisors gave worst results. More precisely, initial results indicate the upper central incisors as having the best performance with a R2 of 0.83, and the lower lateral incisors as presenting the worst results, with R2 of 0.42. The upper central incisors have an average error in absolute value of 3.8 years, with a standard deviation of 1.6 years

**Keywords:** Age Estimation; Forensic Anthropology

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3

# MEASUREMENT OF FACIAL SOFT TISSUE DEPTHS OF LIVING INDIVIDUALS FROM A BRAZILIAN POPULATION USING MAGNETIC RESONANCE IMAGING (MRI) FOR APPLICATION IN FORENSIC FACIAL RECONSTRUCTION

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**Introduction:** Facial reconstruction offers a means of generating an approximate ante mortem likeness of an individual from the skull. Brazilian society is represented by many peoples of diverse ancestry as well as by extensive historical intermarriage. There is, however, a paucity of tissue depth data from Brazilian populations that can be applied in facial reconstruction. OBJECTIVE: The aims of this study were: 1) to validate a standard protocol for the collection of tissue depth data from magnetic resonance imaging (MRI) and 2) to use this protocol for in the collection of a novel tissue depth dataset from a Brazilian population for application in forensic facial reconstruction.

**Materials and Methods:** The protocol of this study was approved by the institutional Research Ethical Comitee (HCRP n° 11.568/2003). Facial MRI scans of 186 Brazilians without congenital or acquired facial deformities were used. Gender, age, ancestry and body mass index were recorded. Traditional craniometric landmarks were adapted for use in data collection from DICOM (Digital Imaging and Communication in Medicine) format facial images obtained from a 1.5 Tesla MRI system (Magneton Vision, Siemens, Erlangen, Germany) with volumetric multiplanar scanning in 3D, using scanning protocol T1 (TR= 9.7ms; TE= 4ms; angle pulse of 12o), a square matrix of 256 x 256, a vision field of 256 mm and a 1 mm slice thickness, generating isotropic voxels of 1 mm3. E-Film Workstation® (Merge Healthcare, Milwaukee, WI, USA, http://www.merge.com/efilm.asp) was used for localization, definition and measurement of the craniometric landmarks. Project data was stored in a data bank built using EpiInfo™ (United States Department of Health and Human Services, Centers for Disease Control and Prevention, http://www.cdc.gov/epiinfo/). In a validation stage involving 21 facial images, tissue depth measurements at 22 landmarks were repeated three times, with at least one week interval between measurements, by two independent observers. Following validation, the method was used to obtain tissue depth measurements at each of the 22 landmarks (including 11 landmarks where tissue depths were measured bilaterally) in the sample of 186 individuals. Analysis of intra- and inter-observer error was undertaken using ANOVA.

**Results:** Some adaptation of traditional craniometric landmark descriptions were necessary to accommodate localisation in MR images, especially in three landmarks requiring identification of dental features. The validation stage indicated that the protocol was repeatible.

**Conclusions:** A standardised and validated protocol permitted a novel and substantial dataset of tissue depth measurements to be collected from MRI representative of a Brazilian population. The protocol offers the prospect of more extensive data collection and of comparison of Brazilian and other samples.

**Keywords:** Facial Soft Tissue; Forensic Facial Reconstrucion; Magnetic Ressonance Imaging; Craniometric Landmar

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# FORENSIC ANTHROPOLOGY AT THE MEDICO LEGAL CENTER OF THE FACULTY OF MEDICINE RIBEIRÃO PRETO - USP (CEMEL/FMRP-USP): COMPARATIVE STUDY OF CASES FROM 1999 TO 2010

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**Introduction:** Forensic anthropology is the study of the skeleton in the interests of the criminal justice system with a view, in particular, of establishing identity and the cause of death. In 2005, a Brazil-United Kingdom partnership supported by the UK Foreign and Commonwealth Office led to the establishment of the Laboratory of Forensic Anthropology (LAF) at the Medico Legal Center of the Faculty of Medicine of Ribeirão Preto, University of São Paulo (CEMEL/FMRP-USP). Optimised protocols for the preparation, analysis and recording of skeletonised and partially skeletonised human remains were developed for application in the context of tropical Brazil. With the establishment of the LAF, cases accumulated prior to 2006 could be examined in addition to new material encountered on a case-by-case basis, permitting a comparison of practices prior to and following its establishment. OBJECTIVE: Comparison of practices used in forensic anthropology prior to and following the establishment of a laboratory for forensic anthropology, and supporting services.

**Materials and Methods:** In order to compare practices, reports from cases accumulated from 1999 to 2006 (first group) and from those encountered between 2007 and 2010 (second group) were analyzed separately. The following quantitative and qualitative variables were compared: number of bones per skeleton; sex; age; stature; ancestry; handedness; odontological findings; pathological findings; and occurrence of belongings.

**Results:** The mean number of bones per skeleton recovered in the first group was 79.57, while in the second group this number increased to 112.83. In order to provide a provisional assessment of utility in identification, the number of skeletons that were 50 per cent complete was calculated, based on an assumed possible inventory of 200 elements. In the first group, only 38.1% of the skeletons were more than 50 per cent complete, while in the second group this number increased to 62.5%. The remains in both groups originated predominantly from Caucasian males. There was a modest decline in the mean age from 38.34 y.o. in the first group to 33.5 y.o. in the second. There was no difference in average height between the two groups studied. The number of cases in which handedness was estimated improved from 42.86% in the first group to 85.72% in the second. Cases were predominantly right handed in both groups. Pathological and dental evidence was also more common in the latter group. There was, however, no difference in the amount of belongings fowarded with the skeletons between the groups at 47.62% overall. The frequency of successful identification increased from 19.11% for skeletons accumulated between 1999 and 2006 to 22.64% of those encountered from 2007 to 2010.

**Conclusions:** Comparison of accumulated (1999-2006) and newly encountered (2007-2010) material reveals an increase in skeletal material per case submitted for analysis, accompanied by increased material of dental and pathological interest. The increase in material per case may also explain the more frequent assignment of handeness as well as the subtle difference in mean age estimation, as well as the underlying increase in successful identification. It is also important to note, however, that positive identification of some skeletons quickly followed the establishment of the LAF in 2006, leading to a positive perception of effective new technology amongst investigators and the public, reinforcing the need for more careful scene of crime work and planning of publicity.

**Keywords:** Forensic Anthropology; Standard Procedure; Effectiveness

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# A SIMPLE METHOD OF NOSE TIP SHAPE VALIDATION FOR FACIAL APPROXIMATION

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**Abstract:** Despite numerous papers relating to the prediction of nose projection for the purposes of facial approximation, little guidance for nose tip shape that has been evaluated on a known data set. This study presents a novel, simple technique for validation of the reconstructed nose tip shape based on methods used in actual approximation practice. The data set was comprised of 25 full-head computed tomography (CT) patient scans. In 22 of the 25 patients across all age and sex groups, when the head is tilted so that soft tissue pronasale is superimposed on hard tissue rhinion, the curvature of the nose tip was found to mimic the curvature of the superior portion of the nasal aperture. This occurs when the head is tilted dorsally by approximately 60° (55.87°± 5.91). Individuals with snub noses presented a much wider tip curvature. The method was highly repeatable and was evaluated through inter- and intra-observer studies (error = 3.15%).

**Keywords:** Forensic Anthropology; Facial Approximation; Nose Shape; Computed Tomography; Three-Dimensional

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# INSERTING CRANIOFACIAL X-RAY FILES IN THE INTERPOL NOTICES: A NEW CHALLENGE, A NEW WAY TO MATCH.

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**Abstract:** As a forensic anatomist we do know that the craniofacial hard structures are very difficult to be modified without X-Ray traces. Furthermore, each DVI investigation needs the help of A.M. and P.M. X-Ray files. The INTERPOL Command an Co-ordination Centre (CCC) has received 178000 messages from National Central Bureaus (NCBs) in 2010 and published 10273 Notices. Analysing the 7 kinds of Notices, we have determined 4 degrees of priority (0-3) with each "color". For non resolved cases, we have given 3 degrees (0-2) of importance with craniofacial X-Ray files. When the main problem is "identification", our proposal seems to be a good way to increase chances of success.

**Keywords:** Interpol Notices; X-Ray Files; Identification

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# AGE ESTIMATION BY RIB-PHASE ANALYSIS IN INDIAN MALES.

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**Introduction:** Currently there are different parameters available to determine the age of a person like study of teeth, ossification of bones and other ancillary data, but the reliability of these measures is only limited to a particular age group i.e. less than 25 years. The Iscan's phase method for the estimation of adult age at death from the sternal extremity of the fourth rib was introduced in 1983. Over the years, numerous tests have confirmed the reliability of this technique on varied samples in different age groups.

**Materials and Methods:** 155 samples of sternal ends of the right fourth ribs belonging to Indian male population with known age at the time of death. Each rib was phased using the standards developed by Iscan and associates in 1984. The phase estimations were then subjected to an analysis of variance.

**Results:** The results of the study indicated that Indian male ribs show the same morphological characteristics that define the phases at nearly identical ages. Variation as measured by the standard deviation increased from phase 5.

**Discussion and Conclusions:** This study demonstrated that the rib phase standards can be accurately applied to Indian males. Investigations of this nature are vital because one cannot assume that a method developed from one group is applicable to a distant population, especially in medico-legal proceedings.

**Keywords:** Forensic Anthropology; Rib Phase Analysis; Age Assessment; Indians

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# A DIAGNOSTIC METHOD IN TORTURE INVESTIGATION : BONE SCINTIGRAPHY

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**Abstract:** Torture appears to be a permanent feature in countries which experienced several Coup detat in the past , such as Turkey . Human Rights Foundation of Turkey was established in 1990 to serve torture victims but mainly who were the victims of 1980 Military Regime . Since then HRFT has been providing rehabilitation and documentation for victims of Torture. Bone scintigraphy can be one of the diagnostic methods to reveal trauma, particularly after several years when it is challenging to find any physical or radiological evidences. HRFT Istanbul Branch referred 97 of their applicants for bone scintigraphy from 1992 to 2010. In this retrospective survey of 97 cases 17 of them were female and 80 of them were male. Socioeconomic conditions, change of torture methods practiced in certain time periods , duration after the torture experience, physical findings, bone scintigraphies were evaluated. The torture methods varied respectively with the period of practice although beating was common denominator among all. The findings were classified regarding duration after torture. More than half of the cases had positive findings, and it is significant to observe a positive result among 71% of >5years cases. Bone scintigraphy should be considered as a valuable non invasive diagnostic method to evaluate and document long term applications and/or cases with no detectable marks on physical examination.

**Keywords:** Bone Scintigraphy; Torture; Phalanga; Diagnosis of Torture; Documentation of Torture; Human Rights

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# THE RAPE AS A WAR CRIME - A FORENSIC PERSPECTIVE

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**Abstract:** Sexual assault, with its juridical form - the rape, it was always an act, which, next to the physical aggression, involves, also, another kind of aggression, more difficult to be touched on all its complex aspects. This is the injury of human dignity, due to the act to see a human been as a thing, and reducing her just to a simple instrument used to obtain sexual pleasure. For longtime, the rape during the war times was considered as "collateral damages". It was a long way until to this conception was changed, even if the move towards criminalization of rape under international criminal law is often traced to the Geneva Convention from 1949. An essential role on this way is recognized to the ICTY and ICTR, which, have contributed to the development of jurisprudence on the rape as a war crime, and, related with human rights, even as torture in some cases. The presentation shows some particular aspects related with the definition of rape and the forensic approach of crime of rape in these special circumstances.

**Keywords:** Rape; War Crimes; Human Rights

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# TORTURE VICTIMS EXAMINED AT DEPARTMENT OF MEDICINE, UNIVERSITY OF COPENHAGEN, 1995-2010 - THE GEOGRAFICSL PATTERN OF TORTURE

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**Abstract:** Torture victims examined at the Institute of Forensic Medicine, University of Copenhagen, 1995 - 2010 - The geografical pattern of torture. Steen Holger Hansen, MD, Forensic Pathologist, University of Copenhagen, Denmark Definition of torture: The deliberate, systematic or wanton infliction of physical or mental suffering by one or more persons acting alone or on the orders of any authority, to force another person to yield information, to make a confession, or for any other reason. (Declaration of Tokyo, 1975). The purposes of the clinical examination are to recover and preserve medical evidence, related to the alleged torture to help in any potential prosecution of those responsible, to obtain redress for victims and to help the authorities in cases of asylum application. The Department of Forensic Medicine in Copenhagen performed from 1995 to the end of 2010 more than 250 examinations of persons claiming to be inflicted of torture. The Danish Immigration Service, in processing cases of asylum application, requested all the examinations. The examinations are initiated with and interview to obtain information of the inflicted torture and the person's medical history. This is followed by a physical examination, and sometimes further examination by radiologists, dentists or other specialists. Finally a psychiatric examination is carried out to reveal a possible posttraumatic stress syndrome The results and conclusions of the examinations and the geografical pattern of torture will be presented.

**Keywords:** Clinical Forensic Medicine; Torture

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# THREE DIFFERENT CASES OF HUMERAL SHAFT FRACTURE DURING POLICE ARREST - BIOMECHANICAL ASPECTS AND RECONSTRUCTION OF THE EVENTS

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**Introduction:** We are going to present three different cases of humeral shaft fractures in young, otherwise healthy persons, that occured while being arrested by the police. In each case there were incomplete or even contradictory statements about the event, both from the victims and the police officers involved. Yet the questions that arouse were quite similar: were those humeral fractures the result of an excessive force used by the police during the arrest? Were the fractures solely caused by the fierce resistance of the victim? Or were they alltogether just an unfortunate accident?

**Methods:** (1) We did a literature research on humeral shaft fractures in young, otherwise healthy people to find similar fracture patterns (as i.e. in arm wrestling) that could help us reconstructing the events. (2) We exposed artificial and animal bone models to different forces (rotation, pressure, etc.) to evaluate and correlate biomechanical causes to specific fracture types of the humerus. Additionally, all fractured bone models underwent forensic imaging to be compared to the original X-rays of the cases.

**Results:** We are going to present our results from the bone model experiments, the underlying biomechanical thoughts and their significance for the present cases (excessive force of the police vs. fierce resistance of the victim vs. unfortunate accident) as well as similar future cases.

**Keywords:** Humeral Fracture; Police Force; Victim; Arrest; Bone Model; Forensic Imaging; Virtopsy

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# HUMAN RIGHTS VIOLATION AN EGYPTIAN VIEW

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**Abstract:** In an attempt to visualize the problem of human rights violator by searching for its cause and trying to put suggestions to ameliorate its effects.

**Keywords:** Human; Violation; Egypt

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# USE AND ABUSE OF THE ISTANBUL PROTOCOL- THE TERMS FOR ASSESSING EVIDENCE OF TORTURE AS TESTED IN THE UK ASYLUM SYSTEM

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**Abstract:** The Istanbul Protocol recommends specific terms for assessment of physical lesions attributed to torture and these are now generally required in medico-legal reports submitted in asylum cases in the UK. Analysis of outcomes of reports prepared by the Medical Foundation shows that there is highly variable understanding of the meaning of these terms and their correct application by both the government case-owners making initial asylum decisions and the judges in the asylum appeal courts. Are the Istanbul Protocol terms suited for this purpose or too open to different interpretations? In the UK asylum system the doctors assessment of the relative likelihood of other possible causes is also frequently questioned by non-clinicians. I will present the outcomes of a series of reports and the implications for the asylum system, the Istanbul protocol and the role of medical expert witness evidence.

**Keywords:** Istanbul Protocol; Asylum; Torture; Medico-Legal

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# IMPACT OF MEDICO-LEGAL DOCUMENTATION AS AN ANTI TORTURE MECHANISM - REAPPRAISAL OF SRI LANKAN EXPERIENCE

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**Abstract:** The History of torture in Sri Lanka extends up to monarchical times though preventive mechanisms directed against it have only few decades of narration. The endemicity of torture in Sri Lanka as acknowledged by national and international scholars contrary to the view of popular politics has exposed the vulnerability of the powerless, inequality of justice and ineffectiveness of the policing in the society demeaned by a terrorist war state for nearly 30 years. In major international forums held during the last decade where the human rights profile of Sri Lanka was a subject, the issue of torture had received high prominence during the discussions. However Sri Lanka has not yet shown significant positive signs of attempting to combat torture through existing legislative and administrative and policing mechanisms. A recent retrospective study performed on torture methods adopted in Sri Lanka has revealed application of 68 different methods of torture. In another recent study the researchers were able to detect 37 physical and psychological methods practised on torture victims. A recent corroboration on broad practice of torture in Sri Lanka is provided by Dr. Manfred Novak the UN Special Rapporteur on Torture in his press release following the visit to Sri Lanka in October 2007. Many preventive mechanisms attempted to curb torturous practices have found a unique strength in the Sri Lankan medical field which could be harnessed to minimize torture in the local society. It was the detailed medico-legal documentation maintained by forensic practitioners on the alleged torture victims they had examined since eighties. In a deteriorating pre-trial situation, the extensive medical/medico-legal reporting of torture in Sri Lanka was responsible to a greater extent for effective corroboration of facts to establish liabilities of alleged perpetrators in fundamental rights cases during last 25 years. The reported Supreme Court cases in Sri Lanka on Article 11 of the constitution will bear witness for this fact. However its real significance was surfaced with the international acclamation of documentation of torture towards the end of the twentieth century. Documentation of torture for medico-legal purposes is a multidisciplinary, multi-stage and integrated exercise decisive in providing reparation. The UN-endorsed Istanbul Protocol contains the first internationally recognized standards and procedures for effective documentation of torture which could be used to record scientific evidence on torture to be submitted to courts. The requirement for proper medical documentation of torture has been evolved over the years as a part of the core concept of necessity for effective investigation into torturous practices. The main developments related to investigation of torture were observed in standard medical examination methods, International legal standards and Ethical codes over the last 50 years. The Istanbul Protocol is the condensed version of all these advances. The manual of Istanbul Protocol includes comprehensive guidelines for clinical examinations to detect physical and psychological evidence of torture and ill treatment. The International Rehabilitation Council for Torture Victims (IRCT) launched a project to promote the application of the Istanbul Protocol in five countries, including Sri Lanka in 2004. This Istanbul Protocol Implementation Project (IPIP) has brought forth the effective means of medical documentation of torture into a broader forum of discussion in Sri Lanka during last five years. Our attempt in this paper is to elaborate its effects and the way forward more extensively.

**Keywords:** Torture; Documentation; Istanbul Protocol

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# WHY DO THEY TORTURE? ETHICAL ARGUMENTS AROUND THIS DARK PRACTICE

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**Abstract:** In the torture debate, some say that it is always immoral to torture. Others insist that if torturing an evil man can save many innocent lives, it is the only moral option. The disagreement turns partly on whether you subscribe to virtue ethics, utilitarianism, or some mix. Comparing the virtues and flaws of those systems is a centuries old enterprise, unlikely to be resolved in our lifetimes. Utilitarians may wind up supporting torture. They said that torture is proved to be an interrogation tactic that saves the most lives and thwarts the most terrorism without awful adverse consequences, it makes sense for a utilitarian to favor the practice. This article might try to persuade them that their ethical system is incomplete and therefore wrongheaded. There are some who insist that torture is always an evil practice, and others who maintain that torture is sometimes the most moral alternative available to us. The disagreement among these folks turns on whether immoral acts are always acts of commission, or whether an act of omission can be immoral. This strikes me as an awfully hard question to answer, about whether torture is ever justified.

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# DENTISTRY OR ODONTOLOGY? A BITEMARK ANALYSIS USED IN JUDICIAL PROCEEDINGS OF A COLD CASE

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**Abstract:** The purpose of bitemark analysis is to retrieve both distinct individual and class characteristics of teeth on the bitten skin. The odontologist can compare the dentition of the suspects with the injury pattern, using a variety of methods, and draw a conclusion as to whether or not they were responsible. It is important to point out, that except in rare cases, the comparison should be carried out within a small sample (2 or 3) of suspected biters. The expert witness assessment of a bite mark pattern injury commissioned by the defendant is presented. The framework is a twenty-year old homicide cold case, where only one suspect has recently been found guilty. The purpose of the presentation is to promote a discussion among experts about correct bitemark analysis approach and how one can reduce potential errors and observer bias. The case presented, in the author's opinion, is suggestive of a partial bitemark where the forensic significance is crucial. This provides the basis for a controversial comparison with a suspect. The poor quality of the evidence, the primary and secondary distortion of the bitten skin, combined with the lack of a direct assessment on the human specimen, plus absence of a proper metric scale, make it impossible to decide upon the correct orientation of the biting teeth. In view of this, the result of the forensic evaluation should be restricted to exclusion. This is not to say that injuries that are probable or possible bitemarks cannot be of assistance in investigations but their value in direct comparisons is questionable. The case presented is not designed to provide exhaustive account of how a bitemark comparison should be undertaken. The increasing concerns within the scientific community of the validity of bitemark evidence leads odontologists to ensure that dentists involved in criminal cases should be aware of the latest research surrounding bitemark analyses and be adequately trained and experienced in the use of such techniques. Many dentists involved in the judicial system in Italy are still not aware how a bitemark assessment should be performed - namely the level of skill required to arrive at an expert opinion which goes beyond everyday dentistry and dental training. The use of non-peer reviewer techniques, the lack of formal training for dentists in forensic odontology, poor quality evidence and prosecutorial interference are some of the possible pitfalls that the review of cold cases have revealed. Reports such as the National Academy of Science regarding bitemark analysis, and ABFO and IOFOS guidelines suggest that bitemark assessments should be carried out by odontologists rather than general dentists.

**Keywords:** Forensic Odontology; Bitemark Analysis; Expert Testimony

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# DENTAL EROSION AS A SIGN OF POSSIBLE DENTAL NEGLECT

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**Introduction:** Dental erosion is a noncarious lesion characterized by an irreversible loss of dental hard tissues which causes dental hypersensitivity, pain and, in severe cases, loss of masticatory function. Dental neglect is defined as a failure of a parent or guardian responsible for a child's care and upbringing to safeguard the child's oral and dental health, as a part of general health. Three groups of indicators have been usually suggested as aids in the identification of dental neglect: untreated rampant caries; untreated pain, infection, bleeding, or trauma affecting the orofacial region; and history of insufficient continuity of care in the presence of previously identified dental pathologies. Dental erosion in children caused mostly by extrinsic sources of acids has attracted increasing attention in the dental community and may represent a potential harm to the childs oral health, well-being and harmonious development. The aim of this study was to investigate the prevalence and severity of dental erosion in primary dentition of preschool children as an indicator of potential dental neglect and determine the relationship between dental erosion, dietary and oral hygiene habits and parental education level.

**Materials and Methods:** We investigated 199 healthy children, aged 4-5 years. Dental erosion of primary teeth was evaluated by a modified Smith and Knight Tooth Wear Index. Information on risk factors such as dietary and oral hygiene habits and parental education level were obtained through the questionnaire.

**Results:** Results showed that 78% children had evidence of dental erosion. In 51.0% of children it was confined to enamel, in 26.8% erosion extended into dentine and in 1.0% it reached pulp, without any significant difference between the genders ($p>0.05$). Questionnaire data indicated a correlation between dental erosion and the consumption of acidic drinks and other acidic food. There was no correlation with oral hygiene habits. With a higher educational level of parents, the prevalence of erosion in children was in decline.

**Conclusions:** The prevalence of dental erosion in primary dentition is very high. Risk factors should be eliminated with increased involvement of oral health professionals in family strengthening programs in order to intensify the importance of parental supervision over their childrens dietary habits. Dietary aspects and dental erosion recognition should be integrated by oral health care professionals for the purpose of protecting children and prevent potential dental neglect.

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**Keywords:** Dental Neglect; Dental Erosion; Children

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# DENTAL TORTURE - HOW DIFFICULT TO INTERPRET

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**Abstract:** According to the UN convention against torture any act which result in physical or mental pain or suffering which has been caused intentionally amounts to torture. Thus any intentional act of torture that cause pain or damage to the teeth and oral soft tissues can be considered as Dental Torture. Throughout history, torture has often been used as a method of interrogation. It was a legalized and tolerated form of interrogation. Even in the 21st century torture is being inflicted on detainees by public official or other person acting in an official capacity. However, now torture is prohibited under international law and the domestic laws of most countries including Sri Lanka .It is considered to be a violation of human rights, and is declared to be unacceptable by Article 5 of the UN Universal Declaration of Human Rights Dental Torture includes disembodying or damaging of gums, tongue, teeth, etc. without anesthesia. This mostly involves the misuse of dental equipment such as extraction forceps and needles. Dental torture is greatly feared due to the intense pain it could inflict and the non-regenerative nature of mature teeth. For many individuals the mere fact of visiting a Dentist for treatment purpose is fearful. The detainees that suffer from any form of dental injuries as a result of torture during imprisonment are not produced for medical/dental examination promptly. The delay in producing for medical/ dental examination results many obstacles in accurate reporting of injuries. Unavailability of previous dental records also poses difficulties in interpreting injuries.

**Keywords:** Dental Torture; Dental Records

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# DENTAL REPORT FORM IN CHILD ABUSE

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**Introduction:** Child abuse is an anthroposocial phenomenon present worldwide that threatens children's physical, emotional and intellectual development, as well as their dignity, security, well-being and even their own lives. Child abuse includes physical, emotional and sexual abuse and its diagnosis is based on physical and behavioral indicators, that is, signs or symptoms that raise suspicions of the possibility of abuse. This problem's approach is multidisciplinary and all health care professionals must work together in preventing, detecting and reporting suspected child abuse. Numerous studies have revealed that the head and orofacial region are common sites of trauma from child abuse. For this reason, Dentists are in a strategic position to recognize and report suspected cases. Therefore, these professionals must be prepared to recognize, diagnose and report their suspicions to the appropriate authorities, which play a key role in victims' protection and criminal investigation. The aim of this work is to propose a form for Dentists to fill in when collecting the medical history and performing the physical examination of a child suspected of abuse, in order to gather all relevant data/information in a complete, systematized and objective manner.

**Methods:** At the form elaboration we used the Missing Person Dental Report1 and the Code Manual2 of the National Crime Information Center (NCIC) from the Federal Bureau of Investigation (FBI), the Federation Dentaire Internationale (FDI) Numbering System (FDI Two-Digits Notation3, ISO 39504) in the codification of the damages and the International Classification of Diseases to Dentistry and Stomatology from the World Health Organization (WHO)5. 1. Missing Person Dental Report. National Crime Information Center. In: Missing Person File Data Collection Entry Guide (NCIC). 2005:26-35. 2. Code Manual of the National Crime Information Center (NCIC). LEO Program Office, FBI CJIS Division. Washington D.C. December 2000. 3. FDI Two-Digit Notation, hosted on the FDI World Dental Federation website. 1971. Page accessed April 21, 20011. 4. ISO 3950:2009. Dentistry - Designation system for teeth and areas of the oral cavity. 5. WHO: Application of the International Classification of Diseases to Dentistry and Stomatology. 3rd ed. World Health Organization. Geneva. 1995.

**Results:** The result is the construction of the Child Abuse Dental Report Form which includes 7 sections: Section 1- Mandated Reporter; Section 2 - Victim Information; Section 3 - Involved Parties; Section 4 - Mouth; Section 5- ICD-DA Codes; Section 6 - Dental Characteristics and Section 7 - Other Dental Information.

**Discussion and Conclusions:** Child abuse is a serious health issue, thus it must be identified and addressed by the professionals and experts in the matter. With this document we intend to standardize for all Dentists the procedures in a case of child abuse and simultaneously help to transmit systematically and objectively the information to the competent authorities. This form also intends to standardize a Protocol in Child Abuse for Dentists in the clinical practice to report to authorities: firstly to the prosecutor in the courts area of residence and secondarily to the entities or officers of forensic services, or the entities with jurisdiction in matter of children and young people and the police authorities.

**Keywords:** Child Abuse; Dental Report Form

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# A UNIQUE DENTAL IDENTIFICATION INVOLVING CO-MINGLED REMAINS FOLLOWING A MIDAIR AIRCRAFT COLLISION

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**Case Report:** On Feb. 8, 2006, 2 aircraft (Cessna 172, N9531B; Cessna 182, N759KE) took off from Gillespie Field airport in El Cajon California. After about 4 minutes in air, the 2 planes collided killing all. Weather conditions at the time showed light winds with a 25 mile visibility. At 4:37 PM, the Cessna 172 (1B) took off. This aircraft had 2 occupants, a student pilot and his instructor. The student, engaged in IFR (instrument flight rules) training, was wearing a "hood" which masked his view outside the cockpit. The flight instructor had the duty to maintain a visual while monitoring the student's progress. Cessna 1B took off to the west and then changed course to the southwest. At 4:38 pm, Cessna 182 aircraft (KE) took off to the west, changed course and headed southwest as well. The solo occupant in this aircraft was flying VFR (visual flight rules). Both aircraft were accelerating as they gained altitude. At 4:40 P.M. both aircraft were now high enough for FAA radar to detect both planes and begin tracking them. At 4:40 and 51 seconds a computerized warning system transmitted a visual and audible warning to traffic control to warn that the two aircraft were on a potential collision course; however no warnings were radioed to the pilots. At 4:41 and 42 seconds aircraft "KE" collided with the right side of "1B" at an altitude of approximately 2,300 feet. On the ground there were 2 crash scenes due to the impact's trajectory. "1B" went straight down into the park (2 victims) and "KE" crashed 1/2 mile to the north into a residential area (1 victim). The 3 victims in both planes were ejected from their aircraft. The "1B" victims landed in the park and the "KE" victim went through the roof of a private residence and landed in the side patio (1/2 mile away from the other victims). Investigators at both scenes recovered fragmented human remains including fragmented dental remains. At the "1B" crash scene both mandibular and maxillary dental fragments were recovered. Some of the fragments were still attached to the decedent and other fragments were disassociated from the second body and scattered in the debris field. At the "KE" scene only an intact mandible was recovered in the debris field. No other dental fragments were recovered at that scene or on that body. The investigators also collected antemortem dental information to aid in the identification. Only 1 of the victims in the "1B" plane had antemortem radiographs. The victim in the "KE" plane had no antemortem radiographs available but the M.E. investigator was able to obtain a maxillary bleaching tray and a maxillary orthodontic retainer. In the Medical Examiner's office, the author resected the attached jaw fragments and identified 1 of the victims on the "1B" plane based on dental radiographic comparison. The other victim's unattached dental fragmented remains had been collected by the investigator at the "1B" crash scene and labeled accordingly. The remaining dental fragments were organized according to the respective crash site and M.E. case numbers. There were no antemortem radiographs available for the remaining 2 victims. The dental prosthesis's obtained for the "KE" victim was for the maxillary arch which was not recovered at the "KE" crash scene or recovered on the body after extensive examination. The dental identifications for the remaining victims had reached a stalemate. Closer study of the fragmented remains from "1B" crash site showed that there were 2 maxillary left fragments. Since the dental remains of the first victim on "1B" were attached to the body, the additional maxillary fragment was from the victim on the "KE" plane even though that aircraft crash site was ½ mile away. The orthodontic retainer and bleaching tray were precisely fitted on this maxillary fragment and the author was able to positively identify the "KE" victim. Neither appliance fit the other maxillary left fragment. The 2nd victim on the "1B" plane was identified by DN

**Keywords:** Dental Identification; Midair Collision; Co-Mingled Remains

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# THE QUALITY OF THE DENTAL DATA IN THE INTERPOL NOTICES - REVISITED

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**Abstract:** The Interpol Black and Yellow notices are issued by the member countries whenever a deceased individual defies all identification efforts (Black notices), or when a missing person is suspected of having travelled abroad (Yellow notices). The quality of the information in these notices varies greatly depending on the persons representing different scientific disciplines that are involved in the compilation of the inquiry. It is the task of the police to establish the identity of a dead body but often other scientific contributions are needed in order to accomplish that task. Unfortunately, quite often the police will not contact a forensic odontologist and the description of the dental status is made by a police officer, a pathologist or an anthropologist. The poor documentation of the dental status prevents carrying out searches of the repositories of the missing persons. Many possible matches remain then undetected. This problem has been brought to the attention of the INTERPOL Standing Committee on Disaster Victim Identification (DVI) in 2003 and then at the Baltic Medico-Legal Association meeting in 2004 as many of the lacking notices originated in the East European countries. The tsunami that affected the countries around the Bengal Bay in 2004 led to an international identification effort, which made the responsible agencies in many countries aware of the importance of the quality of the Ante Mortem and Post Mortem documentation for the identification results. Since then the quality of the dental data in the Interpol notices has improved considerably but there's still space for much more improvement. The description of the dental status of a dead body must be carried out by a dentist (preferably a forensic odontologist who is familiar with the Interpol DVI-forms or other forms used by repositories of missing people and dead bodies, such as WINID). The important features are as follows: - reliable numbering of teeth, - description of materials used in restorations - description of the colour of the restorations if the materials cannot be identified - amalgam for metal fillings, synthetic for all white fillings is sufficient description - crowns; gold or metal-coloured with or without white coating is sufficient description - missing teeth, Post Mortem or Ante Mortem. X-rays and/or colour photographs of the teeth would also greatly increase our prospect of finding a positive match in our repositories of missing people. If the decision is made to send out a notice for identification of an unknown body that hasn't been identified in the country of discovery, and there's a reason to suspect that it was a foreign person, every measure should be taken to make sure that the work put into preparing it is worthwhile, and contains the necessary information to enable a comparison. When there's no forensic odontologist, nor any dentist available, a few close-up colour photographs of the teeth' biting surfaces together with frontal and right and left side photographs will go a long way in helping to show the dental features as opposed to inadequate descriptions made by persons who have no education in the dental profession.

**Keywords:** Interpol; Dental Identification; Forensic Odontology

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# THE RECOVERY AND IDENTIFICATION OF THE VICTIMS OF THE 2008 TRINITY COUNTY HELICOPTER CRASH

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**Institution(s):**[1]SAN DIEGO COUNTY MEDICAL EXAMINER; [2]SHASTA COUNTY CORONER

**Case Report:** On the evening of August 5, 2008 a Sikorsky-61N helicopter with 13 people on board crashed deep in the mountains of Trinity County California. The helicopter and its occupants had been participating in the containment of the Buckhorn fire. They had just refueled and were headed back to their US Department of Forestry base in Oregon. Upon liftoff the helicopter lost power and altitude. Its blades struck a tree causing it to freefall and crash land on its port side. Miraculously, four people were ejected from the aircraft and survived but the remaining nine passengers died on impact. The helicopter immediately burst into flames and due to the inaccessibility of the crash site, the steep rugged terrain, and the ignition of the magnesium metal in the aircraft engines, the fire could not be extinguished. The fire was was allowed to burn itself out, which took three days. Once the fire had extinguished itself coroners investigators from both Trinity and Shasta counties participated in the recovery of the remains. The intensity and heat of the three day fire had resulted in a crash scene of melted, twisted metal along with nine sets of co-mingled, and cremated human remains. It took the investigators three additional days, working on their hands and knees, in one hundred plus degree temperatures, on the side of a mountain, to uncover, collect, catalogue and bag the remains. According to one of the investigators, they would uncover the spinal column remains and trace it up to the skull. Then they carefully collected the skull and dental remains and bagged them separately knowing that the dental remains were going to be key in identification. Trinity County has a cooperative agreement with its neighbor county, Shasta, for use of its coroners facilities and staff so all the remains, once collected, were transported to the Shasta County Coroners office. It was at this time that the author was contacted by Trinity Sheriffs Investigator Bryan Ward to begin the process of identification of the nine decedents by means of dental records. In addition, the author contacted the Governors Office of Emergency Services (O.E.S.) for activation of the California Dental Identification Team (CalDIT). The O.E.S. arranged for transportation of team members to Northern California. Drs. Anthony R. Cardoza, Duane Spencer, and James Wood were asked to participate in the event. Dr. Cardoza also procured a portable digital radiograph unit from his county as well. On August 13, Wednesday afternoon, the author, Dr. Cardoza, and Dr. Verlund Spencer met at the Shasta County Coroners office to commence the process of identification of the nine decedents. Since antemortem dental records were initially slow in arriving it was decided to sort out and process the nine sets of postmortem dental remains first. Once the antemortem records arrived, then the antemortem to postmortem comparisons would proceed. The maxillas and mandibles were mostly fragmented and all were calcined. The teeth were often missing postmortem and/or fractured with no coronal portion recovered. The procedure was to sort out and photograph the remains to determine which jawbone fragments corresponded. The corresponding fragments would be bonded together with cyanoacrylate. We then focused on piecing together the fragmented dental remains though most were root tips only. Lastly we determined which sockets the dental fragments corresponded with and this would be confirmed both visually and radiographically. If in fact the fragments fit then they were bonded with cyanoacrylate, if not, then the fragment was removed and the process was repeated in a different area or different fragment. It was during this step that the use of the digital radiography equipment greatly expedited the process. We had the ability to radiograph an area and see the picture in three seconds which saved time and energy. By Thursday afternoon, the postmortem documentation for all nine decedents was complete. Beginni

**Keywords:** Crash; Calcined; Odontology

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# ORAL SESSION

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# ON THE MECHANISM OF GUNSHOT RESIDUE FORMATION AND DISTRIBUTION IN THE VICINITY OF THE SHOOTING GUN

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**Abstract:** Chemical and morphological examinations, performed by means of X-ray microanalysis, for populations of metallic gunshot residue collected from the substrates of the nearest vicinity of the shooting gun including the cartridge case, obtained within the same single shot, provided interesting information on the mechanism of the shot as well as the distribution of the residue on the shooter and on a set of close range targets. Critical comparative studies of gunshot residue collected from the shooter's hands and the cartridge case after single shots with chosen Luger 9 mm ammunition demonstrated the dependence of their chemical contents on the chemical composition of the primer and other parts of the cartridge as well as the directional course if the subsequent explosives reaction. Whereas the residue taken from inside the cartridge case reveals the chemical contents strictly related to the primer composition, the airborne residue may additionally include the components of the bullet core and jacket as well as impurities of the inner surfaces of the barrel. Further study of the chemical and morphological properties of residue particles settled on hands and clothing of the shooter as well as on targets placed in the range 10 - 100 cm, performed for Makarov 9mm and Luger 9 mm ammunition (Mesko Metal Works, Skarzysko-Kamienna, Poland), demonstrated that the gunshot residue distribution is not homogenous and strongly depends on the distance from the muzzle. Moreover, the changes in their chemical contents along the shooting direction are opposite to these observed on the clothing on the shooter. This finding may have an important consequence as in favorable conditions a gunshot residue examiner may attempt a challenging problem of differentiation between the shooter and other persons present nearby in the crime scene.

**Keywords:** Criminalistis; Gunshot Residue; X-Ray Microanalysis

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# EFFECT OF BARREL LENGTH ON PELLET DISTRIBUTION: AN EXPERIMENTAL STUDY WITH VARIOUS BARREL LENGTHS AND CALIBERS

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**Abstract:** Shotguns are popular worldwide and smooth bore shotguns are bought and used than are rifled types. In cases of shotgun injuries shot range estimation is very important for criminal investigations. The distributional pattern of pellets may allow shot range estimation in shotgun wounds. Type of the weapon, barrel length and choke diameter, type of the cartridge, powder and relevant properties of the pellets as well as the physical circumstances under which the shot was fired will influence the distribution pattern of the pellets on the target. Thus experimental shots under standardized conditions have to be performed in order to establish a reliable shot range estimation. Twelve and 36 gauge with 55 and 71 cm smooth bore shotguns were fired with #6 and #8 shots from 100, 150, 200, 300, 500, 1000, 1500 and 2000 cm distances in a right angle (90º) toward the target by a firing mechanism which allows mounting different barrels in gauge and length. The distribution of the pellets was determined by measuring the maximum distance between the pellets in the vertical and horizontal direction. Statistically significant pellet dispersion values were found for each shotgun by using #6 and #8 shots for different firing distances and barrel lengths. Long guns with shortened barrels are mostly used in connection with criminal offences. If the barrel of a long gun is shortened, bullet velocity decreases. In pellet shots, the distance-dependent shotgun pellet pattern may change. Investigators should perform test fires for each shotgun, for each barrel length and for each pellet type while determining the firing distance.

**Keywords:** Shotgun; Ballistics; Pellet Dispersion; Firing Distance

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# CARTRIDGE CASE SIGNATURE IDENTIFICATION USING TOPOGRAPHY MEASUREMENTS AND CORRELATIONS; UNIFICATION OF MICROSCOPIC AND MATHEMATICAL COMPARISONS

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**Introduction:** A comparison microscope employing the standard optical comparison method and confocal microscopy with subsequent cross correlation mathematical analysis were used to correctly identify cases fired from a set of ten (10) consecutively made pistol slides. The mathematical identifications were based on the breech face impression without the firing pin aperture shear marks. Fifteen (15) unknown cases were compared to test fired cases sets from the consecutively manufactured slides. In addition, five (5) "persistence cases" were also compared to the slides.

**Materials and Methods:** Cartridge cases that comprised test fires from ten (10) consecutively manufactured Ruger slides, fifteen (15) unknown cases, and five (5) "persistence study" cases were received from Thomas Fadul from the Miami Dade Crime Laboratory. The cases were microscopically examined and the results were later confirmed as accurately associating all of the questioned cases back to the correct pistol slide sources. These results were not communicated to the project team until after the surface metrology and correlations were completed. A Nipkow disc confocal microscope was used to gather the 3D topography data from the breech face area of each case. The data were then trimmed removing any uninformative areas. Preprocessing software then was employed to first identify outlier and dropout points, which are typical artifacts in this type of surface measurement. These outliers and dropouts were then interpolated and masked from further correlations. Next, the software applied a Gaussian filter to the data to remove any long wavelength waviness and short wavelength noise. After the filter, the data were then leveled and were registered in the X, Y and ? directions to locate the maximum correlation position. After the registration was completed, the software applied the cross correlation algorithm to quantify the similarity between two cases. A total of 1600 correlations were performed in a 40 x 40 matrix. Using statistical analysis from the known match and known non-match correlations, a baseline cross correlation function (CCF) was established to identify matches. Finally, the results of the mathematical determination of slide source were compared to the validated results from the microscopic comparisons.

**Results:** Based on the CCF results, and a statistical analysis of the match and non-match case scores, each of the 19 of the 20 unknown cases were correctly identified to the slides that it came from. One case was not identified back to its original slide and had an "inconclusive" scoring. However, this one case was identified to other unknown cases that were correctly identified to the same slide.

**Conclusions:** Using the topography from the breech face portion of the case, the cross correlation function performed very well in identifying the unknown cases back to their slides. These results provide an objective mathematical validation of consecutive pistol slide breechface identifications that is in harmony with the results of optical comparison microscopy employed by an experienced firearms examiner.

**Keywords:** NIST; Comparison; Identification; 3D; Confocal; Correlation; Firearm

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# BULLET SIGNATURE IDENTIFICATION USING TOPOGRAPHY MEASUREMENTS AND CORRELATIONS: THE UNIFICATION OF MICROSCOPIC AND MATHEMATICAL COMPARISONS

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**Introduction:** Current firearm identification is based on image comparisons using optical comparison microscopes. The ability to produce an accurate identification depends on image quality which is largely affected by lighting conditions. Because ballistic signatures are geometrical micro-topographies by nature, the main objective is to demonstrate the usefulness of surface topography measurement techniques for firearm identification. Additionally, an objective mathematically based acquisition and comparison method would help demonstrate the foundation of the science of firearm and toolmark identification.

**Materials and Methods:** A 2D and 3D Topography Measurement and Correlation System was developed at NIST for certification of NIST Standard Reference Material (SRM) 2460/2461 Bullets and Cartridge Cases. Based on this system, a prototype system for signature measurement and correlation of fired bullets has been recently developed at NIST for bullet identifications. The 3D topography data of the land engraved areas (LEAs) of fired bullets are captured by a commercial confocal microscope. The LEAs were processed by the "edge detection" method to determine the "striation density", by which the surface area with low striation density on the LEA could be masked out from correlation. The modified 3D micro-topography data on the remaining "valid correlation areas" are compressed into a 2D profile which represents the 2D ballistics signature of the LEA. A correlation program using two methods has been developed for matching the paired profile signatures: the "CMS" (Consecutive Matching Striae) method used by many firearm examiners and the CCFmax (cross correlation function maximum) method developed by NIST based on analysis methods in surface metrology.

**Results:** In July 2010, a set of 20 known-matching bullets fired from 10 consecutively manufactured barrels (two bullets from each barrel) were tested. Their 3D topography images were captured by the confocal microscope at NIST, and correlated by the prototype ballistics identification system using the cross-correlation function maximum (CCFmax) as a correlation indicator. The correlation result was excellent: correlation values of all ten pairs of known-matching bullets scored highest on all correlation lists, yielding a correct identification rate of 100%. For the 60 pairs of matched LEAs (each bullet includes six LEAs), correlation values of matching LEAs scored highest on 59 out of 60 correlation lists, yielding a correct identification rate for individual LEAs of 98.3 %. In August 2010, an additional set of 15 unknown matching bullets fired from the same set of 10 barrels was blind tested. These bullets were correlated with the 20 known-matching bullets mentioned above, making the total number of correct matching pairs equal to 30 (15 × 2). Both the CCF and CMS method were used and showed excellent correlation results. When using the CMS method, one matching pair did not meet the selected CMS criterion (3X) for a "match", and 29 out of 30 pairs of matching bullets were correctly identified, yielding a correct identification rate of 96.7%. When using the CCF method, all 30 pairs of matching bullets scored at the topmost position on their respective correlation lists, yielding a correct identification rate of 100 %. (Note: the CMS criteria were applied to topography images here and not to traditional reflectance microscopy images.) The comparable performances of both mathematical models point to the potential unification of decades of CMS empirical data and new surface metrology systems.

**Conclusions:** A prototype bullet signature identification system is developed at NIST based on a commercial confocal microscope and the NIST Topography Measurement System. Initial tests using a set of 20 known-matching bullets fired from 10 consecutively manufactured barrels, and a set of 15 unknown matching bullets fired from the same set of barrels, have shown excellent accuracy correlation results, with no misidentifications.

**Keywords:** NIST; Identification; Firearm; Topography; CMS; Striae; Correlation; Consecutive; Confocal; 3D

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# ABOUT THE NEW METHOD OF DETERMINATION OF DISTANCE OF A BULLET SHOT FROM A FIRE-ARM

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**Abstract:** For proper qualification of a crime involving use of fire-arms, it is necessary to find out circumstances of its application. In the city N, in the area of private houses, near gypsum plaster board, a dead body of a male was found, with a through gunshot wound in the area of neck. On the gypsum plaster board there were found 2 blind-end holes with 9 mm bullets. It is not possible to determine direction of shot more precisely because of the broad diameter of the bullet damage channel, and shall depth of it (L1=55 mm). Data determined at the moment of the murder: air temperature 15degrees, pressure h2=750 mm Hg., relative humidity W2=50 percent. Height above the sea level is H2= 500 m. For the purpose of search for the murderer it was required to determine the distance of the criminal shot (S1). As a basis it was used previous research in the sphere of ballistics of the mathematician, L.Euler, who managed to find the relationship between velocity (V) of the bullet with bullet penetrating depth (L) to a barrier: V1*V1/V2*V2 =L1/L2 (Formula 1), where V1- is velocity of the bullet, which was taken from crime scene (criminal bullet), at the barrier, L1 — criminal bullet penetrating depth to the barrier, V2 — experimental bullet velocity at the barrier, L2 - experimental bullet penetrating depth to the barrier (L.Euler. Research in Ballistics. - Moscow, 1961. - P.447). Also, the method of determination of bullet velocity at different distances from the muzzle, proposed by Yu. Mishin, Ye, Stashenko, is taken to consideration: (V-602+0,144*B)*(V-602+0,144*B)=(0,1297*B-343)*(0,1297*B-343)+41040 ( Formula 2). Parameter B can be represented as follows: B=A(V0)+C*S*H(y) ( Formula 3), where S - is the distance, at which the bullet has the given velocity, A(V0) - parameter, which depends on the initial bullet velocity, is calculated by the formula (A(V0)-10800+36,85*V0)*(A(V0)-10800+36,85*V0)=(33,194*V0-7346)* (33,194*V0-7346)+10500000, C-ballistic coefficient, and H(y) - is air density function, represented in the reference table (Yu. Mishin, Ye, Stashenko. Short-cut way of calculation of bullet run in air // Expert Technique.- Moscow, 1985. - Issue 92. - P.105-115). In this case, by formula 2 we find V2 - experimental bullet velocity at the barrier, then by formula 1 we calculate V1 -criminal bullet velocity at the barrier. In the following, by formula 2 we find the value B1, and by formula 3 we obtain the target value S1 - presumptive distance of the criminal shot. Under air temperature equal to 20 degrees, pressure h2=740 mm. Hg., relative humidity W2=80 percent, height above the sea level H2= 500 m., there was conducted an experiment, consisted of 5 shots by 9,0 mm bullet from of Makarov pistol, with the initial velocity V0 =315 m/sec, from the distance 50 m to the similar barrier, at the same time, penetration depth was about L2= 45 mm. 1. According to the reference table, made by Yu. Mishin, Ye, Stashenko, we find that: - C1=16,1 ; C2=16,1; - adjustment for h1 and W1 are equal to 0,916 and -0,01, respectively; - adjustment for h2 and W2 are equal to 0,969 and -0,03, respectively; - H1(y)=(0,916-0,01)*(1-500/10000)=0.8607; - H2(y)=(0,969-0,03)*(1-500/10000)=0.892; - A1(315)= 3684, A2(315)= 3684. 2. We shall find B2 by formula 3: B2=3684+16.1*50*0,892= 4402. 3. We calculate V2 by formula 2: V2= 273 m/sec. 4. From formula 1 we find V1: V1 =305,22 m/sec . 5. By formula 2 we calculate B1: B1=3820. 6. We calculate H1(y) : H1(y)=(0,916-0,01)*(1-500/10000)=0.8607. 7. As a result, from formula 3 we obtain: S1= (B1- A1(315))/C*H1(y)= (3820- 3684)/16.1*0.8607=9,81 m. The determined distance of the criminal shot allowed us to determine position of the shooter, that gave unequivocal evidence against the owner of one of the houses. This method allows to determine distance of shot, done from rifled weapon, and to find scientifically reasonable conclusion.

**Keywords:** Makarov Pistol; Firearms

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# NANOTECHNOLOGY AND FORENSIC SCIENCES: A NOVEL FABRICATION PROCEDURE FOR DETECTING AMMUNITION FEATURES

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**Introduction:** Nanotechnologies have, in the last decade, boosted important progresses in several scientific and technological domains: innovative materials, biosensing, nanomedicine and electronic. Only few applications of nanotechnology have appeared in forensic sciences, mainly concerning anti-counter faction and gunshot residue analysis. The main advantage of nanotechnology relies on the combination of novel fabrication method with innovative imaging techniques. The former have allowed fabricating structures with features as small as few nanometers thus allowing a fine tuning of the material properties; to analyze these structures a new family of microscopies (Scanning Probe Microscopy, SPM) has been developed that allows image details with a nanometer scale resolution. We propose a combination of these two innovations to set up an innovative protocol for the quantitative analysis of the features displayed by the ammunition upon shooting. Replica molding has been used to fabricate accurate replicas of different parts of a cartridge and a bullet; in this way an arbitrarily large number of exact copies of the evidence has been made available to be distributed among the different law enforcement agencies thus preserving the original one. Moreover the intrinsic properties of replicas, that make convex what in the original was concave, have made available important parts of the surfaces to the scanning probe microscopy analysis. It is the case of the firing pin mark on the primer cup that upon replica molding become an exact copy of the firing pin and being convex can be scanned by an Atomic Force Microscope.

**Materials and Methods:** Different replicas of cases bottom of different brands ammunitions shot by different guns have been analyzed by conventional optical microscopy (bright and dark field), Scanning Electron Microscopy (SEM) and Atomic Force Microscopy. The images have been then analyzed using the typical tools of material surface analysis: power spectrum density function (PSDF).

**Results:** The results proved that the method produces copies of a single cartridge that are identical down to the nanometer level; the replicas of the firing pin mark on the primer cap, coming from the different guns, have been univocally assigned to the respective weapon with a strong statistical robustness. Moreover, the quantitative spectral analysis of the Atomic Force Microscopy images has allowed to define the range where the association of different marks can be done, thus showing that below few hundreds of nanometers small modification taking place on the firing pin upon shooting and the convolution of the firing pin surface with the primer one prevent any univocal assignment. Preliminary results of the replica of the lateral striae of the bullets will be shown, with special attention to the fabrication of a planar sample from an intrinsically curved one (cylinder); this procedure facilitates the microscopic analysis of the ballistic characteristics, especially those found on bullets very deformed as a result of impacts with hard surfaces.

**Keywords:** Ballistics; Atomic Force Microscopy; Nanotechnology; Replica Moulding; Toolmarks

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# ORAL SESSION

## Session 15.23

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1

# RESEARCH RESULTS IN FORENSIC SCIENCE DISCIPLINES SUCH AS BALLISTICS, FIRE DEBRIS AND LATENT PRINTS, DEMONSTRATE HUMAN VARIABLES AND OLD SCHOOL THEORY ARE THE CULPRITS OF MISS HITS AND ERRONEOUS IDENTIFICATIONS

**Author(s):** Ballou S[1]

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**Abstract:** In 2009 the United States' National Academy of Sciences (NAS) issued a Report on the current state of forensic science which included interpretation of future activities to strengthen the science. The initial response from some within the forensic science profession was outrage and admonition of the views of the NAS commission members that generated the report. However, further review of the report showed the commission had correctly identified areas that required foundational research to bolster the forensic science profession. The National Institute of Standards and Technology (NIST) was mentioned numerous times within the Report due to its reputation and decree as the Nation's measurement laboratory. This distinction has led the Law Enforcement Standards Office (OLES) within NIST to expand or initiate research projects targeted toward the advancement of measurements, standards, and best practices to address the identified gaps within the Report. Several research areas are briefly described below and will be addressed in further detail along with others during the presentation. • The Ballistics Imaging Database Evaluation (BIDE) project was initiated to determine the feasibility and integrity of a national ballistics imaging database. The initial focus soon diverged into several research avenues that have identified human actions that cause poor image capture and instrument software programs that fail to un-compress the image to the original state. These all have a pronounced affect on the numerical rating of a database search that could result in a missed hit or cause a wrong identification. • Research on cognitive bias has slowly been accepted by forensic practitioners that have insisted they can control bias when examining evidence. The latent print examiner was targeted in several research projects to demonstrate that cognitive activity, human factors and characteristics can adversely affect an analysis. • Burn pattern analysis has continuously taken the spot light at NIST in an effort to scientifically bolster the actions of the arson investigators and fire debris analysts. The project is nearing one level of completion demonstrating the need for new training in fire origin identification or more commonly known as point of origin.

**Keywords:** Forensic Science; Ballistics; Latent Print; Fire Debris; Human Factors; Errors

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2

# DATING ISSUES IN FORENSIC SCIENCES

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**Abstract:** Time is an essential criterion at all levels of crime investigation. It is a particularly important factor in forensic science to determine the pertinence of physical evidence and its interpretation. The objective is the timely extraction and interpretation of trace characteristics for investigating criminal incidents and providing evidence for the court. By establishing when a trace was transferred at the crime scene, it is possible to determine the time of contact between objects and/or persons and gain valuable information about the unfolding of criminal events. Currently, only a few selective applications are widely conducted in routine investigation, like the estimation of the time of death, blood alcohol metabolic pathways or the dating of questioned documents; however the latest remains highly controversial and proposed methods are generally applicable in few real cases. Thus, beyond the above mentioned applications, nowadays almost no information about time unities can be gained during the investigative processes due to the complexity of the overall problem. In fact, while the need to develop methods for the dating of different forensic traces has been acknowledged in the past, only preliminary and case oriented studies have been carried out so far, and their application to estimate the age of traces is often debated. The aging of traces are not yet fully understood and the extent of influence of many environmental factors on the aging kinetics and processes remain unknown. Beside these considerations, one major limitation of most previous developments is the obvious lack of validation of the proposed methods, as well as an inappropriate interpretation of the results. Considering that such issues are recurrent in forensic science and transcend the treatment of each trace type separately, a fundamental approach leading to a framework that can be applied transversally to all forensic traces is undeniably needed and will be presented here. This should lead to a better fundamental understanding of age determination issues.

**Keywords:** Time; Aging; Dating; Pertinence; Validation; Interpretation

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# IS IT POSSIBLE TO ELIMINATE SUBJECTIVITY FROM FORENSIC SCIENCE?

**Author(s):** Moszczynski J[1]

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**Abstract:** Is it possible to eliminate subjectivity from forensic science? In some forensic disciplines, human senses and mind constitute basic and irreplaceable examination instrumentation. Knowledge and experience of experts who operate in non-measurable areas, very often lead to the same or similar, repetitive and at the same time, accurate results. Unlimited variety of cases, the experts come across, continue to pose new challenges and, unfortunately, bring about also controversies and mistakes. The problem of lack of sufficient scientific basis across various forensic disciplines, which manifests itself, among others, in subjective expert evaluations, has been presented in two notable reports drafted on the request of the US Congress and European Council. In the hereby presentation, I discuss the causes for occurrence of subjective evaluation in selected types of forensic identification (genetic, fingerprint, handwriting, speech, human scent and footwear analysis) and present the reasons why a substantial reduction of subjectivity is rather impossible. I primarily took into account the properties of identification features, as well as respective stages of comparative examinations. Properties of identification features determine the possibilities of employing appropriate examination methods and demarcate subjectivity areas. Instability of these features (variability, modifiability) as well as their low level of definition result in a destabilization of the entire identification process. Quite often, such properties of identification features do not allow for creation of neither the accurate feature catalogues, nor population databases, and - consequently - for employment of statistical methods for evaluation of the outcome of comparative examinations. Presence of subjectivity in forensic examinations is not a disadvantage, but a necessity. Irrespective of efforts undertaken, in majority of forensic examinations, it is not possible to attain, or even approximate, the level of objectivity in DNA identification, often being set as a model example to follow. Facing this situation and with improvement of quality of forensic examinations in mind, one should focus on suitable training of experts, supervision of their work performance, and standardization of the examination process.

**Keywords:** Subjectivity; Forensic Identification

4

# SEXUAL HOMICIDE: A QUALITATIVE ANALYSIS OF THE CRIMINAL EVENT

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**Abstract:** In the Crime Classification Manual (CCM), Douglas, Burgess, Burgess and Ressler (2006, p. 212) define sexual homicide as involving "a sexual element (activity) as the basis in the sequence of acts leading to death (…) [ranging] from actual rape involving penetration (either pre- or postmortem) to a symbolic sexual assault such as insertion of foreign objects into a victim's body orifices" and classify it into five distinct types: 'organized', 'disorganized', 'mixed', 'sadistic' and 'elder female'. This classification system was developed by criminal profiling experts from the Federal Bureau of Investigation (FBI) for the purpose of assisting with criminal investigation, especially criminal profiling and suspect prioritization. It provides the background characteristics of offenders and victims, based on the motivation of the offender inferred solely from his crime scene behavior. This study is a qualitative analysis of eight sexual homicides that occurred in Portugal. Institutional files of eight Portuguese males convicted of homicide and sex offenses were examined. The aim of the study was to identify common aspects of the crime events (pre-crime, crime and post-crime) related to the victim, the offender and the crime itself, that would allow classification of the crimes according to the CCM. For this purpose, using content analysis, a category system was built according to Bardin's (2004) approach. The categorization process allowed for the creation and classification of analysis units such as: target selection, crime location selection, premeditation, approach strategy, offender/victim interaction, victim resistance, cause and mechanism of death, victim release, and offender's forensic awareness.

**Keywords:** Sexual Homicide; Classification; Criminal Profiling; Content Analysis

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# A KEY MODEL OF FORENSIC SCIENCE: K.E.E.

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**Abstract:** The future of forensic science is the object of many discussions, with a focus directed towards the importance of standardisation and quality management to ensure an overall effectiveness of the forensic science process. But "forensic science is a complicated end-to-end process" (Brown Willis, 2009), and the attention rarely focuses on theory and basic principles whenever quality and improvement of the discipline are mentioned. Thus, there is a need to investigate what pertains to thought processes involved in forensic science in order to strengthen it. True leitmotiv for any forensic science specialist, the concept of relevancy underpins any valuable contributions made by scientists within a legal process; its study is essential for forensic science underpinnings. Working with relevant physical traces would seem to be obvious for all, but the simplicity of the question of whether a trace is relevant or not leads to an answer that is neither obvious nor trivial for the criminalist. The current conundrum that forensic specialists are facing is actually formalized in those terms: the most difficult challenge is "the recognition of relevant physical evidence", whereas it may be questionable whether the capacity to recognize objects as evidence would not have limits (Inman Rudin, 2000). Those limits pertain to the framework of interventions of criminalists: crime scenes are successive but not alike, peculiar to each criminal activity. This forces criminalists to adapt to places and cases in order to find what is relevant. But how does it work? What is a relevant trace? Do all criminalists perceive relevancy in a same way? What will influence their perception? These questions raise issues that go back to the very foundations of the investigative process that cover one fundamental aspect of forensic science. A research dedicated to the relevancy concept in forensic science, which focuses specifically on what will influence the criminalists' perception, is the object of this presentation. Three interdependent cognitive parameters, often cited in the literature, emerge as being likely to influence the search of physical trace at scenes. These factors cover three domains: Knowing, Education and Experience, symbolized by the acronym K.E.E (S.F.E in French). By grouping them, they constitute a stock-in-trade specific to forensic specialists and compose an essential part of their knowledge. The general hypothesis assumes that the K.E.E model conditions the forensic approach of the specialist, and so his evaluation of the relevancy concept while investigating a crime scene and searching for relevant physical trace. A two stages experimental approach was set out to test the formulated assumption. The first step was an exploratory approach achieved through an internship within a crime scene investigations unit, which allowed building up a statistical basis and a picture of the reality on the field. Then, within the experimental approach, semi-conducted interviews, combined with a survey, are intended to determine what perception of the relevancy concept emerges among interviewees (novice and experienced criminalists). The influence of the KEE model on the evaluation of relevancy concept is highlighted through various comparisons between groups by combinations of the KEE parameters. This set of associations determines the value of these parameters compared to each other and their importance regarding the relevancy concept. The results help formulate models to stimulate a better forensic approach at scenes, and provide fundamental tools to reinforce or orientate criminalists' education within a sound logical scheme to approach crime scene investigations. This research has a fundamental methodological component that should help formalise relevant trace detection and collection at scenes. It can provide directions towards the development of an investigation scene management process and should help the overall quality of detection.

**Keywords:** Relevancy Concept; Knowledge Model; Education; Experience

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# THE APPROACH OF PRE-HOSPITAL CARE IN TURKEY TO EVIDENCE PRESERVATION AND COLLECTION IN FORENSIC CASES

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**Abstract:** The study aims to define the level of knowledge of pre-hospital care providers on crime scene investigation, collection and preservation of evidence. A cross-sectional study was designed to provide the level of knowledge of pre-hospital care providers. A question form with multiple choices was developed according to various resources. First phase questions were designed to collect demographic characteristics. Second phase contains 32 questions designed to evaluate the knowledge about crime scene investigation, collection and preservation of evidence. Either the question forms were given to pre-hospital providers before their in-service training or the forms were consigned to the responsible persons in ambulance services in order to hand out to pre-hospital care providers. 133 pre-hospital care providers that work in government ambulance service participated in the study. The answers of the questions encoded into SPSS statistic program and analyzed. It is found that the participants answered wrong for some specific questions about crime scene investigation, collection and preservation of evidence. Pre-hospital care providers' knowledge on crime scene awareness, crime scene investigation, collection and preservation of evidence were not at the preferred level. Data obtained from the question form about collection and preservation of evidence reinforces the educational gap of pre-hospital care providers on crime scene course. However participants chose the right answers of some questions. In regard of gender classification, women; in regard of profession, the doctors had a higher score than the rest of the participants. It is recognized that the primary duty of any pre-hospital providers at the crime scene is to render medical assistance to the victim(s). The police are in charge of any crime scene and have an interest in preserving any physical evidence, which may assist in the prosecution of the criminal case, however the pre-hospital providers should avoid unnecessarily disturbing the scene and should attempt to assure preservation of possible evidence. Therefore they need to have education in crime scene awareness.

**Keywords:** Pre-Hospital Care Providers; Crime Scene Investigation; Evidence

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# A STANDARDIZED APPROACH TO CRIME SCENE IN ITALY

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**Institution(s):**[1]UNIVERSITY OF FOGGIA; [2]RACIS CARABINIERI

**Introduction:** Italy has not any mandatory documents containing guidelines for crime scene investigations. Only few Police Departments have their own procedures and they are fragmented, different from one department to another and uncertified by Italian law. The lack of binding procedures runs the risk of badly performing investigations on crime scene. Statistics on Italian criminal trials of the last 5 years highlight that when investigations are started on an elaborate crime scene, the trial is very often expected to wind up with a acquittal because of the unreliability of the physical evidences collected on crime scene. The current research aims at demostrating how the use of certified, binding and shared procedures manages to improve the quality of the investigations conducted on crime scene and, later on, the opportunities on behalf of the court to make use of evidences coming from crime scene.

**Methods:** A working group, composed of magistrates, lawyers, polices, forensic sciences experts, law school teachers, has drafted standardized guidelines on each step of investigations on crime scene (such as observation, pre-examination, multi-comunication, preservation, initial report, initial strategy, choice of methods and techniques, collection, packaging, chain of custody from crime scene to office/lab, storage items, final report). The procedures have been submitted to a large group of CSI investigators attending training courses at the High schools of the Police Departments. At the end of the training courses, investigators have been asked to highlight the advantages inner to related procedures, to focus on possible points of weakness of procedures, and to strictly apply them when investigations are in progress.

**Results:** Guidelines on Crime scene investigations have been drafted. They are now used as tools for the training of the investigators on crime scene. Procedures find a daily application.

**Keywords:** Crime Scene; Justice; Guidelines

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# ORAL SESSION

## Session 15.24

1

# STUDY OF LETHAL AND NONLETHAL FILMED HANGINGS: NEW INSIGHT INTO THE PATHOPHYSIOLOGY OF HANGING

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**Introduction:** Contemporary understanding of the pathophysiology of hanging is still largely based on old writings and experimentation from the end of the 19th century and beginning of the 20th. Apart from a few animal studies that gave very limited information on the pathophysiology of hanging in human, there was little new development on this issue until the creation of the Working Group on Human Asphyxia in 2006. Here presented are the newest results from this ongoing study.

**Materials and Methods:** Fourteen lethal filmed hangings (nine autoerotic accidents, four suicides and one homicide) were analyzed, as well as three non-lethal filmed hangings in an autoerotic asphyxia practitioner.

**Results:** 1. Lethal filmed hangings: In the fourteen lethal filmed hangings, the following sequence of agonal responses was observed: rapid loss of consciousness in 10 s ± 3 s, mild generalized convulsions in 14 s ± 3 s, decerebrate rigidity in 19 s ± 5 s, beginning of deep rhythmic abdominal respiratory movements in 19 s ± 5 s, decorticate rigidity in 38 s ± 15 s, loss of muscle tone in 1 min 17 s ± 25 s, end of deep abdominal respiratory movements in 1 min 51 s ± 30 s, and last muscle movement in 4 min 12 s ± 2 min 29 s. 2. Effect of the type of suspension: A comparison of time delay for agonal responses in complete suspension and incomplete suspension do not reveal impressive differences. These results suggest that the type of suspension may not be an important factor in the timing of agonal responses and therefore in the time to irreversible damage and death. 3. Effect of ischemic habituation: Considering that autoerotic practitioners might develop over time a certain ischemic habituation, it is theoretically possible that these cases present a deceleration of the sequence. On the other hand, since they often play for a longer period with the hanging process before the final hanging, it could be argue that on the contrary, their hanging sequence will be accelerated. Overall, the time delays for the early responses to hanging seem to be relatively similar between both groups, with the exception of an accelerated start of deep abdominal respiratory movements in the autoerotic practitioners. As for the late responses to hanging, they seem to be decelerated in autoerotic practitioners. 4. Non-lethal filmed hangings: In the three non-lethal filmed hangings, a loss of consciousness was observed in 8 to 16 seconds, followed by convulsions in 9 to 26 seconds. Decerebration rigidity was observed in one non-lethal filmed hanging (at 20 seconds). The ligature, which was not tied tightly to the shower rod, then detached from it, causing the fall of the man and the interruption of the hanging. Upon interruption of the hanging, the man quickly regained consciousness and seemed to present a full recovery without any noticeable symptoms. 5. Estimation of the time to irreversibility and to die by hanging: The scientific basis for the generalized assumption that death by hanging occur in 3 to 5 minutes will be reviewed. There is no forensic study to sustain this estimate of 5 minutes to die. In fact, this number seems to be based on 3 types of studies: a series of near-hanging victims in emergency medicine, studies of carotid endarterectomy, and physiopathological studies of brain ischemia. Though this estimation of the time is certainly precise and accurate enough for the needs of clinicians, it will be demonstrated that scientific evidence are not strong enough to be used in court. So how long does it take to suffer irreversible damage by hanging or by strangulation? The only honest and scientifically valid answer seems to be that we do not know.

**Keywords:** Asphyxia; Hanging; Physiopathology

2

# NATURAL VS VIOLENT DEATH IN THE ELDERLY - A RETROSPECTIVE STUDY

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**Introduction:** Due to improvements in life conditions and health care, the number of elderly individuals in modern western industrialized countries have been increasing significantly in the past century, which is a trend expected to be maintained in the XXI century. Several studies have been carried out concerning natural causes of death in this age group, which defined main groups of pathologies, their relative frequencies, risk and precipitating causes. Perhaps because they are expected to die mostly of disease or of "old age" there are not many studies about the incidence and characteristics of violent death in elder individuals.

**Materials and Methods:** The reports of violent death from autopsies performed in the Department of Forensic Pathology (Coimbra) of the Portuguese National Institute of Legal Medicine in its area of jurisdiction during 2008-2010, concerning individuals older than 65 years old, were reviewed. Data collected was analyzed regarding various parameters, namely, gender, age, type of death, manner of death. Further statistical analyses allowed establishment of the incidence, proportion between manner of death (homicide, suicide, accidental) AND preponderance of gender.

**Discussion:** The most frequent age range was between 65and 75 years old and the majority of individuals were males. As for the manner of death, accidents ranked first, mostly due to traffic accidents and falls, followed by suicide and homicides. The majority of deaths were related to traumatic mechanisms. The authors present the results of a comprehensive ongoing study, in order to obtain a better understanding of violent death phenomena in the elderly, it could be possible to recognize risk patterns that may help to improve or even allow proposing new preventive measures.

**Keywords:** Forensic Pathology; Violent Death; Elders

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# INFRARED TYMPANIC TEMPERATURE FAILS TO ASCERTAIN THE TIME OF DEATH IN A CONTROVERSIAL CASE OF INFANTICIDE BY DROWNING

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**Introduction:** The core temperature of a corpse is necessary in the Henssge (Henssge et al., 1984) nomogram to reconstruct the timing of death. The golden standard to collect the core temperature is through a rectal or esophagus probe (Crawford 2006, Holte 2009). In Italy, instead, it is frequent a core temperature sampling with a tympanic infrared thermometer (core setting), even if in cases where precision is necessary, the tympanic temperature is not ideal (Craig et al. 2002). We assisted a case of suspect infanticide, where the emergency service revealed a deep temperature of 24.9° C with tympanic thermometer Genius 300 A on a female victim of 2 years old, immersed in a 18° C river. Through the application of the Henssge nomogram with this temperature, the death as been reconstructed around 2 hours before the corpse retrieval, when the mother was last seen in the victim company. Hence, the mother was charged with infanticide even if all other thanatological data collected at the moment of the retrieval (bloodgas analysis and myocardium electric activity ) indicated a much more recent death, when the mother was already cooperating with rescue team. Our psychological profiling suggested further that the mother had no motive to commit infanticide. We suspected the validity of the tympanic reconstruction (the only evidence against the mother), we found no data in the scientific literature, hence we conducted a series of experiments to test the correlation between tympanic temperature and rectal one if any.

**Materials and Methods:** To sample tympanic temperature we used both Genius 300 A (used in this forensic case) and Genius 2 (the most popular in Italian emergency services). F or the rectal probe we used Propaq Allyn. We used 3 identical rats of 500 grams on which were collected 6 series of temperature sampling at 1 minute interval both dry and in water 18° C. All the rats were sample first alive and then after suppression, through cervical dislocation. The rectal data were continuously monitored in all rats trough all the experiments. To assess the human response a series of temperature sampling with Genius 300 A tympanic thermometer were collected on an adult volunteer before dry and then with the ear showered with running water at 18° C for 3 minutes and body temperature was continuously monitored

**Results:** All rats showed similar tympanic and rectal temperature between 37°- 38° C when dry and alive. When alive in the water the rectal temperature started slowly to decrease while the tympanic temperature rapidly dropped. The Genius 2 stopped registering at 33° C , the Genius 300 A recorded a quick drop already in the alive rats. As an example, after 3 minutes immersion of a rat alive in 18° C water, the rectal temperature is still 37,5° C while the tympanic temperature drops at 33° C. In the adult male volunteer, 36.5° C body temperature, after the exposition of the ear to 3 minutes of running water at 18° C, the tympanic temperature recorded was 19° C and remained well below 30° C for the next 30 minutes, while the body temperature of the volunteer was constantly unchanged. The use of multiple thermometer excluded the possibility that the reading was influenced by malfunction due to water.

**Conclusions:** Based on our results we strongly discourage the use and abuse of tympanic temperature reading in forensic cases to reconstruct death timing, especially in cases of drowning like the present one. The modern Genius 2 is incapable of recording temperature below 33° C. The rapid decrease of ear temperature after drowning in cold water makes also all other infrared tympanic thermometer, even in core setting, completely inadequate to measure real deep body temperature in cases of drowning or hypothermia. References Craig JV, Lancaster GA, Taylor S, Williamson PR, Smith RL, The Lancet, 360(9333):603-609 2002 Crawford DC, Hicks B, Thompson MJ, J Med Eng Technol, 155(3): 376-81 2006 Henssge C, Brinkmann B, Puschel K, Z Rechtsmed 92: 255-276. 1984 Holte TO, Vandvik PO, Elvsaa IKO, Norderhang IN, Rapport fra kunnskapssenteret, 19:2009. 2009

**Keywords:** Drowning; Infanticide; Hypothermia; Infrared Tympanic Temperature

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# GESTURE CONTROLLED PACS SYSTEM USING THE MICROSOFT KINECT DEPTH CAMERA

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**Introduction:** Medical imaging technologies such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) are used more and more frequently in forensic as well as clinical medicine. CT and MRI can provide additional information about pathologies, that can be useful for a pathologist during autopsy. Since the hands of the pathologist are contaminated with potentially infectious body fluids, conventional input devices such as mouse and keyboard are not sufficient. We present a system, that allows a touch-free control of a Picture Archiving and Communication System (PACS) utilizing a low-cost depth camera originally developed for the gaming and entertainment industry.

**Materials:** The Kinect camera system presented by Microsoft (Redmond, USA) in 2010 is a new generation of low cost depth cameras. The fact, that it delivers depth images instead of normal color images makes is relatively easy to implement gesture recognition. Based on the open source libraries libfreenect, opencv, open frameworks and ofxKinect, we developed a software that interprets depth data recorded from the Kinect camera. It translates gestures into control input for Osirix, an open source PACS system. This way, the slice number, position, magnification and window level of the displayed CT dataset can be altered with hand gestures, without direct physical contact to standard computer input devices.

**Methods:** We validated the gesture control by introducing ten medical professionals into the system. We asked them to recreate 12 images from a CT dataset. We measured the response times as well as the usability of the system in comparison to mouse and keyboard control of OsiriX.

**Results:** Average training time to get comfortable with the system was approximately 10 minutes. In average, users required 1.4 times more time to recreate an image with gesture control than with mouse/keyboard. Additionally, we measured a response time of the system of around 120 milliseconds.

**Discussion:** Controlling a PACS system with our touch free, gesture controlled system is slightly slower than using mouse and keyboard, but during autopsy or surgery it removes a potential vector for infection, protecting both patients and staff. Since using the Kinec

**Keywords:** Virtopsy; Forensic Imaging; CT; MRI; PACS; Kinect; Gesture Control

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# EVALUATION OF THE APPROPIATENESS OF HOSPITALIZATION IN SECURE MEDICAL UNITS

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**Institution(s):**[1]ASSISTANCE PUBLIQUE - HÔPITAUX DE PARIS

**Introduction:** Secure medical units admit persons held in legal custody who require medical monitoring or hospital care which can not be provided on an ambulatory basis. Hospital-bed management is a recurring problem for medico-judicial emergency departments. Within the framework of professional practice evaluation and in order to improve the quality of care for unplanned admissions, we studied the appropriateness of such hospitalizations and identified certain indicators of inappropriate hospitalization. Analysis and results:

**Methods:** This 6-month retrospective analytical survey was conducted in the Paris medico-judicial emergency department during its busiest days, i.e. on week-ends. We used the Appropriateness evaluation protocol (AEP) devised by A. Davido and al. to assess the appropriateness of hospitalizations to our unit, according to clinical seriousness and in relation to the care administrated. The presence of a single criterion indicated that hospital admission was appropriate and could therefore be considered as relevant. Expert advice was sought whenever hospitalization did not seem relevant.

**Results:** We reviewed 100 case files of patients admitted during the week-ends, between July 1st and December 31st 2010. According to the clinical severity scale, most hospitalizations (93%) were found to be appropriate and medically justified. In 7% of cases, although hospitalization was not appropriate, it was justified by one or several of the following reasons: express request by the summoning police or judiciary authorities (2%), altered general condition with major risk of medical complications (4%), highly insecure social background (3%). These patients could not be admitted to other health-care structures than the secure medical unit because they were in legal custody, or because downstream facilities were inadequate or overwhelmed. Five patients whose hospitalization had not initially been considered as appropriate were admitted within the next two days for convulsions (1 case), chest pain (1 case), ingestion of foreign bodies (2 cases: razor blades; 1 case: nails).

**Discussion:** Despite variations in the number of people attending the medico-judicial emergency department over the past 5 years, hospitalization rates have remained stable (4-6%). The AEP clinical severity criteria were usable and reproducible in our study. We identified several causes for inappropriate hospitalization and investigated possible preventive measures aimed at initiating practice changes. Thus, alternatives to hospitalization could be developed along the same lines as the 8-hourly medical examinations that doctors can currently demand from the detaining authorities in cases involving insulin-dependent diabetes or moderate alcohol withdrawal.

**Conclusions:** The reproducible data found during our review confirm that most admissions (93%) to the secure medical unit were justified. Another survey, investigating the duration of hospital stays and the terms of medical discharge/transfer from the secure medical un

**Keywords:** Appropriateness of Hospitalization; Legal Custody; Secure Medical Units

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# DETERMINATION OF HANDEDNESS USING BICEP, FOREARM AND HAND SPAN MEASUREMENTS AND ITS RELEVANCE IN FORENSIC MEDICINE

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**Introduction:** Handedness is defined as an individual's preference to use one hand predominately for uni-manual tasks and the ability to perform these tasks more efficiently with one hand. Research conducted in 1970's has suggested an association between changes in skeletal and musculature morphology and handedness. However, very little research has been identified a reliable and/or standardised method of identifying handedness. The aim of this dissertation was to test using bicep, forearm and hand span measurements in determining handedness by comparing dominant and non-dominant arm measurements. The alternative hypothesis was that there will be a difference in arm measurements and the dominant side will be bigger than the non-dominant side.

**Materials and Methods:** An observational quantitative research study was conducted using 85 volunteers affiliated with Bart's and the London school of Medicine and Dentistry. Each participant was asked to complete Edinburgh Handedness Inventory questionnaire which identified their handedness. Physical measurement of right and left bicep, forearm and hand span measurements were taken and repeated three times for accuracy. Statistical analysis was performed using a Sign test and chi-squared.

**Results:** The frequency distribution of the difference between dominant and non-dominant forearm measurement showed to be significant with a P value less than 0.0001, but this could not be said for the bicep and hand span measurements. Therefore, these results showed that in the total sample group, majority of participants dominant forearms were bigger than the non-dominant side and thus supports the alternative hypothesis.

**Final Comments:** This project showed the potential use of forearm measurement as discriminating evidence for identifying handedness and its relevance in a forensic context. It is difficult to draw accurate extrapolation of this project to the general population but it shows some insight into indicators of handedness for a small sample group which could be developed to others.

**Keywords:** Handedness; Measurements

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# FREEDOM-RESTRAINING MEASURES IN NURSING CARE - DEATHS DUE TO PHYSICAL RESTRAINTS

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**Introduction:** Physical restraints are used primarily in cases of patients at a higher risk of falling, those requiring special care, with high motor activity, provocative behavior patterns as well as the intention of doing themselves harm, i.e. a risk of suicide. The application of freedom-restraining measures (FRM), in particular the fastening of belts against the will of the person in question, is a serious intrusion of basic rights and, as such, a specific form of violence. The incompetent and incorrect application of physical restraints can cause injuries of varying degrees, occasionally even leading to the death of the person thus restrained. A comprehensive investigation of such deaths, and the transparency this will give us, is our prime motivation.

**Materials and Methods:** From 1997 to 2010, a total of 27,353 autopsies were conducted at the Institute of Forensic Medicine in Munich. All deaths (n=26), traceable to physical restraints were analyzed retrospectively. In judging the circumstances of these deaths, additional selective literary research was carried out.

**Results:** While three patients under physical restraints died a natural death, and one did so through suicide, in 22 patient cases death could be traced back to the respective restraints alone. Death had occurred either by strangulation (n=11) thorax compression (n=8) or in the lowered position of the head (n=3). In almost all cases of residents/patients (n=19) the restraints were incorrectly fastened or makeshift. Despite the correct application of an abdominal belt in the case of one resident, this led to strangulation resulting from her agility and physical condition.

**Conclusions:** To avoid deaths of this nature it is highly recommended from a forensic standpoint to exhaust the choice of alternatives to FRMs. Should direct-contact restraints still be unavoidable choice, these must be fastened according to regulations and the restrained party be more closely observed.

**Keywords:** Freedom-Restraining Measures; Fatalities with Belt Restraints; Asphyxiation; Nursing Care

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1

# MEDICAL MALPRACTICE IN HUNGARY - RECENT CASE LAW DEVELOPMENTS

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**Introduction:** In Hungary, the claims for clinical mistakes have been rising in both the number and amounts of compensation sought and awarded over the last 15 years. The aim of our investigation was to identify the causes.

**Methods:** In Hungary there are no comprehensive statistics regarding medical malpractice litigation, so we have to rely on empirical studies. We examined the relevant case law of medical malpractice litigation between 1994 and 2009 (more than 1000 judgments), focusing on the published and unpublished decisions of the Supreme Court and the five Regional Courts.

**Results:** We found that the court's approach towards the crucial legal issues of medical malpractice changed substantially. The standard of care is often judged differently from the accepted professional standard, proof of causation rests with the defendant, and in "loss of chance" cases the courts tend to take the "all or nothing approach", with no distribution of damage even in cases in which it is uncertain whether the harm resulted from the defendant's negligence or from some preceding or concurrent cause. Liability for failing to advise the patient for material risks also plays a major role in malpractice litigaton, the courts tend to apply a very strict standard of disclosure.

**Conclusions:** A balanced approach is needed in order to avoid the onset of a malpractice and insurance crisis.

**Keywords:** Medical Malpractice; Hungary; Case Law; Causation; Loss of Chance

2

# TRENDS IN THE ROMANIAN MEDICAL MALPRACTICE SYSTEM: FROM CRISIS TO REFORM

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**Abstract:** The prevention and solving system of medical malpractice in Romania is still far from an optimum level with regard to an equitable manner of compensation for the victims and prevention of the prejudices caused by errors due to medical or medical-pharmaceutical acts. Within this context, there is a strong need for a change before a system crisis determines irremediable consequences. This study starts from a thorough analysis of the literature, as well as of the genuine reality and the major actors involved - medical system, patients, insurance companies and legislators. The main issues for Romania are the low level of trust in the medical body, emigration, fatigue and inefficiency of the reward method, and increase in the penal allegations against medical personnel. For these reasons, the research aims firstly at identifying and investigating the characteristics of a national model so that anticipation of the future trend to be as accurate as possible. Secondly, it deals with the economic implications of the medical malpractice phenomenon, by applying a principal - agent model adapted to the national specific, in order to determine the equilibrium point in terms of both costs and incentive plans, and the impact of asymmetric information for the implicated parties. Thirdly, but no less important than the previous ones, it deals with supporting a reduction of medical malpractice cases that are brought in the court of justice. Therefore, in order to achieve its main purposes it uses a multidisciplinary approach by mixing both medico-legal and economical elements in a complex analysis. These objectives are to be reached by using an adequate methodology, making use of quantitative and qualitative data. The research instruments use statistical analysis of the medical malpractice cases, as they are registered in a data basis specially designed for this study, and a questionnaire for the medical personnel in the public medical system.

**Keywords:** Medical System; Malpractice; Principal Agent Model; Equilibrium Point

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# DONATION OF EGGS IN ASSISTED REPRODUCTION IN SPAIN: INFORMED CONSENT ON POSSIBLE ADVERSE EFFECTS AND LIMITS TO THE LEGALITY OF ITS ADVERTISING

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**Introduction:** Near 17% of in vitro fertilization (IVF) cycles develop using eggs donated by other women. In Spain, there exists an increasing demand in advertising for the donation of eggs for assisted reproduction. This advertising is present in many types of posters which flood universities and youth centres. Advertisements are also published in newspapers and other mass media. In these posters and graphic media they call on the sense of "generosity" of these women, between 18 and 30, saying that couples will be able to have children if they donate their eggs. Unlike, India, the USA, and Canada, gamete donors cannot be paid in Spain and other countries such as Israel, Australia, Denmark, France, the UK, and Denmark. Supported by: Asociación Española de Mujeres Investigadoras y Tecnólogas (AMIT).

**Materials and Methods:** By documental review, this study pretends to assess: (1) scientific evidence available about adverse effects of egg donation; (2) characteristics of the information given in the informed consent to donors; and (3) the legality of this advertising.

**Results:** The main results are: (1) Many severe problems are associated with induction of ovulation, and many scientific publications report ovarian hyperstimulation (OHSS), tromboembolism, hepatic failure and increased risk of ovarian, breast, endometrial and colon cancer. Egg donors have the possible risk of an ovarian reserve decrease in the future, although this has not been definitely proved. (2) Informed consent for egg donors is very incomplete, according to the Spanish law 41/2002 of Patient`s Information. Those egg donors who elect to take risks for others require meaningful assurance that unpleasant outcomes amongst donors have not gone unreported or been under-reported because the majority of studies center on the effects of the women who undergo a IVF treatment. (3) Current advertising to promote egg donation do not respect the Code of Ethics and Medical Deontology of Spain (1999), the General Law of Advertising of Spain - 34/1988 law -, and law 14/2006 about Assisted Human Reproduction, as they include reference to economic compensations or benefits (600-1000 euros) but no complete information about the risks.

**Discussion and Conclusions:** To our knowledge, there has been no systematic study of the long-term risk of cancer or other adverse outcomes in healthy egg donors, but the risks are normally extrapolated form those of women who undergo IVF treatment in order to get pregnant. At present, we consider that potential egg donors cannot give truly informed consent because insufficient information exists about their possible long-term risks. The mechanism of ovarian stimulation and the possible occurrence of OHSS imply that the process can be potentially very harmful to young women. Deontological and judicial disciplinary procedures should be initiated to protect donors rights.

**Keywords:** Egg Donation; IVF; Ovulation Induction/Adverse Effects; Quality Assurance; Donor Payments

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# MEDICAL MALPRACTICE AND RESPONSIBILITY

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**Abstract:** Problem of medical mistakes and malpractice is always existing in medical law. It has place in the health systems of all countries. Medical staff is taken for responsibility in such cases, hospitals pay compensations to cover expenses for harm to health of the patients, but there are other players as state, insurance companies, pharmaceutical firms and others ... What is situation in Azerbaijan? Do we have statistics of it? Court cases? According to our legislation, responsibility of medical personal may be disciplinary, administrative, material and criminal...What are mechanisms for defining which kind of responsibility should be taken? International experience shows that when medical activities are standartized, clinical protocols exist and medico-legal bases and documentation are solid such malpractice cases reviewed by courts carefully and usually responsibility is relevant to degree of mistake and malpractice. Responsibility given by courts helps to create effective prevention system of future malpractice and medical mistakes.

**Keywords:** Medical Malpractice; Medical Mistakes

5

# PROCESS AND HOW TO ADDRESS VIOLATIONS OF MEDICAL MALPRACTICE IN IRAN

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**Abstract:** Including medical science and the sacred value of the long focus has been on humans. One of the most important tensions in the doctors professional career that his complaint could be facing the patient. On the other hand increase in complaints in some medical specialties tend to reduce the candidates for admission to these courses on the one hand and reduce the risk measures with acceptable risk is higher. Based on surveys taken to complaints against oral, four patients are dissatisfied and 100 written complaints against any verbal complaints there. In fact, you said: probably in front of a written complaint in about 400 patients are dissatisfied. International reports on various countries suggests the fact that unfortunately, despite significant progress of science and technology present new diagnostic and therapeutic services in the field, the amount of complaints has been upward. In the process of medical complaints in Iran are two ways to do grievance or complain directly to the Medical Council of his city, an NGO group is referred to complain during the process of its own medical system have been addressed and ultimately to The verdict is finally being sentenced in case of conviction merely aspects of the doctor and had led police to issue written reprimands, such as processing or verbal reprimands or severe deprivation of the practice is. In the second through Plaintiff complain directly to the court complaint in most cases these complaints to determine the damages awarded to patients in terms of amount and percentage of defects or the effects of physician medical staff work side effects occurred in the medical examination will be organized that penalty Download and criminal aspects of Islamic law governing the Iranian society, from medicine occur if the resulting injury or death to be, even if consent is obtained from the physician will be responsible for their actions.

**Keywords:** Plaintiff; Complain; Legal Medicine; Medical Council; Iran

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# MALPRACTICE LITIGATION IN ALBANIA: A REVIEW OF THE LAST FOUR YEARS HISTORY

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**Introduction:** The Albanian judicial system is facing an increasingly demand for addressing malpractice litigation. In Albania malpractice is considered a penal act and is prosecuted ex officio. The plaintiff role of the patients and their respective relatives is decisive.

**Materials and Methods:** To identify case-by-case the predictors that may lead to malpractice litigation. We have considered 70 files from the Prosecution Offices, where malpractice litigation have been registered, or from Tribunals judging malpractice suits. Detailed characteristics of the victims or plaintiffs have been studied. The sued physician profile is also characterized.

**Results:** From 70 cases, 44 were male patients and 26 were females. The median age of the patients is 38.9 years. 25 of the cases were surgical; 45 were non-surgical. The majority (58/70) was handled in emergency departments. The sued physicians were 33 surgeons, 32 specialists from non-surgical disciplines, 5 anesthetists. In total 21 cases were treated from University Clinics; the rest in other structures. 11 cases were accompanied with body injuries; 59 were deaths. The median length of experience in years of the sued physician was 19.9 years.

**Conclusions:** The emergency of the medical case is a major predictor of the risk for malpractice litigation (83% of the cases were urgent); death is another major risk factor (84%). The length of professional experience of the physician was not a protective factor: doctors were practicing since two decades, in average. The younger age of a patient prompts more easily a litigation suit, since the average age of the patients was 38.9 years.

**Keywords:** Malpractice; Documentation

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# TO ACT OR NOT TO ACT, THAT IS THE QUESTION: INFORMED CONSENT IN A CRIMINAL PERSPECTIVE

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**Abstract:** Litigation surrounding the medical profession increased dangerously and the relevance of the patient's autonomy become the cornerstone of medical malpractice. Therefore, currently the discussion about informed consent is indispensable to medical lawyers and health professionals. Doctors must be aware that any medical act performed without the patient's free and informed consent is considered a criminal offense and may involve a criminal sanction, even if the final result is to safe the patient's life. However, in concrete situations of everyday life is not always clear if information was correctly given or provided by the person legally binding to do it. Some doubts also arise regarding the manifestation of consent, namely, if that particular consent is juridically relevant in order to exclude the doctor's criminal responsibility. The present discussion becomes more complex with refusals to blood transfusions by Jehovah witnesses; requests for euthanasia presented by patients submitted to severe pain and to whom medicine is still unable to provide a cure, not even an improvement in their health conditions; and unconscious patients showing up in the emergency room with living wills and health care proxies. Doctors want to save lives and act guided by the principle of beneficence. Nevertheless, from the perspective of an innovative paradigm in doctor/patient relationship, nowadays the most beneficial for the patients is not always to be treated or even to be kept alive. On account of these new circumstances health care professionals face new challenges and if not properly advised they may ultimately be condemned to a criminal penalty.

**Keywords:** Informed Consent; Criminal Perspective

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1

# DENTAL RECORD PROPOSE AND IT'S UTILITY IN LARGE-SCALE DISASTERS

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**Introduction:** Large-scale disasters can have different sources whether if it is natural or human, open or close. In all this situations it can be require human identification. Teeth and jaws play an important role because they are the hardest and resilient in the body. Assessment between ante-mortem records and post-mortem human remains can be very useful in human identification, mostly in limit situations when bodies are highly destructed, carbonized and mutilated or in advanced decomposition, such as in large-scale disasters. It must contain information how patients are before any treatment, and every single treatment that they do in odontologist's office must be careful and totally filled in. The aim of this work is to elaborate a dental record form able to summarize all current dental data, useful in case individual identification is required.

**Methods:** At this form elaboration we used Federation Dentaire International (FDI) numbering system (two-digit notation), keeping clinical usefulness of dental records.

**Results:** Dental Record Proposal includes 9 sections: 1. Identification; 2. Anamnese; 3. Extra oral examination; 4. Intra oral examination; 5. Previous record (odontogram); 6. Plan; 7. Exams; 8. Treatments (odontogram); 9. Treatments.

**Discussion and Conclusions:** DVI (disaster victim identification) guide of INTERPOL after large-scale disasters established an only one process that contains primary identification, such as fingerprint analysis, comparative dental analysis and DNA analysis; and secondary identification, that contain personal description, medical findings as well as evidence and clothing found on the body. We emphasize the need to archiving and keeping dental records completed and updated, because these contains very useful information in case of necessary identification of a large-scale disaster victim.

**Keywords:** Dental Records; Large-Scale Disasters; Human Identification

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# INDIVIDUAL IDENTIFICATION IN THE FORENSIC ANTHROPOLOGICAL PRACTICE OF ALBANIA

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**Abstract:** Background: The individual identification in the forensic anthropological practice is realized by using the examination of the particular features and the application of the different identification methods. Methods: This study describes the use of distinct identifying features in recent years in the practice of Forensic Anthropology in Albania, methods of Forensic Odontology, facial identification via skull-photo superimposition, skull graphic method of algorithm, etc. The study is illustrated by presenting numerous cases of Albanian practice, which were also included in the monograph manual in Albanian published 2011 in Albania: Identification: Forensic Anthropology, Odontology and Biology (Their application in Albania), author: Bardhyl ipi. Conclusion: Individual identification is accomplished by a close collaboration of the medico-legal experts with forensic anthropologists, criminalistics, forensic dentists and respective specialists of advanced countries and by using distinct individual features and different methods; the results have been more accurate in cases of combined use of these methods with the comparative data from the distinct individual features.

**Keywords:** Individual Identification; Forensic Anthropology; Odontology; Skull-Photo Superimposition; Albania

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# OSTEOLOGICAL FINDINGS FROM A SECRET CEMETERY: THE REMAINS OF COLD WAR KILLINGS

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**Introduction:** The general public sensitivity and awareness regarding the fate of missing people during the cold war in eastern European countries is extremely high. In Albania there is an increasing political and public pressure to uncover the fate of missing people, allegedly killed or extrajudicially executed during the communist regime (1944-1991). In 2010 a secret cemetery was casually found in the periphery of Albanian capital, Tirana. The exhumation was not professionally performed, but all remains were thereafter sent to the forensic facility of the Institute of Legal Medicine, Tirana.

**Materials and Methods:** Reconstruction of skeletons was performed in the forensic facility. The forensic team studied the remains of thirteen skeletons, whose age, sex, bone defects and possible cause of death was described. The methodologies of Buikstra, Bass, Telkka, de Mendoça and other authorities in forensic anthropology were used to approximate, stratify and unify the findings. Detailed professional photographs were performed for every case. Clothes, where present, were set apart and conserved for future examination. No soft tissue remains were found. Osseous material was taken to perform the DNA analysis. Wide media coverage already raised public interest, and other non-forensic instances are registering allegations from relatives of the dissapeared persons during the period the secret cemetery was presumably digged.

**Results:** Twelve skeletons were male, and one them was of female sex. Distal falanges, ribs and other acral bone fragments were missings. All victims showed a single bullet wound, mostly in the occipital region of the head, as an entrance hole; the cause of death therefore was defined a gun shot execution. Several skeletons showed pre and perimortem bone fractures, witnessing the beatings and cruel ill-treatment that mostly of those prisonners suffered during the period prior to killing. The approximative time of death was considered not less than 20 years before, which coincides with the fall of communist regime in Albania. The clothes found were in some cases unpacked, suggesting that victims were told that they were in the process of transfering from a correctional facility to another, a notorious form of picking up prisonners from a detention center with the aim of killing them secretly and immediately thereafter.

**Conclusions:** Although little doubt is raised regarding cruelty of communist secret police and the existence of extrajudicial assassinations, the uncovering and the study of secret cemeteries or massive graves is extremely important under several aspects. First, the identification process might help relatives to know the fate of missing persons. Second, a professional process of gathering evidences will help bringing perpetrators to justice. Third, societal redressing attempts and awareness will of course decrease or even eliminate the option of impunity, for the next and for the remote future.

**Keywords:** Exhumation; Secret Cemetery; Extrajudicial Killing; Mass Grave

4

# DATING HUMAN SKELETAL REMAINS: AN ANTHROPOLOGICAL AND RADIONUCLIDE APPROACH USING 90SR AND 210PB

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**Abstract:** In forensic sciences, there is a strong interest to determine the post-mortem interval (PMI) of human skeletal remains up to 50 years after death. Up to now, there exists no reliable method to resolve the PMI of bones. Current methods are still in an experimental stage and they are highly relying on the experience of the investigating pathologist. In our study, we are using 90Sr and 210Pb (210Po) incorporated in bones by a biogenic process as indicators of the time elapse since death. As the remodeling rate of cortical bone is slower, trabecular bone should reflect short-term alterations much better. Our hypothesis is that the activity of radionuclide's incorporated in trabecular bone could reflect the environment and the dietary habits of a person at the moment of its death. To interpret our results, we used a calibration curve for the Swiss population for 90Sr from the nuclear bomb tests of the sixties covering the studied area and the last 50 years. Using this curve to interpret the results of 90Sr determination, in combination with a conventional anthropological approach, we obtained reliable PMI estimates. 210Po activity is in a secular equilibrium with the activity of 210Pb incorporated into our organism by ingestion. Our results also suggest adding 210Po determination to the 90Sr determination allows confining the PMI-value and make it more reliable. Nevertheless, diagenesis was a problem for both 90Sr and 210Po determination. Trabecular bone is subjected to diagenesis with accumulation of 90Sr and 210Po. This phenomenon can be explained mainly by the large surface-to-volume ratio of trabecular bones and its architecture. Thus in this study we propose a method of very careful decontamination of trabecular bones before any determination of radioactivity, using microwave under pressure mineralization of the bones.

**Keywords:** *Post Mortem* Interval; Bones; Radionuclide; Anthropology

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# THE UTILIZATION OF STABLE ISOTOPES ANALYSIS FOR ESTIMATING THE GEOGRAPHIC ORIGINS OF CORPSES

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**Introduction:** Recently, the number of unidentified corpses is increasing globally. However, little is known of the effective methods by which to determine their geographic origins. Stable isotopes analysis, used in the determining the geographical origin of agricultural products, was utilized to determine the geographical origin of unidentified corpses from their urine.

**Materials and Methods:** The stable isotope ratio of carbon, hydrogen, oxygen, and nitrogen collected from four geographic areas, Japan, Finland, China and Indonesia from healthy volunteers were analyzed. In addition, the effect of drinking bottled mineral water on stable isotope ratios was analyzed and the stable isotope ratio of urine and saliva were compared.

**Results:** The differences between the geographical regions were shown by the d2H and the d18O values, but not shown by the d13C and the d15N values. While the d18O and the d2H values of urine became increasingly similar to those of bottled drinking water as it was consumed. Significant differences were seen in the d18O, the d13C, and the d15N vales of urine.

**Discussion:** Though the number of samples was limited, the research suggests that it may be possible to utilize stable isotope analysis to establish the geographical origin of unidentified corpses and to differentiate body fluids left at crime scenes. At the time of submitting this abstract samples from further locations were being analyzed to increase the reliability of using such a method to identify the geographical origin of corpses.

**Keywords:** Stable Isotopes; Identification; Unidentified Corpses

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# THE IDENTIFICATION PROCESS IN MASS GRAVES AND PRISONER'S CEMETERIES FROM THE SPANISH CIVIL WAR (1936-1939) AND POSTWAR YEARS (1939-1945)

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**Abstract:** We present a review of ten years of exhumation and identification of human skeletal remains from mass graves and prisoners' cemeteries from the Spanish Civil War (1936-1939) and postwar years (1939-1945). The authors have been involved in diverse exhumations and have carried out the study of more than 500 skeletons, with the main goal of identify the remains and return them to the requesting families. To date, more than 100 identifications have been proposed based on diverse combinations of information from different sources, mainly testimonies, archaeology, archives, osteology and DNA. The characteristics of the identification process in the context of the Spanish Civil War, with its problems and advantages, are discussed.

**Keywords:** Forensic Anthropology; Mass Graves; Identification; Spanish Civil War

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1

# FORENSIC IDENTIFICATION ON ERECTILE DYSFUNCTION AFTER TRAFFIC ACCIDENTS FOR 56 CASES REPORT

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**Introduction:** In order to get higher insurance compensation, the victims often magnify the degree of erectile dysfunction(ED),even disguise sexual dysfunction. It's our duty to provide assistance for the judge.

**Materials:** 56 cases of erectile dysfunction after traffic accidents were retrospectively analyzed to explore the appropriate level of disability and the reasons. All cases had no history of diabetes.

**Methods:** First, find out the probably cause of erectile dysfunction through trauma history review. International Index of Erectile Function(IIEF) questionnaire survey were done at the same time. Second, through detailed medical examination to know the location and severity of injury, including neurological examination and inspection of secondary sexual characteristics, with particular attention to lumbosacral, lower extremity, and other parts of perianal and perineal sensation. Again, through laboratory tests, including the detection of audio-visual sexual stimulation (AVSS), nocturnal penile tumescence (NPT), nerve evoked potential (NEP), penile Doppler blood flow, endocrine hormones. Finally, according to history records, inspection findings, the standard reference to the relevant provisions of road traffic accidents to assess the appropriate level of disability and the reasons.

**Results:** 56 cases, the oldest was 55 years old, minimum was 17 years, mean age was 32 years. Classified according to site of injury, four cases of traumatic brain injury, 9 cases of spinal fractures with spinal cord injury, 43 cases of pelvic fracture with urethral injury. All cases were severe dysfunction through IIEF survey, but NPT test showed 46 cases (82.1% abnormality rate) were organic ED, 10 cases had normal erectile function. Somatic sensory nerve detected abnormalities in 10 cases (17.8% abnormality rate), The sacral reflex detected abnormalities in 10 cases (17.8% abnormality rate), Somatic motor nerve detected abnormalities in 2 patients (abnormal rate of 3.6%), Autonomic nerve test detected abnormalities in 46 patients (85% abnormality rate).Penile blood flow detect abnormalities in 4 cases (7.2% abnormality rate). View from the site of injury, pelvic fracture with urethral injury were the most common cause on traffic accident with erectile dysfunction, followed by spinal fractures with spinal cord injury and traumatic brain injury. View from the point of causes, the incidence of neurological ED were higher than vascular ED, endocrine ED. View from the point of Evoked Potential test results, the autonomic nervous injury was significantly higher than somatic nerve injury, may related to the majority cases were pelvic fracture with urethral injury. On 46 cases of organic ED, three cases were complete loss of erectile function, 12 patients were severe ED, 31 cases were erectile dysfunction. According to the standard on road traffic accident, the final assessments were serve disability in 3 cases, moderate disability in 12 cases, mild disability in 31 cases.

**Conclusions:** Traffic injuries were the important causes of traumatic erectile dysfunction in PR china, especially in pelvic fracture with urethral disruption. We must exclude the cases which magnify the degree of ED through lab tests. It should be recommended to exper

**Keywords:** Erectile Dysfunction; Traffic Accidents; Forensic Identification

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5th MAFS MEETING

2

# THE APPLICATION OF QTT IN THE EVALUATION NEUROLOGIC ERECTILE DYSFUNCTION

**Author(s):** Zhu G[1]; Weng S[1]

**Institution(s):**[1]INSTITUTE OF FORENSIC SCIENCE, MINISTRY OF JUSTICE, PR CHINA

**Introduction:** To explore the application of quantitative temperature testing (QTT) in neurologic erectile dysfunction (nED).

**Materials and Methods:** TSA-II thermal sensory analyzer was used to measure the thresholds of sensations of cold, cold pain, heat, heat pain at the surfaces of the dorsal glans (DG), left thenar (LT), and left thigh interior (LTI) under limits model in 22 persons with normal erectile potency and 35 patients with nED. And the thresholds of the different sensations, including DG sensation thresholds (DG threshold of cold, cold-evoked pain, heat and heat-evoked pain) and DG relative sensation thresholds (DG/LT threshold of cold and cold-evoked pain, heat and heat-evoked pain, DG/LTI threshold of cold, cold-evoked pain, heat and heat-evoked pain), were analyzed.

**Results:** The DG threshold of cold and cold-evoked pain, DG/LT threshold of cold and cold-evoked pain, DG/LTI threshold of cold and cold-evoked pain showed no significant difference between the persons with normal erectile potency and the persons with nED($P>0.05$). In the persons with normal erectile potency, except the LT threshold of heat and heat-evoked pain($p>0.05$), the DG threshold of heat and heat-evoked pain, the LTI thresholds of heat and heat-evoked pain, the DG/LT threshold of heat and heat-evoked pain, the DG/LTI threshold of heat and heat-evoked pain were significantly higher than that of the persons with nED ($p<0.05$).

**Conclusions:** The sensation thresholds of heat and heat-evoked pain of glans increase significantly due to the small nerve fiber damage of the glans in the persons with nED . And QTT can be used as a diagnosis method for diagnosing nED.

**Keywords:** Quantitative Temperature Testing; Neurologic Erectile Dysfunction; Glans; Heat Sensation; Heat-Evoked

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3

# ASSESSMENT OF THE RESPONSIBILITY BETWEEN A ROAD TRAFFIC ACCIDENT AND MEDICAL DEFECTS AFTER THE TRAFFIC ACCIDENT INJURY OF KNEE JOINT

**Author(s):** Xia W[1]

**Institution(s):**[1]INSTITUTE OF FORENSIC SCIENCES, MINISTRY OF JUSTICE, PR CHINA

**Abstract:** A 48-year-old Chinese woman was hit by a car in a road traffic accident. Local county hospital considered her right knee was injured, but didn't find any sign of fracture from X-ray imaging. Then the hospital gave the diagnosis of soft tissue contusion and the patient started to exercise with burden 21 days after her right lower limb was fixed by plaster slab. Four months later, she had to go back to the county hospital for recheck due to persistent pain on her right knee. Then, the right tibia outer plateau fracture was found. The patient rejected the advice of open reduction and internal fixation of right tibia plateau fracture. Instead, she accepted the unicompartmental knee arthroplasty in a hospital affiliated to a medical college. The patient felt the knee pain alleviated after surgery; however, the joint dysfunction was aggravated even more. The patient used the legal procedure for personal compensation. Both driver and the insurance company disputed that the final consequence of the injured knee was due to not only the traffic accident,but also poor medical practice involved. So the court consigned us to make judicial judgment of expertise. After investigation, we found the earliest x-ray graph after the accident had shown the fracture of right tibia outer plateau and right knee valgum, with articular surface involvement, so the traffic accident was considered as the primary cause of sequelae. At the same time, the county hospital missed the diagnosis of fracture, and led to insufficient fixation of right lower limb, which was not good for rehabilitation from fracture and joint injury. This was the secondary cause of sequelae. Additionally, instead of the standard therapy, the affiliated hospital of medical college made the unicompartmental knee arthroplasty four months later, which also had a little defect. It was the minor reason for the result.

**Keywords:** Clinical Forensic Medicine; Traffic Accident; Tibia Plateau Fracture; Traumatic Arthritis; Knee Arth

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4

# IDENTIFICATION OF MARKS INVOLVING IN MOTOR VEHICLE COLLISIONS.

**Author(s):** Lili L[1]

**Institution(s):**[1]INSTITUTE OF FORENSIC SCIENCE, MINISTRY OF JUSTICE

**Abstract:** Road traffic accident is a comprehensive technical evaluation of technology, which include engineering, traffic signs and road safety, mechanics, forensic and so subject, including identifying marks of identifying technology is based on the road traffic accident, but there was no trace of the application of the expert corroboration method is only refer to penal and examination methods of the inspection and verification. This article by the classical case, the more characteristics of each test and examination on car marks, signs and marks the ground and trace quantities of substances for analytical summary of test and analysis, the traffic is a crashing of the survey methodology and a general rule for road traffic accidents on the identity provide a new method and new ideas.

**Materials and Methods:** Analysis and comparison of the marks involving in motor vehicle collisions.

**Results:** Methodologies of mark detection and comparison had been summarized.

**Conclusions:** characteristic marks deposited on the vehicle, body marks, skid marks, trace evidence can provide positive identity of motor vehicle collisions.

**Keywords:** Traffic Accident; Vehicle Collision; Mark Detection; Trace Evidence

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5

# THE APPLICATION RESEARCH OF PROJECT RISK MANAGEMENT IN THE APPRAISAL FOR TRAFFIC ACCIDENT.

**Author(s):** Lili L[1]

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**Abstract:** Road traffic accidents technical appraisal in china over the past few years were springing up to develop very fast, but the development is no longer the hierarchy levels of technology in a relationship with the statement, the verification and road traffic accidents were the traces of it, that is only in single identification, and not comprehensive, the road traffic accidents and technology of the comprehensive evaluation of the location and the aim of conflict. On the road traffic accidents technical appraisal in need of one or several people, but a team, traffic signs, engineering, forensic of the subject of a team. This article by analyzing a number of the road traffic accidents technical evaluation project case, the application of project risk management methods of analysis and policy and review of the road traffic accidents in the technical evaluation project will take note of risk indicators for road traffic accidents development of technology to provide a new train of thought.

**Keywords:** Project Risk Management; Risk Identification; Risk Assessment; Forensic Road Traffic Accidents; Application

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# ORAL SESSION

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1

# FORENSIC IDENTIFICATION ON ERECTILE DYSFUNCTION AFTER TRAFFIC ACCIDENTS FOR 56 CASES REPORT

**Author(s):** Wang F[1]; Zhe G[1]

**Institution(s):**[1]INSTITUTE OF FORENSIC SCIENCE, MINISTRY OF JUSTICE, PR CHINA

**Introduction:** In order to get higher insurance compensation, the victims often magnify the degree of erectile dysfunction(ED),even disguise sexual dysfunction. It's our duty to provide assistance for the judge.

**Materials:** 56 cases of erectile dysfunction after traffic accidents were retrospectively analyzed to explore the appropriate level of disability and the reasons. All cases had no history of diabetes.

**Methods:** First, find out the probably cause of erectile dysfunction through trauma history review. International Index of Erectile Function(IIEF) questionnaire survey were done at the same time. Second, through detailed medical examination to know the location and severity of injury, including neurological examination and inspection of secondary sexual characteristics, with particular attention to lumbosacral, lower extremity, and other parts of perianal and perineal sensation. Again, through laboratory tests, including the detection of audio-visual sexual stimulation (AVSS), nocturnal penile tumescence (NPT), nerve evoked potential (NEP), penile Doppler blood flow, endocrine hormones. Finally, according to history records, inspection findings, the standard reference to the relevant provisions of road traffic accidents to assess the appropriate level of disability and the reasons.

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2

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3

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4

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5

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1

# PRE-TREATMENT STRATEGIES FOR THE IMPROVED CYANOACRYLATE DEVELOPMENT OF DRY LATENT FINGERMARKS ON NON-POROUS SURFACES

**Author(s):** Montgomery L[1]; Spindler X[2]; Maynard P[1]; Lennard C[3]; Roux C[1]

**Institution(s):**[1]CENTRE FOR FORENSIC SCIENCE, UNIVERSITY OF TECHNOLOGY, SYDNEY, AUSTRALIA; [2]CENTRE FOR FORENSIC SCIENCE, UNIVERSITY OF TECHNOLOGY, SYDNEY UNIVERSITY OF CANBERRA, AUSTRALIA; [3]NATIONAL CENTRE FOR FORENSIC STUDIES, UNIVERSITY OF CANBERRA, AUSTRALIA

**Abstract:** Cyanoacrylate fuming is a popular technique for the detection of latent fingermarks on non-porous surfaces. Unfortunately, aged fingermarks or those exposed to harsh conditions such as heat, low humidity or UV light often exhibit poor results when subjected to this development method. These poor results are due to the loss of moisture and other constituents from the fingermark deposit, which are necessary for polymer initiation and propagation. A variety of pre-treatment strategies have been proposed to overcome the limitations associated with the cyanoacrylate development of dry or otherwise degraded fingermarks. A recent study by McLaren et al. (Journal of Forensic Identification, 2010, 60, 199-222) compared a range of novel and existing pre-treatment techniques and found that exposure of the fingermarks to the vapour from 10% w/v methylamine solution prior to cyanoacrylate treatment was the most effective. This study aimed to further investigate and validate the use of 10% w/v methylamine as a pre-treatment strategy and compare the results with those obtained using a range of other volatile amine pre-treatment solutions. It was confirmed that dry fingermarks exposed to methylamine responded better to subsequent cyanoacrylate development. Scanning Electron Microscope (SEM) analysis of polymer morphology also indicated that cyanoacrylate development was improved by the methylamine pre-treatment.

**Keywords:** Fingermark Detection; Cyanoacrylate Fuming; Dry Fingermarks; Aged Fingermarks

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# COGNITIVE PROFILING- DEFINING AND QUANTIFYING THE COGNITIVE UNDERPINNING OF EXPERTISE IN LATENT PRINT EXAMINATION

**Author(s):** Bucht R[1]; Dror I[1]

**Institution(s):**[1]COGNITIVE CONSULTANTS INTERNATIONAL

**Abstract:** Experts are characterized by specific and special abilities. Cognitive abilities are the mental skills necessary to accomplish a particular task. The accumulation of these different cognitive abilities represents the general cognitive profile or 'skill toolbox' which is needed to successfully perform the tasks needed in the specific expert domain. In some cases determining which cognitive abilities are important for a profession appearsto be common sense. For example, the ability to accurately detect sometimes small similarities or differences between two visual images appears to be important to the task of latent fingerprint examination. Therefore, examiners who possess enhanced and superior visual comparison abilities, will be able to do their job better. However, 'visual comparison abilities' is very broad and general, and vague from a cognitive perspective. Furthermore, as with all expertise, not all cognitive abilities are as obvious and even the expert may not be able to articulate all the mental skills that are important for the role. For example, professional racing drivers may not be able to articulate precisely how they know when to apply the brakes when approaching a corner; it just 'feels right'. This, sometimes, is the nature of expertise. Correct characterization and quantification of these cognitive profiles enable better selection and screening at recruitment, and provide a very cost effective tool for management. They can also be used as benchmark indicators and to test for job performance potential and effectiveness. In addition, such cognitive profiles provide clear targets for skill development. Cognitive profiling has been used in several domains including military pilots and security X-ray screeners. The details of the abilities needed for forensic latent print examination is described at www.testcogpro.com In order to develop suitable tools to measure cognitive abilities we must better understand and define the nature and critical elements of expertise. This can be done through interviews, detailed task analysis and scientific experimentation. This presentation will provide an overview of the research done at Cognitive Consultant International (www.cci-hq.com) into developing a cognitive profile for fingerprint examiners as well as a set of web-based test constructed to measure an individuals level of aptitude for these skills.

**Keywords:** Fingerprints; Cognitive Profile

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# FINGERMARKS: A SMALL WORLD DISCLOSING A WORLD OF INFORMATION USING MALDI MSI

**Author(s):** Francese S[1]; Ferguson L[1]; Wolstenholme R[1]; Clench M[1]; Bradshaw R[1]

**Institution(s):**[1]SHEFFIELD HALLAM UNIVERSITY

**Abstract:** Identification of suspects via fingermark analysis is one of the mainstays of forensic science. However, the success in matching fingermarks, using conventional scanning and database searching, strongly relies on the enhancement method adopted by the forensic investigators for fingermark recovery; this in turn depends on the deposition surface, the environmental conditions the fingermark was exposed to and the composition of the fingermarks (which may change over time (1)). In the best case scenario, an image of the ridge pattern is obtained for matching purposes in the attempt to identify the suspect. However important, if the suspect has not been previously arrested, hence his fingerprints are not present in the database this information becomes more valuable only after an arrest is made. A technology which would provide a range of information other than the ridge pattern image, thus helping profiling the case and the suspect from the analysis of the recovered fingermark would be very desirable. Here we present a novel application of MALDI Mass Spectrometry Imaging (MALDI MSI) for the examination of fingermarks in a non destructive way firstly reported by our group in 2009 (2). The use of this technology has allowed molecular images of fingermarks ridge pattern to be obtained at a resolution suitable for suspect's identification in a robust way simultaneously with the detection of a wide range of endogenous components and exogenous contaminants (2,3). Detectable species include drugs, lipids, peptides, polymers and small proteins thus making MALDI MSI a largely analyte-independent technique. This opportunity suggests the potential of the technology to provide a range of information concerning the suspect's profile and the actual crime that could greatly aid in the forensic investigation; A case study will be illustrated showing an application of MALDI MSI to the analysis of fingermarks contaminated by condom lubricants in the context of sexual assault crimes. In this work the ridge pattern image was obtained simultaneously to the detection of the lubricant within the fingermark itself. This opportunity could provide corroborative evidence should the lubricant match that from an unopened packet found in possession of the suspect. Previously published and recently acquired preliminary data will also be presented showing the development of a processing strategy to discriminate fingermarks of different age and aged under different environmental conditions (T and Hr, light); ageing markers were tentatively individuated enabling age discrimination. Finally, we have recently developed a methodology enabling MALDI MSI to be potentially integrated within the current operational forensic workflow with optical images of different types obtained prior to MALDI MSI application; the methodology has proven to be applicable to latent fingermarks recovered from a variety of surfaces which is a distinct advantage when compared to the wide range of currently adopted surface-specific techniques. The wide range of information retrievable from fingermarks, as well as versatility of the technology, suggest the potential of MALDI MSI to become the next analytical tool for the forensic examination of fingermarks.

**Keywords:** Maldi; Imaging; Latent; Fingermarks

4

# A NEW TECHNIQUE FOR VISUALIZATION OF LATENT FINGERPRINTS ON VARIOUS SURFACES USING POWDER FROM TURMERIC: A RHIZOMATOUS HERBACEOUS PLANT (CURCUMA LONGA)

**Author(s):** Garg R[1]; Kumari H[1]; Kaur R[1]

**Institution(s):**[1]PUNJABI UNIVERSITY, PATIALA-147002 PB.INDIA

**Abstract:** Various methods have been reported for the development of latent fingerprints on different surfaces in the literature. This paper presents a new powdering method which is simple, non toxic for the development of latent fingerprints that can be employed on different substrates. In this investigation a less expensive, simple and easily available, Turmeric powder, a common ingredient in Indian food, has been used to decipher the latent fingerprints on nine different substrates .It is found that it gives very clear results in majority of the surfaces.

**Keywords:** Forensic Science; Latent Fingerprints; Development; Turmeric Powder; Surfaces; Powdering Method.

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5

# CONTROLLING THE EFFECTS OF COGNITIVE BIAS ON FINGERPRINT IDENTIFICATION: STRATEGIES FOR RESEARCH, TRAINING, AND STANDARD OPERATING PROCEDURES

**Author(s):** Sahota E[1]

**Institution(s):**[1]LAS VEGAS METROPOLITAN POLICE

**Abstract:** Research by Dror and others has suggested that fingerprint examiners may render different or even contradictory conclusions based on the context in which the fingerprint case is presented. The National Research Council, in their report on the status of forensic science in the United States, cites cognitive bias as an important source of error that requires further study. However, the current literature on cognitive factors suggests that humans are most susceptible to bias when making subjective judgments. Thus the most effective strategies for controlling bias should focus on reducing the subjectivity of fingerprint comparisons. These strategies include contemporaneous documentation using the GYRO schema to expose circular reasoning, quantifying the frequency of close non-matching fingerprints in AFIS databases, formulating standardized operating procedures, and training programs to educate forensic practitioners about the hazards of cognitive factors. As suggested by James Reason, an expert on human error, these countermeasures may be more effective than conducting more research on cognitive bias.

**Keywords:** Cognitive Bias; Fingerprint Identification; AFIS

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# FINALISING THE REACTION MECHANISM OF 1,2-INDANEDIONE-ZINC WITH AMINO ACIDS IN LATENT FINGERMARKS AND THE ROLE OF CELLULOSE SUBSTRATES IN THE REACTION

**Author(s):** Spindler X[1]; Shimmon R[2]; Roux C[2]; Lennard C[3]

**Institution(s):**[1]CENTRE FOR FORENSIC SCIENCE, UNIVERSITY OF TECHNOLOGY, SYDNEY UNIVERSITY OF CANBERRA, AUSTRALIA; [2]CENTRE FOR FORENSIC SCIENCE, UNIVERSITY OF TECHNOLOGY, SYDNEY, AUSTRALIA; [3]NATIONAL CENTRE FOR FORENSIC STUDIES, UNIVERSITY OF CANBERRA, AUSTRALIA

**Abstract:** Research presented at the previous IFRG meeting detailed the basic reaction mechanism of 1,2-indanedione-zinc with amino acids, including the role of zinc(II) ions as a catalyst. A potential pathway for the hydrolysis of the final intermediate 2-amino-1-indanone back to 1,2-indanedione in acidic or high humidity conditions was also identified. Further studies - involving visible and NMR spectroscopy - into the structure of the reaction product, Joullié's pink (JP), formed on cellulose substrates and in solution, indicated that keto-enol tautomerisation dictated the chromophoric and fluorophoric properties of the product in different conditions. This study further investigated the role of cellulose in the formation of JP and the influence of working solution and paper substrate pH on keto-enol tautomerisation using solid-state NMR and UV-visible spectroscopy. The formation of JP-silver complexes to determine the major isomer of JP formed upon reaction with eccrine-rich fingermarks will also be discussed. This research also explored a method to prevent UV and water-catalysed side reactions that inhibit JP formation.

**Keywords:** Fingermark Detection; 1; 2-Indanedione-Zinc; Reaction Mechanism; NMR

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# A NOVEL DUAL-SUSPENSION METHOD FOR THE DETECTION AND ENHANCEMENT OF LATENT AND BLOODY FINGERMARKS ON NON-POROUS SURFACES

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**Abstract:** Traditional methods for the detection and enhancement of fingermarks in blood (eg. amido black, DAB) generate rather dark marks; and this is an obvious issue for dark surfaces. In this study, a new method was developed to address this problem using a dual-suspension made up of a white (TiO2) and a luminescent component (Green-Blitz). This method was found to be very sensitive in comparison to other blood enhancement methods. Not only the contrast was improved on dark surfaces because of the development of white marks, but the luminescence could be observed under a variety of conditions which enabled the marks to be distinguished from background luminescence. In addition, this method was able to detect and enhance both latent and bloody fingermarks on non-porous items. The dual suspension with titanium dioxide and Green-Blitz is a highly promising method for the detection and enhancement of latent and bloody marks on a wide range of coloured and luminescent non-porous substrates. This presentation will also report on our ongoing research into novel chemical reagents for the development of latent and bloody fingermarks in a single process.

**Keywords:** Fingermark Detection; Bloody Fingermarks; Titanium Dioxide; Powders

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# ORAL SESSION

## Session 15.30

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1

# MEASUREMENTS AND COMPARISONS OF VELOCITIES OF BLOOD SPATTERS USING A HIGH SPEED CAMERA

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**Abstract:** Bloodstain pattern analysis is a forensic discipline that reconstruct events of a crime scene by analyzing sizes, shapes, distributions, positions of bloodstains. Bloodstain pattern can be classified into the low velocity, medium velocity, and high velocity system. Velocities in this system represent the velocity of the wounding agent (the force applied) and not to the velocity of the blood in flight. Thus there is no reference system about the velocity of the blood in flight in the existing bloodstain classification system. Applying bloodstain pattern analysis to the real crime case, we needed to have the reference system of velocities of impact spatter, cast-off spatter, and expectorate spatter. Therefore we measured the velocities of these spatters using high speed camera and we analyzed the results. In this experiments the average velocity of impact spatter that generated by swinging a hammer with all experimenters strength at the pool of blood is about 4.7 times faster than that of swing cast-off spatter that generated by swinging a red-wat hammer with all experimenters strength, and about 3.9 times faster than that of expectorate spatter that generated by emitting blood from the mouth with all experimenters strength. The velocities of cast-off spatter and expectorate spatter, however, showed similar distributions. Our experiments that measure the velocities of droplets of blood spatters in flight under the specific conditions that generated at fastest speed can give some reference to the classification system of velocities of bloodstains which is not distinct up to now, as well as some real bloodshed crime cases.

**Keywords:** Bloodstain Pattern Analysis; Velocity; Spatter; High Speed Camera

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# BLOOD-ENHANCEMENT REAGENTS, LUMINOL, BLUESTAR®, FLUORESCEIN, AND HEMASCEIN™: A QUANTITATIVE COMPARISON OF PROPERTIES ESSENTIAL FOR CRIME SCENE INVESTIGATIONS

**Author(s):** Bilous P[1]; Fossum M[1]; Hallmark C[1]

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**Introduction:** Forensic scientists use color-based screening tests to tentatively identify blood stains at crime scenes. When criminals attempt to remove blood evidence from crime scenes, sensitive, light-emitting blood-enhancement reagents such as luminol, Bluestar®, fluorescein or Hemascein™ are needed to locate the trace quantities of remaining blood. The objective of this study was to determine which of these reagents had the best limits of detection and stability in order to select the best reagent for crime scene work. Luminol and Bluestar® are chemiluminescent reagents which emit blue-light in the presence of blood. Both reagents have a short shelf-life. Consequently, they must be prepared shortly before use at a crime scene. Fluorescein and Hemascein™ are fluorescence-based reagents which emit yellow-green light in the presence of blood; they require an excitation light source in the blue range of the visible spectrum in order to achieve fluorescence. Hemascein™ is a commercial product that has been formulated to have an extended shelf life when the working solution is protected from light and stored at either room temperature or refrigerator temperatures.

**Materials and Methods:** The light emission characteristics of the four blood-enhancement reagents were quantitatively compared using a fluorometer to measure the time-dependent light emissions with a range of liquid blood dilutions. Luminol and Bluestar®-Forensic reagents were evaluated by recording their light emissions at 460 ± 5 nm over a five minute assay period. A new luminol formulation, WSP-luminol, was used for this comparison. This new formulation was shown in a separate study to exhibit improved light emission characteristics and a longer shelf life than the traditional formulations of luminol. Fluorescein and Hemascein™ were tested by recording their light emissions at 520 ± 5 nm over a five minute time period. An excitation light of 460 ± 5 nm was used for the fluorescence-based assays.

**Results:** This study examined and compared the limits of detection and the stability of the four reagents. It also explored assay conditions which would enhance the light emissions from the two fluorescence-based reagents. A comparison of the light emission characteristics of WSP-luminol and Bluestar®-Forensic showed that both reagents had similar limits of detection. They emitted light above the visual threshold with blood diluted 1:100,000. Light emissions peaked near 30 seconds, followed by a rapid decay process which is characteristic of these reagents. An assay of the light emission characteristics of fluorescein and HemasceinTM showed that both reagents emitted light above the visual threshold with blood diluted 1:100,000,000. Of the four reagents tested, only HemasceinTM and WSP-luminol were stable when stored in the dark at approximately 4oC. After 50 days of storage, both reagents exhibited light emission characteristics comparable to those obtained when the reagents were first prepared and tested. With respect to the assay conditions that resulted in the best light emissions from HemasceinTM and Fluorescein, the proportion of reagent to 1% hydrogen peroxide was critical, with a 9:1 ratio resulting in at least a 5-fold increase in light emissions when compared to those obtained with a ratio of 1:9.

**Discussion and Conclusions:** Choosing an appropriate blood-enhancement reagent for crime scene work depends on several factors such as ease of preparation and use, sensitivity, stability, and crime scene circumstances. Our results showed that HemasceinTM had the best combination of sensitivity and stability of the four reagents tested.

**Keywords:** Luminol; Bluestar; Fluorescein; Hemascein

3

# THE USE OF PRESUMPTIVE TESTS TO DISTINGUISH FLY ARTEFACTS FROM HUMAN BIOLOGICAL FLUID AT A CRIME SCENE

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**Institution(s):**[1]LA TROBE UNIVERSITY; [2]VICTORIA POLICE FORENSIC SERVICES DEPARTMENT

**Abstract:** Adult flies of some species ingest biological material such as human blood or semen to obtain vital protein and carbohydrates. Subsequent to ingestion, flies leave deposits (termed artefacts) through excretion and regurgitation. It is widely recognised by forensic personnel that these fly artefacts can be mistaken for bloodstain patterns generated by gunshot or blunt force trauma, potentially compromising event reconstruction and/or misdirecting police resources. Also, recent research has found that, in some instances, fly artefacts contain sufficient human biological material to generate a full DNA profile. Consequently, DNA crime scene samples could be contaminated by the inadvertent collection of fly artefacts during swabbing for trace evidence. Conversely, these artefacts may prove to be a useful source of DNA if an offender has attempted to clean up a crime scene or has moved a body without spilling blood. Therefore, it is important that investigators are able to distinguish between fly artefacts and spots of human biological fluid at a crime scene. While there are some morphological characteristics that may help distinguish between fly artefacts and spots of human blood, semen or saliva, the present study investigated whether commonly used presumptive tests or other inexpensive and portable systems are able to make these distinctions. A broad range of presumptive tests were studied, covering enzymatic, chemical, and immunological reactions.

**Keywords:** Fly Artefacts; Crime Scene Investigation; Bloodspatter Analysis; DNA; *Lucilia Cuprina*

4

# PORTABLE ASSAY FOR BODY FLUID CONFIRMATION: PROOF OF CONCEPT

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**Institution(s):**[1]WEST VIRGINIA UNIVERSITY

**Abstract:** As DNA evidence backlog continues to plague crime laboratories in the US, novel means of collecting only pertinent evidence at crime scenes are imperative. Three of the most commonly found types of bodily fluids at the scene of violent crimes (blood, saliva, and semen) can be presumptively identified while still at the crime scene with the use of an alternative light source; however most confirmatory testing is confined to a fully equipped crime laboratory. The presented technique allows for confirmation of a specimen's body fluid type, as well as determining if the sample is of human origin, while still at the crime scene. Gathering only the most significant potential evidence can reduce the evidentiary load presented to crime laboratories and thus reduce the number of backlogged cases. The presented proof of concept study utilizes fluorescently labeled probes known as molecular beacons (MBs) to target tissue-specific RNAs for the confirmation of body fluid type of biological evidence found at crime scenes. The assay, developed to determine tissue-specific RNA candidates for blood, saliva, semen, and human origin, will be discussed along with the procedures used to design MB probes. Data will be presented illustrating the use of MBs with RNA extracted from these tissues where fluorescent signals are produced without the use of PCR. The assay has the potential to be made portable to the scene of a crime due to advances in technology that allow for simple RNA isolations and a portable fluorospectrometer.

**Keywords:** Tissue Identification; RNA; Molecular Beacons

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5

# BLOOD DROPS IN FLIGHT

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**Abstract:** Bloodstain pattern analysis is an effective approach to reconstruct the events that happen at a crime scene as by recognizing bloodstain patterns, different bloodletting events may be distinguished. Several bloodletting processes involve the formation of a droplet and subsequent flight of the droplet through the air. Amongst others this happens for passive drops, cast-off patterns and impact patterns. In most cases, the flight through air is assumed to be a straight line, which results in large errors in the determination of the blood source location. The error may be as large as 45 cm in the z-direction, which makes it difficult to distinguish between a standing and seating position. In this study, we show that in fact the flight of a blood drop is subject to gravity and air resistance and thus resembles a parabola. First, blood drops were visualized by means of a high speed camera and their flight path was recorded. The resulting trajectory was compared with 5 models, differing in the approximation of the drag coefficient. The drag coefficient describes the drag on an object traveling through the air. The model with the best match was subsequently used to 'predict' the trajectory back from the bloodstain towards the blood source. In order to calculate this, the volume of the blood drop and its impact velocity have to be known. Nevertheless, at a crime scene, the only information available is the bloodstain itself. Therefore, in the second part of this study, we also examined a new method to determine the volume of a bloodstain. By means of optical coherence tomography the volume could be determined directly without any calibration line. This was performed with fresh and dried blood drops under laboratory conditions. The volume could be determined within 1.4% accuracy and the dry/fresh volume ratio of a bloodstain could be determined. In summary, we demonstrate that it is possible to describe the trajectory of a blood drop in flight more accurately by including drag and gravity, and we introduce a new method for improving volume estimation of a bloodstain.

**Keywords:** Crime Scene Reconstruction; Bloodstain Pattern Analysis; Fluid Dynamics; Blood; Trajectory; Impact

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# APPLYING RESEARCH TO THE REAL WORLD: THE SPECIALIST LOCATION RECOVERY UNIT, NEW SOUTH WALES POLICE FORCE

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**Abstract:** In 2007 the New South Wales Police Force developed and implemented a specialist crime scene examination section to respond solely to the most serious, complex crimes, using the latest methods and technology. The primary aim of the unit is to detect, enhance and recover all possible marks (finger, shoe, tyre, blood, and tool) fully integrated with the collection of all other evidence (such as fibres and DNA) that may be encountered during the examination. A secondary, but vital focus of the unit is conducting and informing research into new methods and equipment, providing a nexus between the theoretical focus of research institutions and practical application of research in the field. A longer term aim of the SLR model is to develop and refine techniques and examination strategies so many of these can be devolved to permanent field based forensic service units for use at a wide range of offence categories. In the four years since its inception, the SLR has sponsored three Masters students, two honours students and two internships, who have conducted research into casework-based problems commissioned by the unit. This presentation will outline the achievements of the unit, including the application of research outcomes to casework such as a protocol for the development of fingermarks on items contaminated by bodily fluids. Challenges that were faced are also discussed, and the networks between the unit and educational institutions will be highlighted, demonstrating the effectiveness of such a model in modern policing.

**Keywords:** Crime Scene Investigation; Case Studies; Research; Fingerprints; Marks

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# ORAL SESSION

## Session 16.1

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# FORENSIC PATHOLOGY; YESTERDAY, TODAY AND TOMORROW. A BRIEF SURVEY OF FORENSIC PATHOLOGY WITH SPECIAL REFERENCE TO ITS CURRENT STATUS IN DEVELOPING COUNTRIES

**Author(s):** Sharifzad HR[1]; Sharifzad A[1]; Rategh R[1]

**Institution(s):**[1]SHIRAZ LEGAL MEDICINE CENTER

**Abstract:** Since the earliest documented reports regarding the relation between medicine and law ,dating back to 2650-2600 bc when the ancient egyptian chief justice; imhotep also examined bodies in certain deaths up to present time "forensic sciences" are being subject of strong revolution. Pathology as a science has certainly the most powerful role in the development and progress of forensic (legal) medicine to such an extent that sometimes forensic medicine is regarded synonymous with forensic pathology. Anatomical pathology was first introduced in the early 16th century in europe by the anatomist antonio benivieni who presented post-mortem dissection to determine the cause of death. Since then various systems and schools are developed for forensic medicine progress. Morgagni, Baillie, Hodgkin, Lobstein, Rokitansky and Virchow are among the famous and outstanding pathologists who made the gross and microspoc pathology as the non-separable parts of forensic science , specially autopsy and post-mortem evauations. Unfortunately especially in developing countries like iran, the role of pathology is some how not considered as it should be and there is no general attempts from both the society and the pathologist for "forensic pathologists" training. For the future we as the pathologist should continue to strengthen the contributions of various aspects of pathology (anatomical,clinical, etc.) to forensic medicine for reaching the highest possible standards of forensic practice in the societies.

**Keywords:** Forensic Pathology; History

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# UXORICIDE: BEATEN TO DEATH

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**Introduction:** Intrafamiliar violence, especially gender-based within a couple, is a very frequent phenomenon, not dependent from age or social status, and adopts different forms of aggression,: from emotional to physical violence. It is most common in societies or age-groups were women are assigned an inferior economic, social, cultural and emotional position as compared to men. In our region - Northern part of Italy (Lombardy) - in the last years a high percentage of intrafamiliar murder were registered (2005: 44,4% North Italy; 13,9% Lombardy).

**Case Report:** On a march afternoon a 66 y.o. man called the first aid telling to have killed his ex-wife (separated couple). At the arrival, of rescuers and police, the 67 y.o. woman was found dead in the living room (3:00 p.m). The crime scene appears immediately well defined and limited to the living room itself, where, near a prepared table for two and a heater, a woman was lying prone in an ample blood pond partially coagulated, no weapons or knifes were found on place. On the near couch were a pair of female sunglasses and a handbag. On another couch-bed, on a leaflet the motivations of the aggression were shortly annotated and on other leaflets were annotated sums given in loan to his ex-wife. At the external examination on scene (4:00 p.m) the woman was completely dressed in a juvenile matter, with multiple blunt injuries on the face - vast ecchymosis on the forehead and around the left eye - and head - on the right parietal region were two skin discontinuations with exposition of the bony surface. Around the body were some teeth, fragmented and intact. Post-mortem changes: no rigor mortis, no livor mortis; corpse inner temperature: 36.2°C (environmental temperature of 20.9°C). At autopsy a relevant head trauma was confirmed with diffused subarachnoid haemorrhage and multiple facial bones (jaw-bones, nasal bone) and skull fractures (cap and base). Intense blood infiltration around the cervical spine, multiple rib fractures, blood infiltration at the heart's great vessel emergency and at the lumbar spine (L1-L2) were found. Ruptured liver and right kidney, with limited hemoperitoneum were also present. The cause of death was indentified in multiple head, thoracic and abdominal visceral and bony injuries.

**Discussion and Conclusions:** The man shortly after the uxoricide explained what happened to the investigators, he had invited his ex-wife to dinner, but instead of a calm lunch in good company, the ex-wife had come only to ask some money and was in a hurry because a friend was waiting out in car to accompany her to a dancing. This situation is then evolved in an animate altercation with his ex-wife about her frequent money requests, he had then attacked and beaten her to death with fists and kicks on her head (1:30 p.m.). The crime scene and autopsy findings confirmed multiple blunt force injuries extended to head, thorax and abdominal region; the blood infiltrations and the small amount of intracavitary intraperitoneal bleeding had allowed to conclude for an initial head and facial trauma and a terminal thoracic and abdominal blunt trauma, with fists, kicks and trampling of the woman first knocked down to the ground and then hit lying on the floor. The multiple localization and the severity of injuries permit to consider this case as an overkill by lethal blunt force trauma (fists and kicks) perpetrated by a single offender.

**Final Comments:** The isolation of one of the spouses after legal separation in a senile couple and the continue requests of money denying the request of friendliness proximity and tenderness can lead to extreme aggressive situations. In this case after legal separation, the unequal permanent conditions between man and woman with the husband confined alone at home and the wife open to new socialization and a second youth, can be identified as an adequate primer to a violent action also in a person, who was up to that moment, considered a quiet retired ex fireman.

**Keywords:** Crime Scene Investigation; Domestic Violence; Blunt-Force Injury; Kicking; Injury Pattern; Uxoricide

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3

# TRAFFIC ACCIDENT RECONSTRUCTION USING NUMERICAL SIMULATION TECHNOLOGY

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**Introduction**: To explore mechanism of injury and analyze impact biomechanics in traffic accident using numerical simulation technologies and to provide scientific evidence for the traffic accident reconstruction and determination of mechanism of injury.

**Methods:** The collision locations of a traffic accident were determined by autopsy. Vehicle traces verification, the process of accident and cause of death were analyzed subsequently. On the basis of the collision locations, the accident reconstruction was performed by coupling the three dimensional car behaviors from PC-CRASH with a MADYMO dummy model ahead. The collision finite element models, being generated from the victim CT scans of a similar body size were loaded with calculated dummy collision velocities and resultant forces and the impact biomechanical response data were extracted consequently in terms of von Mises stress, relative displacement, strain and stress fringes.

**Results:** The autopsy examination and vehicle traces verification showed that the collisions between right lower extremity and left part of the car front bumper, and between parieto-occipital and left part of the car roof can occurred. The accident reconstruction results were identical with the examined results when the vehicle reached a speed of 65km/h. In such cases, the peak translational accelerations of right lower extremity and head were 430G and 160G as well as the peak impact forces of 5300N and 6900N, respectively. The finite element analysis showed that the tibia fractured with a maximum von Mises stress of 141Mpa and the peak impact force of lower extremity was 5184N. The skull peak von Mises stress of 1357Mpa on the collision area was beyond the stress threshold limit value of skull bone. While coupled with bone failure criteria, fractures of the impact location and basis cranii were obviously observed. The brain tissue had a significant coup-contrecoup injury strain fringe distribution. All the results indicated that the fractures of head and right leg could be formed in the impact at a speed of 65km/h.

**Conclusion:** The numerical simulation technology demonstrated its capability in reconstruction of traffic accident and analysis of collision biomechanics for the assessment of response of impact location, prediction of accident process and for the solutions of difficult problems in traffic accident identification.

**Keywords:** Traffic Accident; Reconstruction; Numerical Simulation Technology; Biomechanics

4

# ANALYSIS OF 59 CASES DUE TO ALLERGIC REACTION

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**Abstract:** This presentation will introduce the characteristic of cases death due to allergic reaction in Shanghai area, P.R.China during 1998 to 2008. A retrospective study of 59 cases was performed using the database from the Dept. of Forensic Medicine, Shanghai Medical College, Fudan University (24 cases), Institute of Forensic Science, Ministry of Justice P.R.China (21 cases), the Dept. of Pathology of Shanghai Medical College (3 cases), and the Dept. of Pathology of Second Military Medical University (11 cases), from 1998 to 2008. Details of medical history, agent responsible for the allergic reaction, death scene investigation and postmortem examination findings were reviewed for all 59cases. Of the 59cases, 30 were male and 20 female, and 76.2% of all were younger than 40years. Investigation revealed that 2 of 59 (3.4%) had history of asthma and 5 (8.5%) had previous allergic reaction to certain drugs/food. 3 cases had COPD and 1 had serious liver cirrhosis. 58cases (98.3%) resulted from allergic reaction to drugs during medical practice, and another one to ant powder. 45 (77.6%) cases were related to antibiotics, and 36cases (61%) occurred in clinics illegally operated by unlicensed physicians. The onset of symptoms varied from immediate to 48h after initial exposure to the allergens. Death occurred within one hour of allergic reaction in 27 (45.8%) cases. Postmortem findings were relatively non-specific, and included pharyngeal/laryngeal edema 49 (81.3%), mucus plugging in the airways 31 (52.5%), and pulmonary congestion and edema 59 (100%). Eeosinophilia was seen in the mucusa and submucosa of the respiratory tract in 42 cases (77.8%), and in the gastrointestinal tract in 19 cases (32.2%). Inappropriate use of antibiotics and illegal medical practices were the main causes of identified allergic death in Shanghai. This study indicates that the successful investigation of any allergic reaction death requires a multi-disciplinary approach and adherence to standard protocols of death scene investigation and complete autopsy examination.

**Keywords:** Allergic Reaction; Antibiotics; Forensic Pathology; Investigation

5

# THE STRANGE CASE OF A "WALKING" BULLET

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**Abstract:** Gunshot wounds of the brain constitute approximately one-third of all fatal gunshot wounds. Of the bullets that do not exit the head, the vast majority are retained in the cranial cavity. In a historical perspective, some consider that Professor A. W. Wright of Yale University was the first to help determine the cause of death by the use of Roentgen's "new kind of ray" on a rabbit in the 1890s. X-rays should be performed in all cases involving firearms, history of abuse or deaths of unknown circumstances, and are also useful for identification purposes. They are invaluable in the evaluation of gunshot wounds by giving the location of the bullet, which will save hours of tedious dissection. The authors present a case of a woman who committed suicide with a gunshot to the head. There was no exit wound. The neuropathological examination of the fixated brain revealed the path of the bullet which ended with no bullet at all. Prior fluoroscopy of the brain gave the location of the bullet. It was distant from the original path and there, the brain tissue, revealed no contusions or hemorrhages. This case shows a strange and curious travel of a bullet in the head and the importance of radiology in forensic autopsy.

**Keywords:** Gunshot; Head X-Ray; Brain Fluoroscopy; *Post Mortem* Lodgment

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# ORAL SESSION

## Session 16.2

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1

# EXAMINATION OF CHAINSAW TOOL MARKS ON BONE USING DIGITAL INFRARED IMAGING

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**Institution(s):**[1]UNIVERSITY OF NORTH CAROLINA WILMINGTON; [2]NETHERLANDS FORENSIC INSTITUTE

**Abstract:** Chainsaw tool marks on bone have been reported in some dismemberment cases. When teeth on a chainsaw contact bone and the bone is not completely sawed into two parts, bone fragments are removed forming a channel or kerf. The kerf contains two kerf walls and a floor. Kerf marks are often adjacent to cuts due to false starts or skips in the cutting process. The purpose of this paper is to present the principles of tool mark identification and the results of a study analyzing chainsaw kerf marks on bone using digital infrared images enhanced with computer software. Random imperfections on the leading edge of the teeth may be transferred to the substrate when a material is cut using a chainsaw. When imperfections are transferred, they leave a series of fine lines referred to as striations. The striations vary in width on the cutting edge; therefore, they can be used as identification characteristics to match a tool to a tool mark. For this study, 50 chainsaw cuts producing kerf marks on bovine bone were made with a Stihl® Model 290 chainsaw. This model is equipped with a 56.5 cc engine, a 50 cm (20 in) bar and chipper chain. The model 290 chipper chainsaw has cutting teeth assembled to form 40 cutting links along the chain with alternating left and right cutting teeth. As the chain rotates around the bar, the cutting links remove bone. Bovine bone sections were prepared by drilling a pilot hole in each end of the bone, attaching them to a 13.97 cm (5.5 in) x 13.97 cm (5.5 in) x 76.2 cm (30 in) block of wood and anchoring them with screws to hold the bone in place before making the cuts. The cuts were made at approximately 90 degrees to the bone shaft using the same approximate chain speed. The kerf depth ranged from 1.27 mm (0.05 in) to 3.81 mm (0.15 in) in the cortical bone. A Dino-Lite model AM-413FIT near infrared digital microscope mounted on a stand with a boom arm was used to photograph chainsaw teeth striations on the kerf floor in the bone. The kerf floor images were illuminated using infrared light emitting diodes in the 850 nm range. The infrared images were recorded and examined at approximately 30X to determine if sufficient individual characteristics were present for comparison purposes. The kerf floor images were then enhanced using Jasc software by splitting the color channels of the original image into percentages of black, yellow, magenta and cyan. The color separation feature did not alter the image but changed the contrast for each of the colors based on the original image. The quality of striations on the kerf floor were evaluated and classified as +1, +2 or +3. A +1 score was assigned to kerf floor images with no striations, a +2 score was assigned to kerf floor images with some striations and a +3 score was assigned to images that contained sufficient striations for matching a tool to a tool mark. In conclusion, 9 (18%) of the chainsaw cuts on bone were rated as +1, 27 (54%) of the chainsaw cuts were rated as +2 and 14 (28%) of the cut marks were rated as +3. Striations from chainsaw teeth are not always transferred to cortical bone; however, in this study the infrared imaging and computer imaging software did enhance the visualization of the transferred striations produced by the chainsaw cutting teeth.

**Keywords:** Tool Marks; Digital Imaging; Striations; Chainsaw

2

# THE EVIDENTIAL VALUE OF FINDING GLASS ON HEAD HAIR AND HEADWEAR

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**Abstract:** This study was undertaken to assist with the assessment of the evidential value of glass found on human head scalp and headwear. It mainly attempted to answer questions related to the prevalence and frequency of glass on such 'surfaces'. Experiments were based on two different population groups; the general public who do not work with glass and glaziers from a major Australian glass manufacture. The latter population work with glass and had regular contact with broken glass. 232 samples were collected from the head hair and headwear from the random population. These resulted in the recovery of 6 glass fragments only. All of these fragments were from head hair samples with no multiple fragments recovered. The two headwear samples that were taken revealed no fragments. These results were in contrast to the survey that was conducted on the head hair and headwear of the glaziers from the glass manufacturer: 129 glass fragments were found on 24 of the 25 glaziers. The size and number of fragments found in each sample were also generally larger. The results from this study indicate that the prevalence of glass on the head hair and head wear of the random population is very low. This will be discussed and contrasted against the results of similar surveys undertaken on different 'surfaces'. This will enable a broader discussion about the evidential value of glass.

**Keywords:** Glass; Interpretation; Population Study; Transfer Persistence

3

# CHEMICAL ANALYSIS OF AUTOMOTIVE CLEAR COAT PAINTS BY UV MICROSPECTROPHOTOMETRY AND MICRO LASER RAMAN SPECTROSCOPY

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**Abstract:** For more than 20 years, automobiles around the world have had a clear coat added to the paint regime. This top coat has no pigments or dyes, but contains UV scavengers that protect the color layers below from UV light and other environmental damage. There has been little research on the characteristics and chemical analysis of these coatings compared to the attention paid to the pigmented and dyed automobile paints. This paper reports the analysis of approximately 200 auto paints from the US, Australia and England by UV Microscpectrophotometry and Micro Laser Raman. Chemometrics methods including principle component analysis and hierarchical clustering are used to classify the spectral data.

**Keywords:** Automotive Paint; Clear Coats; Ultraviolet; Microspectrophotometry; Laser Raman Spectroscopy

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# MICRO-RAMAN SPECTROSCOPIC INVESTIGATION OF DIRECT DYES AND DYED CELLULOSE FIBERS

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**Abstract:** Raman spectroscopy is proved to be a fast, nondestructive and sensitive technique in diverse areas of forensic science such as drugs of abuse, paints, explosives and inks. The forensic examination of textile fibers typically involves a comparison between known and unknown samples, and the color of dyed textiles provides an important characteristic which enables objective comparisons to be made and can provide someinformation on dye identity. Meanwhile, it is a complex process to dye fabrics and there may be chemical reactions at the same time. In this study, 21 direct dyes (9 blue, 6 black and 6 red) were collected and three colorless cellulose fibers (cotton, cellulose-viscose and ramie) were dyed with these direct dyes. All the dye and fiber samples were measured by Raman spectroscopy to investigate the association between the dyes and fibers. The Raman instrument was equipped with three laser excitation sources: argon ion laser at 514 nm, helium-neon at 633 nm, and diode array lasers at 785 nm. It was observed that argon ion laser at 514 nm has a better affinity with 21 dyes, it obtained informative spectra for all dyes, although there were 6 pairs of blue dyes, 2 pairs of red dyes and 7 pairs of black dyes remained undifferentiated, because they were similar sulfosalts with azoic formula. Spectra of 3 blue dyes, all black dyes and 5 red dyes were influenced by fluoresce upon 633 nm and 785 nm laser wavelengths, while the slight differences of weak peaks still resulted in same discriminating powers with those of 514nm. The substrate did not influence on the spectra of colored fibers and three different fibers with the same dye gave the almost identical spectra. Meanwhile, spectra of dyed fibers were weaker on peak intensities and stronger on fluoresce backgrounds compared with spectra of their dyes because of lower concentration of dye on fibers. As a result, discriminating power of dyed fibers was the same with dyes under 514 nm laser wavelength while it decreased under 633nm and 785 nm laser wavelengths.

**Keywords:** Raman Spectroscopy; Direct Dyes; Cellulose Fibers

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# ANALYSIS OF FIBRE DYES BY CAPILLARY ELECTROPHORESIS - QUADRUPOLE TIME-OF-FLIGHT MASS SPECTROMETRY

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**Abstract:** Colour is considered as a prime feature in the forensic examination of fibres. However, non-distinguishable colours can be obtained by different combinations of dyes, and, as a result, in many cases, it is still necessary to undertake a chemical analysis of fibre dyes. The evidential value of a 'fibre match' is significantly increased if questioned and known fibres are found to be dyed with the same specific molecule. The corollary is that any instrumental technique capable of extracting this information efficiently becomes extremely valuable to the forensic scientist. Capillary Electrophoresis (CE) is a relatively new instrumental technique that has shown great promise and offers many advantages over conventional techniques, however it also has many disadvantages and a lack of development has restricted its growth in its relatively short lifespan. The emergence of Time-of-Flight Mass Spectrometry provides renewed interest in CE for applications that were deemed difficult previously. Using Capillary Electrophoresis - Quadrupole Time-of-Flight Mass Spectrometry with accurate mass detection, it was possible to analyse disperse fibre dyes extracted from 5mm of a single polyester fibre. Sensitivity of 200 femtograms and a dramatic improvement of repeatability over conventional CE techniques were achieved using a 15mM ammonium acetate buffer (pH 9.3) and a 70cmx50µm fused silica capillary with +30kV of applied voltage. Overall, the results demonstrate significant promise for the future of Capillary Electrophoresis as an instrumental technique in trace evidence / chemical criminalistics in general and for the analysis of fibre dyes in particular.

**Keywords:** Fibres; Dye Analysis; Capillary Electrophoresis; Quadrupole Time-of-Flight Mass Spectrometry

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# THE EVIDENTIAL VALUE OF FINDING FIBRES ON HUMAN HANDS

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**Abstract:** This research was prompted by casework observations: tapings from hands primarily undertaken for DNA recovery often highlight the presence of extraneous fibres. This led to the following questions: Is it common to find fibres on hands and what is the evidential value of fibres in such a context? Violent crimes commonly involve some form of struggle between the offender and the victim. Because of this, either the victim or the offender, or both, may collect fibres on their hands. Knowledge of the extraneous fibre population on the hands is important to assess the significance of the fibre evidence in such cases. In this study, hands within a random population were surveyed. Each hand was divided into four zones: palm, back, fingernails and nail-beds. The palms and backs of volunteers were taped, while wooden scrapers were used to scrape under the fingernails and nail-beds. Fibres recovered from the tapings and scrapers of 73 volunteers were classified according to perceived colour, length and generic type; the delustrant status of man-made fibres was also determined. The proportion of fibres that might not have come from the garments being worn at the time of collection was also determined. It was not uncommon to find fibres on human hands; all volunteers carried fibres on their hands. It was found that gender, age, frequency of showering and washing hands, whether the nails are cut or not, and whether the volunteers bite their nails, do have a significant effect on the average fibre number found on hands. About half (49.0%) of the fibres were black-grey in colour, followed by blue (28.5%). Most of the fibres were natural, with cotton as the most common (75.6%) fibre type. The most common colour/generic type combinations were black-grey cotton (37.8%), blue cotton (22.2%) and black-grey man-made (10.9%). Fibres of 3.0 mm or less in length constituted the great majority (90.6%) of fibres. The distribution of fibres within the different zones of the hand did not generally differ significantly. Approximately three-fifths (61.3%) of the fibres from a sub-population of 36 volunteers were extraneous. These results will be discussed and contrasted against the results of similar surveys undertaken on different surfaces. This will enable a broader discussion about the evidential value of fibres.

**Keywords:** Fibres; Interpretation; Fibre Population on Hands

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# ORAL SESSION

## Session 16.3

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1

# EXAMINATION OF INTRA-INDIVIDUAL DIFFERENCE IN THE SIGNATURE OF JAPANESE REAL AND FICTITIOUS NAMES

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**Introduction:** Japanese manner of signing is much different from the western one. One of the most important characteristics of Japanese signature is the legibility. A large majority of Japanese write their names in the same manner as they write sentences, words and so on when they are requested to sign their names. So, in the course of the handwriting examination of Japanese signature, characters written as one's signature are usually compared with the same characters written in one's general writing. Some features other than character shape such as spacing and character size are also examined. Alignment of characters is also regarded as the writer's own manner. Then, is characters also arranged as the same manner as the signing real name in the case of signing fictitious name? This paper discusses the intra-individual difference between the signatures of real name and fictitious name from the standpoint of the spacing.

**Materials and Methods:** One hundred and twenty four male subjects were asked to fill in the box on a form for their name and birthday ten times. They were also asked to write the fictitious name and birthday on the same form for ten times. Both their real name and the fictitious name were composed of two Kanji characters for the family name and two Kanji characters for the given name. Distance was measured at five points, that is, distance between the left edge of the box and the first character (D1), between the first and the second characters (D2), between the second and the third characters (D3), between the third and fourth characters (D4) and between the fourth character and the right edge of the box (D5).

**Results:** Averages of D1 through D5 were 6.26, 4.06, 4.88, 3.35 and 9.86 millimeters respectively in real name and 6.18, 3.87, 3.83, 1.95 and 14.43 millimeters in fictitious name. These mean that subjects put characters to the left part of the writing box and leave more space at right part of the writing box under both conditions. Results of analysis of variance on D1 through D5 showed intra-individual difference was significant and that inter individual difference was significant in both real and fictitious names. Differences between D2 and D3 and between D3 and D4 were both significant in real name. In the case of the fictitious name, difference between D2 and D3 was not significant and difference between D3 and D4 was significant. Difference between the real name and the fictitious name was not significant on D1 or D2. Differences between the real name and the fictitious name on D3 through D5 were significant.

**Discussion:** Results of analysis of variance mean that subjects put characters on the writing box following their unique and fixed manner in writing both their real name and a fictitious name. Results of the comparison of the space between D2 and D3 and between D3 and D4 suggest the difference of the writer's sense of writing names. Many Japanese give more space between their family name and given name. In this experiment, D3 represented the distance between the family name and the given name. In the case of the fictitious name writing, however, difference between D2 and D3 was not significant. Non-significant difference on D1 between the real and the fictitious names gives an important suggestion to the forensic document examination. A writer has a fixed and unique manner of locating the first character on a given writing space under the both conditions of signing.

**Conclusions:** Difference between the real and the false signatures was statistically examined by measuring the distance between characters. Results of the experiment showed the stability of the first character in both cases of one's own name and false name writing. Re

**Keywords:** Signature; Writer Identification; Spacing

2

# A STUDY OF ANALYZING HANDWRITTEN ELECTRONIC SIGNATURE UPON CONVENTIONAL APPROACHES

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**Abstract:** On the prevalence of electronic technology and its equipments, electronic signature pads are spreading worldwide for obtaining signatures of payment, authorization and identification. Where money and personal identity would go, there should be frauds and counterfeits that lead us to consider the possibilities of forgeries in the forensic point of view. In this paper, conventional approaches of handwritten signature analysis are reviewed and limitations of applying these approaches to the image of signature by electronic signature pads are observed. As a result of analysis experiments by handwriting experts, regulations of managing the signature image and technical requirements of electronic signature pads are proposed.

**Keywords:** Electronic Signature Pads; Signature Analysis; Handwriting; Questioned Documents

3

# TWO EFFICIENT METHODS FOR FORENSIC VERIFICATION OF CHINESE SIGNATURES

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**Methods:** This paper compares two kinds of methods for Chinese signature verification. The first one is signal analysis of the dynamic movement. It displays remarkable differences of different writers signatures in spectrograms. The second is Template matching method in order to make same strokes corresponding in time axes, it can tell different writers without error. The results of experiments indicated that these two methods can be used to identify writer and distinguish forge signatures efficiently.

**Keywords:** Forensic; Handwriting; Chinese Signature; Spectrogram; Template Matching

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# NEW OBJECTIVE METHODS FOR THE EXAMINATION OF QUESTIONED DOCUMENTS. PART 1 - VARIATION IN ARABIC SIGNATURES

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**Abstract:** Results of a major study of Arabic signatures and subsequent analysis, will be presented. The analyses are based upon seeing the signature as a picture composed of various features (variables) which can be measured or coded according to defined classification schemes. From a unique library containing multiple collections of signatures from 188 Arabic people, quantifiable features including height, length height/length ratio, number of strokes and dots, direction of ending, legibility, slant, and starting and ending positions provide an invaluable reference library. Frequency of distribution data will be presented and highlight that legibility is a factor which can influence variation in some features and show other very interesting and unexpected results. Results from a Mann-Whitney statistical test will illustrate, with four of the features, that significant differences between males and females can be observed. Quantitative data obtained for within and between variation of individuals and the level of natural variation when an individual signs their name on separate occasions will be presented. Finally, it will be shown how a Mann-Whitney statistical test can be used to identify the features that are responsible for the variations observed. All of these studies were duplicated to provide evidence that the analytical methods used are reproducible and that quantitative evidence can be obtained. The results presented illustrate that the methods developed could be applied to Western signatures.

**Keywords:** Arabic Signatures; Variation; Statistical Analysis

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# NEW OBJECTIVE METHODS FOR THE EXAMINATION OF QUESTIONED DOCUMENTS. PART 2 - THE USE OF PRINCIPAL COMPONENT ANALYSIS (PCA) FOR THE OBJECTIVE EXAMINATION OF ARABIC SIGNATURES

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**Abstract:** Results of a major study involving the measurement or classification of features in Arabic signatures and subsequent statistical analysis, will show that reproducible, quantitative and objective evidence can be obtained. The approach is based upon seeing the signature as a picture composed of various features (variables) which are analysed by Principal Component Analysis (PCA) and MANOVA statistical methods. The results presented illustrate that these methods could also be applied to the examination of Arabic handwriting and Western and other scripts. Manual methods currently being used for identifying features and associations between features by forensic document examiners is extremely time consuming and subjective. To overcome these problems the natural variation within an individual's Arabic signature was studied using Principal Component Analysis (PCA) with orthogonal rotation of the components. With either legible or illegible types of signature it will be shown that PCA provides an objective, robust and simple routine for identifying the features and importantly the ranking and associations between features. Results presented will also show how the method can assist in confirming the authenticity of signatures.

**Keywords:** Arabic Signatures; Variation; Statistical Analysis

6

# IDENTIFYING A COMMON ORIGIN OF TONER PRINTED COUNTERFEIT BANKNOTES BY MICRO-RAMAN SPECTROSCOPY

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**Institution(s):**[1]CROATIAN NATIONAL BANK; [2]RUDJER BOSKOVIC INSTITUTE

**Introduction:** The most widespread methods currently used for comparison of counterfeit banknotes are visual and physical examinations. These methods usually dont give enough information to identify counterfeit banknotes coming from same source, especially in the case of different denominations and currencies. In addition, analysis of counterfeit banknotes is limited by the fact that, since the counterfeit banknote is evidence, only non destructive methods can be applied.

**Materials and Methods:** In this study the applicability of micro-Raman spectroscopy as a technique for examining toner printed counterfeit banknotes is explored. With the aim to find the origin of the toners used for printing counterfeit banknotes the same template is printed with different kind of toner printers on the two different type of paper. For each sample cyan, magenta, yellow and black colorants of the toners are analyzed separately. The Raman spectra of the colorants of counterfeit banknotes are analyzed considering the Raman fingerprint of various toner samples.

**Results:** The results show that micro-Raman spectroscopy can be applied as a method for analysis of toner printed counterfeits, such as banknotes and documents, in order to connect different samples by measuring properties of toner.

**Keywords:** Raman; Spectroscopy; Toner; Banknote; Counterfeit

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# A NEW METHOD OF USING IN VIVO X-RAY IMAGES OF THE SKULL DURING PHOTO SUPERPOSITION WITH THE IMAGE OF THE SKULL

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**Introduction:** The goal of this presentation is to demonstrate new ways of using in vivo X-ray images for the procedure of craniofacial identification. This newly proposed method uses an adjusted outline-projection technique of a photograph of an unknown skull in order to facilitate comparison to a known radiograph and to account for X-ray distortion of the radiographic images. Our method of craniofacial identification with the use of in vivo X-ray images for comparison to a skull is entirely different from the classic approach where the comparison is made with in vivo photo images. It is often necessary to generate new procedures for carrying out the process of comparing two heterogeneous objects. Typically, the data obtained from studying radiographs are used to form dental status and compare the two radiographic images. However we propose a unique approach. The methods we propose reduce the difficulty of the photo superposition process by using outline projections instead of imposing the two images. Thus, the photo superposition analysis uses the in vivo X-ray image of the dentition and the skull in the same projection as the image of the skull itself, instead of comparing the two images in the same imposition. We will describe 20 cases and a number of experiments used to develop the new method. This method was especially useful when the skull was partly destroyed.

**Methods:** We suggest only the superimposed contours of the teeth and crowns or other unique features be taken into account for the identification process, as co-incidence or differences of the skull contours have little importance as some spatial distortion of the skull image in the radiograph will occur. Combinations of all cranial features are easy to distinguish and should thus be included as they are generally considered unique (Christensen 2005). If the given images are of high resolution, with the dental arcade clearly visible, they are more useful than the separate images of teeth or frontal sinuses. Outline traces of the skull, dentition and other key features should be generated using computer software for both the known and unknown images to be compared. However, one must take into account the differences of the projection distortion of the radiograph, using two steps. (1) The outlines of the skull should be compared - the calvarium contours and the side contours of the lower jaw and then (2) one should compare the contours of the facial bones and the chin. After this general sizing, the unique outlined features can easily be compared in projection and areas of distortion noted from the two-step process can be accounted for and ignored from the identification analysis.

**Discussion:** The process of applying this method is very effective though not labor-intensive for facilitating superimposition identifications. In such cases the comparison of identified and identifying objects is based upon taking into account the combination of separate small features and with the use of the method of photo superposition of skull contours. As a rule, radiographs unevenly distort the true size of the objects they depict. The elements which are nearer to the radiation sensor are projected onto it with less distortion than those which are nearer to the X-ray source. Thus we divide such an X-ray image into two zones: 1) Representation of the back "layer" of the frontal projection of the skull - the skull outline and back sections of the lower jaw are increased to a significant degree. 2) Representation of the front "layer" of the frontal projection of the skull - the face bones contours are minimally distorted. In each of these zones the X-ray contours represent the proportions of the so-called skull "layer" elements rather precisely to enable the procedure of their comparison with the contours of the skull.

**Final Comments:** Our method presented here deals with this radiographic distortion by focusing on more unique features of the skull which has proved successful in facilitating identifications.

**Keywords:** Identification; Skull; Radiograph; Superposition

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# DIAMOND CELL FOURIER TRANSFORM INFRARED SPECTROSCOPY TRANSMITTANCE ANALYSIS OF BLACK TONERS ON QUESTIONED DOCUMENTS

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**Abstract:** This presentation will describe the use of Diamond cell Fourier Transform Infrared (FTIR) Spectroscopy methodology for the analysis of black toners commercialised in Portugal. A total of one hundred and thirty-eight different samples from eighteen manufacturers were analyzed in transmittance mode through a diamond cell. This methodology was considered to be non-destructive as it preserves the questioned documents' integrity in the forensic analysis. The questioned documents support (paper sheets) does not affect the final result. This technique shows high repeatability and intermediate precision. Spectra were organized in twenty distinct groups based on its main chemical characteristics and relative peak intensity. A black toner infrared spectral library was developed. Spectral matches between forty-five blind samples and databases resulted in a 100% positive identification on the correct group.

**Keywords:** Diamond Cell; Infrared Spectroscopy; Black Toner; Questioned Documents

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# ORAL SESSION

## Session 16.4

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# STYRYL DYE COATED METAL OXIDE NANOPOWDERS FOR THE DETECTION OF LATENT FINGERMARKS ON NON-POROUS SURFACES

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**Abstract:** Conventional fingerprint powders rely on contrast induced by absorption/reflection (eg. black powder) or luminescence emission in the visible region (eg Blitz Green). In many cases, these powders provide sufficient contrast for development, however, in some circumstances, surfaces characteristics can interfere with the visualisation of powdered fingermarks. Visualisation in the near infra-red (NIR) region of the spectrum however, has been shown to eliminate interferences often encountered in the visible region. A mixture of two dyes, styryl 11 and rhodamine 6G (designated here as STaR 11) was coated onto a range of metal oxides powders to produce a luminescent fingerprint powder. STaR 11 coated on aluminium oxide nanopowder gave the best results, with strong luminescence emission in both the visible and NIR. Once this was optimized, the powder was coated onto magnetic powder and an extensive comparison against Blitz Green performed. This involved using a range of donors and aged fingermarks deposited on different surfaces. When compared to Blitz Green, STaR 11 magnetic powder resulted in a significant decrease in background luminescence and was also superior to Blitz Green on textured surfaces and on aged fingermarks.

**Keywords:** Latent Fingermarks; Nanopowders; Near-Infrared; Styryl 11; Rhodamine 6g

2

# NOVEL AMINO-ACID TARGETING IMMUNOGENIC REAGENTS FOR THE DETECTION OF LATENT FINGERMARKS ON POROUS AND NON-POROUS SUBSTRATES

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**Abstract:** Our research into the detection of eccrine-rich latent fingermarks using an immunogenic approach has recently expanded along two complementary arms: 1- Enantiospecific anti-L-amino acid antibodies conjugated to nanoparticles for the detection of latent fingermarks on non-porous surfaces; and 2 - Substituent-specific RNA aptamers for the detection of latent fingermarks on porous surfaces. The first of these methods developed an anti-L-amino acid antibody reagent that was determined to be most effective on dry fingermarks (aged up to 12 months) deposited on non-porous substrates. The red-emitting fluorescent dye used for visualisation of the deposited antibodies removed the problems associated with background interference on certain substrates. Aptamers are comprised of oligonucleotides - typically ribonucleic acid (RNA) or single stranded DNA - folded into a specific three dimensional conformation, determined by 'engineering' them using strictly controlled experimental conditions. These aptamers are produced in vitro and behave in a similar manner to traditional antibodies, binding to a target biomolecule or polar organic compound. The aptamers currently under investigation are short chains of RNA designed to specifically target L-isoleucine and L-histidine. The research to be presented in this paper investigates the compatibility of the aptamer sequences with organic solvent systems and their sensitivity to amino acid deposits on porous substrates.

**Keywords:** Fingermark Detection; Immunogenic Reagents; Antibodies; Aptamers; Amino Acids

3

# REACH ON A NEW METHOD OF FLUORESCENT YELLOW WET POWDER TO DEVELOP LATENT FINGERMARKS

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**Abstract:** In this study, a kind of Fluorescent Yellow powder was added into distilled water based surfactant solution, then stirred and ground until into viscous wet powder. We are successful in developing latent fingermarks with the Fluorescent Yellow Wet Powder. The developed perspiration, blood, oil or sebum fingermarks fluoresce and could be distinguished from the multi-color surface easily. The Fluorescent Yellow Wet Powder is a new method to develop fresh or aged fingermarks on dry or wet nonporous surface. Shelf life of the wet powder can exceed six months.

**Keywords:** A New Method; Fluorescent Yellow Wet Powder; Develop; Latent Fingermarks.

4

# NILE RED - AN ALTERNATIVE TO PHYSICAL DEVELOPER FOR THE DETECTION OF LATENT FINGERMARKS ON WET POROUS SURFACES?

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**Abstract:** Physical developer (PD) is the method of choice for the detection of latent fingermarks on porous surfaces that are, or have been, wet. However, PD presents well established drawbacks such as the need to prepare fresh solutions, analytically clean glassware, the lack of contrast obtained on dark substrates and the partially destructive nature of the technique. This study focused on the optimisation and validation of Nile Red - a highly fluorescent lipophilic dye - as a sebum-targeting latent fingermark enhancement reagent for porous surfaces. Nile Red typically produced red, highly fluorescent ridge detail on a non-fluorescent purple background for all of the paper substrates tested. In most instances, Nile Red produced superior fingermark development compared to PD, for both charged and depleted fingermarks, but was more sensitive to diffusion of labile sebaceous components over time. However, a comparative trial of both reagents on 5-year-old examination booklets indicated that Nile Red had a far better detection rate compared to PD. The Nile Red reagent has been placed after PD in the detection sequence for porous substrates, to avoid the higher background deposition of silver that results when PD is applied after Nile Red. In some cases, the application of Nile Red following PD to fingermarks exhibiting poor contrast resulted in the successful imaging of clear ridge detail.

**Keywords:** Fingermark Detection; Wet Fingermarks; Nile Red; Physical Developer

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# ORAL SESSION

## Session 16.5

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1

# ERROR MÉDICO. LA COMUNICACIÓN ASISTENCIAL COMO PROGRAMA DE PREVENCIÓN EN LA GESTIÓN DE RIESGOS

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**Introduction:** La asistencia sanitaria es clave en la mejora de la calidad de vida de los ciudadanos. Los cambios sociales y el extraordinario avance de las ciencia médicas se traducen en nuevas expectativas en relación a la práctica sanitaria y los resultados que se esperan obtener tras la atención recibida. A su vez, nos encontramos ante una actividad asistencial más compleja e institucionalizada con un incremento de la incertidumbre de la práctica clínica y mayores niveles de litigio en la relación entre los profesionales sanitarios y los pacientes. A su vez, nos encontramos en una sociedad crítica en la que los ciudadanos buscan la satisfacción de sus derechos y exigen responsabilidades en situaciones que en otro momento achacaban a la suerte y al azar. El aumento de demandas y denuncias que prosperan en los tribunales y su carácter indemnizatorio ha conducido a los centros sanitarios y a las compañías de seguros a establecer los denominados programas de gestión de riesgos sanitarios, con el fin de identificar, analizar y evaluar los riesgos que conlleva la actividad sanitaria, estableciendo mecanismos de control y de tratamiento. El análisis de las sentencias judiciales muestra con toda claridad que muchos de los hechos juzgados eran previsibles, no sólo por el profesional sino también por la propia organización sanitaria y la gran mayoría podrían haberse evitado tras la adopción de medidas adecuadas de prevención. El objetivo de este trabajo es analizar el proceso de comunicación entre los profesionales sanitarios y los pacientes, detectando oportunidades de mejora que ayuden a incrementar la calidad de la información, evitando errores ocasionados por fallos en el proceso de información y comunicación. De este modo se podrán diseñar las estrategias más adecuadas dirigidas a evitar estos errores lo que redundará en una mejora de la calidad asistencial y promoverá la seguridad de los pacientes.

**Materials and Methods:** La muestra de estudio se obtuvo del total de pacientes asistidos en centros hospitalarios y centros de atención primaria de la Región de Murcia. El tamaño de la muestra es de 3274 pacientes, 1231 varones (37,6%) y 2043 mujeres (62,4%) (p = 0,5; precisión del 5%; nivel de confianza del 95%). La edad media es de 43,3 años ???,27 (D.S. 15,55), con un rango de edad entre 89 y 16 años. Se han establecido los siguientes grupos de estudio: menores de 18 años; de 19 a 30 años; de 31 a 40 años; de 41 a 50 años; de 51 a 64 años; de 65 a 75 años; y mayores de 76 años de edad. A cada uno de los pacientes se le administró un cuestionario validado de 35 ítems. Los pacientes respondieron de forma voluntaria y anónima. El tratamiento estadístico de los datos se hizo mediante el programa estadístico SPSS 15.0 aplicando un análisis univariante o distribución simple de frecuencias, el test de la chi 2 de Pearson y un análisis multivariante mediante el que pretendemos conocer la correlación entre las diferentes variables.

**Results:** En el 17,9% de los casos los pacientes manifiestan que la información proporcionada por el personal sanitario sobre la enfermedad que ha motivado la asistencia no ha sido correcta (4,2% están muy en desacuerdo y 13,7% en desacuerdo con el proceso de información). Al calcular la media entre 1 (muy en desacuerdo) y 4 (muy de acuerdo) obtenemos un valor medio de 3,26 puntos sobre 4, en cuanto al grado de satisfacción por los pacientes en relación a esta cuestión. En el 19,0% de los casos los pacientes señalan que no han sido atendidas sus preguntas de forma correcta. El 23,7% de los pacientes opina que el personal sanitario no se ha preocupado de que entiendan toda la información. El 36% de los pacientes consideran que suele haber interrupciones (entrada de personas, llamadas telefónicas, etc.) durante la consulta con el médico. El 21,2% de los pacientes contestan que han sufrido un error durante su asistencia. De este porcentaje, el error les fue comunicado en el 71,3% de los casos por el personal médico y en el 19,5% por el personal de enfermería y el 6,6% de los pacientes contestan que de forma conjunta por ambos profesionales. Al preguntarles si el error se ha debido a un fallo en la comunicación, el 11,8% de los encuestados contestan que se debió a la comunicación entre el personal médico y de enfermería y el 11,0% entre los profesionales de atención especializada y de atención primaria. El 13,0% de los pacientes

encuestados manifiestan que han cometido un error con la medicación o con el tratamiento al no entender correctamente las instrucciones proporcionadas por el personal sanitario. En estos casos, en el 39,9% las instrucciones fueron verbales, en el 33,1% escritas y en el 23,9% se dieron de ambas formas.

**Discussion:** En el ámbito sanitario y como consecuencia de la prestación de servicios asistenciales es cada vez más frecuente la utilización de conceptos y metodologías de la gestión de riesgos para hacer frente al incremento de reclamaciones administrativas y judiciales. Las estrategias de abordaje implican adoptar una metodología dirigida a la prevención y gestión de los riesgos asociados a la prestación de servicios sanitarios, y a la detección de los factores de riesgo médico-legal que puedan dar lugar a quejas, reclamaciones o acciones judiciales mediante la adopción de normas, reglamentos y manuales de buenas prácticas, y su adecuado seguimiento y control. Para ello se requiere analizar las deficiencias, las causas que las motivan y las medidas que es necesario adoptar. El deficiente proceso de comunicación entre los profesionales sanitarios y los pacientes es una de las causas más frecuentes de reclamación. En el 80-90% de los casos en los que se presenta una demanda o denuncia de responsabilidad médica, se alega la ausencia de información o una deficiente información proporcionada por el equipo médico sobre la actuación médica (diagnóstica o terapéutica) o sobre las complicaciones surgidas.

**Conclusions:** El profesional sanitario debe de poseer alta competencia científico-técnica y relacional-comunicativa, capaz de acompañar a los pacientes en la vivencia de enfermedad y de compartir con ellos el proceso de toma de decisiones. El adecuado proceso de comuni

**Keywords:** Error Médico; Malpraxis; Comunicación; Seguridad del Paciente

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# DISTENSIÓN GÁSTRICA AGUDA COMO CAUSA DE MUERTE: REPORTE DE CASO

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**Case Report:** El caso corresponde a un menor de seis años de edad, quien fue llevado por sus padres en horas de la madrugada al servicio de urgencias de un hospital en la ciudad de Bogotá Colombia, a este centro medico ingreso sin signos vitales. Según la información allegada en los días anteriores el menor había estado enfermo presentando diarrea, fiebre y al parecer síntomas respiratorios, la noche anterior al deceso presento deposición diarreica, dolor y distensión abdominal por lo cual sus padres deciden consultar al centro medico. Hallazgos de Necropsia:

- Distensión gástrica aguda
- Ganglios mesentéricos aumentados de tamaño con efecto de masa, hiperplasia ganglionar reactiva.
- Intestinos con placas de Peyer con hiperplasia reactiva.
- Signos de amigdalitis
- Testículos no descendidos
- Vejiga aumentada de tamaño
- Cambios inflamatorios reactivos en pulmones e hígado.

Causa y Manera de Muerte: Los hallazgos de la necropsia en el contexto del hecho según la información disponible orientan en primera instancia a una muerte natural causada por una distensión gástrica aguda. Durante la presentación del caso se discutirán los aspectos relevantes respecto a la distensión gástrica aguda como causa de muerte a partir de una revisión de la literatura medica disponible a la fecha.

**Keywords:** Distensión Gástrica Aguda

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# IMMERSION SCALD BURNS IN UNSUPERVISED CHILDREN - ACCIDENT OR NEGLECT? - A CASE REPORT

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**Case Report:** Introduction: Scald burns are caused by contact with hot liquid, resulting in spill or immersion patterns and are the leading cause of burn-related emergency visits and hospitalizations in infants. The bathtub can be a dangerous place, particularly to unsupervised children, where they can drown or be scalded in hot water. These injuries are often unintentional, but they can be due to child abuse and/or neglect, and the assessment of manner of death may become a challenge in fatal cases. Immersion scalds tend to be more widespread than other burns, involving approximately twice the mean body surface area (40% or more), with a high mortality rate. Many households comprise unsafe bathtub water temperatures of 54°C (130°F), exposing the occupants to the risk of full thickness scald within 30 second exposure to hot water. The authors present an uncommon fatal case of scald burns in a young child, after hot water immersion. Case Report: A 32 month old boy was left unsupervised in an apartment with his 8 years old sister. He was playing in the bathroom, when apparently fell in bathtub filled with hot water. The child died while carried to the emergency room. The forensic autopsy showed scald burn injuries of the 1st and 2nd degree with epidermal detachment, comprising about 82% of total body surface area, according to the Lund and Browder chart for burn assessment in children. The burns had irregular margin and depth, with an asymmetric distribution involving head, face, neck, trunk, genitalia and limbs. No "stocking/glove" pattern was found. There were also two burn injuries of the 1st and 2nd degree in the abdomen, probably due to close contact with a hot object. The skeleton X-ray showed no recent or old fractures. The scene examination complemented the autopsy findings, showing a water heater indicating a temperature of 66ºC. The water output temperature and at the bathtub, was of 72.2º C and 65.5° C, respectively. Discussion: Skin lesions arising from moist thermal damage can occur within external temperatures of as little as 44ºC, if sustained long enough. The autopsy showed 1st and 2nd degree scald injuries, concerning about 82% of body surface area. The distribution and depth of burn lesions, as well as the circumstantial information pointed to an accidental manner of death. The fact that children found themselves unsupervised at home does not exclude neglect. Conclusions: Young children, because of their natural curiosity, impulsiveness and lack of awareness in assessing danger, are at special risk for sustaining thermal injury. Scald burns are a leading cause of thermal injury among infants and toddlers, with devastating outcomes and high mortality rate, particularly when immersion is involved. Furthermore, immersion scald burns are often suspicious of neglect or child abuse and these issues should always be considered in such cases. Careful consideration must be given to the history given by the caretakers, the developmental ability of the child, as well as a thorough forensic investigation concerning the circumstantial findings at the scene. A complete autopsy should be performed, including analysis of scald pattern and assessment of state of nutrition and general care, thorough description and documentation of other external injuries/scars and complete X-ray screening for bone fractures. Forensic sciences should contribute to suggest and implement safety precautions and security strategies, in order to prevent home based burns and avoid further fatalities.

**Keywords:** Child; Immersion Scald Burns; Negligence

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# HOMICIDIOS POR ASFIXIA POSICIONAL. PRESENTACION DE DOS CASOS

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**Case Report:** Caso No. 1 Cadáver de sexo masculino 29 años de edad, talla 165 cm, tez trigueña, aspecto cuidado y con prendas de vestir en buen estado y de marca (ingresó inicialmente como NN), hallado en la vía pública de un barrio popular de la ciudad de Medellín (Villa Hermosa) en el interior de unos costales de fibra y en cuyo interior se encontraba el cuerpo flexionado de la siguiente manera: cabeza, tórax y abdomen sobre los muslos y rodillas sujetado con cinta trasparente alrededor del tronco y la cabeza contra las extremidades con las manos sujetadas hacia atrás con la misma cinta. Caso No.2 Cadáver de sexo masculino 31 años de edad, talla 170 cm, tez trigueña, aspecto cuidado y con prendas de vestir en buen estado y de marca (ingresó inicialmente como NN), hallado en la vía pública de un barrio popular de la ciudad de Medellín (Aranjuez San Isidro) en el interior de una cobija y en cuyo interior se encontraba el cuerpo flexionado de la siguiente manera: cabeza, tórax y abdomen sobre los muslos y rodillas sujetado con cinta trasparente por debajo de los muslos y de las rodillas con la cabeza contra las extremidades inferiores con las manos sujetadas hacia atrás con la misma cinta.

**Materials and Methods:** Para la realización de la autopsia médico legal se tuvieron en cuenta las incisiones tradicionales, además de las incisiones especiales como exploración cervical, levantamiento facial, incisión dorso glútea e incisión en sitios de presión. Hallazgos externos comunes (ambos cadáveres): Facies congestiva y petequias distribuidas de forma de difusa, marcada congestión en escleróticas, cianosis peri bucal, excoriaciones leves en labios sin compromiso de la mucosa yugal ni de frenillos, congestión en esclavina y en tórax anterior en forma de chaleco, cianosis subungueal Hallazgos internos comunes (ambos cadáveres): Marcada congestión epigaleal generalizada y congestión en esclavina y visceral generalizada marcada fluidez sanguínea. Hallazgos externos particulares CASO 1 Excoriación y contusión violácea en codo izquierdo. Hallazgos externos particulares CASO 2 Vómito en prendas de vestir (caso 1 tenía estómago vacío), equimosis de color violáceo en escápula izquierda, herida contusa en dorso dedos medio e índice mano izquierda Hallazgos Internos particulares CASO 2 Fractura de tercer, cuarto y quinto arcos costales anteriores no desplazadas, laceración de lóbulo hepático derecho con hemoperitoneo de 250 CC.

**Discussion:** El principal mecanismo fisiopatológico relacionado con las muertes por asfixia es la falta de oxigeno. En consecuencia está justificada para algunos la amplitud de conocimientos para hablar de un patrón de reacción común. Por cerca de más de cien años el diagnóstico de asfixia se ha basado en los signos clásicos descritos en muchos textos de medicina forense, en especial autores alemanes. Sin embargo los signos de asfixia pueden estar presentes en todas las causas externas de muerte incluyendo la muerte natural. Por tal razón a menos que exista una prueba de la causa de asfixia, el diagnóstico de ésta es una palabra sin valor alguno. La asfixia postural es una condición fatal que aparece por la adopción de una posición del cuerpo donde se interfiere con los mecanismos de la respiración que pude presentarse en varias circunstancias (accidentes laborales, accidentes de tránsito, tortura, secuestro etc.). Su diagnóstico se hace difícil debido a los signos inespecíficos que presenta (comunes a todas las anoxias), sin embargo su principal diferencia radica en la forma como ocurrió el evento, si se trata de una postura adoptada por gusto o compulsión o por un tercero mediante intimidación por ejemplo. Cuando un individuo presenta restricción para ejecutar estos movimientos libremente se presentan dos situaciones que comprometen la capacidad de respirar: 1) no hay posibilidad de expandir la caja torácica y 2) los órganos abdominales son comprimidos restándole movimiento a los diafragmas lo cual empeora aun más la situación. La circulación venosa comienza a presentar restricción e inunda los tejidos produciendo congestión venosa y ruptura de capilares

**Conclusions:** 1. Los reportes de casos de asfixia postural homicida son pocos dentro de la literatura médica. 2. Los hallazgos descritos en las necropsias realizadas corresponden a un método de tortura, donde la ausencia de signos de estrangulación y la inexistencia de lesiones relacionadas con cuerpos extraños en vías superiores aunado a la presencia de marcada congestión torácica en forma de chaleco es fundamental como diagnostico de este tipo de asfixia, siendo la posición lo que interfiere con la mecánica ventilatoria 3. La

necropsia médico legal completa con incisiones especiales y estudio toxicológicos nos permite realizar un diagnostico certero en relación a la causa y manera de muerte

**Keywords:** Asfixia Posicional; Hiperflexión Toracoabdominal; Homicidio

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# "ESTUDIO DESCRIPTIVO SOBRE AGRESIONES SEXUALES PROVINCIA DE BIO-BIO. SML LOS ANGELES"

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**Abstract:** OBJETIVOS : a) Determinar el perfil de las personas que han sido periciadas sexológicamente durante los años 2007 al 2009 de la Provincia de Bío Bío. b) Establecer el resultado de los procesos judiciales de las evaluaciones sexológicas llevadas a cabo en el SML de Los Ángeles entre los años 2007-2009. c) Establecer una Propuesta de Prevención sobre Agresiones Sexuales en la Provincia de Bio-Bio.

Chile es un país Latinoamericano, con una población de más de 17 millones de habitantes, los que se dividen en 15 regiones y que a su vez, se subdividen en provincias y éstas en comunas. La octava región o región del Bio-Bio es la segunda región con más habitantes en nuestro país, después de la región Metropolitana. La Región del Bio-Bio se divide en 4 Provincias: Ñuble, Concepción, Arauco y Bio-Bio. Esta última se sub-divide a su vez, en 14 Comunas , cuya capital Provincial es la cuidad de Los Ángeles, concentrando un total de 390.047 habitantes en la Provincia. El Servicio Médico Legal de Los Ángeles, tiene cobertura para atender a toda la Provincia del Bio-Bio, comprendiendo el sector rural y urbano de las Comunas. En esta zona se realiza un estudio descriptivo y se caracterizan los casos sexológicos evaluados en el S.M.L. de Los Ángeles, durante los años 2007, 2008 y 2009. Se determina la cantidad de evaluaciones sexológicas llevadas a cabo en el Servicio Médico Legal de Los Ángeles, durante los años ya mencionados, la cantidad de evaluaciones realizadas por año y mes, así como el sexo de las personas evaluadas, edad, Comuna a la que pertenecen, vínculo con el presunto agresor, cantidad de veces que ha sido presuntamente agredido(a) sexualmente, estado civil del evaluado(a), nivel de educación, sector demográfico rural o urbano y si el evaluado(a) presenta o no algún tipo de discapacidad. Posteriormente, por medio de un seguimiento llevado a cabo con Fiscalía de la misma ciudad, se establece en qué estado del proceso se encuentra la causa investigada y si los presuntos agresores sexuales han recibido algún tipo de sanción o condena. Se detectaron 561 evaluaciones sexológicas entre los años 2007 y 2009, quedando para su análisis un total de 480 casos, dejando fuera los pertenecientes a otras regiones o provincias. De los casos pertenecientes a la Provincia de Bio-Bio, se observa que la mayoría de las evaluaciones sexológicas corresponden a personas de sexo femenino en edad pre-púber, mientras que los casos que son de sexo masculino, en su gran mayoría corresponden a niños menores de 14 años. La mayor cantidad de exámenes sexológicos realizados son del sector urbano, con una tasa similar entre las Comunas de la Provincia de Bio-Bio, existiendo Comunas en que los exámenes sexológicos van en aumento, tales como: Laja, Nacimiento, Antuco, Cabrero, Mulchén, Quilaco y Yumbel; siendo esta última la Comuna con mayor tasa de evaluaciones sexológicas realizadas en dicha Provincia. La relación entre víctima y agresor, en un gran porcentaje corresponde a algún familiar, le sigue la categoría de conocido y en un porcentaje menor, el presunto agresor sexual sería un desconocido. Se detecta que las pericias más frecuentes corresponden a niñas pre-púberes de zona urbana, sin discapacidad, en edad escolar básica. Un porcentaje significativo de los casos con evaluaciones sexológicas, al hacer el seguimiento, se encuentran en Archivo Provisional o Vigentes, mientras que en un porcentaje menor ha sido condenado el agresor, sólo el 8% del total de las evaluaciones está con condena efectiva. Las penas van desde los 41 días a los 12 años, concentrándose en su mayoría en condenas de 3 años y un día, seguida de 541 días. De los condenados, poco menos de la mitad se encuentra recluido, los demás tienen principalmente Libertad Vigilada o Reclusión Nocturna, entre otras. Dado lo anterior, se instala la necesidad de implementar un Plan de Prevención que optimice los recursos tanto humanos como económicos, por medio de la

**Keywords:** Investigación; Delitos Sexuales; Manejo

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# LA ENFERMEDAD DE CROHN ES INCAPACITANTE?

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**Abstract:** En algunas ocasiones se nos solicita la valoracion medico legal de un paciente afecto de enfermedad de Crohn a los efectos de su probable incapacidad laboral planteada en la demanda judicial frente a los Juzgados del Social, una vez resuelta la fase administrativa en que se ha denegado al paciente dicha incapacidad laboral. Presentamos dos casos de enfermedad de Crohn cuya distinta evolucin, grado de afectacin del estado general , deterioro en la calidad de vida, complicaciones surgidas, as como el tipo de trabajo que debe desempear, implican que en un caso se haya considerado la enfermedad como incapacitante y en el otro caso no. La enfermedad inflamatoria intestinal es un grupo de enfermedades que producen inflamacin del intestino de forma crnica y recurrente y de las que no conocemos la etiologa pero parece que tanto los factores ambientales como la susceptibilidad gentica tendran importancia. Las principales presentaciones clnicas son la colitis ulcerosa (CU) y la enfermedad de Crohn (EC). Su incidencia ha aumentado en los ltimos aos, debido mayormente a la influencia de factores ambientales relacionados con su etiopatogenia. La incidencia en pases occidentales se estima alrededor de 3,9-7 100.000 habitantes/ao. En Espaa se ha observado este incremento en las ltimas dcadas en relacin al desarrollo econmico, observando tasas entre 1,4-6,1 100.000 habitantes/ao segn series publicadas en nuestro medio. La EC es una enfermedad transmural que puede afectar a cualquier segmento del tracto gastrointestinal. Se caracteriza por ser una enfermedad segmentaria con reas preservadas entre zonas afectadas con afectacin clica y en leon proximal con ms frecuencia. Histolgicamente, se caracteriza por la presencia de granulomas en un 15-85% de los casos-menos frecuentes en las biopsias endoscpicas que en las quirrgicas-. Respecto a la fisiopatologa de la EC todava disponemos de muchas cuestiones por aclarar. La EC se basa en una disregulacin, genticamente determinada, de la respuesta inmune del husped frente a la flora bacteriana y otros antgenos luminales. La presencia del gen NOD2 en el cromosoma 16 parece que favorece una mayor susceptibilidad a presentar la enfermedad. En la EC, a diferencia de la CU, la respuesta inmunolgica se produce mediante clulas Th1 con un papel destacado de TNFa e IFNd. La EC es clnicamente muy heterognea con una importante variabilidad demogrfica, clnica y fenotpica que ha obligado a subclasificar los pacientes segn la edad al diagnstico, la localizacin de la enfermedad y el comportamiento de sta. Los sntomas clsicos de presentacin de la EC son la diarrea, el dolor abdominal y la prdida de peso. Aunque esta triada slo se presenta en el 25% de los casos en el momento del diagnstico. La diarrea es el sntoma ms frecuente en el momento del diagnstico. Sus causas pueden ser por la actividad de la misma enfermedad, existencia de sobrecrecimiento bacteriano, la malabsorcin de sales biliares y, ms raramente, esteatorrea. El dolor abdominal tambin puede ser de causa multifactorial, siendo el tipo de lesiones y su localizacin las que determinarn las caracterstica s del dolor (estenosis, abscesos, irritacin peritoneal). Otro de los sntomas ms frecuentes es la prdida de peso secundaria a la misma actividad inflamatoria por incremento del catabolismo, por fenmenos de malabsorcin y por anorexia. La enfermedad perianal, en forma de abscesos y fstulas perianales, aparece en un 5-10 % de los casos en el debut de la enfermedad y en un 20-40% de los pacientes con EC durante su evolucin y se asocia con ms fecuencia a la afectacin clica. La fiebre puede aparecer debido a la propia actividad inflamatoria grave o como consecuencia de una complicacin (abscesos, perforacin...). En cuanto a las manifestaciones extraintestinales (articulares, cutaneas, oculares, hepticas) se presentan en un 6-47 % de los pacientes con enfermedad inflamatoria intestinal. El diagnstico de la EC se basa en criterios clnicos, radiolgicos,

**Keywords:** Incapacidad; Valoracin del Dano Corporal; Enfermedad de Crohn; Enfermedad Inflamatoria Intestinal

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# INDIVIDUALIZACION DE LA MARCA DE UNA MORDEDURA A TRAVES DE LOS ANGULOS DE LOS INCISIVOS SUPERIORES CON RESPECTO AL EJE INTERCENINO

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**Abstract:** La revisión de sentencias judiciales de las marcas de mordida en el sistema de justicia de los Estados Unidos, han señalado cómo los testimonios de marcas de mordidas no son evidencias suficientemente justificables o aceptables en un tribunal de justicia ya que, aún hoy, se cuestiona la individualidad de la dentición humana y evidencias de marcas de mordida son inequívocamente rebatidas por el ADN. Por ello pretendemos realizar un estudio serio del análisis métrico y de su utilidad para la individualización de una marca de mordedura humana. Para nuestro estudio hemos precisado de la colaboración de un total de 557 pacientes, varones y mujeres, de edades comprendidas entre doce y setenta y ocho años de edad. Para este estudio hemos utilizado ceras de registro oclusal, material fotografico, regla ABFO nº 2, mesa profesional Kaiser RTX, y soporte informático adecuado para el estudio (Programa de retoque profesional Adobe Photoshop CS2, Programa de corrección de distorsión y medición de parámetros IT. 3 (Image Tool 3.0), Programa AutoCAD 2004 ESP, Programa de análisis estadístico SPSS. Con mediciones realizadas del orden de las centesimas se ha estimado la probabilidad de que dos individuos tengan los mismos valores angulares y este resultado no se ha producido. Esto implica que el valor discriminatorio de las cuatro medidas de cada individuo es maximo en la población muestreada. Podriamos concluir este estudio considerando la variabilidad de los ángulos de las piezas dentarias: 22, 21, 11, 12, sobre el eje intercanino permite su aplicación para el diagnóstico del autor de una marca de mordida. A lo largo del estudio hemos encontrado coincidencias en el ángulo de una misma pieza entre dos y hasta tres mordidas diferentes. Sin embargo no hemos encontrado coincidencias de ángulos en distintas piezas de diferentes marcas de mordida. Por lo tanto, las marcas de mordida de la población muestreada presentan individualidad al no haber ninguna que posea la angulación de los cuatro incisivos en las marcas igual a otra.

**Keywords:** Marca de Mordida; Analisis Metrico; Identificación.

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# HUELLAS DE MORDEDURA EN UN CASO DE MALTRATO INFANTIL. REPORTE DE CASO

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**Case Report:** Se trata de un niño de 17 meses quien llega en mal estado general a un hospital de la ciudad de Bogotá con declaraciones confusas en relación a los hechos por parte del padrastro, la madre y el abuelo. En la historia clínica se registra una fractura desplazada de fémur, huellas de mordedura en diferentes zonas corporales del cuerpo, incluyendo pene y se asocian lesiones anales a delito sexual. La autoridad competente, realiza una solicitud al Instituto Nacional de Medicina Legal y Ciencias Forenses para valorar desde el punto de vista forense al niño en mención, por lo que se aborda el caso intra hospitalariamente por parte del médico y la Odontóloga Forense. A la valoración forense se encuentra un niño de 17 meses con una fractura de fémur reducida quirúrgicamente, caries extensas y profundas compatibles con caries de la primera infancia, una laceración ostensible en base pene y varias lesiones claras, concordantes con huellas de mordedura, entre ellas, se observa también una lesión antigua correspondiente a una cicatriz que por sus características hace pensar en una huella de mordedura parcial. Se realiza el cotejo de todas las huellas de mordedura encontradas en niño con los modelos en yeso de los tres sospechosos, siendo relevante la conclusión para resolver el caso.

**Keywords:** Huellas de Mordedura; Maltrato Infantil

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# ORAL SESSION

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1

# APPLICATION OF ADVANCED ANALYTICAL TECHNIQUES IN DETECTING POST-BLAST TRACES OF SOME COMMON IMPROVISED EXPLOSIVES

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**Abstract:** Improvised types of explosives used in terroristic actions are mainly composed of inorganic and/or homemade organic explosives. The detection of post-blast traces of such types is very complicated for many reasons, such as: the unavoidable contamination with the interfering matrix impurities and the fact that the manufacturing process is not usually based on scientific concepts. The present study is concerned with the analysis of post-blasting residues of: ammonium nitrate, blackpowder, potassium perchlorate, TNT and Dynamite as some of the common improvised explosives. Cations and anions of inorganic explosives were analyzed and detected using ion chromatography (IC) dual pump technique followed by suppressed conductivity detector. Organic explosives residues were extracted from soil using accelerated solvent extraction (ASE) technique, analyzed and detected using HPLC/UV, GC/MS and LC/MS/MS.

**Keywords:** Post-Blasting Residues Analysis; Improvised Explosives Analysis

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# DETECTING PETROL ON HANDS - DOES IT HAVE ANY EVIDENTIAL VALUE?

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**Abstract:** The detection of petrol on hands can be crucial in fire investigation. Currently there is little uniformity regarding testing methodologies. Moreover it is difficult to determine the evidential value of detecting petrol on hands for two main reasons. Firstly, petrol is used in everyday activities and the mere detection of petrol in this context is not necessarily indicative of a crime being committed. Secondly, the volatile nature of petrol makes interpretation regarding transfer and persistence difficult. In this research, Solid Phase Microextraction (SPME) was used to detect petrol. Control studies were undertaken by spiking hands with volumes of 5, 10, 50 or 100 L of petrol. Sampling was then conducted by placing the hand in a nylon bag and exposing a Polydimethylsiloxane-Divinylbenzene fibre to the headspace for 30 minutes. Samples were collected at 0, 5, 10, 30, 45, 60 and 90 minutes to monitor the change in volatile compounds. In this controlled study, petrol was identified in each sample. Transfer and persistence experiments were used to determine the chance of detecting petrol on hands in different contexts representing typical casework scenarios. The survey results show that the probability of petrol being detected on hands is higher for people who splashed substantial amounts of petrol around than for people involved in activities like filling their car. This study substantiates the importance of developing a universally accepted method for the detection of petrol on hands. The need to assess the presence of petrol on hands against suggested activities is also highlighted.

**Keywords:** Accelerant Detection; Petrol; Arson; Evidential Value

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# ANALYSIS OF DEATHS CAUSED BY GUNSHOT WOUNDS IN MATERIALS OF BRATISLAVA MEDICOLEGAL WORKPLACES

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**Introduction:** Gunshot wounds represent the most extensive and in-depth examined areas in forensic medicine. However, problems of the origin of gunshot wounds and their effects are constantly in the limelight of the large community of representatives of various scientific fields - both medical and technical. During a war they represent a mass phenomenon, but a high frequency of them occurs also under peace conditions. The aim of this paper was to determine the incidence of fatal gunshot wounds in the Bratislava and Trnava regions, i.e. on the territory of 1.2 mil. population.

**Materials and Methods:** There was performed a retrospective study of all cases of deaths caused by gunshot wounds in materials of Bratislava medicolegal workplaces in the period between 1996 and 2010. In all cases there was performed an autopsy by a standard method and follow-up laboratory examinations. Considering collected data the cases were assessed according to sex, age, cause and manner of death, time and place of origin, localization of gunshot wounds on particular parts of the body, influence of foreign psychoactive substances and type of gun used.

**Results:** In the monitored period there were 451 deaths caused by gunshot wounds from a total number of 15,769 autopsies performed at Department of Forensic Medicine of Health Care Surveillance Authority and Institute of Forensic Medicine of School of Medicine Comenius University in Bratislava, which accounts for 2.86% of a total number of autopsied cases. Males represented 92% of victims, most cases (25%) ranged between 21 and 30 years of age, the mean age of the injured was 40 years. The most common hit part of the body was the head - in 79% of cases, the trunk was hit in 10% of cases, remaining cases involved combined injuries of several body parts. A number of shot channels ranged between 1 and 53. One single shot channel was detected in 64% of cases. The most frequent cause of death was brain death in 67% of cases and haemorrhagic shock in 20% of cases. According to the manner of death in males suicides dominated in 64% of cases followed by homicides in 33% and 3% of cases were accidents. In females 61% of cases were homicides and 39% were suicides. Deaths occurred mainly at home (39%), the second most common scene of death was a street - 14%. The influence of ethanol was detected in 27% of cases, foreign psychoactive substances in 4%. The most frequently used guns were short handguns (73%) followed by long handguns (11%). In unclear cases during fact-finding trials apart from cooperation with experts in ballistics there was used a geodetical method - tacheometry for determining a trajectory.

**Conclusions:** Considering the consequences of gunshot wounds there is 12-fold higher frequency of death in males than in females. The highest death percentage is in the age category between 21 and 30 years. The most commonly used gun was a short handgun. The incidence of deaths caused by guns within the monitored period and region has a fluctuating course with decreasing tendency. Recently there has been a significantly decreased number of homicides in organized crime (mafia).

**Keywords:** Firearm Injury; Autopsy; Cause of Death; Manner of Death; Gun; Ballistics; Tacheometry

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# NEW SUGGESTIONS AND MODIFICATIONS IN THE EXTRACTION, ANALYSIS AND DETECTION OF ORGANIC POST-EXPLOSION TRACES

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**Abstract:** Trace analysis of explosives is one of the most challenging fields nowadays. It generally includes separation and identification of unknown explosives; hence combinations of sensitive and selective techniques are required. The present study is concerned with modifying the methods of extraction, analysis and detection of post explosion traces. Studied explosives were: NC, NG, Tetryl, TNT, RDX, PETN, sheet explosives, and plastic explosives. Samples were extracted, filtered, and cleaned-up. The study suggested a spot test scheme, new TLC mobile phases and a new GC/EI-MS method for the analysis of PETN. ITMS was used for fast detection of explosives and assessment of concentration-time relation in hand swabs for common explosives traces. MDL was found to be 2ng for TNT, 3ng for RDX, 4ng for PETN, and 3ng for NC.

**Keywords:** Analysis of Explosives; Trace Analysis; Post Explosion Analysis

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# STUDY ON THE EXPLOSION TRACE AND QUANTITIVE CHARACTERISTICS IN EXPLOSION CASE SCENE

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**Abstract:** Explosion trace in explosion case scene is the foundation of explosion scene analysis. This paper comprehensively discussed the classification of traces in the explosion crime scene and offered a practical method for explosion traces classification, that is, explosion scene traces involves explosion seat traces, casting fragments, high temperature effect traces of explosion offspring, traces made by air shock wave, traces of the explosion shock damage and traces of explosion on the human body. On the basis of explosion traces classification, the author has got the formation mechanism of explosion seat traces, casting fragments, high temperature effect traces of explosion offspring, traces made by air shock wave, traces of explosion on the human body. Starting with the practice of explosion scene examination and analysis, explosion traces were quantitatively characterized into two parts: characterization of quantitative characteristics of apparent and the related characterization of the controlling factors formed by traces. Characterization of quantitative characteristics of apparent was the presentation and measurement of intuitive explosion traces shape, size, location, physical evidence, etc, while, the related characterization of the controlling factors of trace forming is something that describes the related characteristics of the on-the-spot controlling factors which affect explosive trace. After quantitatively characterized the above explosion traces characteristics in detail, the paper further defined the quantitative parameters of traces characteristics and provided a more intuitive, scientific and theoretical guidance to the explosion scene examination work.

**Keywords:** Explosion Case; Scene Analysis; Explosion Trace; Quantitive Characteristics

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# EXPERIENCES IN THE MEDICO-LEGAL ORGANIZATIONS OF KOSOVO AND FINLAND. A COMPARATIVE STUDY OF BUILDING-UP OF A MEDICO-LEGAL SYSTEM AND RENEWAL OF AN ESTABLISHED ORGANIZATION

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**Abstract:** The ongoing process in Hague war criminal court points out the real value of the medico-legal investigation of individual death and victims of genocide in regional and international conflicts. Kosovo has built up its medico-legal system since the declaration of independence in 2008.The work was initiated already in 2007 by EU project support to justice. This presentation describes the development and the principles, that should be followed in the formation of laws and organization applied to forensics.

**Keywords:** Requirements and Tasks of Medico-legal Expertise

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# THE PROGRESS OF ACCREDITATION FOR FORENSIC SCIENCE LABORATORIES IN CHINA

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**Abstract:** Forensic Science Laboratories Accreditation has been used for quality assurance widely in the world. Although the accreditation of forensic science laboratory started later in China, there was only one laboratory to get accredited by the CNAS(China National Accreditation Service for Conformity Assessment) in compliance with the international criteria ISO/IEC 17025:2005 "General Requirements for the Competence of Testing and Calibration Laboratories" until 2003. Forensic Science Laboratories Accreditation has developed fleetly, especially after Feb 28,2005, the National People's Congress Committee passed a law, which prescribed that there must be accredited or certificated testing labs providing data for forensic science organization(or companies). There are new progress of Accreditation for Forensic Science Laboratories recently, those of progress is in the highest flight comparing with the other countries. Forensic science is divided into testing and inspection, which determine the forensic science organization belonging to laboratory or inspection body. ISO/IEC 17025:2005 apply to all testing (eg. Forensic chemical analysis, trace evidence, DNA testing, voice and image identify). ISO/IEC 1720:1998" Accreditation Criteria for the Competence of Inspection Bodies" apply to all inspectiong(eg. Forensic pathology, Forensic Clinical Medicine, Questioned Documents Examination). Guidance on the Application in the five professional fields (DNA testing, trace evidenc, digital and computer evidence, forensic medicine, questioned documents examination) has been issued by CNAS, except the common criteria of ISO/IEC 17025 and ISO/IEC 17020 in China. It is in the highest flight comparing with the other countries. It is excited that a total of 108 forensic science organizations have been Accreditated up to now, include 63 police criminal labs, 40 forensic science organizations server public, 5 procuratorate labs . A total of 30 new forensic science organizations will be Accreditated every year. Except the international accreditation, the capability of forensic science organization is evaluated with Qualification Certification, which is mandatory and national request for some organizations (eg. Providing data and result for justice sentence, administration decision, arbitration) by government. Furthermore, Certification and Accreditation Administration of the People's Republic of China(CNCA) has issued the standard :"the Evaluation Request for Qualification Certification of Forensic Science Laboratory and Inspection Body " in May 2009. Proficiency Testing of forensic science has expanded to nine professional fields, eg. clinical forensic medicine, forensic pathology, forensic biology(DNA), forensic psychology, forensic chemical analysis, trace evidence, questioned documents examination, voice and image identity, etc. The Institute of Forensic Science, Ministry of Justice, P.R.China was uniquely named a base for PTs provider after getting the accreditation from CNAS in June 2006. More than 1000 participators from 24 provinces and districts like HongKong attend the PTs every year. Administration governments promote the forensic science organization accreditation and certification through some province test run. And they have issued guidance to assure that the aim of accreditation and certification will be implemented favorably, eg. "the annunciate of forensic science organization accreditation and certification (NO.116 file)" issued by Ministry of Justice and CNCA.

**Keywords:** Forensic Science; Quality Assurence; Accreditation; China

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3

# FORENSIC MEDICINE IN DUBAI, UAE

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**Abstract:** Various characteristics of the medico-legal scene in Dubai are described, along with an overview of all cases examined over a period of 6 years. During the period of study, a total of 17683 cases were examined in the Department of Forensic Medicine of Dubai Police General Headquarters. This constituted a yearly average of (2947.16). The average annual increment was 11.13%, the percentage of increase between 2002 and 2007 being 68.96%. This rate of increase of cases represent the actual increase of referral by the prosecution and the police, as well as the increase due to population growth of 7% to 8% per annum. Of these 10165 (57.48%) were clinical cases of injuries, 5404 (30.56%) postmortem examinations, 1525 (8.62%) clinical cases of sexual crimes, 409 (2.3%) age estimations, 58 (0.32%) medical responsibility, 20 (0.11%) criminal abortion, 61 (0.34%) civil actions and 38 (0.21%) miscellaneous cases. Of postmortem examinations, 4846 (89.7%) were males and 558 (10.3%) females. The age ranged from (0-90) years, with a mean age of 40.5 years. The peak incidence was in the age group (20-50) years, where the extremes of age were least represented (Fig. 1). Only in 361 cases (6.68% of the grand total) the deceased was a local citizen. Autopsies amounted to 394 cases, which constituted 7.29% of the total deaths examined. The four manners of death in descending order of frequency were natural 3003 (55.57%), accidental 1727 (32%), suicidal 498 (9.2%), homicidal 164 (3%). The manner was undetermined in 12 (0.22%) of the cases over the 6 year period. As anywhere else, interesting cases have been seen occasionally. These include all manners of death, even a natural manner of death that occur in circumstances that puzzle the crime scene investigators. Of the unusual cases that had been reported and published by the author, a case of homicidal strangulation that was staged by the perpetrators to simulate suicidal hanging, masking and bondage in suicidal hanging, accidental death due to inhalation of sulfuric acid fumes, postmortem sole incisions in morphine overdose, unusual case of accidental positional asphyxia and accidental sand inhalation which was misdiagnosed by the casualty doctor in the hospital. Unpublished cases of note are several. A man was found dead in the passenger seat of his own car, which was locked and his trousers and pants were half way down his thighs, which was found later to be due to massive cardiac infarction. A man alleged by his family to have been found dead in his bed was discovered later to have committed suicide by hanging and the family cut him down and put him in bed to avoid loss of life insurance policy if the fact of suicide death was known. In the drug scene arena, during 2008 we had for the first time ever 3 accidental fatalities from misuse of Tramadol (Ultram) tablets. Bloody death scenes are often found when the police suspect homicide, but the forensic evidence confirm that death was suicidal. In one case self mutilation was so extensive that it really took some courage from the forensic medical examiner to face the suspicious and skeptical crime scene officers.

**Keywords:** Forensic Medicine; Dubai; United Arab Emirates

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4

# STRATEGY OF JUDICIAL EXPERTISE STANDARD MANAGEMENT

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**Abstract:** Judicial expertise refers to take up client's assignment, engagement and commission by judicial appraiser in accordance with the conditions and procedures required by law. The appraisal opinion is the scientific evidence to be scientific and lawful. Judicial expertise is an action of demonstration followed by science and technology as well as an action of lawsuits. Therefore, we have to obey the basic procedure and requirement of judicial action as well as to obey the basic regulation and requirement of science and technology action. I. Analysis of judicial expertise standardization situation and requirement in China 1) Judicial expertise standardization management has not been included in the normal national management Judicial expertise standardization management is not yet included in the normal national management. At present, we are still a large gap from the developed country in this regard without relevant technical regulations and standards system, without technique standard administrative department and without systematic research into technique standards by professional committee, and it has a great lack of technical regulations and standards. 2) Judicial expertise standard is basically blank in China Because of the deficiency of knowledge for standards in a long period, the shortage of judicial standard management and investment funds without relevant operating principles, which leads our standard management to be in blank basically in current, none has yet a national standard of judicial expertise technology. At present, relevant judicial department and administrative department jointly issued to form standards, such as "the human body of critically injured" jointly issued by CAS, CAE and two ministers. 3) The lag of judicial expertise standardization and the influence to judicial expertise opinion Serious lag for standardization has become the important factor to the miscarriage of justice and low efficiency. The resulting phenomenon of multi headed identification and repeated expert evidence will be endless. The related trail dragged on is heavily influenced on judicial efficiency, against the realization of justness, which undermines the authority of the judiciary. 4) As the particularity of judicial expertise, we are not going to rely on the overseas technology standard simply. Our standards should be established based on a national independent development. Thus, it is necessary to strength the capability of independent development. 5) Stipulation and implementation of decision supported opportunities for normalizing the expertise standardization management. The Standing Committee of the NPC adopted the Decision on the Management of Judicial Expertise that issued on 1st. Oct. 2005, which defined ministry of justice as the administrative department of national judicial expertise, and also provides the key conditions and opportunities for the national judicial expertise standardization management. II. Recommendation of judicial expertise standardization in China 1) Establishment of the management mechanism An urgent and important task is to put the judicial expertise standardization into the national normal standardization management, and to establish the national judicial expertise standardizes technical committee which is controlled by the department of standardization administration under the State Council. The judiciary should promptly set up a "National Judicial Expertise Standardizes Technical Committee" for management. 2) Basic tentative idea of judicial expertise standards system Judicial expertise standards system includes a basic system and an implementation system. The basic system is the majority to all of the judicial expertise standards system, which includes all the components covering forensic medical, physical evidences and acoustic materials. The implementation system is the fundamental basis of survival and development, which is the institution with many factors, ex

**Keywords:** Forensic Science; Standard Management

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5

# CONCERNING PERSONAL INJURY COMPENSATION SYSTEM IN CHINA

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**Introduction:** The judicial authentication system has bigger difference, because the judicial system is different in Different countries. Chinas "judicial authentication" and foreign so-called "forensic science", the basic connotation is roughly same, both branches is also similar. The criminal procedure law and the civil procedure law stipulates that all judicial appraisal Suggestions is one piece of evidence that two different procedure law stipulate in china. Therefore, Chinas personal injury compensation system is closely related to the judicial authentication of personal injury.In China, personal injury compensation are including civil cases and criminal cases, personal injury compensation system mainly involves mediation?trial?execution and the judicial relief system of personal injury compensation cases. the judicial authentication about personal injury compensation adopt the qualitative and quantitative mode , the similar cases were identified and quantitative compensated by unified standards. this is accord with Chinas national conditions, and it has the incomparable advantage comparing with other personal injury compensation system.

**Keywords:** China; Personal Injury; Judicial Authentication; Compensation System

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# A CONTRIBUTION TO THE HISTORY OF SCIENCE IN PORTUGAL: ARE THE METHODS AND PRIORITIES OF MEDICO-LEGAL SCIENCES IMMUNE TO IDEOLOGY AND POLITICS?

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**Abstract:** The history of science in Portugal has been recognised by the Portuguese government as a scientific priority by establishing, in 2009, a strategic initiative towards the development of the history of science in Portugal, a programme funded by Fundação para a Ciência e a Tecnologia (FCT). The centenary of the republican regime, in 2010, was considered an opportunity to stimulate increment of history of science studies as the republican regime introduced several reforms in the university and research institutions in Portugal. Legal-Medicine in Portugal has a rich heritage that deserves to be catalogued and deeply studied in a history of science perspective. In the context of a much comprehensive scientific hypothesis, the one that admits that science ideas and practice are related with ideology and politics by a biunique correspondence, we discuss the influence of the main ideological and political strengths over the methods and priorities of medico legal scientists and institutions in Portugal. The relations between the medico-legal institutions with other players such as the anthropology institutes or with leading scientific around the world are also emphasised within the frame of the international emergence of nationalisms along with the increasing popularity of eugenics and race issues in the first decades of the XX th century.

**Keywords:** History of Science; Eugenics; Race

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1

# SURGICAL INTERVENTIONS WITH FATAL OUTCOME: MEDICO-LEGAL INVESTIGATIONS USING POST-MORTEM CT-ANGIOGRAPHY

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**Introduction:** Cases of fatal outcome after surgical interventions are autopsied in order to find the cause of death and to investigate an eventual medical error. Therefore, an exact documentation of any kind of findings is necessary in order to allow the medico-legal expertise. Modern imaging techniques such as MDCT (multi detector computed tomography) allow these documentations. Additionally, post-mortem CT-angiography depicts the vascular system in detail. The aim of our study was to investigate the utility of post-mortem CT-angiography of these delicate medico-legal affairs.

**Materials and Methods:** 150 medico-legal cases have been investigated by using the technique of multi-phase post-mortem angio-CT. It consists in the performance of a native CT-scan and at least three angiographic phases (arterial, venous and dynamic phase) using a modified heart-lung machine and the oily contrast agent Angiofil®. From this collective, we selected cases with a fatal outcome of surgical intervention. The results of conventional autopsy were compared to those of the radiological investigations. Additionally, we explored the impact of the radiological findings on the final interpretation of these cases.

**Results:** Nine cases from the examined collective were investigated due to a suspicion of an error during an intervention. Causes of death were hemorrhagic choc, septic choc and a combination of hemorrhage and blood aspiration. The diagnosis could be made by conventional autopsy as well as by post-mortem CT-angiography. Hemorrhage played an important role in seven of the nine cases. The radiological exam revealed the exact source of bleeding in six of seven cases, whereas conventional autopsy could localize the source of bleeding only approximately in four of the seven cases. In one case, neither conventional autopsy nor CT-angiography was able to identify the source of hemorrhage.

**Conclusions:** Post-mortem CT-angiography is highly recommended for investigations after surgical interventions. It permits to document the findings with the possibility to get a second opinion. Additionally, sources of hemorrhages can be detected and visualized in detail, which is often of special interest in such cases.

**Keywords:** *Post Mortem* Angiography; Virtual Autopsy; Forensic Imaging; Medical Error; Medical Malpractice

2

# CONGENITAL HEART DISEASE (CHD) IN FETUSES: THE DIAGNOSTIC ROLE OF "TRADITIONAL" AND "TOMOGRAPHY" AUTOPSY

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**Introduction:** The role of systematic autopsy in fetal CHD is to identify and better understand the morphology of cardiac and possible associated extracardiac anomalies and the correlation between morphology, suspected clinical etiology and genetics. In fetal CHD, the pathologist generally intervenes after clinical invasive tests, serological/cytogenetic analysis, diagnostic imaging evaluations and abortions. In this study we evaluated the role of autopsy in 643 fetal CHD with and without prenatal diagnosis.

**Materials and Methods:** From January 1990 to December 2010, at the Institute of Legal Medicine of Palermo 2371 fetal autopsies were performed. In 643 cases (abortions, 602; still-birth, 41) there were CHDs with (621 cases) and without (22 cases) associated extracardiac malformations (ECM). The autopsy protocol used was "tomography" for abortions (Wilson JG, 1965. In: Teratology - Principles and techniques. Chicago) while the "traditional technique" for stillbirths (Siebert J.R., 2007. In: Potter's Pathology of the fetus, infant and child. pp.695-739) was used.

**Results:** CHD diagnosis with and without ECM was done only through autopsy in 196 cases (30.48%), while in 447 cases (69.52%) after a "certain" (244 cases, 54.6%) or "suspect" (203 cases, 45.4%) clinical/genetic diagnosis. The etiology of CHD associated to ECM was: cromosomic type, 271 cases (42.2%); syndromic/sequence type, 233 cases (36.2%); association type, 117 cases (18.2%). The etiology of CHD without ECM was in all cases not syndromic. Foetal death in 591 cases (92%) were not due to CHD (induced abortions, 477 cases ; ECM, 114 cases) while in 52 cases (8%) there was a correlation (tricuspid dysplasia, 29 cases; mitral dysplasia, 11 cases; pulmonary valve stenosis/dysplasia, 9 cases; Uhl's anomaly, 2 cases; left ventricular non-compaction, 1 case).

**Discussion and Conclusions:** Our study shows that traditional and tomography fetal autopsy plays a key role in the diagnosis and counseling of CHD, both in cases where it represents the only diagnostic tool (30.48%) and in cases where it is preceded by a clinical/genetic study. In the latter cases, this value depends on detection of ECM, useful not only "to consolidate" a suspect clinical diagnosis (31.57%) but also "to complete", from a morphological point of view, a complex malformative picture "etiologically known" thanks to a previous clinical/genetic analysis (37,9%).

**Keywords:** Congenital Heart Disease; Extracardiac Malformations; Fetal Autopsy

3

# DETECTION OF THE SOURCE OF HEMORRHAGE: DIAGNOSTIC VALUE OF POSTMORTEM CT-ANGIOGRAPHY

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**Abstract:** The aim of this study was to compare the diagnostic value of postmortem computed tomography (CT) to antemortem conventional CT-scan, CT angiography and conventional angiography in the detection and localization of the source of bleeding in cases of acute hemorrhage with fatal outcome. Medical records and imaging of nine patients who underwent antemortem conventional CT-scan, conventional angiography or CT angiography and who died at the local university hospital due to acute hemorrhage were reviewed. Postmortem computed tomography angiography (PMCTA) using the technique of multi-phase post-mortem angio-CT and medico-legal autopsies were performed. The accuracy of localization of bleeding was assessed by comparing the diagnostic findings of the different techniques. Our results showed that data from antemortem and postmortem radiological examinations were similar. However, PMCTA showed a higher sensitivity for detecting the sources of hemorrhage than the ante-mortem CT-investigations. This fact could be explained by the use of a standardized protocol with at least three phases of post-mortem angiography, while clinical emergency investigations are mostly performed rapidly, often using only an arterial phase. By comparing the results of PMCTA and conventional autopsy, PMCTA showed a much higher sensitivity to detect the source of bleeding. In fact, using this technique, the exact origin of hemorrhage could be found in eight of nine cases, while it was identified by conventional autopsy only in three cases. In one case, neither the antemortem investigations including conventional angiography nor PMCTA and conventional autopsy could identify the source of hemorrhage. The results of this study showed that PMCTA, similarly to clinical radiological investigations, can provide significant information for determining the source of the bleeding in cases of acute hemorrhages with fatal outcome. The origin of the hemorrhage can be detected and visualized in detail, confirming the diagnostic value of PMCTA in detecting the vessels involved.

**Keywords:** *Post mortem* Angiography; Autopsy; Conventional Angiography; Hemorrhage

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4

# DISCOVERY OF INCIDENTALOMAS ON THE ABDOMINOPELVIC SCANS OF BODY PACKERS: 100 CASES

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**Abstract:** Many people are apprehended each year by customs or law enforcement officials for smuggling internally concealed illegal substances into France; the drug-containing packets are either ingested or inserted into the vagina or the rectum. This type of smuggling, which mainly concerns cocaine, is also called "in corpore concealment", "internal carrying" or "body packing". The considerable medical implications of this practice stem from its potentially life-threatening complications for the lack of specific antidotes to certain drugs. At the Hôtel-Dieu hospital of Paris, body packers are monitored in a secure hospital ward where they benefit from medical management under police control until the complete evacuation of the cocaine packets ingested. The aim of this study was to identify the incident pathologies, or incidentalomas, revealed by the abdominopelvic scans systematically performed to screen for residual cocaine packets.

This retrospective study included 100 body packers who were admitted to a secure hospital ward between September 2008 and April 2009. Patient age ranged from 17 to 66 years (average: 33.1 years, only one person under 18). M/F gender ratio was 86/14. Performed after the passage of two packet-free stools, the scans were interpreted by an experimented radiologist. Results: The most frequently found pathologies were:

- Calcifications: hepatic (2 cases), arteriovenous (2 cases)
- Calculi: renal (3 cases), gall-bladder (2 cases), ureteral (1 case). Pyelocaliceal dilatation was reported in one patient
- Cysts: cholecystic (2 cases), renal (1 case), bleeding functional ovarian cyst (1 case)
- Nodules: hepatic (1 case), pre-aortocaval (1 case), adrenal (1 case)
- Other pathologies: suspected ganglioneuroma.

Many incidentalomas have no immediate or late consequences on the body packer's health and do not give rise to further investigation or treatment. However, certain incidentalomas were mentioned in the hospital discharge report as they will require medical monitoring and/or specific therapy during detention. Such was the case for the patients presenting with pyelocaliceal dilatation, hepatic nodules, mediastinal, pre-aortocaval nodules, adrenal nodules, and suspected ganglioneuroma.

The study of these abdominopelvic scans allowed us to detect incident pathologies, or incidentalomas, which would most probably have remained undiagnosed in these patients who generally carry no health insurance and often come from emerging countries.

**Keywords:** Body Packers; Drug Packet; Incidentaloma; Abdominopelvic Scan

5

# CARDIAC TROPONIN I INTEREST IN THE POST MORTEM DIAGNOSIS OF MYOCARDIAL DAMAGE

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**Introduction:** Cardiac disease is the most common cause of sudden death. In forensic practice, there is a need for more sensitive and specific diagnostic methods to identify myocardial damages. The aim of this study is to assess the diagnostic efficacy of post-mortem dosage of cardiac troponine I in cadaver fluids for the detection of myocardial damage.

**Materials and Methods:** Our study is prospective including 72 corpses autopsied in the Department of Forensic Medicine of the University Hospital Fattouma Bourguiba of Monastir-Tunisia. Cases with cardiopulmonary resuscitation history and post mortem interval over 48 hours were excluded from the study. Levels of cardiac troponine I (cTnI) were measured in pericardial fluid, cardiac and peripheral blood. Statistically significant correlations between different variables levels of cardiac troponin I and cardiac damage were studied. Receiver-Operator Characteristic (ROC) curves were generated and areas under the curves were determined. Results were considered to be statistically significant when $p< 0.05$.

**Results:** Cardiac troponin I levels in pericardial fluid, cardiac and peripheral blood are correlated significantly between subject with and without observable signs of myocardial damages with a p value respectively at 0.0007, 0.0009 and 0.004.

*ROC curves analysis of cTnI levels in pericardial fluid, cardiac and peripheral blood*

| | Cut off level (ng/ml) | Positive predictive value | Negative predictive value | Area Under curve | Standard Error |
|---|---|---|---|---|---|
| Pericardial fluid | > 108 | 97.2 | 82.3 | 0.925 | 0.045 |
| Cardiac blood | > 70.66 | 91.4 | 70.8 | 0.869 | 0.045 |
| Peripheral blood | >11 | 84.4 | 54.1 | 0.681 | 0.067 |

**Conclusions:** CTnI can be a powerful aid in the diagnosis of myocardial damages. This biological test can be used in triaging sudden deaths before to external examination versus complete autopsy.

**Keywords:** Myocardial Damage; Troponin; Sudden Death; Autopsy

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# THE EFFECT OF USING CRIME SCENE RECONSTRUCTION TECHNOLOGIES TO THE UNDERSTANDING OF A CRITICAL CRIMINAL CASE: PRELIMINARY STUDY

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**Abstract:** According to Turkish Criminal Procedure Code (CMK) came in to force in 2005, when a special or technical knowledge is required, it may be decided to obtain the vote and opinion of an expert, by the court's own demand, by the demand of the public prosecutor, or by demand of the intervening party; of his representative, of the suspect or the accused or his defense counsel. Crime reconstruction requires the ability to put together a puzzle using pieces of unknown dimensions without a guiding picture. At the courts, there is a fundamental shift from oral to visual mediation and this modern evidence presentation technology needs to be analyzed. According to the Turkish Criminal Procedure Law mentioned above, this modern evidence presentation can be requested by the lawyer, prosecutor or the court. Thus, the objective of the study is to analysis the effect of using crime scene reconstruction technologies at a criminal case. In this study 20 lawyers who are actively working, has been homogeneously selected and the evidence of a criminal case is presented to those lawyers. Firstly, participants are divided into two groups, named A and B with 10 lawyers in one group. Then Group A participants just studied the case from original court file. They haven't participated any modern evidence presentations. Group B participants first studied the case from file. Then they were able to attend the modern evidence presentations in order of mockup, video animation and real time reconstruction. After the presentations, a descriptive and exploratory survey is performed to all participants. The questions of the survey were like "How many gunshot were fired?, How many bullets were penetrated to victim? Which one was fatal? Are the statements of witnesses compatible with the blood patterns? Is the location of witnesses proper to see the crime scene clearly?" After the response of all participants, the level of understanding the case is evaluated. Results show that most of the participants in Group B reported better understanding when it is compared with Group A. It is clear that, by the new regulations about expert witnessing in Criminal Procedure Code (CMK), it is easier than before to understand and recognize the criminal cases.

**Keywords:** Crime; Crime Scene; Reconstruction; Evidence Presentation; Forensic Animation; Forensic Science

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1

# THE NATIONAL ACADEMY OF SCIENCES (NAS) REPORT: IT IS TWO YEARS LATER AND WHERE ARE WE NOW?

**Author(s):** Siegel J[1]

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**Abstract:** In February, 2009, a Committee of the US National Academy of Sciences issues a far ranging report on the status of forensic science and a path forward. This report had 13 recommendations. The fallout, reactions and after shocks from this report are still being felt, not only in the US but around the world. But 2.5 years later, has anything changed? There is legislation from the US Congress but will have any real effects? This presentation will take a look at the present status of forensic science and where it is going, from a member of the NAS Committee that did the study and wrote the report.

**Keywords:** National Academy of Sciences; Forensic Science Status; NAS Report

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2

# AN EXPLORATION OF EPISTEMOLOGICAL UNCERTAINTY IN FORENSIC SCIENCE

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**Abstract:** Voltaire wrote that 'Doubt is not a pleasant condition, but certainty is absurd'. Our Courts have long had the good sense to realize this and require the jury to find fact only beyond reasonable doubt. As science is an engine designed to eliminate uncertainty, the Courts turn in their deliberations to scientists. This presentation will examine the contemporary paradox of forensic science, which is that exciting developments—particularly in the field of DNA profiling—have been accompanied by a realization that many of the assumptions upon which many forensic sciences are founded are uncertain. Few forensic science sub-disciplines can approach the 'gold standard' of DNA. Some sub-disciplines may not even be science at all. The respective roles of the Universities and the profession in promoting academic research and education in forensic science will be considered. Despite their media image, forensic science and forensic medicine are academia's 'forgotten sciences' upon which anyone's fate may suddenly depend. A free society is founded upon the liberty of the individual. The presentation will contend, in conclusion, that the perpetual crises in policy and in administration in forensic science are signs of complacency unfitting of democratic societies.

**Keywords:** Forensic Science; Uncertainty; Reasonable Doubt; Science

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3

# "FORGING A STABLE RELATIONSHIP? BRIDGING THE LAW AND FORENSIC SCIENCE DIVIDE IN THE ACADEMY"

**Author(s):** Mccartney C[1]; Cassella J[2]

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**Abstract:** The marriage of law and science has most often been represented as discordant: a marriage of 'opposites' (Wonder 1989), and 'troubled' (Haack 2009). While the law/science divide meme is hardly novel, concerns over the potentially deleterious coupling within the criminal justice system may have reached fever pitch. There is a growing chorus of disapproval addressed to 'forensic science', accompanied by the denigration of legal professionals for being unable or unwilling to forge a symbiotic relationship with forensic scientists. The 2009 National Academy of Sciences Report on forensic science heralds the latest call for greater collaboration between 'law' and 'science', particularly in Higher Education Institutions (HEIs) yet little reaction has been apparent amid law and science faculties. To investigate the potential for interdisciplinary cooperation, the authors received funding for a project: 'Lowering the Drawbridges: Forensic and Legal Education in the 21st Century', hoping to stimulate both law and forensic science educators to seek mutually beneficial solutions to common educational problems and build vital connections in the academy. A workshop held in the UK, attended by academics and practitioners from scientific, policing, and legal backgrounds marked the commencement of the project. This paper outlines some of the workshop conclusions to elucidate areas of dissent and consensus, and where further dialogue is required before progress is possible, but aims to strike a note of optimism that the 'cultural divide' should not be taken to be so wide as to be beyond the legal and forensic science academy to bridge. The authors seek to demonstrate that legal and forensic science educators can work cooperatively to respond to critics and forge new paths in learning and teaching in both law and forensic science, creating an opportunity to take stock and enrich our discipline as well as answer critics. As Latham (2010:34) exhorts, we are not interested in turning lawyers into scientists and vice versa, but building a foundation upon which they can build during their professional lives: "Instead of melding the two cultures, we need to establish conditions of cooperation, mutual respect, and mutual reliance between them." Law and forensic science educators should, and can assist with the building of a mutual understanding between forensic scientists and legal professionals, a significant step on the road to answering calls for the professions to minimise some of the risks associated with the use of forensic science in the criminal process. As Condlin (1999:183) wrote over a decade ago, when referring to the reluctant bedfellows of law and science: "Not working effectively with one another is no longer an option for either discipline, if it ever was".

**Keywords:** Legal Education; Forensic Science Education; Law And Science

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4

# THE APPROPRIATE EDUCATION FOR A FORENSIC SCIENTIST: WHERE DO WE GO FROM HERE?

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**Institution(s):**[1]INDIANA UNIVERSITY PURDUE UNIVERSITY INDIANAPOLIS; [2]WEST VIRGINIA UNIVERSITY

**Abstract:** Prospective forensic scientists have a number of options to prepare for a career in a forensic science laboratory. Traditionally the route has been to obtain university education and perhaps graduate work in a science such as chemistry or biology. In recent years, the number of forensic science degree programs has expanded worldwide in response to the popularity in the topic and demand from students. Are these programs appropriate for employment in a forensic science laboratory? Do these programs provide enough science? Is a graduate education needed, and, of so, how much? This paper will explore the needs of and future for forensic science education and hopefully provide some answers to these questions.

**Keywords:** Forensic Science Education; Tertiary Education; Graduate School

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5

# FORENSIC SCIENCE EDUCATION: INVESTIGATION INTO CURRENT TERTIARY FORENSIC SCIENCE COURSES

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**Introduction:** Over the past two decades the field of forensic science has experienced a remarkable development, immense mass media focus, and a substantially enhanced public profile. Consequently, forensic science education has been characterised by a rapid expansion in both the number of forensic science courses and the number of students enrolling in such courses. However, very little is published on forensic science education and on the curricular and pedagogical approaches adopted in forensic science courses. This paper aims to generate a deep understanding about the current status of forensic science education in academia and the curricular and pedagogical frameworks adopted in forensic science courses.

**Methods:** In order to fulfil this aim, a document analysis of 190 forensic science courses offered worldwide was conducted. Document analysis focused on the curriculum and pedagogy of the forensic science courses. The study also focused on the link(s) between the forensic science courses and the forensic science centres, forensic science laboratories, and relevant law enforcement agencies. It also focused on the potential career opportunities emphasised by these courses.

**Discussion and Conclusions:** This study reveals the various curricular approaches and pedagogies adopted within various forensic science courses. It also shows that the rapid expansion in forensic science education has attracted both authentic and inauthentic investments in such education. This paper finally raises the question about the sustainability of forensic science courses, particularly those courses which do not properly emphasise the science component in their curriculum or those that run in isolation from industry stakeholders.

**Keywords:** Forensic Science Education; Forensic Science Courses; Curriculum; Pedagogy; Sustainability

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1

# FORMULATION AND APPLICATION OF BONE AGE STANDARD ATLAS OF CHINESE HAN POPULATION TEENAGERS

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**Introduction:** The time of the emergence of histology ossification centers and closure of histology line is often used to deduce the life age of juveniles involved in lawsuits in China. In order to ensure the accuracy of the appraisal of bone age, we formulated the bone age standard atlas of Chinese Han population teenagers according to the emergence of histology ossification center of collarbone sternal end and histology closed degree of different bones, such as scapula, humerus, radius, ulna, wrist bones, iliac crest ischium, femur, tibia and fibula etc in every half years old for male and female teenagers.

**Materials and Methods:** Radiographs of different bones including sternoclavicular joint and the left side of shoulder, elbow, carpal, hip, knee and ankle joints were collected in 1,897 male and female teenagers with known ages from 11years old to 20 years old, which were from Eastern China, Southern China and mid-China. The emergence of histology ossification center of collarbone sternal end and histology closed degree of different bones (24 indicators) were analyzed and classified according the criterion "classification methods of bone growth by X-ray in Chinese teenagers" which was made by ourselves. The frequency distribution of the classifications of histology closed degrees in every half years old for male and female teenagers were analyzed. Then the pictures of the classifications with the maximum frequency distribution were assigned as standard bone age atlas. In order to test the value of the standard bone age atlas in application of forensic appraisal, 80 teenagers with known life ages were selected by one group researchers and their bone ages were deduced with the standard bone age atlas by another group researchers. All the statistic procedures were carried out by SAS 8.1 and SPSS 11.5 software.

**Results:** Bone Age Standard Atlas of Chinese Han Population Teenagers for every half years old from 11 years old to 19 years old was formulated. According to the application test in the 40 males, when the error is ±0.5 and ±1.0 years old, the accuracy rate is 70.0% and 82.5%, respectively. In 40 females the accuracy rate is 77.5% and 87.5%, respectively.

**Conclusions:** Bone Age Standard Atlas of Chinese Han Population Teenagers represent bone development situation of modern Chinese Han population teenagers and can be used as a method for deducing the teenager's life age with a high accuracy rate.

**Keywords:** Forensic Science; Bone Age Standard Atlas; Chinese Teenagers; Epiphyseal Fusion

2

# A POST-PROCESSING TECHNIQUE FOR CRANIAL CT IMAGE IDENTIFICATION

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**Abstract:** A major challenge often encountered in radiographic identification is the inconsistent orientation between clinical (ante-mortem, AM) and postmortem (PM) radiographs. We developed and applied a post-processing technique to reposition a multislice computed tomography (MSCT) scan for spatial registration with a CT radiograph from the same patient. A second set of MSCT images from different individuals served as the non-matched control group. The consistency in radiographic positioning eliminated subjectivity in the comparison and identification process because the radiograph superposition provided objective evidence that confirmed the identification with fine detail. A quantitative comparison with statistical validation was achieved by measuring a set of 14 landmarks from the images. Discrimination of identity based on logistic regression analysis of the earlier CT patient scans (the "AM" group) and subsequent MSCT scans (the "PM" group) was objective and reliable. This quantitative comparison depends less on subjective judgment and the experience of the examiner, and so may meet legal standards.

**Keywords:** Forensic Anthropology; Radiographic Identification; Post-Processing Techniques; Superimposition

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3

# USING A PORTABLE XRF TO DETECT THE TRANSFER OF MATERIAL FROM THE PRIOR USE OF A SAW IN CUTTING BONE

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**Institution(s):**[1]WESTERN CAROLINA UNIVERSITY

**Introduction:** The principle of transfer evidence is a fundamental tenet of forensic science. Within forensic anthropology the assessment of bone trauma often hinges on the transfer of tool or instrument features to bone. This can be seen in cases of dismemberment as a saw creates recognizable patterns on the cut surface. There is also the possibility that a previously used saw may transfer material from that prior use to the cut bone surface.

**Materials and Methods:** An experimental design was set up to test whether a saw blade used to cut a copper pipe could transfer minute particles of copper when subsequently used to cut through bone. Copper was chosen to simplify the procedure by focusing on one element and to reduce the likelihood of environmental transfer. Two saw blade classes were chosen: 18 teeth per inch raker set and 18 teeth per inch wavy set. The purpose was to amplify the transfer process by creating ideal experimental conditions. Copper concentrations were measured using an Innov-X Systems handheld X-ray Fluorescence (XRF) unit. This XRF detects 23 elements between Titanium and Lead on the periodic table. The x-ray exposure is software driven and set by the manufacturer and was identical for each sample. A shielded test stand was used for testing ensuring that the distance from the XRF to the bone was the same for each sample. Each bone sample, control or test, received at a minimum one XRF exposure session. Larger bones required multiple exposures to ensure that the complete surface had been exposed. This was performed for all cut surfaces. All non-human samples consisted of long bones of Odocoileus virginianus (White-tailed Deer). Two control sets were created. Thirty-one uncut human and non-human bones formed one control set. These included contemporary and prehistoric elements. The second control of 25 non-human bones were saw cut using fresh blades without prior use. The test samples consisted of 31 non-human bones. Prior to each test cutting the saw blade was used to cut through a piece of 25 millimeter copper tubing. Immediately after cutting the tubing each bone was completely cut through and then analyzed using the XRF. The saw blades were also tested.

**Results:** Among the non-cut controls one bone had a detectable copper level. At 3338 ppm (parts per million) this was the highest copper reading for any sample. The control cut group of 46 samples from 25 bones yielded detectable copper in four samples in four bones (16.0%). Levels ranged from 62 ppm to 129 ppm, with an average level of 91 ppm. The prior use test cuts consisted of 31 individual bones with 84 sample exposures. Copper was detected in 31 of the 84 sample sessions. This translates to 24 individual bones, or 77.4%. Copper levels ranged from 27 ppm to 321 ppm with an average of 100 ppm. Detectable copper was present in each blade sample, used or unused. Levels were consistently high and ranged from 663 ppm to 2088 ppm with an average level of 1168 ppm. A test of the average copper levels of the cut control and test cut groups, 91 ppm and 100 ppm respectively, was not significant ($t = .2573$, $p = .7896$). However, in terms of numbers the test cuts had a much higher total percentage of bones with detectable copper compared with the control test cuts, 77.4% vs. 16.0%.

**Discussion and Conclusions:** Excluding the one uncut control sample environmental transfer of copper can be ruled out. The transfer of copper from the prior use of a saw blade was confirmed microscopically. This demonstrates that copper was directly transferred from the copper tubing to the bone. It is assumed that the transfer of copper in the cut control samples was from the blade alloy. Therefore the true indication of prior use transfer cannot be ascertained using the XRF. While copper was transferred from the saw blade to the bone during the cutting process the XRF cannot distinguish between the actual transfer and incidental transfer from the saw blade itself.

**Comments:** This research was sponsored by an Innov-X Systems academic grant.

**Keywords:** Dismemberment; Saw Cuts; Transfer Evidence

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4

# AGE ESTIMATION IN CHINESE LIVING TEENAGERS WITH LIMB JOINTS RADIOGRAPHS

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**Abstract:** Introduction: Estimation of age is an important task for forensic experts especially in developing countries where birth records are often not well maintained. In this study, we tried to establish standard methods by which we could estimate the chronological age of Chinese living teenagers with limb joints radiographs. Methods: Radiographs of 7 joints including sternoclavicular joint and the left side of shoulder, elbow, carpal, hip, knee and ankle were taken from 1,897 Chinese teenagers aged between 11and 20 years. 24 epiphyseal logos(X1~X24) of those joints were selected as the bone age indicators. Changes in the imaging and morphological process of secondary ossification center appearance and epiphyseal fusion were observed, and ossification grades of the 24 indicators were classified according to the hierarchy system proposed by Tanner J.M, Whitehouse. H. and others. Correlation and proc nlin analysis were applied to find the optimal model fitting of the relationship between ossification stages of the indicators and the actual chronological age. The Fisher's linear discriminant models were used to determine whether the age is 14, 16 and 18 or not. The ages of secondary ossification center appearance and epiphyseal fusion were also studied. All the statistic procedures were carried out using SAS 8.1 and SPSS 11.5 software. Results: Compared with the data from last century, maturation of bone development in Chinese teenagers had been significantly ahead of schedule by 2~3 years earlier with appearance of secondary ossification center and epiphyseal fusion, especially in X1, X8, X9, X15, X16, X20, X21, X22, X23, and X24 indicators. Except X6, X7, height and weight, the majority of the indicators have moderately well correlation with the chronological age (R>0.6). For males, the indicators with high correlation with the chronological age were X1, X2, X4, X8, X9, X13, X15, X16, X22, X23 (R>0.8, P<0.0001), while the indicators wereare X1, X2, X4, X8, X9, X15, X16, X22 (R>0.8, P<0.0001) for females. Several multiple regression equations were established to estimate the bone age. A higher accuracy of the equation for male was Ym=7.673+0.015*Height+0.450*X1+0.153*X2+0.364*X3 +0.170*X4+0.215*X6+0.332*X9+0.219*X15, When precision is defined as 1.0 year, the accuracy was 70.59%, and when precision is 1.5 years, the accuracy was 88.24%. The equation for female was Yf=9.414+0.462*X1+0.182*X2+0.493*X3+0.226*X4+0.304*X8+0.184* X15+0.096*X16. When precision was defined as 1.0 and 1.5 years, the accuracy was 78.46% and 93.85%, respectively. Discriminant equations were established for each gender to determine whether a person had reached age 14.0, 16.0 or 18.0. The mathematical models were tested by ANOVA and were found to be statistically significant (p<0.001) for both genders. Conclusion: The updated age estimation criteria of living teenagers in this study appear to be more practical and accurate. These criteria could technically be used by pediatricians and other clinicians in such cases as ethically unacceptable errors, as well as cases involving the possible criminal liability of the supposed minor. Our proposed mathematical models in this study may provide new methods for the current forensic age estimation involving cases with possible criminal liability.

**Keywords:** Forensic Science; Bone Age; Age Estimation; Living Teenagers; X-Ray; Epiphyseal Fusion

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# A STANDARD PROCEDURE FOR FORENSIC ANTHROPOLOGICAL EXAMINATIONS UNDERTAKEN IN TROPICAL BRAZIL

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**Introduction:** In 2005, a Laboratory of Forensic Anthropology (LAF) was established at the Medico Legal Center, Faculty of Medicine of Ribeirão Preto (CEMEL/FMRP-USP) as a result of a partnership between Brazil and the United Kingdom sponsored by the UK Foreign and Commonwealth Office. The particular local environmental, cultural socio-economic and forensic epidemiological circumstances, and the volume and backlog of cases, necessitated the development of a rapid, practical and optimal procedure for forensic anthropological examination. OBJECTIVE: To establish a rapid, practical and optimal procedure for reliable forensic analysis of skeletonised and partially skeletonised human remains applicable to urban and rural populations in tropical Brazil.

**Materials and Methods:** The procedure involved four stages: 1) initial photography, 2) preparation, 3) forensic analysis and 4) reporting. Firstly, all possessions, clothing, jewellery, piercings and any peculiar marks or signs of trauma or pathology on the body were extensively photographed and recorded. Secondly, if necessary and prior to recovery of samples for DNA analysis and so on, soft tissues were removed using a procedure optimised to local conditions. Thirdly, the skeletal remains were placed in anatomical position and an inventory completed. Sex was evaluated using a contingency table based on up to nine features of the pelvis (size of subpubic angle;presence of ventral arc; presence of medial ischio-pubic ridge; size of greater sciatic notch; width of sacral alae; curvature of sacrum; extent of sacral auricular surface; projection of auricular surface; presence of preauricular sulcus) and seven features of the skull (shape of glabella / supraorbital ridges; presence of occipital protruberance; size of mastoid processes; presence of supramastoid crest; height / robusticity of zygomatic; size and shape of mentum; flaring of mandibular angle). Age in juveniles was estimated by assessment of epiphyseal fusion. Age in adults was estimated using a combination of methods (pubic symphysis - Suchey/Brooks; auricular ilium -Lovejoy/White; 4th sternal rib end - Isçan/Loth; cranial sutures closing - Meindl/Lovejoy; changes in vertebrae). Ancestry was evaluated through an anthroposcopic analysis of the skull and potentially appendicular bones. Stature was estimated from the measurements of the long bones (Trotter, Gleser and Genove). Handedness was evaluated using a contingency table consisting of 8 items (clavicle maximum length, shorter on dominant side; area of costoclavicular ligament attachment; maximum biepicondylar breadth; breadth of inter-tubercular grove; diameter of nutrient foramen; summed maximum lengths of humerus and radius; breath from dorsal tubercle to styloid process; area of biceps attachment). The dentition was inventoried and recorded, and assessed for age, pathology and other distinguishing features. The forensic analysis was extensively recorded and supported by photographs. Fourthly, a report was produced detailing the inventory and forensic analysis, and photographic images, and including a summary section presenting findings relevant to identification and the cause of death in a way accessible to the investigating authorities.

**Results:** The protocol was designated as LAF/CEMEL. From January 2005 to 2010, 74 unidentified bodies (52 skeletonised and 22 partially skeletonised) were investigated resulting in 18 positive identifications (24.32%). Investigation of unidentified cases implicates lack of ante mortem comparative data as a likely factor.

**Conclusions:** LAF/CEMEL forensic anthropology protocol was significant in that it permitted the establishment of examination of skeletonised and partially skeletonised human remains in a region of Brazil where none had previously been routinely undertaken. The rate of positive identification may be confounded by lack of comparative ante mortem data, exacerbated in a region that has a high immigrant population from other parts of Brazil.

**Keywords:** Standard Procedure; Forensic Anthropology; Bodies; Bones; Skeleton; Human Identification

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# THE APPROACH OF MASS MEDIA IN TURKEY TO TRANSPHOBIC HATE CRIMES

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**Abstract:** This paper aims to explain the mass media coverage of transphobic hate crimes in Turkey. Media coverage in response to a hate crime brings widespread recognition to the very serious problem of violence against transgender people. However, media coverage can be inaccurate, uninformed, and disrespectful. This was a retrospective study that included transgender hate crimes between January 2009 and December 2010. The law enforcement statistics, LGBT-related organizations' records and mass media coverage of transphobic hate crimes were cross analysed. When the law enforcement statistics and LGBT-related organizations reports of transphobic hate crimes were cross analysed with mass media coverage, it is found that mass media only covers 1/3 of the whole transphobic hate crimes. Assaults towards transgender people don't attire media's attention than the death resulted events. At the present time, transphobic hate crime is not officially recorded even at the EU level. In Turkey, the police record transphobic and homophobic hate crimes under the same section. The scale of transphobic hate crime is unknown given the under-reporting by victims as well as the misreporting by the media. As transphobic hate crime in Turkey is not generally recorded by law enforcement, it is clear that official records are unlikely to be reliable source of data. The mass media approaches to transphobic hate crimes with images and language that are openly derisive, sensationalistic. Media coverage can be inaccurate, uninformed, and disrespectful; this unfair and unbalanced news further degrade the victim of a hate crime. Except for a handful of high-pro?le cases, hate crimes against transgender people remain largely ignored or badly reported by the mass media.

**Keywords:** Transphobic; Mass Media; Hate Crime; Transgender; Law Enforcement

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# REPORTING OF STRONGLY DISCRIMINATING TECHNIQUE COMBINATION RESULTS IN THE NETHERLANDS

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**Abstract:** With the advent of strongly discriminating technique combinations such as (LA-)ICPMS and IRMS a potential obstacle is encountered to effectively and efficiently use these techniques to provide state of the art evidence in courts. Within the Dutch judicial system a solution has been found in a transparent fit for purpose application using several flexible stages of investigation within the NFI Quality Assurance system. (LA-)ICPMS and IRMS are used together as part of forensic casework investigations within the NFI since 2003. Many applications were developed that demonstrate the strong discriminating power of this technique combination. The ICPMS/IRMS combination (or the single techniques) are used for a wide range of materials such as various tape types, adhesives, paper, safe wall filling materials, jeans, motor oils, polyester trousers, polypropylene rope, poly methyl methacrylate objects, candles, jerrycans, remnants of burnt jerrycans and other materials. Some applications will be discussed in the presentation. Due to the highly varying nature of forensic investigations we frequently encounter materials for which no prior ICPMS/IRMS background variation information is available. The effective and efficient use of forensic science methods while maintaining Quality Assurance conditions for these investigations is one of the challenges for modern forensic science. For Quality Assurance (QA) purposes a NFI procedure is used that is based on accredited methods (such as NFI LA ICPMS glass investigations) but using e.g. a different matrix. This NFI procedure for infrequently encountered special matrices has been accredited by the Dutch accreditation board. Prior to each investigation a small dedicated project plan is made which includes QA targets. After the investigation, the results are addressed in an internal NFI report, compared to the QA targets and possible deviations discussed. Effective and efficient use of ICPMS/IRMS forensic science methods is ensured by the following. For serious crimes such as murders, results are used for different purposes in different phases of a large scale police investigation (indicative investigations) and the court process. Four phases can be distinguished in the Netherlands. In the first two phases results are used to assist the police with forensic intelligence. In the last two phases results are used to assist the court with forensic evidence. Police investigation Phase 1: many scenarios are possible and IRMS/ICPMS can assist in eliminating some of these scenarios. In this phase it is especially of interest if samples can be discriminated. Phase 2: later on in the police investigation possible scenarios will be weighed relative to each other. At this stage it is not only relevant to be able to discriminate samples but also to estimate the value of a match. Court investigation Phase 3: apart from the prosecution hypothesis at least one alternative (defence) hypothesis is required to state the evidence logically correct. To evaluate the value of a match, knowledge on the background variation of the material is also required. If this background variation was investigated previously, a report for the court can be formulated directly after the investigation. Phase 4: if the background variation of the material has not been investigated previously, it may be required to formulate sequential reports for the court; the first specifies the match and the limitations because of lacking knowledge on background variation. Depending on the importance of the evidence for the court, in the fourth phase information on the background variation is then collected and the match interpreted considering this information. The advantage of providing forensic information for these different phases is that (preliminary) results can be reported relatively fast to assist the police during their investigation, whereas in-depth reports for court will be provided later, if necessary.

**Keywords:** Report; ICPMS; IRMS; QA

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# FORENSICS AND THE MISSING IN THE BALKANS: FORENSIC STRUCTURES, CURRENT CHALLENGES, AND FUTURE NEEDS

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**Abstract:** The Balkans has seen one of the most intensive applications of forensics to address the issue of the missing ever undertaken in post conflict situations. It has led immeasurably to the development of forensic techniques in the field and laboratory. While much has been achieved during this time, this paper looks at what it has left in the Balkan region regarding local forensic structures and expertise, and what the challenges are today facing the recovery, analysis, and identification of missing persons. The last 10-15 years has seen a large number of international and national forensic actors involved in addressing the missing persons issue. While international involvement in these issues persists, involvement of local forensic experts has varied in the region. It is clear that the long-term sustainability of local forensic structures is imperative to successfully address the missing issue. Currently, there remain some fundamental technical forensic challenges, many of which are regional. These include issues such as stored unidentified human remains in BiH, Kosovo, and Croatia, potential misidentification, and unidentifiable human remains. Raising the expectations of the families concerning the identification of human remains has only negatively impacted on their emotions, and it is necessary to understand that currently, forensic science, on its own, will not be able to comprehensively address all of these challenges. It is only through the coordinated approach of all forensic actors and wider society that these issues can be constructively dealt with. Therefore, sustainability of forensic structures, standards of best practice, and coordination between all forensic and other relevant actors, are key pillars on which the issue of the missing should be best addressed.

**Keywords:** Forensics; The Missing; Local Forensic Capacity; Regional Challenges; Coordination of Actors

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# COMBINATION OF EVIDENCE IN COMPLEX CASEWORK USING BAYESIAN NETWORKS

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**Abstract:** In forensic casework, often multiple investigations are performed. Reporting the evidential value of the combined results within a single casework investigation is desirable in many respects. Bayesian networks have been proposed in the literature as a useful tool for combining evidence. However, many challenges are encountered when putting theory into practice in complex casework investigations. Nonetheless, we conclude that this is the way forward. In this presentation we illustrate the pros and cons of using Bayesian networks in complex casework investigations using a real case, involving many questions and many types of forensic evidence. Late in a summer night two incidents occur in a rural Dutch area. A motorcade of a car with trailer, an excavator and a private car (Ford Sierra) are signalled by the police. This is a combination that is often used for a hit on an ATM. The excavator is used to break into the ATM, the last private car is used to hinder pursuers e.g. by throwing spikes on the road. The police pursue the motorcade and encounter on a side road the Ford Sierra that advances and hits the police car in the flank. A police officer standing outside the police car feels threatened and shoots five times at the Ford Sierra. Subsequently, an injured male is encountered on the driver's seat in this car. An excavator is found abandoned a little further on the road. A few days afterwards, in the woods close by, the body of a man is found. His head and back are covered with maggots of different sizes and a large part of the soft tissue has gone. On his skull an injury (impression) is observed. This male is identified shortly afterwards. His DNA matches blood and tissue samples as taken from the Ford Sierra and a guardrail next to it. The main question is if this man was (mortally) injured by the police officer during the shooting incident. Many forensic investigations were made including comparison of bullets to the police officer gun, DNA-investigations on many samples, fibre comparison of materials found on the bullets to garments and balaclavas, comparison of paint and glass particles found on the bullets to the Ford Sierra car paint and (broken) window glasses. Especially the micro traces (human tissues, glass, paint, fibre) on two bullets found in the Ford Sierra appear to link both the deceased and the injured male to the incident and to each other. GSR investigations on clothing around damages (holes) were made to verify if these damages could be bullet holes. The FT-IR spectrum of a white substance found on one bullet matched the spectrum of bone material. A tool-marks investigation on the head injury did not provide a definitive answer whether this injury was caused by a bullet. The autopsy and subsequent pathology and toxicology investigations could not determine a cause of death for the deceased due to the advanced decomposition of the body and the lack of soft tissue. Through hair and fibre investigations a link with the excavator was investigated. In total, 11 expert areas were involved. We explored the use of Bayesian networks in this case. In our presentation we show a network that was made for answering a part of the main question: the manner of death. Some progress was made to combine DNA, glass, paint, fibre, (white) material, bullet trajectory, tool-marks and pathology evidence. We shall discuss the assumptions made in the structure of the model and the probability tables behind it, as well as the various advantages (explicit derivation of the combined evidential value, transparency of reasoning and assumptions, sensitivity analysis, information analysis) and disadvantages (many assumptions required, possibly misleading suggestion of exactness, sensitivity to small changes in formulation). This presentation concerns work in progress. No claim is made that the present approach provides the final answer although the authors feel there appears to be no viable alternative to the Bayesian network modell

**Keywords:** Evidence; Micro Traces; Bayesian Networks

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1

# COLD CASES REOPENED. DNA MAKES LIGHT (OR DARK?)

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**Abstract:** Recently more sensitive technologies in forensic genetics (DNA extraction techniques, real-time quality and quantity analysis and PCR kits) could assist scientists in recovery much information than in the past from crime samples, especially unsolved homicides of the past. This is the light side of forensic science that makes enthusiastic forensic geneticists as well as mass media. But DNA can prove innocence or guilt only if it's used as a justice - and not injustice - tool. The more the sensitiveness the more complex are the new data. Mixed or low-template DNA profiles occur but they need to be interpreted and not always they are. Also, a critical revision of contamination prevention and evidence collection methods used at the time of the accident need to be carefully considered as they are key details that often reduce the first enthusiasm. Furthermore, the evidence preservation rules need to be better coded because different forensic scientists will reanalyzed samples that some other had worked in the past. Some cold cases were solved and many other are to be reopened in every country and probably all the unsolved crimes will be reanalyzed in the next future. We discuss some real cases occurred in Italy and, in order to assure the stringency and the quality guarantees in this type of caseworks, we suggest some guidelines and recommendations for the forensic laboratories.

**Keywords:** DNA; Cold Case; Forensic Identification

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# DIRECT AMPLIFICATION APPROACHES TO STREAMLINING DATABASING SAMPLE PROCESSING

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**Abstract:** Laboratories involved in convicted offender and arrestee sample processing are continuously seeking opportunities to increase throughput and minimize the potential for sample backlogs. Increasing the turnaround time from sample submission to genetic profile upload provides earlier access to law enforcement enabling more expeditious resolution of no suspect cases and providing investigative leads in a timely fashion. Direct amplification approaches allow laboratories to eliminate time-consuming sample processing steps which may be prone to sample switching errors or cross contamination. The AmpFlSTR Identifiler Direct PCR Amplification Kit was initially developed to take advantage of the lysis capabilities inherent in FTA paper. The Identifiler Direct Kit contains a robust master mix allowing users to directly punch discs from blood or buccal samples deposited on FTA paper into the amplification master mix, eliminating the need for DNA extraction and purification. The increased efficiency is accompanied by high data quality with first pass success rates (full, interpretable profiles) at a 150 RFU analysis threshold of 94.7% for buccal samples (N=703) and 99.8% for blood samples (N=437). Recently, we have developed a protocol which extends direct amplification capabilities to non-FTA substrates. The Prep-n-Go Buffer effectively lyses buccal samples collected on punchable non-FTA substrates such as the Bode Buccal DNA Collector and is compatible with the Identifiler Direct kit. The protocol is similar to direct amplification from FTA paper: a 1.2 mm disc is punched into 2 ul of Prep-n-Go Buffer prior to addition of the amplification reagents. This protocol is easily automated and does not require an extended incubation or heating step to facilitate lysis. Success was demonstrated by the generation of interpretable, well-balanced, complete DNA profiles without introduction of artifact peaks. The first pass success rate of 95.9% (N=270) for buccal samples collected with the Bode Buccal DNA Collector was similar to that achieved for buccal samples on FTA cards at an analysis threshold of 150 RFU. Evaluations of non-punchable substrates such as cotton swabs indicate that this streamlined protocol can be extended to a wide range of substrates. Side-by-side comparative studies showed that the Prep-n-Go Buffer helps improve the workflow efficiency and the STR profile quality of samples collected from buccal swabs and when amplified with the AmpF#61548;STR NGM and NGM Select PCR Amplification kits. The Prep-n-Go Buffer used in combination with AmpF#8467;STR kits such as the Identifiler Direct PCR Amplification kit will provide direct benefits to laboratories seeking to increase their efficiency for processing databasing samples.

**Keywords:** STR Analysis; Direct Amplification; DNA Databasing

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# CONSENSUS METHOD FOR LOW TEMPLATE TYPING AFFECTS GENOTYPING RELIABILITY AND DATABASE SEARCH RESULTS

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**Abstract:** To analyze DNA samples with very low DNA concentrations, various methods have been developed that sensitize short tandem repeat (STR) typing. Sensitized DNA typing is accompanied by stochastic amplification effects, such as allele drop-outs and drop-ins. To minimize the number of drop-outs and drop-ins in low template (LT) DNA profiles one can try to infer the genotype by a consensus method that uses alleles confirmed in replicate analyses. This study focuses on consensus methods varying for the number of replications and requested level of reproducibility. DNA profiles from mock casework samples were obtained using standard PCR and capillary electrophoresis (CE), increased cycling and enhanced CE injection. Consensus profiles were assembled from two to six replications using four methods: composite (include all alleles), n-1 (include alleles detected in all but one replicate), n/2 (include alleles detected in at least half of the replicates) and 2x (include alleles detected twice). We compared the consensus profiles with the DNA profile of the known donor, studied the stochastic amplification effects and examined the effect of the consensus procedure on DNA database search results. We show that the accuracy of LT DNA typing and the efficiency of database searching improve when the number of replicates is increased and the consensus method is n/2. The most functional number of replicates within this n/2 method is four (although a replicate number of three suffices for samples showing >25% of the alleles in standard STR typing).

**Keywords:** Low Template DNA; Low Copy Number; Allele Drop-in; Consensus Methods; Database Searches

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# DNA DATA EXCHANGE BETWEEN EU MEMBER STATES - PORTUGUESE EXPERIENCE

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**Abstract:** The original Prüm Treaty was signed in 2005 (May 27th) between Austria, Belgium, France, Germany, Luxembourg, The Netherlands and Spain, in pursuance of the stepping up of cross-border cooperation, particularly to combat terrorism, cross-border crime and immigration. The principal purpose of the Treaty was to improve the exchange of information between the Contracting States, particularly by giving reciprocal access to national databases containing DNA profiles, fingerprints; and vehicle registration data. After the Treaty was signed a joint working group at senior level and technical working groups were created. In 2007 the EU Justice and Home Affairs Council agreed to incorporate elements of the Treaty into the EU legal framework to apply to all Member States. Council Decisions 2008/615/JHA and 2008/616/JHA require all Member States to allow automated searching or comparison of DNA data, fingerprint data and certain vehicle registration information. DNA and fingerprint data searches will be facilitated on a 'hit or no hit' basis only. Follow up requests for further information in response to a 'hit' are made via existing channels. Concerning DNA data exchange, Portugal begun participating on a regular basis on DNA Technical Working Group since 2007 (March 9th). ... ...

**Keywords:** DNA Data Exchange

5

# DEVELOPMENT AND IMPLEMENTATION OF A RAPID DNA PROFILING SERVICE

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**Abstract:** Forensic DNA typing involves a multi-step workflow taking around 10-12 hours. For several scenarios it may be valuable to obtain an interpretable DNA profile, suited to search a DNA database, within a few hours. We reduced the total DNA profiling time to 2-3 hours by a direct and rapid PCR approach that uses the following elements: 1) the inhibitor-tolerant, highly processive Phusion Flash DNA polymerase; 2) a modified, not-adenylated allelic ladder; 3) the quick PIKO thermal cycler system; 4) profile interpretation guidelines with increased allele calling threshold, modified stutter ratios and marked low-level artefact peaks and 5) regulation of sample input by mini-tapes that lift a limited amount of cell material from swabs or fabrics. The procedure is specifically effective for single source samples like saliva, blood or semen stains and hair roots. Success rates, defined as a complete DNA profile, depend on stain type and surface. Due to the use of tape lifting as the sampling technique, the swab or fabric remains dry and intact and can be analyzed at a later stage using regular procedures. The protocol effectively instructs researchers unfamiliar with the procedure. Direct and rapid PCR was found to be compatible with various STR kits. We have incorporated direct and rapid PCR in a "DNA-6hours" service that can assist police investigations. This procedure rapidly derives DNA information from trace evidence, searches the STR profile against a DNA database and gives a brief report to police or prosecution. In the first six months of its existence the DNA-6hours service was able to give useful information in 8 out of 9 cases. A DNA profile was made, searched against the DNA profiles of known persons in the DNA database and a brief report containing information about the match or no match was sent out within 4 hours. In one case, the results of the DNA-6hours service resulted in an arrest of a suspect within 24 hours after the crime took place.

**Keywords:** DNA; Direct PCR; Rapid PCR

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# DOING MORE WITH LESS: IMPLEMENTING DIRECT AMPLIFICATION WITH THE POWERPLEX® 18D SYSTEM

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**Abstract:** "No good deed goes unpunished…" goes the saying about being noticed for effective performance. The state and national DNA databasing program demonstrates increasing value to law enforcement and has subsequently seen rapid growth in workload. Development of single-amplification STR kits, multicapillary electrophoresis and automation has provided great efficiency gains over the past decade. Still, many database laboratories seek further process improvements to keep pace with the dramatic growth in submissions. Currently, sample processing and thermal cycling are two of the longest steps in the STR analysis process for databasing laboratories. The PowerPlex® 18D System has been developed to significantly reduce the STR analysis process with direct amplification and rapid PCR technology. Additionally, simplifying or removing sample preparation also reduces manipulations and saves extraction reagents. Performance and workflow impact of PowerPlex® 18D will be shared for processing of common sample types including GE/Whatman FTA® cards, Omni Swabs and Bode DNA Collectors™.

**Keywords:** STR; Powerplex®

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# TOPOGRAPHY MEASUREMENTS AND PERFORMANCE COMPARISONS BETWEEN NIST SRM 2460 STANDARD BULLET MASTERS AND BKA BULLET REPLICAS

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**Abstract:** Two Standard Reference Material (SRM) 2460 bullets produced by the National Institute of Standards and Technology (NIST) were used as masters for the fabrication of replica bullets at the Federal Criminal Police Office, Bundeskriminalamt (BKA). The surface topography of the SRM masters and the replicas were measured and compared to determine their topography similarity. The topography comparisons revealed surface contamination of replica bullets made from the first SRM bullet master. However, the surface contamination problem was significantly improved with replica bullets made from the second SRM bullet master. To compare the performance similarity of imaging correlations, one of the replica bullets was imaged at the National Laboratory Center of the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) using an Integrated Ballistic Identification System (IBIS)*. The image of the replica bullet was correlated with those of the SRM bullets previously tested from 2002 to 2006. The Max Phase correlation scores were used for performance comparisons. There was no significant performance difference between the SRM bullets and the replica bullet.

**Keywords:** Forensic Science; Ballistics Identification; Standard Reference Material; SRM; Standard Bullet; IBIS

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# ILLEGAL FIREARMS IN PORTUGAL

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**Abstract:** The Laboratório de Polícia Científica (LPC) is the laboratory responsible for forensic firearm examination in Portugal, leading to the fact that a significant amount of the firearms seized in our country are analysed by their experts. One of the phenomena with the most impact in the LPC's current casework is the converted firearms, which are mostly originally blank pistols, modified after their manufacture, in order to be able to use live rounds and fire an actual bullet. This kind of firearms is found nationwide, in a great variety of brands, calibres and type of conversions. So, within this context, this presentation aims to describe the relevance of this reality in our country, both quantitatively and in his distribution, thus expressing a concerning trend that is also found across many European countries. In addition, since the converted firearms are obviously illegal, this presentation will also focus in other kind of prohibited guns found in Portugal, like the homemade firearms and the ones designed to reproduce other common and everyday objects.

**Keywords:** Illegal Firearms; Homemade Firearms

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# PISTOL BARREL DISCRIMINATION: A NUMERICAL ANALYSIS

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**Institution(s):**[1]NOTTINGHAM TRENT UNIVERSITY; [2]EDITH COWAN UNIVERSITY; [3]CRANFIELD UNIVERSITY

**Abstract:** The gross surface profile of barrel land transitions typically change as a result of gun design and manufacturing method, creating a set of characteristic features for discrimination. This research aims to develop a computer-assisted, quantitative method by which land transitions from a range of pistol barrel manufacturers and rifling methods can be compared and potentially identified. A selection of fifteen 9 x 19 mm calibre pistols were obtained, primarily comprising of barrels with conventional, 6 right class characteristics. Each barrel bore was cast using grey Isomark T-3 silicone polymer and cross-sectioned at three separate locations. Images of the transition regions were obtained at 200x magnification, pre-processed and binarised. Spectral analysis was undertaken on the binarised images using fast Fourier transform, on which principal component analysis (PCA) was performed. The weighted Euclidean distance (WED) was finally optimised to enhance barrel discrimination. By calculating WED between any land transition and an average land transition for each barrel in the database, statistically significant differentiation is achieved between 12 barrels (8 barrel manufacturers) using one-way ANOVA and Tukey or Dunnett T3 post-hoc test (95 % confidence interval). Differentiation is further increased to all 15 barrels (11 manufacturers) when WED is calculated between a trio of land transitions and an average land transition for each barrel in the database. This research shows that surface land transition profiles of 11 barrel manufacturers can be quantitatively compared and differentiated, irrespective of typical class characteristics, such as direction of twist and widths of lands and grooves. There is also the potential to infer the rifling method as well as discriminate between new and used barrels produced by a specific manufacturer, which may be useful to firearms examiners when unmarked or unidentified barrels are encountered.

**Keywords:** Barrel Manufacture; Firearm Identification; Forensic; Principal Component Analyis; Rifling

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# THE EXAMINATION, EVALUATION AND IDENTIFICATION OF 9MM CALIBER CARTRIDGE CASES FIRED FROM 1,275 GLOCK SEMIAUTOMATIC PISTOLS MANUFACTURED OVER AN 18 YEAR PERIOD

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**Abstract:** One thousand two hundred and severty five (1,275)fired 9mm GLOCK cartridge cases were microscopically intercompared and evaluated to determine if the cases could be individualized. A total of 1,624,350 examinations were conducted and it was determined that the cases could be individualized to themselves and to the exclusion of the other 1,274 fired cases.

**Keywords:** Criteria for Identification; Daubert; Firearms Identification; Empirical Scientific Research.

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# GSR ANALYSIS BY SEM/EDX - A POWERFUL TOOL FOR FIREARMS CRIME INVESTIGATION

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**Abstract:** Since the publication of the Aerospace Report (1977), SEM/EDX became the standard technique for Gun Shot Residue (GSR) analysis, an important kind of evidence used in the investigation of shooting incidents. Just as Firearms analysis can establish a connection between spent ammunition elements (bullets, cartridge cases, etc) and a weapon, GSR analysis can establish a connection between a person or an object and a shooting incident. The purpose of this communication is to present the results that may be obtained from the analysis of this type of evidence and also to show the importance of information delivered to the lab in the assessment and evaluation of the case. Sometimes, due to misinformation, GSR evidence is claimed to be inconclusive. We want to emphasise that GSR evidence, as all trace evidence, needs to be conjugated with other investigation elements. Also, we want to highlight the importance of ongoing studies inside the forensic community in order to clarify and support the conclusions that could be drawn from this kind of evidence. Finally, the complementary character of results of all kinds of evidence is illustrated based on a case where only the interpretation of the combined results from the Crime Scene Inspection, GSR analysis, Ballistics, DNA and the autopsy of the corpse allowed the understanding of an unusual situation. In particular the comparison of composition from GSR particles collected in the items from the crime scene and particles from the spent cartridge cases analysed in Ballistics were of utmost importance to solve this case.

**Keywords:** GSR; SEM/EDX; Ballistics

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# ACCIDENT OR HOMICIDE?

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**Abstract:** The authors demonstrate a complicated case of death of 34 year old man, from a small village near the town called Martin (Slovakia), whose body was found in a small river 21 kilometers away form his home village. The body examination made by the G.P. had established the drowning under the influence of alcohol as a cause of death. The police authorities have called the forensic expert to the scene because of suspicious appearance and position of the body. The body was examined by the experts and with the autopsy findings the case gets a surprise ending.

**Keywords:** Homicide; Examination; Police

2

# THE OCCURRENCE OF NON-NATURAL DEATH IN THE AUTOPSIES PERFORMED IN THE CASES OF SUDDEN UNEXPECTED DEATH (2006-2010)

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**Abstract:** Similarly to other EU member states, autopsy rates have been failing in Hungary in the last 10 years although it is still around 40 %, and about 20 % in cases of sudden unexpected deaths. The low rate of autopsy involves the possibility of violent deaths remained undiscovered. The rate of violent deaths was investigated in clinical autopsies performed for sudden unexpected deaths in two forensic medical centres between 01.01.2006 and 31.12.1010. There were altogether 15538 autopsies, from which clinical autopsies for sudden unexpected deaths was performed in 4758 (30.62 %) cases. In 609 cases (12.80 % of clinical autopsies) the violent cause of death was suspected and a medico legal autopsy was ordered. After a careful autopsy, histology and toxicology natural death was diagnosed in 262 and violent death in 347 cases (7.29 % of clinical autopsies; alcohol and other poisoning, falling from height, traffic accidents, etc.) in which 9 homicides (0.19 %) were revealed as well. The rate of violent death was 8.57 % in Budapest and 2.83 % in Szeged. Our results indicate that as a consequence of the improper scene investigation and low autopsy rate several hundreds of cases of violent deaths and even some homicide cases may be remained undiscovered yearly.

**Keywords:** Autopsies; Non-Natural Death Sudden Death

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# RE-EVALUATION OF SUDDEN UNEXPECTED DEATH IN EPILEPSY

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**Abstract:** Epilepsy is a common chronic neurological disorder characterized by seizures. Mortality is significantly increased in patients with epilepsy. Sudden unexpected death in epilepsy (SUDEP) is the most common seizure-related category of death, accounting for 7.5% to 17% of all deaths in epilepsy. A retrospective study of forensic autopsy cases from 2007 to 2009 at the Office of the Chief Medical Examiner (OCME) yielded a total of 104 sudden unexpected deaths directly or indirectly caused by epilepsy/seizure disorder in the State of Maryland. Of these deaths, 75 cases were accepted for the study based on the definition of SUDEP. The age of SUDEP individuals ranged from 14 to 63 with the majority of subjects in the ages between 21-50 years (58 cases, 77.3%). Males were slightly more likely than females to die of SUDEP (Male : Female = 1.4:1). The onset age of epilepsy was documented in less than 50% of cases (36/75) based on OCME investigative records. Of the 36 cases, 12 subjects had early onset epilepsy (onset ages 1-15 years) and 20 subjects had duration of epilepsy more than 10 years. The majority of deaths (62 cases, 82.7%) were unwitnessed. Death scene investigation showed that 73 deaths occurred inside of residence with 50 subjects (66.7%) found either in bed or on the bedroom floor near the bed. Forty-four out of 75 cases (58.7%) showed neurological lesions. Per history, 51 subjects were reported on anti-epileptic drugs (AEDs). However, postmortem toxicological analysis revealed that only 26 subjects (34.7%) had detectable AEDs. This report focuses on the characteristics of death scene investigation and postmortem examination findings of SUDEP cases to identify potential risk factors for SUDEP. The use of SUDEP terminology as a cause of death in the practice of forensic pathology is also discussed.

**Keywords:** Sudden Unexpected Death in Epilepsy; Seizure Disorder; Forensic Investigation; Autopsy

4

# JUVENIL SUDDEN DEATH. WHAT KILLS YOUNG PEOPLE IN SEVILLE?

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**Introduction:** Juvenile Sudden Death (JSD) is a serious public health problem in western countries. So far, studies on SJD in Spain have been retrospective and limited. The aim of this study is to analyze the incidence, causes and risk factors of JSD in the province of Seville (Spain).

**Materials and Methods:** Prospective study of the cases of sudden death in youngs between 1-35 years-old of the total forensic autopsies carried out from 1 November 2003 to 31 May 2011 (91 months) at the Forensic Pathology Service, Institute of Legal Medicine of Seville (Total population: 1.917.097; population 1-35 years: 965.546, according to 2010 census). Data analyzed: age, sex, personal and family history, circumstances of death, anthropometric data (BMI and waist circumference), heart weight, thickness of LV, cause of death (cardiovascular and no cardiovascular), toxicology and microbiology results.

**Results:** 135 cases of JSD were collected representing 1.9% of total autopsies (6890), 4.3% of natural deaths (3128), and 7.2% of sudden deaths (1876). 106 (79%) cases were male and 29 (21%) women. The mean age was 25.3 ± 9 years (range 1-35 years). The JSD was cardiovascular (CV) in 101 (75%) cases and non-cardiovascular (NCV) in 34 (25%). The most common cause of CV-JSD was cardiomyopathy (genetic, mixed and acquired) in 36/101 (35%), followed by coronary atherosclerotic disease (CAD) -most frequent isolated cause- in 19/101 (19%) cases, 12 of whom (63%) had acute occlusive thrombosis, JSD with structurally normal heart in 12/101 (12%), pulmonary embolism in 12/101 (12%) and idiopathic LV hypertrophy 7/101 (7%). Between NCV-JSD, the most frequent cause was the sudden-unexpected death in epilepsy with 8/34 (23%) cases, followed by haemorrhagic stroke with 7/34 (21%) cases and fulminant sepsis by N. Meningitidis 5/34 (15%). Toxicological analysis was positive in 27/135 (20%) cases: ethanol 14/27, cannabis 4/27, anti-epileptic medication 4/27, benzodiazepines and/or antidepressants 3/27 and analgesics 2/27.

**Conclusions:** 1/ In Seville, JSD has an incidence of 1.9/100.000 inhabitants per year and it is of cardiovascular origin in 75% of the cases. 2/ The incidence of juvenil sudden cardiovascular death is 1.4/100.000 inhabitants. 3/ We underline the high incidence of CAD (19%) in spite of the young age.

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**Keywords:** Sudden Death; Young; Autopsy; Forensic Pathology

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# ACCURACY OF DEATH CERTIFICATE FOR FOREIGN BODIES

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**Introduction:** Death certificate itself is a problem within homeland, but we have major discrepancy, when someone lost his/her life abroad. In spite of the international autopsy protocol, there are no uniform autopsy requirements for forensic autopsies performed on foreign bodies. The aim of our investigation was to determine if the cause of death in the death certificates issued were accurate or not.

**Methods:** Total 20 cases were examined, based on the death certificate, police investigation, or data provided by the family, and autopsy done by our institution.

**Results:** We found that more than half of the cases were not autopsied in spite of the violent death, there were no formal death investigation conducted, and two cases were suspicious for murder.

**Conclusions:** An international protocol is needed to determine the cases when autopsy has to be performed on a foreign body in order to rule out possible violent crimes and insurance fraud.

**Keywords:** Death Certificate; Violent Death; Insurance Fraud

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# COMBINED HOMICIDE-SUICIDE IN EASTERN CROATIA

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**Abstract:** Homicide and suicide are closely intertwined in combined homicide-suicide. These tragic acts generate much public concern. In some cases homicide-suicide inolves annihilation of entire families. A difficult phenomenon to study in part because the perpetrator also dies in the act. Combined homicide-suicide have been classified based on the relationship between the perpetrator and victim(s) in a several types; consortial, filial, familicidal homicide-suicide, adversarial, pseudo-commandos and cult homicide-suicide. To further understand the nature of this tragic phenomenon data were systematically collected on all combined homicide-suicide events that occurred over a continuous 20-year period (1988-2008), in Osijek County, Eastern Croatia. Combined homicide-suicide included approximately 1.5% of all suicides and 9% of all homicides that occurred in the same period. A consortial (71%) followed by filial (18%) were the two most common types of combined homicide-suicide. Husband, lover and boyfriend were offenders in cases of the consortial type. Depression, alcoholism, possessiveness were personality traits equally present among consortial perpetrators. A father killed children in two separate acts of filial type but contrary to expectation only one mother was the offender in such cases. All but one perpetrator were male and 74% of the victims were females. As age group victims were (mean 38 age) younger then perpetrators (mean 44 age). Both perpetrator and victims were usually killed (88%) in the same location. The deadliest (42%) place for both perpetrator and victims was in dwelling especially one in which both had lived. Most of combined homicide-suicide (64%) involved use of firearms. Where handgun was used to kill the victim, a handgun was also used to commit suicide. According to other studies consortial type of combined homicide-suicide were the most common, which deserve much attention to further analyze personality and stress factors underlying these tragedy.

**Keywords:** Homicide; Suicide; Psychopathology; Consortial Homicide-Suicide

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# CHILDREN VICTIMS OF ANOTHER WAR

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**Abstract:** With the globalization, there is no more remote distance on the world. Countries, nations and cultures became closer. With the development of technology, travel between counties became easier and multinational marriages increased. This increase naturally brought along its problems. The difference of culture between spouses, poor understanding arising from language problems and non satisfaction of expectations increased the number of divorces. Together with the cease of marriages, kidnapping of children by the parents who could not get the custody, is in the daily life of the world since beginning of 70s. Number of children kidnapped by parents is increasing every year. The psychology of the kidnapped children being used as weapon due ; passion of obtaining the custody, war of powers, extreme affection, - and more over of these -, the aim of revenge and giving pain to ex spouse, has always been disregarded. Children are more of a powerful weapon than any other nowadays. However, the kidnapped child is squeezed between two cultures, in addition to the traumas resulting from being away from habitual environment, most of the times, because of hiding to avoid going back are lacking of its most natural and universal rights of education and healthcare love of the other parent. Together with the end of marriage, the children are forced to feel hatred to the parent left behind and the trauma faced during this period is bringing damages on the children. The Hague Convention on The Civil Aspects of International Child Abduction aiming to bring a solution to the juristical dimension of this problem, having organized the return of the child to its habitual residence, managed to override the problem at least in the countries that have signed the convention. The Hague Convention is focused on the child for solutions and child rights are given the top priority. What it is in the countries that are not member of the convention or even in the countries that are members, how to handle the child during this period and ensure minimal damages. This presentation contains views of 3 disciplines; Law, Forensic Medicine and Child Psychiatry. In this presentation we have to arrange the coordination between the disciplines as well as the coordination between countries use a common universal language and use all possibilities in high favor of the children. To secure this, we must not let the fights between countries and cultures to affect the individuals and systems. We have to shelter under the law and International conventions. Medical systems should also handle the child, away from prejudice of dominant cultures. In this article presentation the angle between the disciplines will be discussed and the difficulties monitored in the three paths and the psychology of the children will be examined, facilities that the children may take profit will be searched.

**Keywords:** Child Abduction; Kidnapped Children; Law; Child Psychiatry; Forensic Medicine; The Hague Convention

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# ORAL SESSION

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1

# A PROPOSAL FOR THE RENEWAL OF THE CLASSIFICATION OF DEATH

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**Abstract:** The WHO classification of death dates back to 19th century, based on concepts prevailing at that time. Modern medical science has given profound insight in the death mechanisms. Society needs reliable and real death statistics. Forensic medical autopsy gives a reliable basis for this. In order to enhance the informative value of death certificate new entities and concepts are proposed as complement and renewal of the present classification. The new structure is described and the requirements put on the investigation is discussed. This encompasses the evaluation of the underlying mechanisms hidden in the medical diagnoses.

**Keywords:** New Classification of Death; Application of the New Classification

2

# TIME-DEPENDENT FTIR SPECTRAL CHANGES IN RATS OF MASSIVE HAEMORRHAGE DEATH DURING THE LATER POSTMORTEM PERIOD

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**Abstract:** The massive heamorrhage death is one of the most common causes of death in forensic practice. Our previous study shows time-dependent FTIR spectral changes in rats of craniocerebral injury death during 7 days postmortem. The aims of the study were as follows:

(1) to investigate the spectra in different organs in rats of massive haemorrhage death;

(2) to explore the spectral changes in different organs 15 days postmortem and best mathematical model with different band absorption ratio changes to PMI ;

(3) to compare the spectral changes results of two causes of death.

Ten male Sprague-Dawley rats were sacrificed by cutting abdominal aorta and cadavers were kept at 20±2? in a control chamber. 7 different organs were sub-sampled from same rat at intervals of 1 day until reaching 15 days postmortem and measured by FTIR spectrometer. Six mathematical model functions were explored. The absorbance of bands and band absorbance ratios showed increase or decrease with increasing time after rat death and most bands absorbance ratios remained stable from 7 days to 15 days after death. The absorbance of bands assigned to C-H and =CH increased continuously; the absorbance of bands from PO2- stretching decreased continuously; the absorbance of bands from C-OH bending and CO-O-C antisymmetric stretching remained relatively stable. Cubic model functions of the various bands absorbance ratios against PMI showed a stronger related coefficient. The spectral changes of two causes of death and of different organs were similar. These spectral changes in rat are believed to reflect progressive postmortem chemical functional groups changes. Furthermore, FTIR spectroscopy reveals a time dependent metabolic process with potential for using as a method to estimate PMI during 7 days postmortem and further studies should be considered.

**Keywords:** *Post mortem* Interval; FTIR Spectroscopy; Model Functions; Massive Haemorrhage

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# THE BEHAVIOR OF THE HYPOXIA INDUCED FACTOR 1-ALPHA (HIF1-A) IN NORMAL, PATHOLOGICAL AND HYPOXIC LUNG TISSUE

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**Introduction:** In a previous work the reaction of the lung tissue to hypoxia through the study of the surfactant protein A (SP-A), of Selectin P and E, and of hypoxia induced factor 1-alpha (HIF1-a) was investigated. The results showed that HIF-1a is always negative in the vessels of the control group, and stains positive only after a hypoxic stimulus, with the number of positive stained vessels related to the duration of asphyxia. To the best of our knowledge, no studies have still been made on human lung tissue with the marker HIF1-a, with the exception of cases of lung cancer. Aim of the study. In the present study we focused on the behaviour of HIF-1a in lung tissue in normal, inflammatory, toxic and hypoxic conditions.

**Materials and Methods:** A cohort of 54 cases, 32 cases of death due to asphyxia [drowning (7), hanging (7), strangulation (4), smothering (4), aspiration (4) CO intoxication (7)], 5 deaths due to illicit drug intoxication, 6 natural deaths with no pathological findings in lung tissue, 5 deaths due to pulmonary infectious disease, and 5 deaths due to head trauma, was evaluated. Lung tissue samples from each lobe in both areas of the lung, central and subpleural, were taken and fixed in formalin 10%, included in paraffin and, finally, stained with HE and immunohistochemical technique using antibodies anti-HIF1-a. The number and intensity of vessels, pneumocytes, leukocytes, alveolar macrophages, and bronchial epithelial cells, staining positive with HIF-1a, were studied applying a semi-quantitative method.

**Results:** In lung tissue, alveolar macrophages, leukocytes, endothelial cells and pneumocytes stain positive with HIF-1a. Alveolar macrophages and leukocytes stain always positive with HIF-1a, but the intensity differs according to the cause of death. Leukocytes show a strong intensity (+++) in pneumonia, while alveolar macrophages in death due to asphyxia. In normal lung tissue and in control cases (death due to head trauma) vessels and pneumocytes do not stain positive. This result confirms the potential importance of HIF-1a as a marker of lung tissue reaction to O2 deprivation. Pneumocytes stain intense positive (+++) in lung infectious diseases, probably because the O2 deprivation follows the damage of pneumocytes. Noteworthy in these cases is the absence of positive stained vessels, maybe because the microcirculation is not immediately involved. Pneumocytes and vessels stain positive in CO intoxication, probably because vessels and pneumocytes are the first to be damaged by the lack of O2 in the erythrocytes. In addition to the positivity of macrophages and leukocytes, in asphyxial deaths also the vessels showed a positive staining. Interestingly, the number and intensity (-/+-/+/++/+++) of HIF-1a expression in pulmonary vessels differ according to the type of asphyxial death; the strongest was found in hanging (++/+++), followed by aspiration (++), smothering, and CO intoxication, with few vessels positive in drowning (+), and in strangulation (+).

**Conclusion:** HIF-1a proved to be a good marker in cases of death due to asphyxia with an interesting potential application for differentiating the cause and type of O2 deprivation.

**Keywords:** Asphyxia; Death; Human Lung Tissue; HIF-1a

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# THE IDIOPATHIC GIANT CELL MYOCARDITIS

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**Abstract:** The unusual case of death of 2.5 month old child is being reported by the authors. After the birth, the congenital heart defect had been detected (defectus secundum interatrialis) i the infant ´s heart. At the age of 2.5 month, the child was transported by emergency to the hospital after involuntary aspiration of milk. The urgent resuscitation was no effect. The clinical diagnoses prior of autopsy were SIDS, asphyxia due to aspiration, cardiopulmonary insufficiency. The autopsy proved the suffocation as the cause of death. To the great surprise, the histology of the heart had discosed the idiopathic myocarditis of the granulomatous type (s.c. Fiedler, giant-cell myocarditis), together with other degenerative changes of the cardiomyocytes.

**Keywords:** Myocarditis; Giant Cells

5

# A MOLECULAR APPROACH FOR EXTENDED POSTMORTEM INTERVAL ESTIMATES

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**Abstract:** Having the ability to determine postmortem interval (PMI), or time since death, provides information to law enforcement that can prove useful in suspect inclusion/exclusion as well as reconstruction of events leading up to the crime. Current estimators, with the exception of forensic entomology, can only provide an accurate PMI for a period of four days following death. To extend the time frame following death in which estimates can be produced, a molecular approach that measures predictable RNA degradation patterns in postmortem tissues is presented. In order to estimate PMI, pig heads were buried in a shallow grave, teeth were extracted at predetermined intervals, and total RNA isolated from the tooth pulp. The relative degradation rate of a small (stable) versus a large (less stable), non-overlapping segment of a house keeping gene's mRNA were determined in a summer and winter study. These data will be presented along with a quantitative measure of morphological changes that occur in aging postmortem tooth pulp. Statistical reasoning as to whether the data obtained using this technique better predict PMI in the form of absolute time (in days) or physiological time (in accumulated temperature) will also be presented. Results indicate that our approach, compared to other methods including forensic entomology, can substantially extend the time frame over which PMI estimates can be made.

**Keywords:** *Post mortem* Interval; RNA; Reverse-Transcription Real-Time PCR

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# VICTIMS OF THE SLAVE TRADE- INJURIES IN VICTIMS TRAFFICKED FOR SERVITUDE AND PROSTITUTION TO THE UK

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**Abstract:** Trafficking is on the increase globally and not only for prostitution but also for unpaid servitude. Many of these victims are children. I will present a series of cases seeking asylum and compensation from their employers and discuss the medical evidence found and the particular problems in examining this patient group. These problems include the lack of physical evidence for rape after prolonged time has elapsed ,the difficulty in disclosing history due to young age, threats from traffickers and cultural beliefs including fear of voodoo as well as the difficulty of distinguishing injuries due to more recent assaults from those acquired in earlier life.

**Keywords:** Trafficking; Asylum; Rape; Voodoo; Slavery; Servitude; Prostitution

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# RECENT SITUATION AND PROSPECT OF PERIPHERAL NERVE INJURY FORENSIC APPRAISAL AND ELECTROMYOGRAPHY IN CHINA

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**Abstract:** In China, the peripheral nerve injury (PNI) person, who has involved in intentional injury case , traffic accident case or industrial injury case, must accept the forensic clinical appraisal. In order to supply evidence for the civil economic compensation and criminal punishment, the forensic climical expert must issue the conclusion about the severity of PNI and the grade of disability according to the location,pattern,severity of PNI, and the degree of limb dysfunction. Nevertheless, the injured persons usually do not coordinate the forensic clinical expert, camouflage or exaggerate the PNI, because they tend to obtain more compensation or increase the punishment to the accused. Additionally, some injured persons maybe have peripheral nerve disease before the injury happen. For those reasons, there exist some main problems in the forensic clinical appraisal of PNI. (1)Lack of objective methods for the evaluation of limb dysfunction: Lovett classification of manual muscular strength and sense by the British Medical Association is very subjective. (2)The best timing for appraisal is still decided by the experience of expert witnesses and very controversial. Whether the appraisal timing is too soon or too late, the conclusion would be affected. (3)The peripheral nerve disease is often ignored but the discrimination is necessary. Electromyography has important value for the location,pattern and quantitation of PNI. But there are three main aspects as follow to study for us: (1)The correlation between the electromyography indexes and the motion and sense function of limb.(2)The dynamic change of electromyography indexes and the best timing for appraisal.(3)How to discriminate the peripheral nerve disease and its influence to dysfunction after PNI. Followed these study, the forensic clinical appraisal of peripheral nerve injury in China would be more objective and impartial.

**Keywords:** Forensic Clinical Medicine; Peripheral Nerve Injury; Electromyography; Appraisal

3

# EVALUATION OF BODY INJURY TO WORKERS OF THERAPEUTIC HYPERBARIC CHAMBERS: BASIC ASPECTS

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**Abstract:** The growing number of Therapeutic Hyperbaric Chambers installed in Portugal and of HBOT workers, raises a concern: in the event of any problems arising from an accident at work or an occupational disease, how shall the Medical Expert evaluate the victim? In addition to the pathology resulting from the Hyperbaric Atmosphere, there are biological and other risks. It is intended to describe some basic aspects of the risks of this professional activity, which can help the Medical Expert in the Evaluation of the Body Injury.

**Keywords:** Evaluation of Body Injury; Therapeutic Hyperbaric Chamber; Hyperbaric Risks; Biological Risks

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# WHEN BODILY INJURIES IN CHILDREN CAN ALERT TO CASES OF VIOLATES HUMAN RIGHTS?

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**Introduction:** Violence against children is a serious social problem, which "violates human rights" in developed and developing countries. In Brazil, as in other parts of the world in different cultures and social classes, regardless of sex or ethnicity, children are daily victims of domestic violence, which is a universal phenomenon and endemic. The violent acts happen to children and adolescents, mostly within the family.

**Methods:** Analyse the types of injuries and location of the body that the children had injuries, trying to create a body map that can alert other health professionals serving these children for whom lesions may be suspected maltreatment in children. During the period 2008 to 2010, 200 children with injury were examined at the Legal Medicine Institute, São Paulo, Brazil, by experts in forensic medicine.

**Results:** It was found that the locations of the lesions are more frequent in the upper limbs (60%), followed by the head (25%) and lower limbs (15%). Where the vast majority of injuries were bruises (85%), multiple and located in the same region of the body.

**Conclusions:** Thus the preliminary data we report that alerts health professionals that serve children who should be alert to cases of abuse to child where it finds lesions grouped in one location and physical characteristics that have multiple bruises.

**Keywords:** Violence; Children; Injuries; Abuse; Bruises; Human Rights

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# PRACTICAL PROBLEMS FACED BY MEDICAL OFFICERS IN RELATION TO ALLEGED TORTURE CASES

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**Abstract:** Investigation of alleged torture incident is a medico-legal challenge due to less support from police and victims. Medical officers' evidence is the deciding factor because in non-wartime torture cases, prosecutor (Police) is the perpetrator. Medical officers encounter various practical problems when dealing with alleged torture cases. Problems are created by victims, police or medical officers. Acceptance of torture, non-divulgence, delayed presentation, wrong information, miss-attribution, timing of injuries, difficulty of expressing opinion, methods for maximizing pain with minimization of injuries by perpetrators, lack of knowledge, unawareness, lack of team approach, absence of victim's consent, absence of victim friendly investigation system, wrong expert evidence against victims and torture injury pattern are discussed with solutions. 39 alleged torture cases examined in Teaching Hospital Kurunegala during last two years are presented to highlight above problems.

**Keywords:** Problems; Torture; Sri Lanka

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# THE KINDS OF SEXUAL VIOLENCE ATTENDED IN THE BEM-ME-QUER UNITY OF THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL, IN THE PERIOD FROM 2001 TO 2009

**Author(s):** Camargo R[1]; Candido M[1]; Mendes Colmenero J[1]; Hoppe L[1]; De Toledo Leme V[1]; Aguiar Sarmento G[1]; Pereira de Oliveira J[1]; Perioli C[1]; Zeri Nunes S[1]; De Souza J[1]

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**Abstract:** The sexual violence is present in all the civilizations of the contemporary world, being noted by bigger frequency in the feminine population, followed by the childish population. India is the country that leads this type of crime against the human person. It is a fact that in this kind of aggression is not uncommon the omission of the violence for part of that what suffer it, very often caused by the fear imposed by the aggressor, other times for shame of the members of the society in which they coexist. This data presents the Analysis of the types of sexual violence when they were detected through sexual examination when Bem-Me-Quer located in the city of São Paulo, which takes the service as a characteristic aim to the feminine population and to children was carried out in the Unity of the Legal Medicine Institute. The historical analysis of the sexual examinations was carried out in the city of São Paulo in the period from 2001 to 2009, composed by all the victims of the feminine sex, of all the age and childish groups of the masculine sex up to the age of 12 years. In the studied period, 38.567 victims of sexual aggression were examined, being a 46,41% younger than 14 years of age, 42,57% older than 14 years and 11% corresponded to children of the masculine sex. The collection of biological material for the realization of examinations corresponded to 67,85 % of the victims, and 18,8 % of then expressed positive result for the inquiry of spermatozoon. The victims of sexual aggression attended in the specialized Centre of the IML of São Paulo (Bem-Me-Quer) in this period, after the expert examination, were attended in the medical service of health and they received preventive treatment for diseases there is classified by infect contagious. For pregnancy unwished in women's fertile phase for procreation, as well as, attendance and psychological treatment.

**Keywords:** Violence; Sexual; Bem-Me-Quer; Feminine; Childish; Human Rights

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# ORAL SESSION

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# THE BRAZILIAN FEDERAL POLICE FORENSIC SCIENCES: AN ONTOLOGICAL AND EPISTEMOLOGICAL APPROACH BASED ON THE TERM PAPER OF THE NATIONAL POLICE ACADEMY, BETWEEN 2006 AND 2010

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**Institution(s):**[1]NATIONAL POLICE ACADEMY/FEDERAL POLICE , BRAZIL

**Introduction:** Until recently in the Brazilian Federal Police, if a Police Servant was to be promoted to the last rank of the career, after ten years of service, he/she had to complete successfully a Degree in Police, which was later refurbished on a Management Policies in Public Security (post graduation studies), where is mandatory to present a monograph on a relevant topic related to the police universe as a term paper. The aim of this study is to analyze themes and keywords of these papers, on the premise that the interest shown in the choice of topics reflects the experience of officers who have an about ten-year career and indicates the theoretical and epistemological framework of Federal Police Forensic Sciences.

**Methods:** In the Library of National Police Academy, we analyzed 85 monographs, produced by 126 Forensic Scientists between 2006 and 2010, according to its subject and keywords. These 126 experts who are now at the top of their career correspond to just over 11% of the Federal Forensic Scientists on active (n = 1066) and about 1% of Federal Police Officers on active duty (n ? 11000). We formulated a knowledge tree of Federal Police Forensic Sciences, following the conceptual model of the Brazilian Agricultural Research Corporation (EMBRAPA). We unified and complemented the topics and keywords of each paper (five per record), based on its title and content. The total number of records of themes and keywords was 510. We analyzed the themes and keywords separately, noting their annual and total frequency and classifying them into different hierarchical levels to define the tree of knowledge.

**Results:** We identified 28 topics of interest to Forensic Scientists, divided into 246 keywords. We observed that only the topics related to Financial Crime, Criminalistics, Drugs, Documentoscopy, Management and Information Technology correspond to relative frequencies of occurrence greater than 5%, totaling 56% of all papers. The most cited keywords were Forensic Sciences (6.8%), Forensics (4.7%), Criminal Forensics (3.5%), Federal Police (2.8%), Public Security (2.1%) Forensic Accounting (1.9%), Documentoscopy (1.6%), Police Management (1.4%), laboratory (1.2%), Money Laundering (1.2%), Environment (1.2 %). Together, these 11 keywords, with at least five citations each, correspond to 28.5% of records, while another 45 keywords (between four and two citations each) match to 26.8% of records. 190 keywords were mentioned only once, match to 44.7% of the records.

**Discussion:** The studies of the Forensic Sciences conceptually designate two strands of knowledge. The ontological means the existence of scientific production, which can be verified by the production of term papers, and shows the ontological commitment (Quine, 1963) to assist in establishing the existence of the entities surveyed. The epistemological side, in terms of Carnap (1969), justifies an overt part of knowledge, i.e. to show that this part is a genuine knowledge. The tree of knowledge displayed denotes these two strands. The knowledge exists (ontology) and is interconnected in an overt network that justified it (epistemology). We observed a highlight to classical themes in the Brazilian Forensic Sciences as Financial Crimes, Drugs and Documentoscopy, likely as a result of the significant amount of professionals working in these areas, since about 23% of forensic team is compound by accountants and economists and other 18% are chemists and pharmaceuticals. On the other hand the interest in newer forensic knowledge areas such as Environmental and Cyber Crimes is growing and now stands out as a result of the recent trend of diversification of academic backgrounds of the new Forensic Scientists.

**Conclusions:** The wide variety of keywords and the low rate of citation of the most of them reflect the extent and scope of the Forensic Sciences, indicating its diversity of subjects. The trend toward diversification is increasing. The concern with issues of managemen

**Keywords:** Information Theory; Tree of Knowledge; Forensic Sciences; Brazilian Federal Police; Term Paper

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# AN ANGLO-BRAZILIAN PARTNERSHIP IN FORENSIC DEATH INVESTIGATION

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**Abstract:** In 2003, an academic collaboration in forensic science and medicine led by the Centro de Medicina Legal, Universidade de Sao Paulo Faculdade de Medicina Ribeirao Preto (CEMEL / USP-FMRP) gained the support of the United Kingdom Foreign and Commonwealth Office Global Opportunities Fund (FCO GOF) to implement a programme of capacity building in forensic science and medicine. This presentation describes the practical organisation of the project, problems encountered and lessons learned, and mutual benefits to the participants, in both Brazil and the UK. The presentation will briefly describe the preceding track record of the collaborating researchers and outline plan. It will then describe the academic and training component of the programme, including establishment of facilities, training, education and implementation. Training focused on forensic human identification and autopsy. Training in forensic anthropology and plastic forensic facial reconstruction was delivered in situ at CEMEL in facilities established with FCO GOF support, using skeletal material held in the CEMEL archives. Training in forensic DNA profiling, computerised forensic facial reconstruction and autopsy were provided in the United Kingdom via novel and existing short courses. Knowledge, training and mentored professional practice was provided to academic forensic scientists, graduate students, technicians and professional forensic pathologists attached to CEMEL, who were able to apply this capacity to accumulated and newly encountered cases. The United Kingdom participants benefited substantially from the partnership. They encountered skeletal material and forensic case scenarios that are rarely encountered in the UK, gaining considerable knowledge and experience as a consequence. The project also facilitated further collaboration in education, via the Brazilian CAPES programme, and an international research partnership in the Projeto Genetica da Face.

**Keywords:** Forensic Science; Forensic Pathology; Forensic Anthropology; Education; Training; Partnership

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# FORENSIC INVESTIGATION IN INDIAN PERSPECTIVE

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**Abstract:** Forensic Science and its usage in the investigation of crimes; in India, has seen a thorough makeover in the past few years. This presentation discusses the changing scenario and new advancements that have taken place over the years, in the field of Forensic Investigation; in the country and presents a few important case studies, of high relevance that will elaborate on the current status and future needs. Tele-Forensics; 3D scanning of Crime Scenes; Usage of Integrated Ballistics Identification System (IBIS - 3D) in case of country made firearms; Suspect Detection Systems; Applications of Nanotechnology in Forensic Investigations, are few such areas; currently being explored. The Gujarat Forensic Sciences University is also one such unique initiative by the Gujarat State - India, which has been established with the idea of fulfilling the necessary lack of man power and foresees the required forensic experts in making.

**Keywords:** Forensic; Investigation; Indian Scenario; New Forensic Advancements

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# POST MORTEM CIRCULATION: AN ESSENTIAL TECHNIQUE FOR THE LIVING?

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**Introduction:** The development of new medical materials, such as aorta valves, needs several animal studies and training on anatomic corpses before it can be permitted to be used for patients. The post mortem circulation technique allows a reperfusion of the vascular system similarly as the one of a living person. This technique is used in forensic medicine for the injection of contrast media into the vascular system in order to perform post mortem computed tomography angiography. For that purpose, specific material for the reperfusion of a human body was developed in the research program of post mortem angiography at the University Center of Legal Medicine in Lausanne. The aim of this study was to demonstrate that a postmortem circulation can imitate in-vivo conditions that allow the testing of essential medical material on a corpse.

**Materials and Methods:** For this purpose, a postmortem circulation has been performed on 4 corpses donated by an anatomical Institute, in order to recreate an environment as close as possible to the living one. A forensic team (forensic pathologists and forensic radiographers) installed a postmortem circulation by cannulating the femoral vessels and perfusion of the body with paraffin oil and a specialized perfusion device (Virtangio®). The clinical team was composed by interventional cardiologists taking part in the development of a new aortic valve. With a mobile fluoroscopy, percutaneous catheterization technique was used to deliver the material at the right place. Once the valve implanted, the heart and primary vessels were extracted by the forensic pathologists in order to control the right position of the implanted valve.

**Results:** Our results show, that the postmortem circulation was very useful, even essential in certain cases, to help clinicians to deliver the material into the correct position and to train their implantation techniques. Due to the intra-vascular circulation, sites with important arteriosclerotic stenosis could be passed which was impossible to do on the same body without the perfusion. Moreover, clinicians were able to test and train the new disposable device with working conditions, almost identical as the one they are used to on their everyday practice.

**Conclusions:** In conclusion, our experiences show that a technique, reserved until now only for post mortem investigations, is useful to test new medical material, essential for livings.

**Keywords:** *Post mortem* Circulation; Forensic Imaging; *Post mortem* Angiography

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# THE EFFECT OF WIND ON BLOW FLY (DIPTERA: CALLIPHORIDAE) OVIPOSITION IN NORTHERN OKLAHOMA AND ITS IMPLICATION TO FORENSIC SCIENCE

**Author(s):** Tholt K[1]; Obrien RC[1]

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**Introduction:** Estimation of a time of deposition for a body in a death investigation involves an understanding of the process of decomposition as well as the environmental factors that may delay or accelerate insect colonization. Previous research has exposed variables which can cause a delay in blow fly oviposition habits such as the physical wrapping of a body, burial depth, and covering a body with insecticide. This research investigated the effect of sustained prevailing wind on blow fly (Diptera: Calliphoridae) oviposition. The significance of this study exemplifies the variability of wind as a factor that may affect colonization of a body by Calliphorids and the estimation of time of deposition determined by authorities.

**Materials and Methods:** Research was conducted at the Selman Living Laboratory in northern Oklahoma during the summer months. Each replicate consisted of two domestic pig (Sus scrofa) carcasses; one was exposed to wind while the other sheltered. Open-bottomed cages surrounded by zoo-grade mesh covered each carcass to eliminate the effect of vertebrate scavengers while allowing the colonization of invertebrates. Observations of blow fly oviposition were documented by manual sight of the researchers. Calliphorid egg rafts were observed and photographed in 15 minute to 1 hour intervals and later counted to estimate a rate of colonization. An invertebrate collection was obtained to identity the species of carrion-feeding Calliphorids. Weather data including temperature, relative humidity, wind speed, and rainfall was recorded using Tiny Tag data loggers at each site. Carcasses were allowed to decompose naturally to either the skeletonization stage of decomposition or mummification. The obtained data was analyzed statistically to determine the true effect of wind. The dominant wind prevalence in northern Oklahoma provided a unique chance to investigate the effect of this variable in a true field experiment as opposed to a laboratory one.

**Results:** Results demonstrated that blow fly colonization was delayed on the carcasses exposed to wind. Statistical analysis showed that the delay in colonization could be caused by steady winds at high speeds and also due to low relative humidity percentages. A majority of the carcasses exposed to wind mummified before reaching the skeletonization stage of decomposition, similar to previou

**Keywords:** Forensic Entomology; Time Since Death; *Calliphoridae*

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# DIFFERENTIAL DECOMPOSITION BETWEEN A PERI-TROGLOZONE AND THE MIXED-GRASS PLAINS OF NORTHERN OKLAHOMA

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**Introduction:** The research in this study investigates the variation in decomposition rates of domestic pig carcasses (Sus scrofa) between a peri-troglozone (cave mouth) and a mixed-grass plains at Selman Living Laboratory in northern Oklahoma. Previous research has shown that decomposition rate is affected by multiple variables. Notable variables affecting decomposition rates are environmental conditions and the necrophagic activity of local scavenging guilds. Studies on decomposition rate and its variables have previously been conducted in multiple locations such as Tennessee, Hawaii, Arizona, and Australia. This study is important in contributing to the previous research on the complex processes and patterns of decomposition rate. Research on decomposition rate and scavengers has yet to be conducted in Oklahoma or in other geographical locations with similar environmental characteristics. Also, there is a deficiency in previous research on decomposition rates and the local scavenging guilds in a peri-troglozone and on a mixed-grass plain.

**Materials and Methods:** The materials for this study included twelve domestic pig carcasses, two metal cages covered in zoo grade metal mesh, still cameras, and TinyTag data loggers. Six of the pig carcasses were placed in the peri-troglozone of several caves, while another six were deposited on the plains and left to decompose until they reached mummification or skeletonization. The controls, one carcass from each microclimate, were placed in metal cages so that decomposition could be observed without the effects of vertebrate scavenging. Visual observations and still cameras were utilized to observe the decomposition of the carcasses while the data loggers collected measurements on the ambient temperature and relative humidity of each microclimate. Visual observations were made 3 times daily for a 3-4 week period or until the carcasses reached 30%-50% skeletonization/ mummification. Still cameras captured an image (triggered by motion) of the scavengers present on the carcasses and the progression of decomposition on the carcasses (photographed every hour). This research was conducted in the peri-troglozone of several caves and on the mixed-grass plains at Selman Living Laboratory in Woodward County, Oklahoma. The scavengers pre

**Results:** The results of this research showed that decomposition occurred at a faster rate in pig carcasses deposited on the plains than carcasses in the cave. The variability in rates was likely due to the different ambient temperatures and the different scavenging guilds found between the two microclimates.

**Keywords:** Taphonomy; Scavenging; Cave Mouth; Oklahoma

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# FORENSIC BOTANY'S CONTRIBUTION IN A MULTIDISCIPLINARY APPROACH TO IDENTIFY HUMAN SKELETAL REMAINS: A CASE REPORT

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**Introduction:** The examination of a fully skeletonized body presents with some specific problems being the main one its identification which is not as straightforward as it usually is in a "fresh" body. Estimation of the post-mortem interval (PMI) and determination of the cause and manner of death can also be quite difficult. Therefore, circumstantial information regarding the location and conditions in which the remains were found is of paramount importance. When skeletal remains are found in a forest area, a forensic botanist is one of the experts that can greatly aid the medical examiner in the resolution of the previously mentioned problems. Our objectives are to demonstrate how the joined efforts of multiple fields of forensic expertise assist in the identification of human skeletal remains, as well as the estimation of the PMI and the determination of the cause and manner of death.

**Case Report:** A set of skeletal remains was found lying beneath a tree, on the ground of a forest area, along with some personal belongings and clothes. One of the tree branches had a tied rope with a slipknot in the opposite extremity. The medical examiner was not called to the scene, being the recovery of the skeletal remains performed by the crime scene investigators. The skeletal remains, belongings and the cut branch were sent to the North Branch of the National Institute of Legal Medicine for examination, as well as some photographs from the scene and data about the missing individuals suspected to have disappeared in that county. The tree branch exhibited an annular constriction where the rope was tied, suggesting the victim hanged himself from that branch. Most of the skeleton was well preserved. Taphonomic alterations indicated the skeletal elements were in contact with dirt and vegetal elements. Partial destruction observed in some bones showed a pattern matching animal scavenging. No anti-mortem or peri-mortem traumatic lesions were found. Biological profile suggested the victim was a male, 35 to 50 year-old. Since more than one individual were suspected to have disappeared in the area, a Forensic Botany exam to date the tree branch annular constriction growth in order to estimate the post-mortem interval (PMI) was requested to the Botany Department, Faculty of Sciences of Porto University. Age determination of the branch annular constriction growth estimated the PMI between 2 and 1.5 years. This PMI was consistent with one of the missing men. Genetic testing was performed on the suspected victim's father and sister confirming its identity.

**Discussion and Conclusions:** Multiple fields of forensic expertise assisted in the identification of the remains, as well as the estimation of the PMI and the determination of the cause and manner of death. Forensic Anthropology provided a biological profile, Forensic Botany provided the PMI, Forensic Pathology excluded other signs of fatal trauma present in the bones and Forensic Genetics established the victim's identity, thus showing that collaboration between different fields of forensic science render the optimal results.

**Keywords:** Human Skeletal Remains; Forensic Botany; Suicide; Hanging

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# THE BEAUTY OF FORENSIC BOTANY IN CRIME SCENE INVESTIGATIONS

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**Abstract:** A charred body was found in a burnt bag casing in a palm oil estate. The body was charred with remaining skeletonised skull, part of an exposed thorax, part of upper and lower limbs and pelvic bones. After the autopsy, a scene investigation was carried out trying to search for clues to help police in estimating the time since the event took place. A Few budding plants were discovered from a large burnt area of dried palm oil leaves, grasses and small plants. Samples of the one type of plant ( Test Sample ) was determined, dated, documented, measured from top to the roots and photographed. A further visit to the scene was carried out 6 days later and the same procedure carried out. These plants were removed at the roots and cultivated at the mortuary compound ( Control Sample ). Daily observations were carried out and their height was documented every 2 days till day 6. It was estimated that, the event could have had happened from 4 to 6 days before discovery of the body. The findings were corroborated with other methods - Entomology ( at least 4 days ) and an account from the palm estate worker who last visited the area 7 days prior to discovery.

**Keywords:** Forensic Sciences; Botany; Crime Scene Investigations

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# THE FRENCH HEALTH POLICY

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**Abstract:** France and health system relies on multiple actors such as health insurance (compulsory complementary), more than 300 000 professionals including general practitioners, pharmacists and laboratories; 4 000 hospitals representing more than a million of employees. In 2000, the World health Organization considered the French health system as the best worldwide. Still, major gaps remain in terms of access due to social and geographical disparities. With a deficit exceeding Euros 11bn, health expenditures grow faster than national wealth. In 2004, the French Government announced a national healthcare information technology (IT) program, composed of: the Sésam Vitale Smartcard and Frances Electronic Health Record (EHR) - the 'Dossier Medical Personnel' (DMP). France is one of the forerunners in the European Union designing a legal framework adapted to the use of eHealth with Denmark, England, Estonia, Finland, Norway, Scotland, Slovak Republic and Sweden. This paper gives an overview of the French e-Health Policy till March 2011 concerning the governance of eHealth (1), the deployment of eHealth applications (2) and of the infrastructures (3).

**Keywords:** Law; Governance; France; Telemedicine; E-Health; European Union

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# MUERTE ASOCIADA A COCAÍNA LÍQUIDA (NUEVO MODUS OPERANDI EN EL TRAFICO DE DROGAS ILEGALES): REPORTE DE CASO

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**Case Report:** El caso corresponde a un hombre de 23 años de edad, nacionalidad venezolana, oficio desconocido, cuyo cuerpo sin vida fue hallado en horas de la mañana del día 18 de septiembre de 2009 en una habitación del Hotel Delfines en la ciudad de Bogotá. De acuerdo a la información recibida el hombre estaba hospedado solo desde ocho días antes del deceso pero recibía visitas, lo describen como enfermo "ansioso, se mordía los labios"; el día del hallazgo los huéspedes del hotel reportaron una inundación en el cuarto del hombre y como no respondía al llamado entraron a la habitación y lo encontraron desnudo y sin signos vitales. En la escena encontraron un frasco de antiácido, el empaque de un enema y tabletas de laxante.

PRINCIPALES HALLAZGOS DE NECROPSIA:

- Presencia de elementos extraños en tracto gastro-intestinal (cuarenta y cuatro (44) cápsulas de plástico transparente que contienen un líquido oleoso transparente en estomago y una en colon, cuatro de estas presentan evidencia de ruptura).
- Trauma de tipo contundente que no explica el deceso en cabeza y extremidades
- Adherencias peritoneales por apendicetomía previa
- Signos de hipoxia tisular
- Condilomas anales
- Presencia de cocaína y benzoilecgonina en sangre, orina y contenido gástrico.
- Serologia positiva para virus de inmunodeficiencia humana

Los hallazgos de la necropsia permiten establecer que el hombre muere por una intoxicación con cocaína en el contexto de tráfico ilegal de esta sustancia: "mula", "bolero", "body packer". CAUSA DE MUERTE: Intoxicación con cocaína MANERA DE MUERTE: Accidental

**Keywords:** Cocaína; Mula; Bolero; Body Packer

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# CONCENTRACIÓN DE OPIÁCEOS EN SALIVA DE CONDUCTORES: CORRELACIÓN CON ALTERACIONES FÍSICAS EN LA POBLACIÓN ESTUDIADA

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**Introduction:** En la conducción de vehículos a motor la detección de drogas de abuso tiene interés para valorar posibles alteraciones en los sujetos y su repercusión en distintos procedimientos legales. La saliva es una matriz utilizada actualmente por ser una muestra no invasiva y donde se pueden analizar drogas o medicamentos. La presencia de drogas en saliva es un indicador de su existencia en sangre. Objetivos del estudio: confirmar y cuantificar la presencia de opiáceos en saliva de conductores sospechosos de conducir bajo la influencia de las drogas y relacionar los datos con los signos físicos detectados en los sujetos.

**Materials:** 115 muetras de saliva procedentes de conductores, que fueron intervenidos en controles policiales por sospecha de conducir bajo los efectos de las drogas.

**Methods:** Aplicación de un test de screening previo de inmunoensayo (Cozart). Límites de detección de opiáceos (6-MAM): 50 ng/ml. En los casos de resultados positivos al test obtención de una muestra adicional de saliva y envío al laboratorio del Instituto de Medicina Legal de Cataluña. Confirmación de resultados por CG-EM. Límites de detección de 6-MAM: 5ng/ml. Límites de cuantificación 20ng/ml. Aplicación de un cuestionario a los conductores con los ítems: estado de las pupilas, coordinación motora, marcha, estado de ánimo y lenguaje. Se compararon los resultados cuantitativos de 6-MAM, categorizados en grupos, con las variables cualitativas, signos físicos, mediante pruebas de c2.

**Results:** La concentración media de 6-MAM fue 4,21 mg  Mediana 0,30 mg (DE 11,33) Rango 77,17 (max 77,17 min 0,01). No se hallaron diferencias significativas entre la concentración y los signos físicos apreciados en los sujetos.

**Conclusions:** El estudio aporta datos a la literatura especializa ya que no existen muchos trabajos sobre concentración de opiáceos en saliva. Otra conclusión es que no se hallaron alteraciones importantes en la conducción relacionadas con el consumo de opiáceos en la

**Keywords:** Medicina Forense; Toxicologia; Drogas de Abuso; Seguridad Vial;  Opiáceos

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# EVALUACIÓN ANALÍTICA DE UN KIT DE DETECCIÓN DE DROGAS DE ABUSO EN SALIVA DE CONDUCTORES

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**Introduction:** En la actualidad la detección de drogas de abuso es una práctica frecuente en el ámbito legal por su repercusión en distintos procedimientos y muchos paises se han preocupado de los efectos que las drogas de abuso producen en la conducción de vehículos. La saliva es una matriz no invasiva que ha adquirido interés para análisis de drogas y los kits de detección de drogas en saliva que existen en el mercado han sido evaluados en diferentes proyectos internacionales, con resultados variables en relación con su eficacia. Objetivos: evaluación del test CozartDDS , diseñado para la detección de drogas en saliva basado en técnicas de inmunoensayo. El kit detecta las drogas: cocaína, hachis, anfetaminas, metanfetaminas y opiáceos.

**Materials and Methods:** 2180 muestras de saliva procedentes de las actuaciones de las policias locales en Cataluña y que se remitieron al Instituto de Medicina Legal en Barcelona. Las muestras se tomaron en horarios y lugares previamente determinados. Los datos se refieren solamente a los casos en que se haya obtenido un resultado positivo en el test, al menos para una sustancia. Los resultados del test se confirmaron por CG-EM. Se calculó la sensibilidad (S), especificidad (E), los valores predictivos positivos y negativos (VPP VPN) y los coeficientes de probabilidad positivos y negativos (CP+, CP-). Los cálculos se basaron en la clasificación de los resultados como VP VN FP FN.

**Results:** La sensibilidad, especificidad, valores predictivos positivos y negativos, coeficientes de probabilidad positivos y negativos para el cannabis fue de 87% , 86%, 94%, 73%, 6,15 y 0,16 respectivamente. Los mismos parámetros para la cocaína fueron 92%, 90%, 95%, 85%, 9,44 y 0,09 respectivamente. La concordancia total para el cannabis fue del 86% y para la cocaína del 91%.

**Conclusions:** Los resultados indican que el test es eficaz para la detección inicial de drogas de abuso en saliva en relación con la cocaína y el cannabis, comparativamente con otras pruebas similares. Se consideró que la baja prevalencia de opiáceos, anfetaminas y metanfetaminas en la muestra podía introducir sesgos en los parámetros evaluados, por lo que no se hallaron estos valores como en el caso del cannabis y la cocaína. CozartDDS es eficaz como prueba de screening en la detección de drogas de abuso en conductores bajo la influencia de las drogas, aunque los resultados deben de ser confirmados por técnicas especficas y exactas para su validez en los procedimientos legales.

**Keywords:** Saliva; Conducción Bajo la Influencia de Drogas; Cozart; Drogas de Abuso; Seguridad Vial

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# APLICABILIDAD DE LA CIF Y DE LAS GUIAS DE EVALUACION DEL DAÑO PERMAMENTE DE LA AMA, MEDIANTE SISTEMA DE INFORMACION, EN EL CAMPO CLINICO MEDICO LEGAL

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**Introduction:** Utilizando la herramienta propuesta por OMS denominada "Clasificación del Funcionamiento, la Discapacidad y de la Salud" (CIF) y estandarización propuesta en la Sexta Edición de la Guía para la Evaluación del Daño Permanente de la Asociación Médica Americana ( Guides to the Evaluation of Permanent Impairment) es posible realizar valoración médica del daño corporal en forma objetiva y equitativa, considerando criterios uniformes apropiados para la adecuada administración de justicia; La evaluación del daño físico, psíquico y social producido por actos violentos, tiene relevante utilidad en Medicina Legal, considerando que la definición de salud rebasa la esfera física y la propone como el bienestar físico, psíquico y social del individuo, englobando al individuo en interacción con su entorno. La Valoración Corporal clásica define la patología traumática o la secuela de la misma, es decir la deficiencia observada en el individuo sin considerar la discapacidad resultante; la herramienta propuesta evalúa la función alterada, la estructura dañada y las limitaciones en las actividades y restricciones en la participación (social) como consecuencia de la patología traumática que se adecua mucho mejor al objetivo de la valoración del daño para la administración de justicia. Los objectivos son proponer una base de datos para sistematizar la información obtenida en la aplicación del CIF y de la guía para la valoración del daño permanente de la AMA en la valoración del daño corporal; concluir con informe de la evaluación del daño integral especificando las alteraciones objetivas de las funciones corporales, de las estructuras corporales, de las limitaciones en las actividades y restricciones en la participación, de acuerdo a los calificadores propuestos en la herramienta internacional, con la finalidad de apoyar a la Justicia.

**Materials and Methods:** Revisión de la sexta edición de la guía AMA con la finalidad de definir, en forma objetiva, los grados de las alteraciones funcionales y anatómicas, de acuerdo a la calificación propuesta en la CIF y también de las limitaciones y restricciones como consecuencia de la alteración anatómica y funcional. Para realizar el manejo de la información obtenida en la investigación utilizaremos los siguientes paquetes estadísticos como el SPSS versión 17 y el Minitab versión 15, adicionalmente también trabajaremos con la hoja de calculo Excel 2007 los cuales ayudaran a procesar la información. Se utiliza para el ingreso de datos el programa Estadístico - Epidemiológico Epi Info el cual nos servirá como base de datos, permitiéndonos trabajar con el software estadístico desde el mismo sistema.

**Discussion:** Considerando que La Valoración de Daño Corporal es una actividad médica que tiene por objetivo evaluar e informar de las lesiones, secuelas, menoscabos, perjuicios, dolores, molestias, incapacidades, invalideces que pueda tener una determinada persona, derivado de un acto violento como de enfermedades producidas tanto por agentes exógenos como endógenos, con objeto de que se pueda producir una reparación jurídica adecuada y que aplicando la CIF y la metodología propuesta en la 6ª Edición de la Guía para la valoración del daño permanente de la AMA, es posible tener el panorama completo de la correlación de las consecuencias causadas por la lesión, en la función del órgano afectado, en la modificación de la estructura así como las limitaciones y restricciones resultantes de esta alteración anátomo fisiológica y de la repercusión pisco-social correspondiente, para el mejor entendimiento de quienes administran justicia y en búsqueda del resarcimiento justo y equitativo.

**Conclusions:** Lo inconveniente en la utilización de la CIF son los estándares no cuantificados que utiliza, situación resuelta prolijamente en la sexta edición de la Guía de evaluación del Daño Permanente. El procesamiento de los datos recogidos y sistematizados está orientado a realizar un seguimiento informatizado de la evolución del daño producido por el acto violento.

**Keywords:** CIF (Clasificación Internacional de Funcionamiento); Discapacidad Y Salud

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# APORTE DE LAS CIENCIAS FORENSES EN LA IDENTIFICACIÓN DE PERSONAS VICTIMAS DE DESAPARICIÓN FORZADA EN COLOMBIA

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**Abstract:** El fenómeno de la desaparición forzada en Colombia ha estado íntimamente ligado a la dinámica política, social y económica del país. En la década de los sesenta se presentaron los primeros casos de desaparición forzada, cuando miembros de seguridad del Estado, grupos guerrilleros y de autodefensa ilegales, implementaron prácticas de detención clandestina, donde las personas después de un tiempo no se encontraban detenidas, ni secuestradas, y generalmente luego de ser torturadas, eran ejecutadas e inhumadas clandestinamente. Para enfrentar este flagelo el estado Colombiano creó el Centro Único Virtual de Identificación al cual pertenecen las instituciones encargadas de la Búsqueda de personas desaparecidas e identificación de cadáveres y cuyo mecanismo de abordaje consiste en: - La recolección y uso de información investigativa en casos de desaparición forzada, utilizando las herramientas para la recolección e intercambio de información a nivel intra e inter-institucional, los lineamientos de la investigación criminal y los métodos investigativos las metodologías de entrevista investigativa, formulación de hipótesis, criterios de evaluación de información, credibilidad y exactitud. - Cuando en la fase investigativa se ha obtenido información confiable sobre un posible sitio de disposición ilegal del cuerpo de una persona desaparecida, el objetivo a seguir es descartar o confirmar la presencia de alteraciones en el suelo o determinar que hubo un entierro en el lugar, la verificación de la presencia del cadáver en dicho sitio (labor de prospección) y su posterior recuperación (labor de exhumación) con el fin de identificarlo fehacientemente y entregarlo a los familiares. - La necropsia médico legal de cadáveres y el análisis forense de las evidencias recuperadas contribuye a la administración de justicia, aportando información sobre la causa, el mecanismo y la manera de muerte, así como sobre las circunstancias alrededor de la misma, tiempo de muerte, establecer la identificación de la víctima ayudando a la determinación de responsables o perpetradores. - La identificación de cadáveres en el contexto forense se lleva a cabo mediante el proceso de comparar datos y registros conocidos de la persona desaparecida con la información obtenida de un cadáver durante la inspección al lugar de los hechos, la necropsia médico legal y demás análisis forense. - La entrega de los restos de personas desaparecidas a sus familiares constituye un acto de justicia y reparación en sí mismo, como lo expresa la Corte Interamericana de Derechos Humanos. Este trabajo pretende mostrar al mundo y en especial a la academia forense el proceso de búsqueda de personas desaparecidas e identificación de cadáveres en Colombia (métodos de identificación forense), los avances, resultados de hallazgos, identificación y entrega de cuerpos a los familiares, como medida de reparación y aporte a la justicia. Según información del Sistema de Información Red de Desaparecidos y Cadáveres (SIRDEC) administrado por el Instituto Nacional de Medicina Legal y Ciencias Forenses, en Colombia se encuentran reportadas como desaparecidas a la fecha 50.000 personas. Según la información de la Unidad de Fiscalías para la Justicia y Paz se ha encontrado 3.282 fosas, de las cuales se han exhumado 4.034 cadáveres, se encuentran con posible identidad 848, 1.600 cadáveres identificados y 1.450 cadáveres entregados. De igual manera se han tomado 17.000 muestras biológicas de referencia de familiares de personas desaparecidas para identificación de cadáveres por genética forense.

**Keywords:** Desaparecidos; Investigación; Cadaveres; Identificación

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# CASUÍSTICA FORENSE EN COLOMBIA

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**Abstract:** Los medios cogniscitivos son importantes para esclarecer conductas punibles, ninguno de ellos es tarifario, sin embargo es indiscutible que la ciencia y la técnica como prueba pericial se destaca frente a los demás medios probatorios por la utilización de conocimiento y técnica científica. La casuística permite ver con claridad cómo el fallecimiento de 7 personas que aparentemente la causa de la muerte era la misma, la prueba pericial logró demostrar que una de ellas había muerto antes de que le dispararan proyectiles por arma de fuego. En este caso podría haber variación en la responsabilidad penal.

**Keywords:** Prueba Pericial; Necropsia Médico-legal; Violación de Derechos Humanos

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# MORT SUBITE PAR DISTENSION GASTRIQUE: À PROPOS D'UNE OBSERVATION AUTOPSIQUE

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**Abstract:** La mort subite par distension gastrique est rare. Elle peut survenir dans plusieurs situations et sa pathogénie reste peu connue. Nous rapportons, une observation autopsique d'une femme, jeune, obèse, sans antécédents pathologiques connus qui décède subitement à son domicile. L'autopsie médico-légale avait révélé un syndrome asphyxique marqué et une distension abdominale majeure qui était en rapport avec une dilatation importante isolée de l'estomac. Celle-ci refoulait le reste du tube digestif, le diaphragme et les poumons. L'analyse toxicologique s'est révélée négative et l'examen anatomopathologique des différents organes n'a pas trouvé de lésions organiques notables pouvant expliqué le décès en dehors d'un amincissement sans rupture ou nécrose de la paroi gastrique. Nous discutons les mécanismes pathogéniques pouvant entrainer une distension gastrique et la mort subite.

**Keywords:** Médecine Légale; Mort Subite; Asphyxie; Distension Gastrique

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# ASPHYXIE POSITIONNELLE ACCIDENTELLE D'UN NOURRISSON DE 7 MOIS

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**Abstract:** Nous rapportons le cas d'un nourrisson de 7 mois, retrouvé en arrêt cardiorespiratoire dans sa poussette en décubitus ventral complètement suspendu au niveau des membres supérieurs par la ceinture de l'entrejambe. L'examen externe et l'autopsie du cadavre n'ont pas trouvé de lésions traumatiques et n'ont montré que des signes d'asphyxie non spécifique. L'expertise toxicologique était négative. L'examen anatomopathologique des différents organes n'a révélé qu'un œdème pulmonaire et une congestion poly-viscérale. A la reconstitution des faits, le nourrisson non retenu par le protège pied, se serait glisser de la poussette en prenant une position de décubitus ventral et se serait coincé et resté complètement suspendu au niveau des membres supérieurs par la ceinture de l'entrejambe. Devant les constatations autopsiques et la reconstitution, le diagnostic d'un décès par asphyxie positionnelle a été retenu.

**Keywords:** Médecine Légale; Asphyxie Positionnelle; Enfant; Poussette

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# LE SUICIDE EN MILIEU HOSPITALIER, À PROPOS DE 4 OBSERVATIONS AU C.H.U. DE BATNA

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**Abstract:** Le milieu hospitalier constitue un lieu de soins et de prise en charge. Malgré cette notion, le milieu hospitalier de Batna a vu le passage à l'acte suicidaire de malades hospitalisés. Nous rapportons dans cette communication 04 observations de suicide en milieu hospitalier par des malades ayant pris connaissance du diagnostic de leur pathologie. La constatation de suicide en milieu hospitalier nous interpelle à créer des unités de psychologie réparties à travers les différents services qui traitent la pathologie lourde à savoir les cancers. Nous considérons que ce phénomène du suicide en milieu hospitalier est un phénomène de détresse.

**Keywords:** Suicide; Cancers; Autopsie

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# ADDICTION ET MORTS CRIMINELLES

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**Institution(s):**[1]CHU BENI MESSOUS

**Abstract:** En Algérie La mort criminelle s'inscrit dans le cadre le plus large de la violence qui est devenu un problème de santé publique la gravite de la situation vient au fait que le passage vers l'acte criminel ne cesse d'intéresser la population la plus jeune surtout dans les grandes villes La toxicomanie et l'alcoolisme ont un rôle déterminant dans le phénomène de la criminalité Nous rapportons à travers une étude rétrospective les cas de morts criminelles recensées sur une période de 10 années au service de médecine légale du CHU Béni Messous. Alger et nous proposons de souligner l'importance de l'addiction dans la genèse du fait criminel

**Keywords:** Morts Criminelles; Alcoolisme; Toxicomanie.

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# LES VIOLENCES A L'EGARD DES PERSONNES AGEES

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**Abstract:** Les violences à l'égard des personnes âgées, est un acte de violence, qui se trouve dans toutes les classes de la société, ont tendance à constituer un phénomène social, dont la prévention et la répression doivent retenir l'attention des autorités aussi bien médico- social que judiciaires. Notre matériel d'étude porte sur la période de 03 années recenser à travers les dossiers de consultation de médecine légale CHU Beni Messous Alger. Notre étude a pour objectif :

- D'établir la fréquence des violences à l'égard des personnes âgées
- Les caractéristiques épidémiologiques de la victime et le profil de l'auteur des faits
- Difficulté de l'examen des victimes de violence
- Délai entre la date des faits et l'intervention du médecin.
- Proposer des recommandations pour la prise en charge de ces victimes
- Que prévoit la législation à l'égard de ces personnes âgées.

**Keywords:** Violences; Personnes Âgées; Législation (Code Pénal Algérien)

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# SYNDROME DE MÜNCHHAUSEN PAR PROCURATION: A PROPOS DE TROIS VICTIMES D'UNE MÊME FRATRIE

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**Abstract:** Le syndrome de Münchhausen par procuration, décrit pour la première fois par Meadow en 1977, est un trouble rare, se situant à la frontière des champs pédiatriques, psychiatriques et légaux. Il s'agit d'une forme particulière de maltraitance à l'égard de l'enfant qui se caractérise par un désordre apparenté dans lequel les parents, le plus souvent la mère, fabrique des symptômes à leur enfant ce qui fait subir à ce dernier une série de tests médicaux et d'interventions inutiles. Nous présentons trois observations survenues au sein d'une même fratrie de façon successive et dont l'issue était fatale pour deux enfants. Observation n° 1 : Enfant S. 9 ans, a été admise en pédiatrie, à 8 reprises en 10 mois, pour des crises convulsives. Le bilan médical était sans particularités. Elle est morte d'un syndrome de détresse respiratoire aiguë compliquant une pneumopathie d'inhalation. Observation n° 2 : Enfant M. 3 ans, était admis en pédiatrie, 10 jours après le décès de sa sœur, pour des convulsions. Le séjour hospitalier a duré 3 mois avec succession de périodes de prise en charge en unités de réanimation et de petits enfants. Le bilan médical était normal. Il est décédé d'une inhalation pulmonaire. Observation n° 3 : Enfant H. 11ans, a été admis en pédiatrie, 8 jours après le décès de son frère, pour des convulsions. Il a été pris en charge en réanimation où l'évolution était favorable et le bilan toxicologique avait retrouvé un raticide dans les urines (Chloralose). Le même produit a été découvert dans un jus que la mère avait préparé pour son fils. Nous développons les particularités des tableaux cliniques, les difficultés diagnostiques et le profil de la mère qui a été mise en cause pour homicide volontaire.

**Keywords:** Médecine Légale; Maltraitance; Enfants; Syndrome de Münchhausen par Procuration

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# ESTIMATION DE L'ÂGE PAR L'ÉTUDE DE L'EXTRÉMITÉ STERNALE DE LA 4ÈME COTE : ÉLABORATION D'UN SCORE PROPRE À LA POPULATION TUNISIENNE DE SEXE MASCULIN

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**Introduction:** La méthode d'Isçan basée sur l'examen de l'extrémité sternale de la 4ème côte constitue une des méthodes de référence pour l'estimation de l'âge. Son application sur la population tunisienne nécessite une adaptation préalable afin d'y apporter les facteurs de correction nécessaires. Nous nous sommes proposés d'établir un score tunisien pour l'estimation de l'âge par l'examen de l'extrémité sternale de la 4ème côte partant d'un échantillon de sujets de sexe masculin du centre tunisien et d'étudier la corrélation entre le score proposé pour chaque côte et l'âge réel des individus afin de définir pour chaque tranche d'âge un score qui lui est convenablement adapté.

**Materials and Methods:** Notre étude est prospective et a porté sur l'examen de l'extrémité sternale de la 4ème côte de 108 individus de sexe masculin et de nationalité tunisienne âgés entre 18 et 83 ans ayant fait l'objet d'une autopsie au Service de Médecine Légale de l'Hôpital Universitaire Fattouma Bourguiba de Monastir. Nous avons établi un score composé de quatre critères. Le score total est la somme des quatre valeurs données pour chaque critère. L'examen des côtes est fait par deux observateurs en double aveugle. Chaque observateur attribue une valeur pour chaque critère constitutif du score. Le score total varie entre 4 et 27. Nous avons étudié la corrélation de chaque critère ainsi que du score total avec l'âge pour chaque observateur. Nous avons aussi vérifié la reproductibilité (inter-observateurs) et la répétabilité (intra-observateur) du score.

**Results:** L'étude de la corrélation entre chaque élément constitutif du score, le score total et l'âge réel montre qu'il existe globalement une bonne corrélation pour les deux observateurs (0.742-0.781 pour le score total). Le caractère prédictif et discriminatif du score n'est constaté que pour les âges inférieurs à 37 ans pour l'observateur 1 et pour les âges inférieurs à 39 ans pour l'observateur 2. Il existe une excellente reproductibilité entre les deux observateurs (coefficient de corrélation à 0.982) ainsi qu'une bonne répétabilité (?1 0.87/ ?2 0.89). Nous avons appliqué un nouveau classement des tranches d'âges qu'on a corrélé avec le score. Les résultats montrent une très bonne sensibilité (0.078-0.83), une excellente spécificité (0.81-0.98) et des valeurs prédictives positive et négative se rapprochant de 1 pour les trois catégories (un âge<30 ans pour un score = 12, un âge entre 30 - 39 ans pour un score qui varie entre 13 et 18 et un âge > 39 ans pour un score > 18).

**Conclusions:** Le score que nous avons établi ne peut être utilisé que pour classer les âges en trois catégories : < 30ans, 30-39 ans et > 39 ans. Les résultats ne sont applicables que pour les âges inférieurs à 39 ans. Ces résultats sont aussi les mêmes pour la méthode d'Isçan appliquée à notre d'étude. Nous recommandons ainsi d'utiliser d'autres méthodes d'estimation de l'âge à partir de 40 ans.

**Keywords:** Médecine Légale; Anthropologie; Âge; Quatrième Côte; Identification; Score

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# LA FAUTE MÉDICALE CARACTÉRISÉE DANS LE CHAMP DU DIAGNOSTIC ANTENATAL

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**Introduction:** La loi du 4 mars 2002 encadre les préjudices résultant de la naissance d'un enfant handicapé. Dans ce cadre, la réparation de l'impréparation psychologique des parents s'établit sur la notion de la faute caractérisée

**Materials and Methods:** Cette recherche effectuée à l'aide de termes-clés (faute caractérisée, diagnostic anténatal) dans une base publique référencée de décisions judiciaires a voulu déterminer les critères de la faute caractérisée en étudiant les 15 décisions judiciaires publiées. Comment les juges déterminent ce qu'est une faute caractérisée dans le domaine du diagnostic anténatal?

**Results:** Cette recherche a surtout retenu ce qui n'est pas une faute caractérisée. En effet, des pratiques jugées conformes aux données acquises de la science dans la surveillance de la grossesse ne caractérisent pas une faute, même si les investigations n'ont pas diagnostiqué les malformations fœtales. Seuls quatre décisions judiciaires ont retenu la faute médicale caractérisée sur les critères de négligence accompagnée pour certains juges du caractère hâtif notamment pour l'échographie. Les investigations complémentaires sont alors effectuées rapidement et avec légèreté. Deux décisions stipulent que l'inversion des résultats et l'absence d'information sur le caractère inhabituel de la marge d'erreur de la culture cellulaire sont des fautes caractérisées. Ces fautes médicales permettent ainsi de reconnaitre le préjudice de l'impréparation à l'accueil un enfant handicapé.

**Keywords:** Responsabilité Médicale; Diagnostic Anténatal; Faute Caractérisée; Jurisprudence

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# REFLEXIONS MEDICO-LEGALES SUR LELONGATION OBSTETRICALE DU PLEXUS BRACHIAL

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**Abstract:** Llongation du plexus brachial dans les suites dun accouchement engage assez souvent la responsabilit du mdecin gyncologue. Plusieurs questions mritent alors dtre poses. Comment retenir la responsabilit du mdecin? Sur quels critres se basent les mdecins experts? Y-a-t-il de nouveaux critres? Est-ce tout simplement un accident imprvisible de laccouchement comme ne cesse de le dire les gyncologues obsttriciens? Nous tenterons dapporter quelques modestes rflexions sur pineux problme.

**Keywords:** Accouchement; Dystocie des Paules; Longation; Plexus Brachial; Paralysie

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# ASSISTANCE MORTELLE : À PROPOS D'UN CAS

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**Abstract:** Lors de notre exercice nécropsique au service de médecine légale du chu de Bab-El-Oued, nous avons été frappés par l'aspect atypique et rare d'une asphyxie mécanique à type de strangulation au lien. Cette observation posait un problème de diagnostic de la forme médico-légale: s'agit-il d'un homicide ou d'un accident? Les auteurs de ce travail ont tenu à rapporter les étapes diagnostiques de cette observation pour répondre à la question posée.

**Keywords:** Assistance Mortelle

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# ORAL SESSION

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# LAS EXCEPCIONES A LA OBTENCIÓN DEL CONSENTIMIENTO INFORMADO EN ESPAÑA: LA ASISTENCIA URGENTE

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**Abstract:** Exponemos las normas españolas sobre el derecho del paciente a ser informado y a dar su consentimiento previo a cualquier intervención asistencial, así como las excepciones a las mismas. (CE, Ley 14/1986 General de Sanidad, Ley 41/2002 de autonomía del paciente, derechos y obligaciones en materia de información y documentación clínica, Convenio del Bioética del Consejo de Europa). Consideramos, particularmente, la excepción a solicitar consentimiento informado de la situación de urgencia. Ante el "deber de curar" del médico que aplica en las situaciones de urgencia, atendiendo a la ciencia y a su conciencia ¿Cómo ponderar la realidad de la urgencia, para que ésta se coloque sobre el derecho fundamental del paciente a recibir información y elegir y autorizar el tratamiento? Los calificativos clásicos en nuestra normativa recogen: c) Cuando la urgencia no permita demoras por poderse ocasionar lesiones irreversibles o existir peligro de fallecimiento… (Ley 14/1986). Cuando existe riesgo inmediato grave para la integridad física o psíquica del enfermo y no es posible conseguir su autorización, consultando, cuando las circunstancias lo permitan, a sus familiares o a las personas vinculadas de hecho a él (Ley 41/2002). … situación de urgencia… podrá procederse inmediatamente a cualquier intervención indispensable…(Convenio de Bioética del Consejo de Europa). En la práctica, recae sobre el médico la responsabilidad de valorar la necesidad de la actuación, la gravedad de la situación y la rapidez en actuación, circunstancias que están en el núcleo del caso que discutimos en esta comunicación. La Sentencia del Tribunal Constitucional STC 037/2001, ha anulado las Sentencias de Primera Instancia y de la Audiencia Provincial, que exoneraban de responsabilidad a los médicos que realizaron, sin consentimiento informado, un cateterismo para colocar un stent coronario, produciendo secuelas sensitivo-motoras en el brazo. En estas sentencias se aludía a la "urgencia relativa" y al "riesgo vital" para justificar la ausencia de consentimiento informado. El TC considera que para actuar sin consentimiento informado la urgencia debe ser inmediata y grave, recogiendo lo que dice la propia ley 41/2002 y que considera no aplicaron los tribunales que actuaron en los procesos anteriores. Valora contrario a la inmediatez el plazo de 20 horas transcurrido desde el ingreso del paciente en urgencias con dolor coronario, hasta que se hace el cateterismo, que soluciona el problema coronario, pero deja secuelas por las que se reclama indemnización. Esta Sentencia: - Reconoce que actuar sobre un paciente, sin su consentimiento puede vulnerar su derecho a la integridad física, derecho que merece la tutela judicial - Critica los argumentos del Juzgado de Primera Instancia y de la Audiencia Provincial, en cuyas Sentencias se exoneró de responsabilidad a los médicos, aunque consideraron probado que no se informó al paciente y que no se obtuvo su consentimiento. - Considera que el razonamiento de la primera Sentencia de que el paciente unos años antes había sido sometido a un cateterismo (vía femoral, incluso de más riesgo que la radial) y no le era desconocido este acto médico, es "irrazonable". - Esta Sentencia, del Tribunal Constitucional, analiza la situación del paciente para llegar a la conclusión de que el tribunal de Primera Instancia que lo Juzgó apreció "urgencia relativa", para exonerar de culpa a los profesionales; sin embargo, el Tribunal Constitucional dice que precisamente esa expresión es contraria a la urgencia inmediata y grave que debe existir para poder prescindir del consentimiento. Al referirse a la Sentencia de la Audiencia Provincial, que recogía la existencia de "riesgo vital", indica que en ningún caso analizan y justifican que este existiera, solo lo mencionan. Resulta definitivo para que el Tribunal Constitucional no aprecie la existencia de urgencia inmediata y grave el hecho de que el paci

**Keywords:** Medical Responsability; Consentimento

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# ASPECTOS ÉTICOS Y LEGALES DE LAS VOLUNTADES ANTICIPADAS

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**Abstract:** Presentamos determinados aspectos en relación a un documento de sumo interés tanto clínico, ético como legal que conlleva. Fundamentado en el propio Convenio para la Protección de los Derechos Humanos y la Dignidad del ser humano con respecto a las aplicaciones de la Biología y la Medicina, Convenio sobre los Derechos Humanos y la Biomedicina, marcó un antes y un después fundamental respecto a determinadas cuestiones y entre ellas al reconocimiento, en la legislación española, de la autonomía de los pacientes para tomar decisiones clínicas. A esta normativa comenzaron a añadirse de forma sucesiva legislaciones autonómicas hasta llegar a completar el mapa estatal. Por su parte, la Ley 41/2002 de 14 de noviembre, básica reguladora de la autonomía del paciente y de derechos y obligaciones en materia de información y documentación clínica incluyó en su articulado las "instrucciones previas", estableciendo las normas mínimas que han de regular el hasta entonces denominado 'testamento vital' pasándose a denominar "Instrucciones Previas ". Pero centrándonos en el objeto de nuestra exposición y volviendo a España, el principal fundamento jurídico que otorga solidez a la autonomía del paciente es la ley 14/1986 de 25 de abril, General de Sanidad y aunque reconocía el derecho a la autonomía, al consentimiento previo y al consentimiento por representación, no reconocía específicamente el derecho a las instrucciones previas. Fue el Consejo de Europa el que aprobó el "Convenio para la Protección de los derechos Humanos y la Medicina" firmado como todos sabemos en Oviedo el día 4 de abril de 1997. En éste texto y concretamente en el capítulo II, dedicado al "Consentimiento" se recoge por primera vez en texto legal el concepto de Instrucciones Previas. A partir de esa norma y al amparo de la Constitución Española, las diferentes Comunidades Autónomas regularon mediante el correspondiente y específico desarrollo legislativo el referido derecho. Desde el punto de vista deontológico la "Expresión de voluntades anticipadas" no es más que el reflejo de la expresión del consentimiento del paciente y por ello sólo puede ser aplicable a aquellas actuaciones que exigen de por sí el consentimiento de los pacientes capaces. De esta forma, el médico, nunca podrá dar cumplimiento a voluntades que le exijan acciones u omisiones que pudieran ser contrarias a la Ley, ni por supuesto incluir tratamientos que el propio médico considere desde el punto de vista asistencial o clínico inapropiados o perjudiciales. De ahí que desde este punto de vista deontológico sea preciso determinar claramente las posibles conexiones entre voluntades anticipadas y eutanasia; determinar la igualdad de derechos de los pacientes incapaces con respecto a los capaces; promover para el médico, mediante la información, los mejores intereses de sus pacientes haciendo efectivas la interpretación por parte del médico con buen juicio profesional así como el principio de que las voluntades anticipadas no pueden ser contrarias a las convicciones éticas del médico.

**Keywords:** Derecho Médico; Voluntades Antecipadas

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# CARACTERIZACIÓN DEL HOMICIDIO EN CHILE: ESTUDIO DESCRIPTIVO TANATOLÓGICO Y PSICOLÓGICO EN LA PROVINCIA DEL BÍO BÍO ENTRE ENERO DE 2008 Y ABRIL DE 2011

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**Abstract:** Se realizó un estudio descriptivo de las autopsias por homicidios derivadas al Servicio Médico Legal de la provincia de Bío-Bío, abarcando las 14 Comunas de dicha Provincia, entre Enero de 2008 y Abril de 2011. Se analizan los protocolos de Autopsias y se evalúa psicológicamente al agresor, en cinco casos, utilizando el HCR-20. Durante dicho período de tiempo, se realizaron 39 pericias tanatológicas por homicidio, de los cuales el 82% pertenece al sexo masculino, el 100% de los casos el agresor es también masculino. Se detecta que el rango de edad de las víctimas es de 38,8 años, con un porcentaje de heridas recibidas en los siguientes rangos: entre 1 y 4 heridas, se encuentran el 51%, seguido de 30% de víctimas con más de 20 heridas provocadas por el agresor. La causa de muerte con mayor porcentaje corresponde a traumatismo con un 64%, seguido de complicaciones médicas con un 25,6% y 7,8% de asfixia. El arma homicida más usada es el arma blanca con un 48,7%, seguido de arma de fuego con un 35,9%. Las zonas corporales dañadas por el homicidio, son en primer lugar el tórax con un 28,2%, seguido de zonas múltiples con un 23%. El móvil de acción más frecuente, de los casos determinados, corresponde a móvil sentimental con un 23%, seguido de riña con alteración de conciencia con un 18%. Un 35,9% no fue determinado, por falta de información disponible. La relación víctima-victimario en un 38,5% es vincular, en tanto que en un 35,8% no se pudo determinar por falta de información disponible, en un 17,9% existe una relación entre ambos sólo circunstancial. A una muestra de cinco agresores, se le aplica el HCR-20, "Guía para la valoración del riesgo de comportamientos violentos", consistente en los siguientes ítems: Caso N°1: asesinato de una mujer Agresor masculino, 21 años. Víctima mujer, 51 años. Síntesis del relato de los hechos: "Llegué a la cuidad de Mulchén, no recuerdo la fecha y salí con mi cuñado y su polola" (pareja). Reporta que bebieron y que la pareja discutía constantemente, situación que lo tenía muy molesto. Durante la noche, vieron pasar unas personas y las fueron a asaltar. Se puso a conversar con la mujer a la que pensaba asaltar, la que resultó ser conocida y ella lo invita a tener relaciones sexuales, razón por la cual él se enoja. Por lo anterior, discuten y ella le da un golpe con un palo, por lo que lo que él expresa: "me enojé, saqué la cuchilla y tiré un corte, después no me acuerdo de nada". El Informe de Autopsia indica 23 puñaladas. Se declara culpable, luego refiere que recuerda sólo dos puñaladas y que "estoy arrepentido", pero no se observa concordancia afectiva con su relato, mostrándose frío e inexpresivo emocionalmente. En cuanto al cumplimiento de condena, lleva 6 meses privado de libertad. Expresa que está bien en la cárcel, sólo extraña a sus hijos. Caso N°2: joven asesina al amante de su madre Agresor masculino, 20 años. Víctima masculino, 64 años. Síntesis de los hechos: "Yo estaba en mi casa entre las 10:45 horas y las 11 de la noche, estaba viendo tele con mi hermana chica y salí al baño (el baño queda fuera de la casa). Vi al caballero en el portón, cuando me vio se fue hacia la esquina… vi a mi mamá corriendo hacia la esquina, la seguí y no la encontré. Había un portón grande, me asomé y vi dos sombras corriendo, yo me voy para la casa, pero me entró la duda y me devolví y pillé a mi mamá besándose con el hombre y ahí reaccioné mal… no puede ser hacer eso, al frente de la casa. Me dio rabia, corrí hacia la otra esquina, salté la pandereta y di un grito y él se asomó entre dos container y le pegué con un palo, le di dos golpes en la cabeza y en las rodillas. Después empecé a reaccionar y busqué ayuda, llamaron a la ambulancia, a Carabineros. Mi mamá le decía mi amor, mi amor". "Más tarde, detenido, pregunté como tres veces por él. Al otro día me enteré que había muerto. No sé por qué le pegué tan mal (llora). Nunca tuve la intención…

**Keywords:** Homicidios; Chile; HCR-20; Perfirl Psicológico; Agresor

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# DENTAL AGING METHODS AND POPULATION VARIATION: METHODOLOGY FOR INTERNATIONAL APPLICATIONS ON HUMAN REMAINS FROM FORENSIC CONTEXTS

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**Abstract:** In the bioarchaeological and forensic fields, age estimation in adults is a persistent problem. In the forensic context, the methodologies used and the results obtained can be seriously questioned. From this perspective it is very important to show the level of precision and accuracy of these methodologies in order for the evidence to have solidness and scientific quality. During the prosecution process, these methodologies can be a requirement to fulfill the criteria of admissibility of evidence in court. The compilation of international databases (IDB) can be a very useful tool to standardize procedures, even when applied to different population types. The creation of IDB is one of the new theoretical perspectives of forensic anthropology, and it is focused on incorporating information from multiple populations to use them as "universal" models, applicable to any context in the world. This exposure presents a IDB of dental criteria as root transparency height (RTH) and periodontal height (PH) and root height (RH). The IDB contains information about 693 individuals with different phenotypes: Peruvian mestizos (136), Colombian mestizos (78), white Mediterraneans (79), white Americans (200) and African Americans (200). This study evaluated different published procedures and adapted a Bayesian regression equation in order to potentiate the information analyzed. This research also found that the impact of population variation and sexual dimorphism on the estimation of adult dental age using RTH and PH is minimal. These results indicate that the criteria for RTH and PH can be considered as a standard methodology, and that they can be applied in different populations around the world.

**Keywords:** Forensic Science; Forensic Anthropology; Skeletal Age at Death; Adults; Teeth; Root Transparency

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# ESTUDIO DE LAS COMPETENCIAS DEL ÓPTICO OPTOMETRISTA, A PROPÓSITO DEL NUEVO GRADO EN ESPAÑA Y ANÁLISIS INTERNACIONAL CON ESPECIAL REFERENCIA AL ÁMBITO FORENSE

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**Introduction:** Con la implantación del Espacio Europeo de Educación Superior (EEES) surge el Grado en Óptica y Optometría (GOO) en España, equiparándose esta titulación en toda Europa. Este cambio supondrá un aumento de competencias profesionales en los GOO que habrá que integrar con las del Médico Oftalmólogo. Por lo tanto, urge delimitar la responsabilidad profesional de ambos grados, el GOO con el Médico y con el Oftalmólogo. Asimismo, es preciso hacer hincapié en escasa presencia en España de los GOO en el ámbito forense para valorar el daño visual y ocular. Nuestros objetivos fueron: 1) Estudiar las competencias de estos profesionales internacionalmente. 2) Proponer una adecuada división de competencias de los GOO y los Oftalmólogos en España. 3) Valorar las competencias del GOO para la práctica de la valoración del daño visual y ocular en el ámbito forense. 4) Analizar la jurisprudencia internacional más relevante sobre los GOO en el ámbito de la responsabilidad profesional.

**Materials and Methods:** La metodología empleada fue: 1) Documentación disponible en Colegios de Ópticos y Optometristas de otros países. 2) Estudio legislativo de la formación académica de estos profesionales y de sus competencias según la Ley 44/2003 y el plan de estudios del Grado actual. 3) Base de datos Westlaw-Aranzadi Internacional.

**Results:** 1) En numerosos países de Europa, los GOO poseen competencias más amplias que las españolas, aplicando medidas farmacológicas que facilitan el examen visual optométrico e interviniendo quirúrgicamente junto a los Oftalmólogos; en Estados Unidos y Canadá, los profesionales homólogos a los GOO también asumen la terapia médica y quirúrgica; así como en varios países de Sudamérica, como son México y Colombia. Los citados profesionales tienen unas competencias muy dispares, realizando tareas en equipo con el Oftalmólogo tanto en el quirófano como en la consulta de la práctica habitual con pacientes preocupándose ambos de la salud visual. 2) La formación del GOO en España es más amplia en el área del sistema visual en comparación con el grado en Medicina, o el licenciado, si bien los Médicos Oftalmólogos, que cursan tres años de especialidad como médicos internos residentes, poseen una mayor formación en terapia clínica y quirúrgica, con un conocimiento mayor de la fisiología y patología humana. Las competencias oftalmológicas de los GOO al respecto de la salud visual y ocular que proponemos son las relacionadas especialmente con el polo anterior del globo ocular: prevención de las enfermedades oculares y diagnóstico, tratamiento y terapéutica de los pacientes con patologías oculares y visuales (por ejemplo: intervención de cataratas y defectos de refracción). Para ello es necesario que existan distintas especialidades dentro del GOO, con la creación de una residencia de dos años para la formación en práctica clínica y quirúrgica, con especial énfasis en farmacología y anestesia. 3) Es patente la necesidad del los GOO en la práctica diaria forense, en la valoración de daño visual y ocular, y en la actuación como peritos en procesos judiciales que versen sobre la actuación de otros GOO. Consideramos que es el profesional sanitario más adecuado y competente para valorar el daño en agudeza visual y en lesiones tras intervenciones quirúrgicas por catarata y miopía, por citar unos ejemplos. 4) Revisada jurisprudencia española e internacional, se encuentran sentencias en las que los GOO están implicados por responsabilidad profesional e incumplimiento de "lex artis", si bien no se ha encontrado ninguna española.

**Discussion and Conclusions:** En la actualidad los Diplomados Ópticos Optometristas en España tienen unas funciones muy limitadas en el ámbito de la salud visual y ocular, pero desde el año 2011 son Grado y con ello se incrementarán potencialmente sus competencias. Para peritar sobre daño visual y ocular, y responsabilidad profesional de los GOO, se precisa la incorporación de Ópticos Optometristas en el ámbito forense.

**Keywords:** Óptico-Optometrista; Competencias Profesionales; Daño Ocular y Visual; Responsabilidad Profesional

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# PREDOMINANT GENETIC COMPONENT OF HUMAN MISCEGENATION URBAN POPULATION OF PERU: FORENSIC APPROACH

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**Abstract:** Peru has one of the most diverse populations in Latin America. Cultural traditions and genetic lineages are originated from admixture between Native American, European, African, Middle Eastern and Asian descent. However, at present, knowledge of the structure and genetic variability of the Peruvian population is limited. The application of forensic genetics science is challenged due to the poor knowledge of the genetic component predominates in a particular population, especially in the Andean populations were a phenomenon of genetic substructuring have been reported. This study evaluated the genetic component predominates in the admixture of the urban population of Peru through the ancestry study of three databases containing uniparental and biparental markers of Peruvian individuals: 118 maternal markers Profiles (mtDNA), 165 profiles of parental markers (Y-chromosome) and 416 autosomal STR marker profiles. The data indicate more uniparent Native American genetic content in the maternal lineage, and increased foreign genetic content in the paternal lineage. As expected a largest autosomal ancestry content of Native American DNA was found in the sample. These results document that the Native American genetic contribution in urban Peru is close to 75% of the DNA sequences of the total population. This work presents the first findings for understanding the genetic structure of urban settings in Peru and warns special care in the analysis of forensic genetics in this context.

**Keywords:** Peru; Population Genetics; Miscegenation; Andes; Forensic Science

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# CORRELATION BETWEEN CHRONOLOGICAL AGE AND MINERALIZATION OF THIRD MOLAR BY DEMIRJIAN METHOD

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**Introduction:** Forensic Dentistry is a specific area of dentistry which plays a significant role, solving criminal cases or human identification, for example in mass disasters. Identification through dental pieces enables data collection in adverse conditions such as incineration, immersion, mutilation and trauma. Due to its mineralization these are highly resistant structures within human body and were considered the most indestructible pieces. Age estimation is a module of forensic dentistry important for identification processes. Demirjian method is used for this calculation and classifies teeth, in eight stages of development, designated by letters "A"," B", "C", "D"," E", "F", "G" and "H". The aim of this study was to evaluate correlation between chronological age and mineralization of third molar by Demirjian method.

**Materials and Methods:** Panoramic radiographs were analysed from a sample of 104, which ages where between 13 and 21 years old. All panoramic radiographs where from Fernando Pessoa University dental medicine clinic. We assessed whether this was a reliable method.

**Discussion:** We observed that the sample was reliable for this population, and it was noted differences between females and males, with had more satisfactory results.

**Conclusions:** We confirmed that Demirjian method is usefulness for estimate age based on eruption of third molars, as a method for identify alive persons who are undocumented, illegal immigrants or refugees which number is increasing. This technique is a simple and noninvasive method which it's seems to be valid in human identification.

**Keywords:** Demirjian Method; Third Molar; Forensic Dentistry; Forensic Science; Dental Age

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# ORAL SESSION

## Session 16.22

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# THE DISCUSSION ABOUT FORENSIC PATHOLOGY INSPECTING TO SUDDEN DEATH DETAINED

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**Case Report:** It is well known,systematic and comprehensive forensic pathology autopsy is important for finding out the causes of death. And the actual inspection of forensic pathology is often not comprehensive, so that it bring bad effect to searching for the cause of death, cant even find cause of death.The author has inspected to a sudden death who was in jail,and not found abnormalities, not to find causes of death in routine anatomy inspection.by detailed autopsy and pathology inspection, we found a spongiocytoma in the dead mans cervical cord.The tumor was benign, its position was higher, laid in the first to the fourth cervical pulp place, and coat was complete.We can determine the causes of death was that spongiocytoma laid upper cervical cord involved the life central in medulla oblongata and caused sudden death,Contacting toxicology tests results?the case history and the deceased activities state,We dismissed questions of relatives, resolved the contradiction between the families and the judicial authority.About this case, the author thought that we stick to do the following in the traditional post-mortem forensic pathology: autopsy would be closely combining the facts, systematic, materials specifications, and closely combining the result of poisoning inspection?

**Keywords:** Forensic Pathology; Spongiocytoma; Upper Cervical Cord; Sudden Death

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# OBSERVATIONS FROM AN AUDIT OF THE HISTOLOGICAL EXAMINATION OF THE VERTEBRO-BASILAR SYSTEM IN 24 CASES OF TRAUMATIC BASAL SUBARACHNOID HAEMORRHAGE

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**Introduction:** The identification of the nature and site(s) of vascular tearing in cases of traumatic basal subarachnoid haemorrhage(TBSAH) has important medico-legal implications, as does the recognition of significant pre-existing wall disease. The approach taken by pathologists to histological sampling varies greatly and probably explains the relatively high (up to about 30-40%) failure rate in identifying convincing tear sites in the older literature. In order to assess whether the histological methods adopted by our units provides sufficient information concerning the microscopy, we audited the histological reports, material and findings in 24 cases of TBSAH (22males, 2 females : age range 22-63, average 42years).

**Methods:** The autopsy reports were reviewed for key information relevant to the histology. The histology reports and material were audited for extent of artery sampling, use of levels and special stains and the effectiveness in identifying site(s) of genuine vascular damage along the vessels and the recognition of any pre-existing wall disease.

**Results:** All victims were unconcious and in cardiac arrest at the scene of the assault. 12 were confirmed dead within 1 hour, 6 survived up to 24 hours and 6 up to 36 hours on ITU. A short delay between sustaining trauma and collapse was documented in 2 victims. In 22 cases, the entire intracranial VAs and basilar artery were embedded. 16 also included junctional (dural) zone and 18 extracranial VA material (13 with distal segment). Intracranial tearing was identified in 20 victims (6 single site and 8 with separate area(s) of intracranial damage). 8 also had extracranial VA tearing/dissection, almost always in the distal 3-4cm below the dura. In 4 cases a definite tear site was not documented but 2 of these showed focal areas of wall splitting. Both cases with delayed collapse had dissection as the predominant wall pathology. Levels were cut in all instances and serial sectioning proved essential for delineating the vascular damage in 3 deaths. Special stains were universally applied (EVG and Masson Trichrome being most helpful). The vessels were generally described as in good condition. However, 2 cases showed pronounced atherosclerosis and 6 had calcification along the internal elastic lamina, but without significant degenerative changes in the tunica media. Fibrin thrombus was present around 14 tears with early neutrophilic reaction in 9. Smooth muscle nuclear loss was evident close to the tearing in 18 instances.

**Conclusions:** Complete embedding of the intracranial course of the VAs and the basilar artery, with the use of levels and simple connective tissue stains has been shown to identify the site and nature of the tearing in the majority of deaths from TBSAH - but not all the traumatic vascular pathology. Embedding of the distal 4-5 cm of the extracranial VAs from just below the dura is also recommended. This will frequently identify additional tearing and dissection and also allow full assessment of the vessels for pre-existing wall pathology, both findings of potential medico-legal significance.

**Keywords:** Vertebral Artery; Traumatic Basal Subarachnoid Haemorrhage; Histology; Tearing

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# POST-MORTEM CT EXAMINATION REVEALING A FOREIGN BODY IN THE BRONCHIAL TREE - CASE REPORT

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**Introduction:** The purpose of evaluating results of post-mortem CT examination prior to proceeding with conventional forensic autopsy is to address any major problems, including localization of foreign bodies. In general, this refers to metallic objects (eg. bullets). There are reports demonstrating different types of foreign bodies revealed using PMCT, such as a mouthful of food closing off the respiratory tract.

**Materials and Methods:** A dead body of an unknown male person was found in an open area, lying near a raised concrete surface. At the site extensive injuries of the head of the corpse were visible particularly of the face. The post-mortem native MSCT was performed before a conventional forensic autopsy, using the following clinical equipment: Siemens Somatom Sensation 16, slice thickness: 0.75 mm (for the head) and 1.5 mm. The DICOM files obtained from the CT acquisition were analyzed using a computer program, Osirix.

**Results:** The cross-sections (2D) of the chest on the right side revealed a presence of a clearly contrasting foreign body similar to a piece of bone. In some slices and in three-dimensional (3D) reconstructions the characteristic shape of a tooth was seen. The authors present the results with a series of 2D and 3D pictures and animations of both the skull (with extensive damage) and the chest (with a foreign body).

**Conclusions:** The authors believe that even a very thorough conventional forensic autopsy performed by an experienced forensic pathologist without prior analysis of CT scans would not give the opportunity to obtain such a finding. Its location supports the theory that the badly beaten victim - aspirated the tooth. Such a case clearly shows how important the introduction of routine post-mortem MSCT prior to conventional autopsy is.

**Keywords:** *Post Mortem* CT; Foreign Body; Extensive Facial Injury; Aspiration of Tooth; Badly Beaten Victim

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# "HISTOLOGICAL EXAMINATION OF THE CAROTID BIFURCATION IN CASE OF VIOLENCE AGAINST THE NECK"

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**Abstract:** The carotid sinus and carotid body, localized in the carotid bifurcation, can reflexively influence ventilation, heart rate or blood pressure in case of physiological irritation due to stimulation by arterial pressure fluctuations or nervous impulses. Neck compression or trauma with subsequent fatal bradycardia or asystolia is discussed controversially in the literature since decades. In 20 cases with verified violence against the neck carotid bifurcations examined histologically with regard to haemorrhage as an indication of tissue trauma. This group consisted of 15 cases of death by hanging, 2 cases of blows and kicks against the neck, 2 cases of ligature strangulation and 1 case of manual strangulation. The control group consisted of 82 cases with different causes of death without any trauma of the neck. Only in one case of violence against the neck haemorrhage was found in the tissue of the carotid bifurcation but without any evidence of fatal cardiac reflex. In all other cases of the study or control group haemorrhage was not found. Fatal vagal bradycardia or asystolia due violence against the neck is discussed with regard to the present literature.

**Keywords:** Carotid Bifurcation; Carotid Body; Carotid Sinus; Haemorrhage

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# ESTIMATION OF THE TIME OF DEATH BASED ON EYE TEMPERATURE MEASUREMENTS: FIRST PRACTICAL APPLICATIONS IN CASEWORK

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**Abstract:** The first three successive death cases are presented in which in situ internal eyeball temperature measurements taken shortly after death made it possible to accurately determine the time of death (TOD) on the basis of the data obtained (33.1°C, 32.2°C and 29.5°C for each of the three cases respectively). Rectal temperatures in all three cases were measured at the same time and found to be between 36.3°C and 36.8°C, thus reflecting the body temperature of a living individual. On top of these factors, ambient temperatures (18°C, 20°C and 15°C respectively) and environmental conditions (still air and normal humidity in all cases) were recorded every time. The single eye, rectal and ambient temperature measurements were taken at the scenes of death using pin probes connected to a high precision electronic thermometer (Dostmann-electronic). TOD was calculated using a formula based on Newton's law of cooling previously successfully applied in comprehensive studies on pigs [1-3]: $T = Ta + (T0-Ta) \exp(-kct)$ (Eq. 1) where T is the temperature of the body site, Ta is the ambient temperature (assumed to be constant during the course of cooling until the time of the measurement), T0 is the initial human eye temperature (36°C), kc is a first order cooling rate constant, and t is the time since death. The mean value of kc=-0.113h-1 had been previously determined in studies on the postmortem cooling process in pig eyeballs at room temperature and in still air. Thanks to both the significantly faster postmortem decrease of eye temperature and the residual plateau effect or lack thereof in the eye, TOD in the human death cases could be estimated with good accuracy. Using Eq. 1, TOD in these three cases was shown to be: 1h33 min (case 1), 2h24 min (case 2) and 3h17min (case 3). By comparison, the actual TOD established during investigations appeared to be: between 1h30min and 1h50min in case 1 (homicide by manual strangulation), exactly 1h55min in case 2 (the death of an ambulance patient on route to the hospital), and between 2h55min and 3h05min in case 3 (the death of a passenger on a bus). Apparently the TOD estimation error did not exceed 30 minutes. Such an accurate estimation of TOD in the early postmortem period, made possible mainly because of the several-hour-long plateau effect, could not have been achieved if, as is common in forensic practice, rectal temperature data alone had been relied upon. The results show that the described method of TOD estimation is of satisfactory accuracy in the early postmortem period, particularly when applied to bodies found at room temperature and in normal environmental conditions (still air, normal humidity). The very important advantage of this method is its independence of body mass. To further improve its accuracy, more comprehensive trials using the methodology developed in pig studies (several-hour-long early postmortem eye, rectal and ambient temperature measurements) are being conducted on the bodies of people with known TODs. The method is also being continuously verified in casework.

**Keywords:** Time of Death (TOD); Body Cooling; Eye Temperature; Rectal Temperature; Temperature Plateau

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# A NOVEL METHOD USING MICROWAVE DIGESTION AND VACUUM FILTRATION FOLLOWED BY AUTOMATED SEM FOR DIATOM DETECTION IN THE DIAGNOSIS OF DROWNING

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**Introduction:** The detection of diatoms has been proposed to be useful in the diagnosis of drowning. In the presented paper, we described a novel method using microwave digestion and vacuum filtration followed by automated scanning electron microscopy (SEM) for detection of diatoms in water and organs, and the reliability and applicability of quantitative and qualitative diatom analysis by the method in the diagnosis of drowning had been evaluated.

**Methods:** We reported the analysis of water and organ samples of 48 drowning cases,15 submerged-after-death cases of which the bodies were confirmed to had been thrown into water after death, and 20 control cases of on-land bodies with the deaths caused by natural diseases. With the method, samples including lung, liver, kidney, bone marrow and water were treated by microwave digestion with concentrated nitric acid and hydrogen peroxide; the fluid obtained was vacuum-filtrated, and its sediment on the microporous Nylon membrane was dried, coated, and photographed under the scanning electron microscope with automated scanning mode; quantitative and qualitative analysis of the diatoms in the samples were accomplished based on the images taken.

**Results:** Diatoms were detected in all water samples. So it was with all the lungs, 95.8% of the Livers, 91.7% of the kidneys and 83.3% of the bone marrows of the drowned victims. While the diatom test gave negative results for the submerged-after-death cases and the control cases.

**Conclusions:** The method is rapid, sensitive, labor-saving, and accurate for qualitative and quantitative diatom analysis, thus is of prominent application value in the diagnosis of drowning.

**Keywords:** Diagnosis of Drowning; Microwave Digestion; Vacuum Filtration; Automated SEM

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# POSTER SESSION

## Session A1

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# FEMALE GENITAL MUTILATION: TWO CASES REPORT

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**Abstract:** Female genital mutilation comprises all procedures that involve partial or total removal of the external female genitalia. This practice is mostly carried out by traditional circumcisers on young girls sometime between infancy and age 15 years. Two cases of female genital cutting examined by authors at the South Branch of the National Institute of Legal Medicine, in Portugal, are extensively reported and discussed about its consequences either as a rare expression of bodily damage or a violation of the human rights.

**Keywords:** Female Genital Mutilation; Bodily Damage; Violation of the Human Rights.

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# HOW RELIABLE IS THE SPANISH BODILY HARM ASSESSMENT SCALE?

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**Abstract:** In Spain, compensation for injury resulting from traffic accidents is calculated according to a medical scale enacted by Royal Decree L (8/2004). Its coming into force has been accompanied by excessive disparity between medico-legal assessments in the law courts. To investigate this development, we set up a group of 24 experts in the evaluation of In Spain, compensation for injury resulting from traffic accidents is calculated according to a medical scale enacted by Royal Decree L (8/2004). Its coming into force has been accompanied by excessive disparity between medico-legal assessments in the law courts. To investigate this development, we set up a group of 24 experts in the evaluation of personal injury and required them to give an independent assessment of the same patient. They were asked to estimate the period of time for the healing of lesions, appraise the time periods for in-patient and out-patient care and assess the functional and aesthetic consequences. Statistical analysis of the 24 reports shows significant lack of agreement, highlighted by, among others, the values for Cohens and Fleiss kappa coefficient, which confirms a poor inter-rater agreement in interpreting the scale. Our results indicate a low reliability of the Spanish medical scale for assessment of personal injury, which must be improved. and required them to give an independent assessment of the same patient. They were asked to estimate the period of time for the healing of lesions, appraise the time periods for in-patient and out-patient care and assess the functional and aesthetic consequences. Statistical analysis of the 24 reports shows significant lack of agreement, highlighted by, among others, the values for Cohens and Fleiss kappa coefficient, which confirms a poor inter-rater agreement in interpreting the scale. Our results indicate a low reliability of the Spanish medical scale for assessment of personal injury, which must be improved.

**Keywords:** Compensation for Injury; Traffic; Scale for Assessment

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# ETHICAL ASPECTS OF FORENSIC MEDICAL EXAMINATION TO VERIFYING OF ILLEGAL SUBSTANCES OR OBJECTS IN NATURAL CAVITIES OR ORIFICES IN THE BODY

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**Introduction:** In Brazilian prisons, visitors from detainees frequently use their vagina or anus to transport drugs, weapons, cell phones and other illicit substances or objects. Not uncommon for Brazilian public safety agencies is requiring the presence of medical examiner to conduct a gynecological and proctologic examinations, either within prison or in institutes of legal medicine in order to verify the existence of such content. The objective is to discuss the ethical aspects of forensic examination for finding illegal substances or objects in natural cavities or holes in the human body.

**Methods:** Extensive review of the literature with search of articles between 1970 and 2011 in the research sites (PubMed, LILACS and SciELO) using the terms "body packer", "body pusher", "drug trafficking" and "medical ethics" in search of increased protocols and publications of official data from public safety agencies and regulators of medicine in Brazil. Assessment and critical reflection on the subject.

**Results:** Scientific publications involving drug trafficking through swallowing, "body packer", are common, however, involving the introduction into the anus or vagina "body pusher" are rare. The majority of studies devoted to the diagnosis and treatment of victims as a question of care and not forensic. In addition, the Federal Council of Medicine prohibits doctors from performing forensic exams within prisons and police stations or exceed the limits of their powers and responsibilities.

**Conclusions:** After a critical review of the subject is possible to conclude that simple inspection of a person does not require a medical act. Also, it is suggested a protocol of conduct for public security agents against the illegal transport of substances or objects in natural cavities or holes in the body.

**Keywords:** Body Packer; Body Pusher; Forensic Medicine; Medical Ethics; Drug Trafficking

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# CAUSAL NEXUS ISSUES IN WHIPLASH: REGARDING TWO CASES

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**Abstract:** Traffic accidents are annually responsible for the death of more than 700 people in Portugal. In addition to the fatalities, there is an estimated 35000 traffic accidents with victims per year that arouse elevated costs. In Portugal, the standard practice while evaluating these cases is to use the Portuguese Civil Law Corporal Damage Scale "Tabela de Avaliação de Incapacidades Permanentes em Direito Civil". Controversy surrounds the basis on which symptoms following minor cervical spine trauma may develop. In particular, there is considerable disagreement with regard to a possible contribution of psychosocial factors in determining outcome. The role of compensation is also a source of constant debate. This subject is a topic that occupies and concerns physicians, lawyers, accident analysts and insurers. Even with the latest advances in the field of diagnostic imaging, including improved resolution of computed tomography and magnetic resonance imaging, discrete injuries may remain undetected. This raises the possibility of such injuries going untreated, and that patients may be considered as malingerers or frauds. The authors present two cases of evaluation of corporal damage in traffic collision victims, one being a front-end collision and the other a case of a stationary car hit from behind. Both victims suffered cervical trauma and developed chronic neck pain. In the case where abnormalities were detected in the imaging techniques, causal nexus was not admitted, though it was admitted in the other one. The assessment of spinal impairment is difficult, and it is one of the most controversial factors in the evaluation of physical impairment. Recording a complete medical history is important to identify facts or conditions relevant facts to the case that may interfere with the attribution of causal nexus. Regarding two cases the authors discuss the importance of establishing both a diagnosis and methodological principles based on objective and useful criteria for an expert assessment that will be understood and generally accepted.

**Keywords:** Whiplash; Causal Nexus; Corporal Damage

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# POMPE'S DISEASE IN CIVIL LAW EVALUATION - SEQUELS OF TRAUMA VS NATURAL PROGRESSION OF THE DISORDER

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**Introduction:** Pompe's disease is an autosomal recessive metabolic disorder, which damages muscle and nerve cells throughout the body. It is caused by an accumulation of glycogen in lysosomes due to deficiency of lysosomal acid alpha-glucosidase enzyme. The build-up of glycogen causes progressive myopathy throughout the body, affecting various body tissues, particularly the heart, skeletal muscles, liver and nervous system. There can be an infantile onset or a late onset form. The latter occurs after the age of one to two years and progresses slower than the infantile-onset form. The first symptoms to occur are progressive decrease in muscle strength starting within the legs and moving to smaller muscles in the trunk and arms, such as the diaphragm and other muscles required for breathing. Respiratory failure is in fact the most debilitating and common cause of death. The course of the disorder occurs with a morbidity and life expectancy both difficult to predict.

**Case Report:** FR, female, 7 years, student, diagnosed with Pompe's disease at the age of 4. Victim of a car accident suffering fracture of the mandible, that healed perfectly, and of the proximal third of the right femur. Conservative treatment was carried out on the limbs with the application of a hip spica cast, which implied a prolonged time of immobilization. During that period, as well as the one that followed the removal of the cast, the patient was repeatedly readmitted to the hospital with numerous acute respiratory infections. On one occasion she even suffered from acute respiratory distress and cardiac arrest, having needed invasive ventilation. Given the prolonged immobilization period, the child also suffered a rapid loss of muscular tonus, despite having carried out several programs of physical rehabilitation. Before the accident the patient had a broad-based gait with hyper-lumbar-lordosis posture, a slight thoraco-lumbar axial deviation without significant rotation of the vertebral bodies and no osteotendinous retractions on upper and lower limbs. At the time of our evaluation she presented herself in a wheelchair, not being able to stand-up on her own or even to sit up straight. She presented a severe scoliosis, with deviation to the right, and an exuberant kyphosis. Furthermore she had a major deficit of muscular strength on all four limbs and two centimeters shortening of the right leg.

**Discussion and Conclusions:** Despite the known progressive nature of Pompe's disease, the authors considered, in the present case, that the consequences of the car accident, and namely, the prolonged immobilization time demanded for the healing of the femur's fracture, were very detrimental to the underlying disorder, therefore being partially responsible for the actual patient's clinical status. Medical experts therefore validated the shortening of the right femur as well as the aggravation of the pre-existing kyphosis, having attributed 14 points of general permanent incapacity. Quantum doloris and aesthetic damage were both evaluated as 7 in a scale of 7 degrees, of increasing severity. Finally, considerations were also made in respects to the complete dependence of the patient on a third person for all her daily living activities and locomotion. Medical experts are expected to be familiar with this disorder in order to produce precise clinical evaluation in civil responsibility cases following trauma involving these patients, specially considering the delicate balance between the sequels of trauma and the normal progression of this specific syndrome.

**Keywords:** Medicolegal; Pompe's Disorder; Trauma Sequels

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# NON-FATAL MOTOR VEHICLE-PEDESTRIAN ACCIDENTS IN CIVIL LAW AND THEIR REPERCUSSION ON WORK CAPACITY: A RETROSPECTIVE STUDY IN THE CENTRE BRANCH OF INML, IP (2004-2009)

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**Introduction:** Traffic accidents represent a major medico-social issue with special implications in the field of insurances because of their incidence, and of the numerous complications and risks of impairment, which generate high costs. In 2009, according to the National Agency for Road Safety (Autoridade Nacional Segurança Rodoviária), there was in Portugal a total of 47151 victims in traffic accidents, 6143 representing motor-vehicle-pedestrian collisions. Even though it represents 13% of all traffic accidents, the gravity index calculated by the same agency for motor-vehicle-pedestrian collisions (2,2) is higher than for motor-vehicle-motor-vehicle collisions (1,8). This study has the objective to define which are the most common types of sequelae and their location in motor-vehicle-pedestrian collisions, as well as the permanent work related consequences of these events.

**Methods:** In this research was used a retrospective analysis of Civil Law reports performed at the Centre Branch of the Portuguese National Legal Medicine Institute (INML, IP) from January 1st 2004 until December 31st 2009. Data was analyzed according to age, gender, incapacity period and medico-legal evaluation of sequelae.

**Results:** During the previously mentioned period a total of 151 Civil Law reports were analyzed. 119 of the vehicles involved in the collision were passenger cars. There were 83 female and 68 male victims. In this population, there were workers or elderly people still working in agriculture or domestic activities and students, considered also as a working activity. Total work incapacity had a median value of 180 days and partial work incapacity had a median value of 168 days. The most commonly found sequelae were Orthopedic, followed by Neurological sequelae. We also found other types of sequelae, namely, Psychiatric, Urologic and Vascular. In 111 cases there were permanent consequences in the work capacity.

**Discussion and Conclusions:** Motor-vehicle-pedestrian collisions represent an important cause of trauma and a considerable source of distress for the victim. The yearly amount of non-fatal motor vehicle-pedestrian accidents in Civil Law, evaluated in the Centre Branch of INML, IP, remains fairly the same in the last five years. Most of the cases were employed victims that couldn't work for a median time of 180 days, and had their work capability temporarily abridged for a median time of 168 days. As for the sequelae, the most frequently found were Orthopedic, especially in the lower-limbs, followed by Neurological sequelae, mainly Post-Concussion Syndrome. There is a high prevalence of long-lasting effects in the work capacity, albeit most of them just require additional effort for their usual labor, it can also be a cause of severe decline in the remaining work capacity. In some victims, it can withdraw the ability to perform a normal daily routine.

**Keywords:** Motor Vehicle; Pedestrian; Non-Fatal Accidents; Collisions; Civil Law

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# PELVIC FRACTURES IN CIVIL LAW: A RETROSPECTIVE STUDY (2007-2009)

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**Introduction:** The pelvis is a ring-like structure of bones at the lower end of the trunk that creates a bowl-like cavity containing many digestive and reproductive organs, large nerves and blood vessels. With all of these important and vital structures running through the pelvis, a pelvic fracture can be associated with substantial bleeding, nerve injury and internal organ damage.

**Methods:** Retrospective analysis of Civil Law reports performed at the Centre Branch of the Portuguese National Institute of Legal Medicine (INML, IP) from January 1st 2007 until December 31st 2009. All cases of documented pelvic fractures were included. Data collected was analysed according to age, gender, type of event, type of motor-vehicle collision and vehicles involved, characteristics of injuries sustained, medical or surgical procedures applied and medico-legal evaluation of sequelae.

**Results:** A total of 30 cases were included in this study, only one not related to motor-vehicle accidents, but rather to crushing due to fall of a straw bale. There was no significant preponderance of gender and as for age, it presented a bimodal distribution with a peak at the [20; 30[ and another at [50; 60[ years-old. In cases related to traffic accidents, the majority involved front end collision between light vehicle collisions. In 22 cases victims had fractures in other than pelvic bones, the most frequent affected location being the thorax, lower limb and upper limb, in decreasing order of frequency. 16 cases involved fractures of multiple pelvic bones and 14 fractures involved only one bone with the hightest frequency for the pubis and decreasingly for ischium, acetabulae and sacrum. There was diastase of the symphysis in 8 cases (6 male, 2 female) and only in 5 cases was reported damage to visceras, vessels or pelvic nerves. Surgical procedures were required in 37% of cases. At the time of our evaluation, the most significant complain related to pelvic injuries was pain although, with significantly less frequency, neurological/sexual dysfunction were cause of valoration. In 3 cases the victims were unable to return to work due to sequelae. It was not possible to thoroughly compare the incapacity valoration as different valoration tables were in use during the time frame of this study and because it was not always possible to individualize the value of valoration solely for the pelvic sequelae.

**Discussion and Conclusions:** Although, as it is known, the morbidity of pelvic fractures may be significantly high due to anatomical features of this region. In our study, there wasn´t relevant frequency of related co-injuries, namely neurological or vascular. On the other hand, most cases also involved fractures in other sites other than the pelvic bones, which may relate to high-velocity impact. As most cases were front end collisions between light vehicle, perhaps the higher frequency of thoracic fractures may be associated with wheel impact on the sternum or costal grid. Although not frequent, sexual dysfunction noticed, may be severe depending on the degree of nerve involvement or other injuries. A study involving more cases, with a time frame including the use of only one valoration table and discrimination of incapacity points per sequelae, as it is our way-of-doing nowadays, could further improve the analysis of pelvic fractures evaluation in the context of Civil Law.

**Keywords:** Pelvic Fractures; Civil Law

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# CIVIL LAW EVALUATION OF CERVICAL TRAUMA IN TRAFFIC ACCIDENTS: FOUR YEARS RETROSPECTIVE STUDY (2006-2009)

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**Introduction:** Cervical trauma in the context of Civil Law cases may pose a variety of challenges at time of evaluating the sequelae or the nexus of causality, especially when there are complains of chronic pain without documented structural lesions or previous degenerative disease. On the other hand, when in fact structural lesions occur, they can be the source of significant morbility.

**Methods:** Retrospective analysis of Civil Law reports performed at the Centre Branch of the Portuguese National Institute of Legal Medicine (INML, IP) from January 1st 2006 until December 31st 2009. All cases of motor vehicle accidents with documented cervical injury or complains during follow up or those whose final incapacity valoration took into consideration cervical symptoms were included. Data was analysed according to age, gender, type of traffic accident, type of collision, type of vehicles involved, cervical injury sustained, associated injuries, documented degenerative pathology and medico-legal evaluation of sequelae.

**Results:** A total of 70 cases met the criteria established for this study. A male-female ratio of 3:4 was found, with most victims in the 40-50 year-old range. As for the type of accident, 3 were runovers and the remaining collisions. From those cases in which the type of collision was specified (72%) most were rear-vehicle collision (44%), followed by front collision (38%). The majority of collisions occurred between two light vehicles (67%) and only 7 cases involved motorcycles. Most individuals had cervical complains at time of hospital admission and in 47 cases there were documented lesions (fractures or contusions) elsewhere. In 14 cases the fractures occurred at a single region and in 5 cases affected multiple areas. The most frequent fractured structure was the cranium, closely followed by upper limb and then lower limb fractures. As for cervical damage, only 8 cases had documented fractures involving C6, C2, C7 and C2 in decreasing order of frequency and as for other pathology, we found 20 cases of post traumatic hernias and post traumatic luxation (n=8). In 13 cases a surgical intervention to the cervical spine was required. Besides orthopaedic lesions, 6 cases also involved medullar lesions and 5 radicular damage. In 22 cases it was documented previous degenerative pathology In the aftermath, the most frequently referred complain was chronic pain, followed by neck rigidity and then neurological compromise. In two cases of neurological damage, the individuals required third party assistance.

**Discussion and Conclusions:** The majority of cases were related to female individuals. As expected most cervical damage occurred in the context of vehicle collisions, namely rear ou front end collisions, possibly with hyper flexion and/or extension contributing to the final outcome. However, probably due to increased safety measures adopted by car manufacturers, the incidence of fractures seems to have decreased, when comparing with a previous study on this subject carried out in our Department (2000-2005). On the other hand there is a relevant number of post traumatic hernia and luxation. In terms of final evaluation, chronic cervical pain was a recurrent complain and therefore subject of valoration. Although clear cervical structural damage was not the most frequent case, when it included medullar compromise, it caused severe impairment.

**Keywords:** Cervical Trauma; Civil Law; Traffic Accidents

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# SEXUAL DAMAGE AND HIP ARTHROPLASTY

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**Abstract:** The post-traumatic arthrosis one of the most frequent sequels and one of the most complex situations in the Evaluation of Body Damage in Civil Law. Present in many cases resulting from road accidents, raises many problems in their assessment, especially if the joint degradation lead to dysfunctional joint replacement with a prosthesis. The surgical treatment of hip arthrosis include total arthroplasty, a procedure very common and with more satisfactory results, for the relieve pain and the improvement of quality of life, including sexual performance. However, it is essential that some rules are respected in order to avoid complications, such as dislocations of prosthesis, which in a large percentage of cases, occurs during sexual intercourse. Despite the clinical and symptomatic improvement (hip pain and stiffness) observed in individuals submitted to this type of surgery, accident victims with hip arthrosis have a repercussion of sexual performance that should never be overlooked in the assessment body in Civil Law. The aim of this presentation is to contribute to a better characterization, in the perspective of medical-legal evaluation of post-traumatic bodily damage in Civil Law, when a hip replacement is present. To achieve the above objective, the authors made an investigation that includes (1) literature about hip replacement surgery and the impact on the sexual activity (2) retrospective study and subsequent analysis of medico-legal reports made in the assessment of body damage in Civil Law in Clinical Forensic Service of the Centre Branch of the National Institute of Legal Medicine in Portugal, between the period of 2004-2010.

**Keywords:** Hip Artroplasty; Sexual Damage; Civil Law

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# SEXUAL ABUSE IN VICTIMS UNDER 18 YEARS OF AGE: WHAT, WHERE AND HOW? A REVIEW OF THE MEDICO-LEGAL EXAMINATIONS PERFORMED AT LISBON

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**Introduction:** Examinations of victims of sexual offences represent a very important part of the medico-legal activities at the South Branch of the National Institute of Legal Medicine (SB-NILM). When the victim's age is under 18 years-old, the sexual examination is particularly delicate, given the implications to the victim's development and well-being. This kind of examinations can take place both in emergency settings, performed either at the SB-NILM or at a hospital emergency room served by the Institute, or non-emergency ones (only performed at the SB-NILM).

**Materials:** The medico-legal reports (n=374) made at the SB-NILM in a two years period (2009-2010) related to alleged victims of sexual offence under 18 years of age (both in emergency and non-emergency settings) were identified and reviewed. The descriptive data analyzed and collected include general socio-demographic characteristics of the victim, description of the abuser(s) and the alleged sexual offence, including type and circumstances of abuse. Descriptive statistics was performed using the Statistical Package for Social Sciences (SPSS 11) for Windows.

**Results:** Results showed, mainly, that the majority of the victims were female, with a mean age of 10.61 years-old (standard deviation=4.73). Physical violence was reported in 57 (26.8%) and 31 (14.5%) of ES and NES cases, respectively (p=0.01). In 87 (40.8%) cases threats were reported; in 38 (17.8%) of the cases there may have been enticement; chemical substances were used in 12 (5.6%) of the cases. In 34 (16.0%) of the cases the child or adolescent had "consented" with the sexual practice. In 33 cases it was reported more than one of the methods mentioned above. With respect to these coercive methods used to commit abuse, physical violence and the use of chemical substances were both more frequent in ES cases as it was in "consented abuse" cases. Vaginal penetration was reported in 135 cases (31.6 %) being more frequent in ES, followed by manual manipulation (104 cases; 24.4%) and anal penetration (70 cases; 16.4%), both more frequent in NES; and more than one method frequently coexisted.

**Discussion and Conclusions:** Examinations performed in emergency settings are critical, both for the opportunity to screen physical signs and collect biological evidences, but also because this moment is often the first chance to deal with the victim, which become it in a very relevant setting to accomplish the expert mission: to get information and evidences for justice can be done. The knowledge of the circumstances of the abuse and its type is extremely important to guide the forensic examination and the diagnostic exams asked, but also to better understand and support the victim providing the best treatment (clinical and social) to each case.

**Keywords:** Sexual Abuse; Medico-Legal Examinations

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# SEXUAL OFFENCES UNDER 18 YEARS OF AGE: A REVIEW OF THE MEDICO-LEGAL EXAMINATIONS PERFORMED IN EMERGENCY AND NON EMERGENCY SETTING AT LISBON

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**Introduction:** Introduction and aims: Examinations of victims of sexual offences represent a very important part of the medico-legal activities at the South Branch of the National Institute of Legal Medicine (SB-NILM). When the victim's age is under 18 years-old, the sexual examination is particularly delicate, given the implications to the victim's development and well-being. This kind of examinations can take place both in emergency settings, performed either at the SB-NILM or at a hospital emergency room served by the Institute, or non-emergency ones (only performed at the SB-NILM). A retrospective analysis of the reports of the examinations regarding victims of alleged sexual offences was extensively done. The descriptive data was collected and analyzed in order to identify possible differences between sexual offences which medico-legal examination had been performed in emergency or non-emergency setting.

**Materials and Methods:** The medico-legal reports (n=374) made at the SB-NILM in a two years period (2009-2010) regarding victims of alleged sexual offence under 18 years of age (both in emergency and non-emergency settings) were identified and reviewed. The descriptive data analyzed and collected include general socio-demographic characteristics of the victim, description of the alleged sexual offence, description of the abuser(s), as well as laboratory findings and expert conclusions. Descriptive statistics was performed using the Statistical Package for Social Sciences (SPSS 11) for Windows.

**Results:** Preliminary results showed, mainly, that the majority of the victims where female, with a mean age of 10.61 years-old (standard deviation=4.73). Analysing the period of time between the event and the medico-legal examination, 37.4% of these were performed in emergency settings (< 72h after the event), followed by those performed more than 30 days after the alleged assault.

**Discussion and Conclusions:** Examinations performed in emergency settings are critical, both for the opportunity to screen physical signs and collect biological evidences, but also because this moment is often the first chance to deal with the victim, which become it in a very relevant setting to accomplish the expert mission: to get information and evidences for the justice can be done. In other hand, the examinations performed more than 30 days after the alleged assault have to be carefully interpreted considering the victim's age and the delay time until the disclosure.

**Keywords:** Sexual Offences; Medico-legal Examination; Emergency; Non-Emergency

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# ECHOVIRUS MYOCARDITIS AND MOTOR-VEHICLE ACCIDENT. DILEMMAS IN ESTABLISHING THE NEXUS

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**Introduction:** The assessment of cases related to infections is not very common in Civil Law and even more so if it is in the context of a motor—vehicle accident. The authors report such a case in which was required to determine the nexus between a car accident and the sequelae of viral myocarditis.

**Case Report:** A 29 year old female sports teacher had a runoff followed by rollover with the vehicle stopping in an upside-down position. She was admitted in a Hospital complaining only of occipital and cervical pain. An X-ray was performed that revealed no traumatic injuries and, consequently, she was discharged after a couple of hours. She reported that during the following two weeks, there was a worsening of the cervical pain, which irradiated to the left side scapulae and was not completely relieved by resting nor by use of pain medication. She came to develop a generalized edema with significant limitation in physical activity and behavioural changes which led to a Hospital readmission, seventeen days after the accident. Medical records reported she mentioned episodes of dry cough, diarrhea and vomits that began five days after the accident. Following the diagnosis of heart insufficiency with severe metabolic acidosis, she was admitted in the Intensive Care Unit and further testing was performed which revealed echovirus myocarditis. During the next months she was maintained under medical observation and was discharged with a dilated miocardiopathy post viral infection, which required the implantation of a CDI and a pacemaker due to malignant arrhythmias a few months later.

**Discussion and Conclusions:** Although the Insurance Company at first assumed responsibility for medical treatments, at time of our evaluation the existence or not of nexus was put into question. The assessment of causation is not as straightforward as it may seem at first glance considering the incubation period of echovirus (variable time between 2 days and 2 weeks) and she had been in an hospital setting in the sequence of the accident. In a multidisciplinary approach, a final decision was made based on the unlikelihood of transmission during the very short ER stay, the usual routes of transmission and the sanitary hospital regulations. Although in Medicine we can never say always nor never, the available information and timing of events led us to conclude that in this case there was no nexus.

**Keywords:** Civil Law; Echovirus Myocarditis; Motor-Vehicle Accident

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# HOMICIDES IN LISBON, PORTUGAL: A DECADE RETROSPECTIVE STUDY, 2001-2010

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**Abstract:** This study provides a retrospective review from the autopsies reports and police records of all registered homicide deaths in the Great Lisbon Area, from January 2001 to December 2010. This region is served by the National Institute of Legal Medicine - South Branch (INML-DS), in Lisbon, where all the victims of homicide in this area are autopsied. During the period covered in this work, 407 autopsies related to homicide victims were performed in INML-DL. Autopsy files include data concerning the complete identification of the victim, criminal investigation reports, autopsy findings, toxicological and histological analysis, and other information available. The data gathered from the autopsy files were analysed for the age, gender, nationality, employment, autopsy justification and type of injuries, death certificate, post mortem blood alcohol concentration and presence or absence of drugs. From the police record in each case included the method of homicide (firearm, sharp force, blunt force, asphyxia, etc.), local where the homicide took place, local where the death was verified, time (six hour period), day of the week and month of the year the homicide occurred, and when it was possible, the circumstances, and the relation between the victim and the assailant. This study was undertaken to examine the characteristics associated with homicide in Lisbon, and, where possible, to compare such information with what is known about homicide in other European main cities.

**Keywords:** Homicides; Lisbon; 2001-2010; Retrospective Study

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# THE "SUICIDE BRIDGES" IN PORTO

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**Abstract:** Bridges frequently used to commit suicide, most typically by jumping off and into the water below (although, in some cases, the fall occurs on rocks, pavement, or surrounding streets) have acquired a notorious nickname: the "suicide bridges". The most notorious of these, the Golden Gate Bridge in San Francisco, completed in 1937, has had more suicides than any other in the world, the number currently being around 1,500 (approximately 30 suicides per year). People have been known to travel to San Francisco specifically to jump off the bridge, as approximately 75 m above the water is high enough for 98% falls to be fatal. The Clifton Suspension Bridge, spanning the Avon Gorge, in Bristol, UK, has had over 1,000 deaths, and approximately 4 suicides per year. The Aurora Bridge, in Seattle, Washington, 51m above the water, is the second deadliest suicide bridge in the USA. Since its opening in February 1932, there have been 230 suicide falls. The Nanjing Bridge over the Yangtze in China has also gained a fatal fame: up to 1,000 people are believed to have died by jumping off it since its completion in 1968. According to unofficial statistics, around 200 people jumped from 100-year-old Netty Jetty Bridge in Karachi, Pakistan. Another magnet for suicides is Nusle Bridge in Prague, opened in 1973. There are no official statistics, but the number of deaths is estimated at 300. The San Diego-Coronado Bridge is the third deadliest suicide bridge in the USA: between 1972 and 2000, more than 200 suicides were committed on the bridge. Another suicide bridge is Sunshine Skyway, spanning Florida's Tampa Bay. Around 100 people have committed suicide by jumping from the center span into the waters of Tampa Bay since the opening of the new bridge in 1987. When it opened in 1918, no one thought the Prince Edward Viaduct in Toronto would rank as the second most fatal standing structure in the world, with over 400 suicides. At its peak in 1997, the suicide rate averaged one person every 22 days. The Jacques Cartier Bridge, in Montreal, Quebec, Canada is the second busiest bridge in terms of suicides committed in the country, with an average of 10 suicides per year. Suicide prevention advocates believe that suicide by bridge is more likely to be impulsive than other means, and that barriers can have a significant effect on reducing the incidence of suicides by bridge. Families of victims and support groups for the mentally ill have lobbied governments to erect such barriers. In 1998, new barriers were added to the Clifton Suspension Bridge, in Bristol, UK. Six years later, in 2004, a suicide prevention barrier was installed in the Jacques Cartier Bridge, in Montreal, Quebec, Canada. Recently, new barriers have been constructed along the length of the Nusle Bridge in Prague, in order to lessen the number of incidents. The new system has been tested by experienced rock climbers that couldn't get over the barriers. There has been no suicide in Prince Edward Viaduct in Toronto since the construction of the Luminous Veil barrier in 2003; however, it is not known whether the suicide rate at other bridges in the city has risen, nor whether overall suicide rates have dropped in the city as a direct result of this structure. In December 2006, six emergency phones and 18 signs were installed on the Aurora Bridge, in Seattle, Washington to encourage people to seek help instead of jumping. Local authorities have installed six crisis phones and began 24-hour patrols of the Sunshine Skyway, in Florida's Tampa Bay, but the total number of jumpers has not significantly declined since the introduction of these safeguards. This study aims at characterizing this phenomenon in the city of Porto, known for its many bridges, and where suicide by bridge is more frequent than in any other part of Portugal. Are there, in fact, suicide bridges in Porto? For this purpose, document analysis was performed on the files kept by the Portuguese Maritime Police of suicide incidents

**Keywords:** "Suicide Bridges"; Suicide; Prevention

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# RECOVERY OF LATENT FINGERPRINTS AND DNA ON HUMAN SKIN

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**Abstract:** In post mortem casework, evidence of offender contact on the skin surface of the homicide victim has up to date been regarded as almost impossible to detect in Europe, as also has forensic analysis of such evidence. The project "Latent Fingerprints and DNA on Human Skin" was the first systematic research in Europe dealing with detection of fingerprints and DNA left by offenders on the skin of corpses. The analyses of one thousand samples allowed general statements on the materials and methods used. The tests were carried out according to a uniform trial structure. Fingerprints were deposited by natural donors on corpses. The latent fingerprints were treated with magnetic powder or black fingerprint powder. Afterwards, they were lifted with silicone casting material (Isomark) or gelatine foil. All lifts were swabbed in order to recover DNA. It was possible to visualise comparable and identifiable fingerprints on the skin of corpses (16%). In the same categories, magnetic powder (18.4%) yielded better results than black fingerprint powder (13.6%). The number of comparable and identifiable fingerprints decreased on the lifts (12.7%). Isomark (14.9%) was the better lifting material in comparison to gelatine foil (10.1%). In one third of the samples DNA could be extracted from the powdered and lifted latents. Black fingerprint powder delivered the better result with a rate of 2.2% for full DNA profiles and profiles useful for exclusion in comparison of 1.8% for the magnetic powder traces. Isomark (3.1%) yielded better results than gelatine foil (0.6%).

**Keywords:** Fingerprints

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# A CASE REPORT: MURDER OF CASTEL SAN PIETRO. PART I : SCIENTIFIC EVIDENCES RELATING TO A CASE OF A WOMAN KILLED IN SWITZERLAND AND FOUND IN ITALY

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**Case Report:** A female body was found in the lake of Como in Italy, where is close to the Laglio region on 2 April 2010. The head and throat were wounded by a blunt object and an edged object respectively. She was presumed as a prostitute because of her dressing in only underwear. The information of her physical characteristics was given to the mass media and the tattoos of hers were identified to a recent disappeared lady who lived in Castel San Pietro in Switzerland, who was married and a mother of a 7 years old child. After a scrupulous investigation by the Swiss Police Unit, they found that the husband of the victim is the murderer. He killed his wife at their home on 25 March 2010 and kept her body in the trunk of his car for two days. He then crossed the border and dumped her body into the lake. He faked his wife's departure until 4 April 2010, the day he was arrested. The perpetrator has been sentenced for life imprisonment, which was the first time in Ticino as well as one of the few cases in Switzerland.

**Keywords:** Murder; Identification of Body

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# COMPARISON OF COPAN FORENSIC COLLECTION KITS TO TRADITIONAL FORENSIC DEVICES FOR MAXIMIZING CRIME SCENE SAMPLE PROCUREMENT

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**Introduction:** Collection kits for sample procurement from crime scenes are using traditional cotton, polyester, rayon or cellulose swabs. Copan developed 4N6 FLOQSwabs™ (FFS) specifically designed to facilitate and maximize crime scene sample collection, neutralize microbial contaminants while preserving human nucleic acids (NA) integrity without the need for drying the swab prior transport or storage. Each Copan forensic collection kit may contain a special designed regular, flat, round/rims, or nails forensic FFS and a Nucleic Acid Optimizer (NAO), which consists of a semi-permeable basket, that allows efficient release of all sample collected from small traces during a crime scene investigation. The objectives of this study were: 1. To compare the Copan forensic collection kits (FFS+NAO) to traditional forensic collection devices like the forensic Sarstedt swabs (SS) and the Whatman Omniswab (OS) for procurement and preservation of nucleic acids for forensic investigation. 2. To validate the FFS ability to preserve nucleic acids in samples with a heavy load of bacterial flora contaminants. 3. To validated the quality of nucleic acid for profiling. 4. To validate the ease of use of the special designed FFS for sample collection.

**Methods:** Simulated (n=13) crime scene traces were prepared in the laboratory and included: Seven dry blood traces spotted on different type of surface including two with strong bacterial contamination; four sweat traces on different type of surface; one saliva trace on bottlenecks; one human skin trace under fingernails. Six replicates were prepared for each trace, and duplicate samples were collected with Copan FFSs, SS and the OS. Each swab was pre-wetted with 50 ul of sterile distilled water. After collection, FFS and Sarstedt swabs were immediately placed in their own transport tubes, while the Omniswabs were placed in an open microtube for 2 hours to dry. All swabs were stored 10 days at room temperature then tested for DNA quantity and quality for profiling. The FFSs were used in association with the NAOs during the purification procedure in order to completely drain the swabs after the lysing step. Nucleic acid was extracted with QIamp DNA blood mini elute (Qiagen), quantified by Real Time PCR with Plexor HY kit (Promega) and profiled with NGM PCR amplification kit (Applied Biosystem).

**Results:** In all the samples tested, the Copan FFS recovered from blood, saliva, sweat and skin under nail traces 0.20 ng/ul, 0.83 ng/ul, 0.15 ng/ul and of 0.3 ng/ul of human DNA respectively, compared to 0.15 ng/ul, 0.07 ng/ul, 0.05 ng/ul, 0.06 ng/ul of human DNA for SS and 0.0097 ng/ul, 0.01ng/ul, 0.0033 ng/ul and 0.0044 ng/ul of human DNA for the and OS respectively. When comparing the total qPCR results, Copan FFSs recovered an average of 0.24 ng/ul of human DNA compared to an average of 0.106 ng/ul for the SS and of 0.0072 ng/ul for the OS. From two heavily contaminated blood traces FFS detected 0.61 ng/ul versus 0.014 ng/ul for SS and 0.0 ng/ul for OS. Copan FFS collected 2.26 times more DNA than SS and 33.3 times more DNA than the OS. Nucleic acid profiling is in progress. FFS easily collected all samples, flat for hard surfaces, regular for blood traces, round for bottleneck and nails for skin traces under nails and transported in its own tube. The SS performed fine except that are limited to a single geometry, while the OS were shredding during collection and did not have a transport tube.

**Conclusions:** Copan forensic collection kits are increasing and preserving DNA collection from 2.2 to 33 times more than SS and OS swabs. The FFS can be used for sample collection in heavily contaminated environment even after 10 days storage at room temperature without the need of drying. The FFS were easy to handle especial for the hard surfaces, bottleneck and under nail collection.

**Keywords:** 4N6 Floqswabs™; Nucleic Acid; Sample Collection

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# NICOLA CALIPARI: THE ABSURD DEATH OF A CALABRIAN SERVANT OF THE STATE. ANALYSIS AND RECONSTRUCTION OF THE CASE : BALLISTIC AND MEDICO-LEGAL ASPECTS - BAGHDAD, IRAQ,4 MARCH 2005

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**Case Report:** We report the case of Nicola Calipari, highly decorated SISMI agent, whose death happened in Baghdad during a covert operation by the Italian military secret service, (SISMI), to rescue an Italian journalist from kidnappers in Iraq. After the successful retrieval of the woman, on March 4, 2005, the car with her and two secret agents came under friendly fire by US Army troops along the Baghdad airport road; because of an error unfortunately the secret agent Nicola Calipari was killed while allegedly protecting the journalist with his body. She was hit only in the shoulder and medicated to a US Army field hospital shortly after the incident. Calipari was posthumously awarded the Gold Medal of Military Valor and become a national hero in Italy. The government supported an investigation about the shooting conducted by special prosecutors of of the Magistrates service of Rome whose ballistic and medico-legal aspects are here reported.

**Keywords:** CSI; Ballistics; Medico-Legal Investigation

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# OPTICAL REVEAL RESEARCH ON SCENE FAINT TRACES BY FULL-WAVE CHARGE COUPLED DEVICE TO EXTRACT FAINT TRACE ON THE SCENE

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**Abstract:** The material evidence examination system of full-wave CCD can photograph within 200-1200nm of the ultraviolet, the visible light and the infra-red spectrum scope, respond better spectrum, record the light in this range, and then allows the images shown on the monitor directly into the computer. Therefore it is convenient to do necessary treatment on the material evidence images. The essay introduces the structure and operation methods of the material evidence examination system of full-wave CCD, as well as the ways in the faint trace extraction on crime scene with an aim to photograph without any system damage, eliminate the background interference on faint trace,enhance the comparison and clearly display real-time faint trace on crime scene. In comprehensive comparison with common optics reveal methods, the material evidence examination system of CCD exposes the promising prospect of faint trace extraction on crime scene. With comparison to other modern photograph system, it summarizes the characteristics and merits of material evidence examination system of CCD, such as high discerning rate, good sensitivity, convenient operation, obvious results and so on. The system makes accessible to weak signal collection under feeble light and to high-quality acquirement of image information that is knotty and hidden. Sufficient knowledge of the characteristics and functions of the device can make it play a striking and key role in case crack.

**Keywords:** Full-Wave CCD System; Faint Traces; Accumulated Exposure; Inner Cooling

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# TESTING EQUIPMENT GEORADAR RIS / MF FOR RESEARCH ON HUMAN REMAINS: A PRELIMINARY STUDY

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**Introduction:** In our area of intervention was frequently checked the need to search dead bodies for which it is known the precise site of burial. The most typical cases stem from revelations almost always inaccurate, collaborators of justice or, more rarely of people informed about the facts still are not able to pinpoint the exact point in siltation. Under such conditions, sometimes the research carried out by conventional means can be extremely laborious and time-consuming and not always successful. The use of ground penetrating radar equipment, now widely used for various requirements, it could be extremely profitable if it were in fact applicable to this field of research. A GPR system is certainly able to identify areas of loose soil, and then to other compact than the surrounding lands, in cases of recent burials, but could also give good answers in the identification of corpses in an advanced state of decomposition that could appear on the layout of underground cavities as deserving to be further investigated. Based on these assumptions has designed a program of research to be conducted in stages in order to verify the feasibility of the field than assumed. To this end, we have buried some adult pig carcasses in various geological media by taking a first search GPR zero time, a month after planting and again after another three months, sent in winter, to see which amendment is made in the traces obtained in part because the agro imbibition due to the rains and the consequent re-consolidation of the land. If after three months of the instrumental responses were positive you will have to continue the experiment after six months and so on until it was no longer possible to get paths that prove a point of discontinuity of the actual burial. Here we illustrate briefly the working principle of a modern ground penetrating radar equipment and the type of analytical response that you can get with it.

**Materials:** The principles of GPR prospecting The GPR (Ground Penetrating Radar or GPR) is one of the non-destructive methods of investigation and allows, during the conduct of investigations, a section along lines predetermined electromagnetostratigrafica. Distinctive features of using this instrument of investigation are: • type of non-destructive and non-invasive investigation; • returning data easy to interpret; • cost economics; • speed of execution. The instrument is basically comprising a transceiver capable of sending multi-frequency pulses into the ground and record the arrival time and amplitude of any reflected signals at the interface between materials with different dielectric constant. The electromagnetic wave generated by the radar is emitted in the subsurface by a transmitter (TX) located inside the antenna. When the waves encounter a physical discontinuity, part of the incident energy is reflected back, generating a pulse shape similar to the one sent but attenuated and distorted in phase and frequency, which is collected by a receiver (RX). The antennas can operate in three main ways: • provision monostatic; • provision bi

**Methods:** Instrumentation used radar The mission was carried out using a unit acquisition RIS / MF including a next-generation multi-frequency antenna array comprising: • 3 antennas from 600 MHz; • 2 antennas from 200 MHz; • wheel metric to measure the coordinates of the acquired data. In such a configuration were acquired simultaneously: • Three sections monostatic (TX1-RX1, RX3-TX3, TX5-RX5) with 600 MHz antennas, • a section monostatic (TX2-RX2), with 200 MHz antenna, • Two sections bistatic (RX4-TX2, TX4-RX2) with 200 MHz antennas

**Conclusions:** Preliminary investigations have made it possible to verify that it is a "zero time" that one month was able to identify with certainty the presence of anomalies on the tracks due to a buried corpse. These data suggest to continue with further steps under the Protocol in order to ascertain the real usefulness of the method, even longer.

**Keywords:** Georadar; Cadaver; Human Remains

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# CRIME SCENE INVESTIGATION AND FORENSIC MINERALOGY APPLICATIONS AT GURPINAR (ISTANBUL - TURKEY) MURDER

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**Abstract:** A reliable CSI is the most important step of Forensic Investigation to find out the crime and cirminal. It is a fundamental legal principle to reach guilty from evidence and to judge the accused with the legally obtained evidence. In the recent years, using multidisciplanary studies are increased in Forensic Science by the development of science and technology. Compiling bioligical samples, finger prints researches, forensic materials is important to solve the crime, to ensure the justice and to relief. The scope of this study is to highlight the using of forensic mineralogy and crime scene investigations in forensic science. Fort his purpose, the mineralogical findings were compared. The mineralogical findings were collected from crime scene and from a buried 50-55 aged male body found on the sea cost of Büyükçekmece Gürpinar. Also some of the findings were taken from the houses and cars of suspects who can be related to the crime

**Keywords:** Forensic Mineralogy; Crime Scene Investigation; Autopsy

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# PERSONAL IDENTIFICATION FROM CONTAMINATED FECAL AND URINE MATERIALS: A CRIME SCENE MODELLING

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**Abstract:** Biological evidence in crime scenes has a great importance in both identifying perpetrators and revealing crimes. Although blood, semen, saliva are the most common biological material, urine and stool can also be rarely found in the crime scene. Urine and/or fecal samples may be either intentionally left behind or neglected as in the example of used toilet papers. This type of evidence is also valuable in sexual assault cases for DNA analysis in forensic identification. This study initially aims to demonstrate in which conditions the urine and fecal samples, therefore the results of the analyses can be affected. The second aim of this research is to analyze the bacterial contamination since the urine and stool have specific bacterial flora and furthermore the environmental factors also have an effect on this media. It is also evaluated in this research whether these bacteria affect DNA isolation and amplification or not, a false identification due to microorganisms in urine and stool might be possible or not. An experimental design was used considering a crime scene modelling. Human urine and stool samples of the volunteers were subjected to various environmental conditions. DNA was extracted using Chelex and QIAamp DNA Stool Mini Kit. Amplifications were carried out using AmpFISTR SGM Plus PCR Amplification Kit and the samples were electrophoresed on ABI 310 Genetic Analyzer. Saliva samples of the volunteers were also analyzed as controls. The results reveal that the urine and stool samples are significant and beneficial evidence for forensic identification in particular when there is not any other biological evidence in the crime scene.

**Keywords:** Crime Scene; Stool; Urine; DNA Identification; Bacterial Contamination; Turkey

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# INTERDISCIPLINARY FORENSIC INVESTIGATION OF DOCUMENTS: A PROTOCOL AND CASE STUDY FOR COMBINED EXAMINATION OF DNA AND FINGERPRINTS

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**Abstract:** Latent fingerprint detection techniques and sampling of biological traces for DNA-analysis can potentially be mutually deleterious. To maximize the results that can be obtained from traces on documents the effect of commonly used latent fingerprint detection techniques on DNA have been studied. These results were subsequently used to construct a methodology for combined biological trace and fingerprint examinations of documents. Here we present the resulting interdisciplinary approach that was developed at the Netherlands Forensic Institute. This protocol not only optimizes the combined examination of DNA and fingerprints but also allows for other document analysis techniques (ink/paper and handwriting comparison). The use of this new protocol is illustrated by a case study.

**Keywords:** DNA; Fingerprints; Document Examnination; Interdisciplinary Approach

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# IDENTIFICATION OF HUMAN REMAINS BY NEXT GENERATION SYSTEMS : A CEMETERY COMMON GRAVE CASE

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**Case Report:** Many bones have been discovered in a unmarked grave inside a cemetery together with some remains of old open coffins. DNA analysis was requested to verify the number of people from which the rests originated. Isolation of DNA from forensic samples is strongly conditioned by many factors such as wide variety of samples, degradation by environmental exposure, presence of PCR inhibitors or limited quantity of starting material. To overcome this problems for DNA extraction we used BTA™ lysis buffer that is a new formulation reagent (Applied Biosystems) designed for challenged forensic sample types such as Bone, Teeth, and Adhesive-containing substrates since it destroys more efficiently complex matrices. For PCR it was used the AmpFLSTR NGM SElect™ kit that amplifies the 5 new markers approved by the European Union Council for the expansion of the European Standard Set plus the highly discriminating SE33 and shows enhanced performance on degraded/inhibited samples and high tolerance to PCR inhibitors.

**Keywords:** Bones; BTA; NGM Select

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# ALLELE FREQUENCIES OF 9 STR LOCI OF SIX ETHNIC MINORITY POPULATIONS IN CHINA

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**Abstract:** STR analysis, the most direct and important test method of forensic biological samples, greatly widens the area of forensic science. The study of STR's polymorphisms in populations is the foundation of its forensic application. In order to study the forensic analytical value of 9 Non-CODIS system STR loci, the polymorphisms of these loci in 11 ethnic populations, which include Han from Guangdong, Zhuang from Guangxi, Miao from Guangxi, Yi from Guangxi, Hui from Guangxi, Jing from Guangxi, Maonan from Guangxi, Mulao from Guangxi, Gelao from Guangxi and Li from Hainan, were investigated. These 9 STR loci are comprised of D18S1364, D12S391, D13S325, D6S1043, D2S1772, D11S2368, D22-GATA198B05, D8S1132 and D7S3048. Research on genetic distance of 11 ethnic populations could not only be used to evaluate their genetic affinity and to enrich the research database of Chinese ethnic groups, but also to provide genetic background materials of the study of disease relations. Methods and results are as follow: The 2030 samples (Han 258, Zhuang 183, Yao 202, Miao 181, Mulao 199, Maonan 166, Hui 156, Jing 176, Yi 172, Gelao 166, Li 171) in this research were randomly collected from 10 minority places in Guangxi, Hainan, and Guangdong. DNA samples were tested by STRtyper-10F/G PCR Amplification system and ABI 3130xl Genetic Analyzer. The forensic parameters such as allele frequency, homozygotes (H), discrimination power (DP), power of exclusion (PE), matching probability (PM), polymorphism information content (PIC) and so on were calculated by Genepop 4.0 and Powerstats V 1.2. The result showed that D6S1043 locus had most alleles (15 altogether), and D11S2368 locus had least alleles (10 altogether). The highest allele frequency was D2S1772 locus 24 allele (as high as 0.3808). There were 4 detectable differences from Hardy-Weinberg expectations (HWE) of the nigh tested loci in 11 ethnic populations. They were D18S317 locus in Yao (P=0.0040), D2S317 locus in Hui (P=0.0002), D11S539 locus in Jing (P=0.012) and D2S1179 locus in Zhuang (P=0.0163). All of the nigh loci are highly polymorphic loci. The results demonstrate that the 9 STR loci are capable of the forensic human identification and parentage testing in the 11 ethnic populations. Arlequin 3.1 software was used to calculate the Nei's standard genetic distance (Ds) of 11 ethnic groups. A phylogenetic tree of 11 populations based on 9 STR loci was constructed by MEGA 4.0. The genetic distance between Mulao and Maonan was the closest (0.0002), followed by Zhuang and Maonan (0.0055), conversely, it between Yao and Jing was the farthest (0.231). The phylogenetic tree consisted of two main branches. One solely included Yao. On another branch, other 10 ethnic populations were clustering together.

**Keywords:** STR; Genetic Polymorphism; Genetic Distance

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# GENETIC POLYMORPHISM OF 17-STR LOCI IN FOUR MINORITY POPULATIONS IN GUANGXI OF CHINA

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**Abstract:** To investigate the genetic polymorphism of Y-chromosomal short tandem repeat (STR) loci in Jing, Yi, Yao and Zhuang minority populations from GuangXi Province, China. 17 Y-STR loci were co-amplified using AmpFlSTR® YfilerTM PCR Amplification Kit System, and the PCR products were analyzed by 3130xl genetic analyzer. Cluster and phylogenic tree analyses were conducted to show the genetic distance among the populations. There were 61 different haplotypes in 100 unrelated Yao males, 79 in 103 unrelated Jing males, and 91 in 107 unrelated Zhuang males. The haplotype diversities of Jing, Yi, Yao and Zhuang were determined as 0.9784, 0.9866, 0.9911, and 0.9956, respectively. Among these 4 minority populations, the genetic distance between Jing an Zhuang was the smallest(0.0391),while the genetic distance between Yi and Yao was the largest(0.3376).The 17 Y-STR loci in the 4 minority populations from Guangxi Province revealed a highly polymorphic genetic distribution, which show a high potential for population genetics and forensic practice.

**Keywords:** Y-Chromosome; Haplotype; Genetic Polymorphism; Genetic Distance; STR

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# THE SUCCESS RATE OF FORENSIC DNA-PROFILING OF CONTACT TRACES ON ADHESIVE TAPE

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**Introduction:** At the Netherlands Forensic Institute (NFI), adhesive tapes are examined in a multidisciplinary approach that includes analysis of the presence of fingerprints, fibers and/or biological traces. This research results in a relatively large number of samples with possible contact traces that are subjected to DNA-analysis (approximately 650 in 2008). A case file study was carried out in order to investigate the success rate of DNA-profiling of these samples with respect to the criminal context of the case. Analysis of these results may improve sampling techniques of tape and may increase the success rate of DNA-typing.

**Methods:** A case file study was carried out in which 65 forensic cases that involved sampling and DNA-typing of various kinds of tape were analysed. These samples of tape were divided into 4 subclasses (samples of rolls of tape, tape with visible traces of bite marks, tape with traces of fingerprints and tape ends (extremities)). Subsequently, the resulting DNA profiles were evaluated in the criminalistic context of the case.

**Results:**

1. DNA-profiling of samples taken from the inner parts of tape rolls (n=17) yielded predominantly mixed DNA profiles. Thirty percent of the samples showed evidence of the presence of foreign DNA (not matching the DNA profile of the victim).

2. Samples of possible bite marks (n=30) yielded 5 single-donor DNA profiles that were all dissimilar to the DNA profile of the victim.

3. Fingerprint-samples (n= 28) from the adhesive side of tape (evidenced by methyl violet staining) yielded predominantly single-donor DNA profiles of which 4 did not match the DNA profile of the victim.

4. From samples that were taken from the extremities of tape, approximately 10% (47 from 445) yielded DNA profiles that were suitable for comparison. Most of these DNA profiles matched the DNA profile of the victim, but 10 of these were dissimilar. The overall result of this study shows that 24 out of 544 analyses obtained from samples of 16 out of 65 cases (25%), were informative for meaningful comparison to DNA profiles of suspects and/or searches in the Dutch DNA-database.

**Conclusions:** Forensic DNA analysis of biological contact traces on tape is a time consuming process. This study shows that this research is worth the effort. In the forensic casework situation we obtained criminalistically relevant DNA profiles in approximately 25% of the cases. The results of this study offer promising new possibilities to further increase this success rate.

**Keywords:** Contact Trace; DNA; Tape; Fingerprint; Bite Mark

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# DECONTAMINATION OF FORENSIC CONSUMABLES USING ETHYLENE OXIDE

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**Introduction:** In 2009, the "German phantom case" showed impressively that current methods to sterilize consumables used in forensic laboratories are not suitable to guarantee their "DNA freeness". Ethylene oxide (EO) is described in the literature as an effective tool to destroy DNA, however little is known on the exact EO processing conditions which would allow the removal of extraneous DNA from consumables.

**Materials and Methods:** In the present study, different consumables such as latex gloves, cotton swabs and micro test tubes were spiked with relatively small amounts of saliva and blood (2 l) to simulate a real-life contamination scenario and with pure DNA (5l AmpFlSTR Control-DNA 007, 0.1 ng/l). In addition, cotton swabs with skin cells were prepared. EO treatment was performed for the duration of 3, 5, 7, and 10 hours in comparison to a gamma and electron beam radiation. After extraction of the samples, the DNA content was quantified using a real-time PCR based system. STR-Analysis was performed using a latest generation STR-kit to meet current sensitivity limits (PowerPlexESX17 kit).

**Results:** After 7 hours of EO treatment no DNA from gloves and swabs contaminated with saliva and blood, from tubes spiked with saliva and swabs containing skin cells could be recovered. Only DNA from blood placed inside the micro test tubes could not be destroyed completely. Gamma and electron beam radiation was not effective at removing DNA from consumables at all.

**Conclusions:** It could be shown that ethylene oxide treatment is capable of reducing realistic contamination of consumables. But conditions of the ethylene oxide treatment have to be adapted to the different consumables.

**Keywords:** DNA; Decontamination; Ethylene Oxide; Consumables

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# DEVELOPMENT OF 23-PLEX Y-SNPS TYPING METHOD BASED ON SINGLE-BASE EXTENSION AND CAPILLARY ELECTROPHORESIS TECHNOLOGY AND ITS APPLICATION IN FORENSIC SCIENCE

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**Abstract:** In order to develop a robust single nucleotide polymorphism (SNPs) typing assay with co-amplification and to type 23 human Y chromosome SNPs using SNaPshot kit, we drawn markers from the phylogenetic tree of Y chromosome: P164,P203,P148,P145,M89,P151,M216,P128,P157,P149,P131,P199,P123,P191,P201,M111,M9,P132,P200,P197,M119,P136,M134. All 23 Y-SNPs in one reaction were amplified; the pooled PCR products were purified. The minisequencing reactions were performed simultaneously for all 23 Y-SNPs with fluorescein-labeled dideoxynucleotides. And analyzed by capillary electrophoresis and multicolour fluorescence detection, 290 male Chinese in Guangdong were genotyped. A 23-plex Y-SNPs co-amplification system was developed. All of the Y-SNPs are polymorphic in Chinese. The gene diversity of the Y-SNPs ranged from 0.0137-0.4912. A total of 143 haplotypes were found, the haplotype diversity was calculated to be 0.9907. The 23-plex Y-SNPs system developed is efficient , high-throughput and appears to be suitable for forensic science and population evolution study.

**Keywords:** Forensic Biology; Single Base Extension (SBE); Minisequencing; Snapshot Kit; Single Nucleotide

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# COMPLETE MITOCHONDRIAL GENOME SEQUENCING OF ARCHIVAL SALIVA SPECIMENS FROM TAJIKISTAN, CENTRAL ASIA

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**Introduction:** Central Asia is a vast geographic region in the Eurasian heartland between the Caspian Sea on the west and China on the east. This area represents a historical crossroad of human migrations and one of the world centers where human civilization and culture were formed. However, our knowledge about the genetic landscape in different parts of Central Asia and the genetic background of numerous ethnic groups that inhabit this region remains fragmentary. There are two reasons why this region is especially important today for genetic studies. First, DNA data from Central Asia will contribute to the ongoing efforts in understanding the global human diversity. Second, the growth of criminality in the region during the last two decades, including the proliferation of human and narcotics trafficking appeals to the establishment of regional forensic DNA database that includes mtDNA and CODIS STR markers. The main goal of this project is to obtain the comprehensive data on genetic variation in several human populations from Central Asia. For the entire Central Asia, the reports on the complete mitochondrial genome sequences and the allele frequencies in the CODIS STR loci are unknown. Tajiks are the largest ethnic group in Tajikistan, a country in the southeastern part of Central Asia. The forensic DNA markers in Tajiks living in Tajikistan have not been previously studied as well.

**Materials and Methods:** The Tajik saliva specimens were collected from 100 unrelated adult donors in 1997-98. Informed consent and information about birthplace were obtained from all persons. The 1.5-ml whole saliva samples arrived from all four provinces of Tajikistan. Except during transportation, the samples were stored at -20C for approximately ten years. Then, the saliva samples were applied to FTA cards and these FTA cards were utilized for DNA extraction. The sequencing strategy was based on the multiplex PCR of the entire mitochondrial genomes with nine overlapping primer pairs in the primary amplifications followed by the secondary amplifications with 28 overlapping primer pairs. The mtDNA haplogroup recognition for the Tajik mtDNA sequences was based on a two step approach. First, the mtDNA control regions were assigned to the most-probable mtDNA haplogroups using mtDNAmanager, a web-based bioinformatics tool. Second, the final assignment of the Tajik mtDNA haplogroups was carried out by the comparison of the whole mitochondrial genome sequences to PhyloTree Build 11, a high-resolution comprehensive phylogeny of global human mtDNA variation.

**Results:** The routine analysis of mtDNA control region from the 15-year-old whole saliva samples failed to produce positive results in 40% of PCRs and left up to 15% of the Tajik mtDNA sequences unassigned to particular mtDNA haplogroups. The transfer of saliva from tubes to FTA cards assisted in removing PCR inhibitors and the multiplex PCR improved the yield of DNA products. The human mtDNA fragments with the size up to 0.75 - 2 kbp were successfully amplified that allowed the assembly of entire sequences of the mitochondrial genomes from Tajiks. The complete mtDNA sequencing classified the unassigned mtDNA haplotypes, corrected erroneous haplogroup recognitions based on the mtDNA control region sequences, and provided differentiation between individuals carrying the identical mtDNA control region sequences. It was determined that the majority of the Tajik mtDNA haplotypes are of West Eurasian origin with the minor admixture of East and South Eurasian lineages.

**Conclusions:** After long-term storage, saliva remains an important source of DNA for forensic and population studies. The complete mitochondrial genome analysis demonstrates a number of benefits for human identification that cannot be provided by the mtDNA control region comparison. These benefits include improved assignment of the mtDNA sequences from Central Asia to the mtDNA haplogroups and the greater power of discrimination between two individuals randomly selected among Tajiks.

**Keywords:** Mitochondrial DNA; Mitochondrial Genome; Central Asia; Tajik; FTA Card

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# FTA: THE NEXT DIRECTION

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**Abstract:** In the field of forensic sample collection and preservation the chemically treated FTATM products have become well established, offering an effective storage for a variety of sample types. The proprietary chemicals contained within the matrix not only capture and lyse the nucleic acids, but also protect and preserve the DNA when stored at room temperature. In modern forensic laboratories samples may be subject to a variety of processing methods in order to utilize the DNA held within them for identification purposes. However the quality of the DNA obtained may depend on how suitable the sample collection device used performed with the particular extraction method or amplification process. This presentation will discuss an independent study that was commissioned to compare the quantity and quality of DNA obtained from buccal samples using a range of commercially available DNA collection instruments with organic extraction, 'punch in' and 'direct' processing methods. Quantity of DNA from each device was evaluated using real time PCR. Quality was determined by STR profiling and specifications were set using US and UK DNA database loading criteria for human identification. In addition, to determine the suitability of each device for collection and preservation of DNA for forensic testing and convicted offender databasing the study provides a comparison of essential characteristics of each collection device, detailing: relative ease-of-use, process time and reproducibility. In addition an initial study has also been carried out to examine the storage properties of treated matrices. Blood and buccal samples which had been spotted on FTA paper for 22 and 13 years respectively were to be tested with both 'punch-in' and direct processing methods in order to ascertain quality of profile returned from each method. FTA is a Trademark of GE Healthcare Companies.

**Keywords:** FTA; Direct

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# DETERMINATION OF PENICILLIN G AND ITS MAJOR METABOLITES IN BLOOD BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY

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**Abstract:** Penicillin G belongs to the ß-lactam class of antibiotics, and is frequently used in human and veterinary medicine to inhibit the infections of bacteria and fungi. A fast method for the quantitative determination of penicillin G, penicilloic acid and penilloic acid in blood with high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) is presented. The procedure involves a simple protein precipitation step for a clean-up and the blood extract was directly injected onto the LC column. Chromatographic separation of the components was performed on a C18 column using 0.1% of formic acid in water and acetonitrile. The mass spectrometer was operated in the positive electrospray MS/MS mode. The limit of detection (LOD) of penicillin G, penicilloic acid and penilloic acid were 2.0, 0.5 and 0.1 ng/mL, respectively. The method was applied to the analysis of blood samples taken from rat receiving penicillin G at the dose of 20 mg/kg. The stability of the penicillin G in blood was evaluated at different temperatures.

**Keywords:** Penicillin G; Penicilloic Acid; Penilloic Acid; LC-MS-MS; Stability

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# POSTMORTEM INVESTIGATION OF MASS FIRE CASUALTIES IN A BUILDING: A CASE OF ALLEGED ARSON

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**Introduction:** A fire is an important major cause of mass disasters, involving various forensic issues. There are potential dangers of mass fire disaster in densely populated areas as well as stores, and amusement and hotel facilities. Thus, a forensic case study of mass fire casualties is important for disaster prevention. We report the forensic autopsy findings of 16 fire victims in an alleged arson case in a building.

**Case Report:** At approximately 3:00 a.m., a fire broke out in the middle of a 'private video parlor' on the ground floor of a building, and 16 men in their twenties to sixties were killed. The fire was alleged arson. The parlor had only one entrance/exit, without an emergency exit or a sprinkler system. Fifteen victims were found dead in the passage (n=4) and in the rooms (n=11). A victim who was found unconscious in a room near to the entrance was resuscitated, underwent oxygen therapy under the diagnosis of CO intoxication, but died on the 14th day in the hospital. All victims underwent forensic autopsy. Autopsy findings: Burns were localized (<20% of body surface) in most victims, except for 3 victims found dead between the entrance and the estimated fire-outbreak site: two victims had 2nd to 3rd degree burns over about 30% and 75% of the body surface with partial charring, and one victim sustained 3rd to 4th degree whole body burns with charring and airway burns. Seven victims found around the possible fire-outbreak site had minor 2nd to 3rd degree burns over about 5-20 % of the body surface and/or mild airway burns without charring. The other victims found in inner rooms did not show any significant burns. These found-dead victims had substantial amounts of soot in the airway. The hospital death case had minor 2nd to 3rd degree burns over about 10 % of the body surface, whole body edema, advanced pulmonary congestion and edema, and encephalomalacia, without any other pathology. Toxicological findings: Blood carboxyhemoglobin saturation (COHb) was 50-85%, showing a tendency to be higher for victims found in the inner area. Three out of four victims found dead in the passage had lower COHb levels of 50-60%, while 11 victims found dead in the rooms had higher COHb levels of 60-85%. In found-dead cases, blood cyanide levels were sublethal (0.24-0.76 μg/ml in left heart blood), moderately correlated to COHb for right heart blood ($r=0.66$, $p<0.01$), but were relatively higher for victims found around the estimated fire-outbreak site. Blood ethanol was positive in two cases (< 1 mg/ml). A trace of toluene was detected in the blood of 14 cases; however, metabolites of organic solvent chemicals (hippuric acid, methyl hippuric acid and mandelic acid) in urine were within reference intervals. Acetone was only slightly positive in all cases. Toxicological screening for drugs using gas chromatography-mass spectrography was negative. The hospital death case had a COHb level of 4.1% under oxygen therapy 6 h after hospitalization. Toxicological findings were negative at autopsy, except that amobarbital due to clinical intervention was detected.

**Discussion and Conclusions:** In the present case of a mass fire disaster, most bodies were intact; thus, identification was completed by the police investigation without difficulty, supported by DNA analysis. The major lethal factor was CO intoxication due to smoke for all victims, but burns were more severe for victims in the area between the possible fire-outbreak site and the entrance, and blood COHb and cyanide levels showed different distributions, possibly depending on individual situations during the fire. There was no evidence of thinner, alcohol or drug abuse as a possible cause of an accidental fire outbreak. These observations contribute to the reconstruction of the fire disaster, and suggest possible survival by proper disaster measures, which include smoke extraction, an escape route and a sprinkler system as well as a fire alarm system for earlier escape from an airtight building.

**Keywords:** Mass Disaster; Fire Fatality

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# PREHOSPITAL TREATMENT OF OPIOID OVERDOSE IN COPENHAGEN - IS IT SAFE TO RELEASE ON-SCENE?

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**Introduction:** In the prehospital setting opioid overdose is often treated with naloxone. In our physician-based medical emergency care unit (MECU) we have adopted a release-on-scene policy, where patients are released on scene if no residual signs of opioid intoxication are found after treatment. The aim of this study was to describe our experience with the release-on-scene policy used during a 10-year-period with focus on the frequency of rebound opioid toxicity.

**Methods:** Data were prospectively recorded in our MECU database and we reviewed all cases of opioid overdose between 1994 -2003. The MECU database was cross-referenced with the Central Personal Registry. For patients who died within 48 hours of MECU contact we reviewed the forensic autopsy reports to establish whether rebound opioid toxicity was likely.

**Results:** We found 4762 cases of acute opioid overdose. In 3245 cases positive identification was obtained. Over this ten year period fourteen patients who were released on-scene after having been treated with naloxone died within 48 hours, but only in 3 of these we found a rebound opioid toxicity to be the likely cause of death, corresponding to 0.13% of those 2241 released on scene who were identified.

**Conclusions:** Prehospital release on-scene after naloxone treatment is associated with a low risk of death due to rebound toxicity.

**Keywords:** Overdose; Heroine; Naloxone; Prehospital; Patient Safety; Opioid; Toxicity

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# COMPARISON OF TWO SAMPLES OF ALCOHOL IN BLOOD AND VITREOUS FLUID IN THE BODIES REFERRED TO FARS PROVINCE FORENSIC CENTER (SOUTH OF IRAN) IN 2010

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**Abstract:** The concentration of ethanol measured in postmortem blood needs to be interpreted in relation to whether the person had consumed alcohol and has exceeded some threshold limit. However, interpreting postmortem BAC results and drawing correct conclusions about ante mortem levels is fraught with difficulties as under some circumstances alcohol might be produced after death by microbial activity. In the case of ethanol, the blood samples should be taken from a femoral vein and whenever possible additional specimens, such as urine and vitreous humor (VH), should also be obtained and sent for analysis to be able to have the best interpretation. 167 Specimens of femoral vein blood and vitreous humor were analyzed. In this study, direct injection and gas-chromatographic techniques were employed to quantitate the ethanol concentrations. These two concentrations were then compared and the BAC/VHAC ratio was evaluated. Among these specimens, there were 142 cases in which we have found ethanol in blood but not in vitreous humor. Vice versa we have found 2 cases by positive VHAC but negative BAC. The average blood ethanol concentration was 61.5 mg% and the average ethanol vitreous humor concentration was 127 mg%. On the other hand the ratio was measured as 0.7. The similarity in the result of the post mortem cases reinforce assertion that co analysis of vitreous humor and blood is important to interpret ante mortem results .

**Keywords:** Ethanol; Vitreous Humor; Blood; Autopsy; Fars Province; Iran

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# TRACE EVIDENCE'S SYNTHESIS APPLICATION IN ROAD TRAFFIC ACCIDENTS BY ESCAPED

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**Abstract:** Traffic accident evidence is refers to the traffic accident to process the personnel to collect, the gain to be able legally to prove the traffic accident real situation the material, the matters and the trace. This article summarized the transportation to cause trouble the condition which the escape documents concept and should have, to cause the transportation to cause trouble the escape document some subjectively, the objective factor. This article mainly from describes each kind of trace evidence characteristic to embark, through to each kind of trace evidence examination and the application, elaborated the trace evidence synthesis applications importance, to recognize cause troubles the suspicion vehicles and the cause troubling suspect provides the theory the basis and the method. Through the consult massive correlation data, cause troubles the escape accident scene record, inquired that the handling a case personnel understood are familiar many illustrative case, carries on the classification the scene each trace evidence examination appraisal method, to compile, mainly from the tire trace, the vehicles trace, the paint, the human body trace and other traces and so on each kind of trace evidence application to cause troubles the escape to carry on the analysis, the elaboration, the reproduction traffic accident scene, cause troubles in the escape document for the road traffic to recognize that cause troubled the suspicion vehicles and the cause troubling suspect has provided the method and the mentality, thus the reappearance traffic accident scene, promulgated traffic accidents truth directly, enhanced the transportation to cause trouble the accuracy which and the fairness the escape document responsibility recognized.

**Keywords:** Traffic Accident by Escaped; Trace Evidence; Synthesis Application

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# MICROANALYSIS OF CARBON MONOXIDE IN PUTRID BLOOD AND HEPATIC TISSUES BY HEADSPACE GAS CHROMATOGRAPHY AND MASS SPECTROMETRY

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**Introduction:** During the last twenty years, several methods for the determination of carboxyhaemoglobin (COHb) in fresh blood of postmortem have been published, which include HS/GC/TCD, CO-Oximeter, Capillary Electrophoresis(CE) and so on. In China, the fact is that most of the samples picked from the cadaver in CO poisoning cases are putrid, because the cadaver was found days or months after the death. The detection of COHb% in putrid blood is therefore difficult for toxicologists.

**Methods:** Thus we introduce a method, head-space Gas Chromatography and Mass Spectrometry, for the determination of COHb% in blood, especially when the blood is putrid. The experiment was performed by making male rabbits inhale CO in the exposure apparatus. Immediately after the death of the rabbits, blood was collected and analyzed for COHb% by means of HS/GC/MS. Then it was preserved in different temperatures, and was detected after it had been preserved for 7 days, 14 days, 30 days and so on.

**Results:** Using a packed Molecular Sieve Column, we are able to quantify CO levels down to 0.01% in the air and COHb levels down to 0.2% in small blood samples. There was a good positive correlation(r = 0. 9995) between COHb% and the CO content in the blood examined. The method can exclude the strong effect of temperature on the COHb%, thus we detected the COHb% in the putrid blood as the same result as detected in the fresh blood on the day the rats were poisoned by CO gases (RSD %< 5%).

**Conclusions:** This report might be useful for identifying the cause of the death in cases of putrefaction, to find out if the one died from the carbon monoxide poisoning or not.

**Keywords:** Forensic Toxicological Analysis; Putrid Blood; Carbon Monoxide Poisoning; COHb

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# TOXICOLOGICAL FINDINGS IN SUICIDES DUE TO HELIUM AND ARGON

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**Introduction:** Numerous death cases due of asphyxiation by a toxic or oxygen deficient gas atmosphere have been described. However especially cases involving inert gases like helium are often presented without toxicological findings. We report about observations on two suicides, one by helium and the other one by argon inhalation.

**Materials and Methods:** During autopsy gas samples from the lungs were collected directly into headspace vials by a procedure ensuring minimal loss and dilution. Analyses were performed by headspace gas chromatography / mass spectrometry (HS-GC/MS) in which the usual carrier gas helium was replaced by nitrogen.

**Results:** We obtained positive results for argon, but in the case involving helium we saw results similar to environmental air.

**Discussion:** In principle use of HS-GC/MS enables to detect inert gases like argon or helium. However, a number of factors may later influence the results as e.g. a longer period of time between death and sampling or pre-analytical artefacts during sampling of such highly volatile substances.

**Keywords:** Suicide; Helium; Argon

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# SIMULTANEOUS IMMUNOASSAYS ON BIOCHIP PLATFORM FOR MULTIPLEX SCREENING OF BENZODIAZEPINES, METHADONE, OPIATES AND PHENCYCLIDINE

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**Abstract:** Screening techniques are often used in the initial stages of toxicological analysis; they are followed by analytical confirmation of positive results. The use of rapid and reliable automated analytical methods for simultaneous screening of analytes is advantageous in test settings. Evidence biochip technology provides a platform for the simultaneous determination of multiple analytes from a single sample. This leads to an increase in the results output and a reduction in the consumption of sample/reagents. This study reports the analytical performance of the simultaneous immunoassays for benzodiazepines, methadone, opiates and phencyclidine in urine on a biochip platform. The core of the technology is the biochip (9mm x 9mm) where the capture molecules are immobilised and stabilised defining arrays of test sites. The biochip is also the vessel for the immunoreactions. The simultaneous competitive chemiluminescent immunoassays were applied to the fully automated analyser Evidence according to the manufacturer's instructions. The system incorporates dedicated software to process, report and archive the multiple data generated. This biochip array presents two test sites for benzodiazepines. The specificity values of the assays, expressed as % cross-reactivity, were as follows: for the benzodiazepine assay 1 [(cut-off 200 ng/ml, 100% (oxazepam)] ranged from 25.6% (2-OH-ethylflurazepam) to 1818.2% (alprazolam), the benzodiazepine assay 2 [(cut-off 200 ng/ml), 100% lorazepam] exhibited a cross-reactivity of 29.9% for desalkylflunitrazepam and 68.7% for clonazepam. The assay for methadone (cut-off 300 ng/ml) presented 100% cross-reactivity for methadone HCl. The opiates assay [(cut-off 300ng/ml, 100% (morphine)] ranged from 17%(hydrocodone) to 1500%(6-MAM). The phencyclidine assay (cut-off 25 ng/ml) exhibited a cross-reactivity of 100% for phencyclidine and 90% for tenocyclidine. For the four immunoassays, the total imprecision (n=80) was %CV<17% for different levels. Urine samples assessment showed the following average %agreement with GC/MS: >83.6% (benzodiazepine class, n=506), 94.4% (methadone assay, n=162), 89.1% (opiates assay, n=322) and 83.3% (phencyclidine assay, n=144). Data indicate applicability of the Evidence biochip array kit to the simultaneous detection of for benzodiazepines, methadone, opiates and phencyclidine from a single urine sample and represents a useful analytical tool for the rapid screening of batches of samples in drug testing settings.

**Keywords:** Biochip Array; Benzodiazepines; Methadone; Opiates; Phencyclidine; Multiplex Screening

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# VALIDATED METHOD FOR DETERMINATION OF WARFARIN IN BLOOD BY UPLC-MS/MS

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**Introduction:** Warfarin (Varfine®), as a vitamin K antagonist, is one of the most commonly prescribed anticoagulant drugs for the prophylaxis and treatment of venous and arterial thromboembolic disorders (3rd anticoagulant with higher number of packages sold in the National Service of Health, Portugal). Warfarin is also used in high doses as poison for rodents (rodenticide). It was with this purpose that it was introduced in the market in 1948. Some authors refer that warfarin is the most used oral anticoagulant world-wide. This work presents a validated method developed for the determination of free warfarin in whole blood by ultra performance liquid chromatography combined with tandem mass spectrometry (UPLC-MS/MS).

**Methods:** Blood samples, after being spiked with internal standard (zolpidem-d6) and prepared using solid phase extraction (Oasis® HLB, 3cc, 60mg) were analyzed by UPLC-MS/MS. The chromatographic separation was performed on a Waters Acquity UPLC® HSS T3 column (100 x 2.1mm i.d., 1.8µm particles), with a gradient mobile phase consisting of acetonitrile and formic acid 0.1%, at a flow rate of 0.5 mL/min. The detection was carried out using an Acquity™ TQD tandem - quadrupole MS, equipped with an electrospray ionization (ESI) source operating in positive mode. Quantification was achieved using multiple reaction monitoring mode (MRM) for the transitions m/z 308.9>162.8 and 308.9>250.8, for warfarin, and m/z 314.5>235.3 for zolpidem-d6.

**Results:** The calibration curve obtained with whole blood was linear between 5 to 1000 ng/ml, with a correlation coefficient (r2) of 0.9971. The analytical thresholds of the method were studied and values of 4 ng/mL and 11 ng/mL were obtained for the detection and quantification limits, respectively. This method meets the analytical validation parameters usually accepted internationally and adopted by the Forensic Toxicology Laboratory (INML, I.P. - Centre Branch) in terms of selectivity, sensitivity, precision, accuracy and recovery.

**Discussion and Conclusions:** The authors developed and validated a selective, sensitive and fast method for detection and quantification of free warfarin in blood samples by UPLC-MS/MS, allowing the Forensic Toxicology Laboratory to reply to the requests in the scope of Medico- Legal activity.

**Keywords:** Warfarin; Method Validation; UPLC-MS/MS

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# SUICIDAL ASPHYXIATION WITH HELIUM: A CASE REPORT WITH CONSIDERATIONS ON HELIUM DETECTION TECHNIQUES

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**Introduction:** Reports detailing suicides by helium inhalation have recently emerged in western literature; however, this method of suicide is very rare in Japan. Helium is an inert gas and has no biological effects and therefore the cause of death is considered asphyxia by inhalation of the gas. Unfortunately routine toxicological examinations do not encompass the detection of helium. Thus the inhalation of helium can only be determined using circumstantial evidence at the scene of death. Only a limited number of reports of the analytical detection of helium in autopsy samples exist in the literature but none cover the issue of quantitative analysis.

**Case Report:** 42-year-old male was found dead in his bedroom with a plastic bag over his head—the bag being sealed at the neck with rubber bands. The bag was connected to a 400 L helium gas tank outlet by a polypropylene tube. Condensation was observed inside the plastic bag. Although an ambulance was called, no resuscitation attempts including artificial ventilation and oxygen therapy were attempted. External examination of the body revealed very slight "ligature marks" on the neck caused by the rubber bands and only a few petechiae on the conjunctivae. In contrast autopsy findings revealed no evidence of fatal pressure on the neck. The face skin was only slightly congestive and there was no petechia on face and no hemorrhage in the cervical muscles. Autopsy revealed no significant findings except for pulmonary edema. Toxicological examinations of blood and urine were unremarkable. For the detection of helium in autopsy samples, blood, lung, cerebrospinal fluid (CSF), and gaseous contents in trachea and stomach were collected. Analysis was performed using gas chromatography with a thermal conductivity detector. The head-space method was used for analysis of blood, lung, and CSF.

**Results:** Helium was detected in the blood and lung at a concentration of 0.0017 mL/g and 0.35 mL/g, respectively. No helium was detected in CSF. Concentration of helium in the gaseous contents in trachea and stomach was 10.5% (v/v) and 7.4% (v/v), respectively.

**Discussion and Conclusions:** Although the solubility of helium in blood is very low, we were successful in detecting blood-helium levels. We concluded that the cause of death was asphyxia by helium gas inhalation and that the detection of helium in blood was evidence that the victim had inhaled helium gas prior to death.

**Keywords:** Helium; Suicide; GC-TCD

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# CYANIDE POISONING DEATHS DETECTED AT THE NFS HQ IN SEOUL OF KOREA : A SIX YEAR SURVEY (2005-2010)

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**Abstract:** The records of 255 cyanide poisoning deaths from National Forensic Service(NFS) headquarter located in Seoul of Korea, from 2005 to 2010 were retrospectively reviewed. The mean age was 41.88±13.09 and range was 6-80 years(unknown 7 cases). Number of death of male and female was 200 and 53, respectively(unknown 2 cases). The largest number of cases occurred in those 40-49 years (n=81, 31.8%) followed by the age group 30-39 years (n=51, 20.0%), 50-59 years (n=44, 17.2%) and 20-29 years (n=43, 16.9%). Total death numbers of other age groups (below 10, 10-19, 60-69, 70-79, over 80 years and unknown) were 36 and occupied only 14.1%. Ratio of 97.3% of all cyanide poisoning death was due to suicide and 14.5% of the total deaths were received medical treatment. The most frequent site of ingestion was their own residence (n=120, 47.1%) and most of the route of administration was oral(n=252, 98.8%). From total 255 cyanide poisoning cases, white powders were submitted for analysis in 92 cases. Potassium cyanide and sodium cyanide occupied 51 and 41 cases, respectively. This study showed that poisoning deaths due to cyanide is one of the major public health problems in Korea. And enforcement of regulation and safety education to prevent cyanide poisoning should be carried out by government.

**Keywords:** Cyanide; Poisoning; Suicide

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# ORGANOPHOSPHORUS PESTICIDES. VALIDATION OF A QUALITATIVE ANALYTICAL METHOD IN BLOOD SAMPLES BY GC/MS

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**Abstract:** The organophosphorous ester insecticides (OP) were first synthesized in 1937 by a group of German chemists led by Gerhard Schrader. Many of their trial compounds proved to be exceedingly toxic and unfortunately under the management of the Nazis in World War II, some were developed as potential chemical warfare agents. Today, there are some 200 different OP's in the marketplace. Taking into account their characteristics and their extensive use in agriculture, it is critical that users follow all safety recommendations. However, evidence shows that serious cases still occur, often as a result of voluntary intoxication. The mechanism by which the OP's elicit their toxicity is associated with the inhibition of acetylcholinesterase, the enzyme responsible for the destruction and termination of the biological activity of the neurotransmitter acetylcholine (Ach). With the accumulation of free, unbound Ach at the nerve endings of all cholinergic nerves, there is continual stimulation of electrical activity. The signs of toxicity include those resulting from stimulation of the muscarinic receptors of the parasympathetic autonomic nervous system (increased secretions, bronchoconstriction, miosis, gastrointestinal cramps, diarrhea, urination, bradichardia), those resulting from the parasympathetic divisions of the autonomic nervous system as well as the junctions between nerves and muscles (causing tachycardia, hypertension, muscle fasciculation, tremors, muscle weakness, and/or flaccid paralisys) and those resulting from effects on the CNS (restlessness, emotional liability, ataxia, lethargy, mental confusion, cyanosis, coma). Considering that in most cases toxicologists are confronted with the need to confirm the involvement of these compounds in cases of voluntary intoxication, the authors present the results of the validation studies for demonstrating the suitability of an analytical method used in routine laboratory to detect and confirm the presence of a group of OF's in post mortem blood samples. Samples were prepared by using solid phase extraction (Oasis HLB cartridges®) and were analyzed by GC/MS. The study focused on all parameters included in the validation procedure for qualitative methods in place in our forensic toxicology laboratory (selectivity, specificity, analytical thresholds, extraction efficiency, robustness and carryover), and the method has proven to be suitable for the intended.

**Keywords:** Pesticides; Organophosphorous; Validation; GC/MS.

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# DETERMINATION AND VALIDATION OF PROPOFOL IN BLOOD AND APPLICATION TO REAL SAMPLES

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**Abstract:** Propofol was commonly used as an anaesthetic agent in the induction and maintenance of anaesthesia, but now categorized as controlled drugs in our country because of high incidence of drug abuse. The present study describes liquid-liquid extraction (LLE), gas chromatography/mass spectrometry (GC/MS) assay, method validation and application to whole blood samples from cadaver cases for analysis of propofol. One mL of whole blood samples (triplicate), 30 µl of thymol (10 µg/mL) as the internal standard, 0.5 mL of 0.05 M phosphate buffer (pH 6.0) and 0.2 mL of 0.1 M sodium hydroxide and 5 mL of chloroform-ethylacetate (70:30, v/v) were mixed and extracted. After centrifugation, the organic layer was evaporated to dryness under nitrogen and reconstituted with 100 µl methanol. One µl was injected into the capillary column of the GC-MS system. The method was specific and sensitive and the regression curves were linear with a range of 0.05-2 µg/mL. The method was accurate and precise with intra-assay and inter-assay precision. This fully validated method was applied to whole blood (n=130) collected from cadaver cases in National Forensic Service (NFS) from 2005 to 2010. Propofol alone were detected in 49 out of 130 death cases and other drugs frequently combined with propofol were lidocaine (n=53), atropine (n=30), chlorpheniramine (n=18), tramadol (n=10), valproic acid (n=9), ketamine (n=8) etc. The concentrations of propofol from cadaver cases (n=48) ranged from 0.05 to 8.83 µg /mL (average 1.66) in heart blood and ranged from 0.08 to 8.65 µg /mL (average 1.71) in femoral vein blood, respectively. For the evaluation of post mortem redistribution of propofol, the ratio of heart to femoral vein blood from simultaneously collected heart and femoral vein blood in 15 death cases were investigated. This paper also discussed the concentrations of propofol according to cause of death and drug abuse or suicide patterns of propofol.

**Keywords:** Propofol in Blood; GC/MS; *Post Mortem* Redistribution

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# DETERMINATION OF CLOZAPINE IN PSYCHIATRIC PATIENTS NAILS

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**Introduction:** In drug analysis nails are an unconventional biological sample compared to blood or urine, however, their unique qualities and attributes such as longer time limit for disintegration and more stability than blood or urine, caught the attention of researchers and forensic examiners in recent years. A Benzodiazepine antipsychotic drug, clozapine, which is widely used in the treatment of schizophrenia, was chosen to develop a LC-MS/MS method in China firstly. Ten specimen nail clippings were detected in this experiment to look for possibilities and applicability in detecting illegal drug in forensic science.

**Methods:** Frozen mill coupled ultrasonic technique was used in the pretreatment of nail. The analysis was performed by positive electrospray ionization with multiple reactions monitoring mode. The limit of detection for clozapine was 50pg/mg when 5mg nail clippings were processed. The calibration curves were linear over a range of 0.5-50ng/mg. Results of the specimen nails analysis of clozapine users were also presented.

**Results:** Ten specimens were obtained from Shanghai Mental Health Hospital. The samples belonged to patients, whose cure dosage of clozapine ranged from 25 to 300mg per day, lasting more than 9 months. Concentration of clozapine in nails ranged from 1.60 to 12.30ng/mg. Clozapine was detected in the same individuals' hairs by GC/MS, concentration of it ranging from 16.7 to 59.2ng/mg. The correlation between the concentration of clozapine in nails and in hair was strong (correlation coefficient is 0.901). The correlation between the concentration of clozapine in nails and the dosage was weak. Nor-clozapine, major metabolite for clozapine, was identified. The proportion between response values of nor-clozapine and clozapine ranged from 16.63 to 20.92%.

**Comments:** This study established that drugs are incorporated into growing nails at levels similar to those in hair. The initiative use of frozen mill coupled ultrasonic technique notched a higher recovery during release of the drug from nail clippings, and kept it more stable and reliable by subzero temperature. And metabolite of clozapine got into the nail in a consistent mode measured simply by response values of mass spectrum. It enables us to evaluate that drug analysis of nails could be useful in illegal drug detection and therapeutic drug monitoring in cases where hair may be unavailable. But more research is clearly required in this area.

**Keywords:** Nail; Clozapine; Frozen Mill; Liquid Chromatography-Tandem Mass Spectrometry

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# QUANTIFICATION OF ALL THREE KETONE BODIES TO DETERMINE THE CAUSE OF DEATH

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**Introduction:** Ketone bodies are known to be elevated in alcoholism, diabetes mellitus and hypothermia but normally they are only measured in living humans and not postmortally although there are often autopsies of alcoholics or diabetics without detectable cause of death. We determined all three ketone bodies (acetone, acetoacetate and ß-hydroxybutyrate (ß-OHB)) in different sampling collectives to identify a ketoacidotic death.

**Materials and Methods:** Ketone bodies were analysed in fatal cases of alcoholism, diabetes mellitus, hypothermia and in a control group in five different matrices: blood of the femoral vein, blood of the heart, vitreous humour, cerebrospinal fluid and urine. Therefore ß-OHB was enzymatically converted into acetoacetate and the latter was thermically changed into acetone which can be detected with head-space gas-chromatography / flame ionization detection.

**Conclusions:** The method was validated according to the guidelines of the GTFCh and shows linearity for 1-3,000 mg acetone/l, 10-10,000 µmol acetoacetate/l and 10-30,000 µmol ß-OHB/l. Differences in the ketone body concentrations in the sampling collectives and in the different matrices will be discussed as well as data for exclusion of a ketoacidosis.

**Keywords:** Ketone Bodies; *Post mortem*

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# BODY PACKING: FATAL CASES DUE TO COCAINE OVERDOSE

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**Case Report:** Body packing is a recognized means of international drug smuggling. Body packers are also known as "swallowers," "internal carriers," "couriers," or "mules". Body packing is the term used for the intracorporeal concealment of illicit drugs mainly cocaine, heroin, cannabis, amphetamines and methamphetamines. The first case was reported in 1973, describing a patient who had swallowed a condom filled with hashish. Body packers usually carry about 1 kg of drug, divided into small packets of 8 - 10 g each, although persons carrying more than 200 packets have been reported. Each packet of illicit drug contains a life-threatening dose of the drug. These drugs are wrapped in the forms of capsules, condoms, balloons, plastic bags, or finger of latex gloves and located in various anatomic cavities or body orifices in order to get across borders without being detected. The authors present two cases of body packing with cocaine, which had a fatal outcome. Toxicological analysis of illicit drugs were performed in blood (cases1and 2), urine and gastric content (case 2) belonging to the victims who were autopsied at the Medico-Legal Office of Angra do Heroísmo (INML, I.P.). To the postmortem specimens were applied the validated analytical procedures for drugs of abuse (solid phase extraction followed by gas chromatography/mass spectrometry analysis), used in the routine casework at the forensic toxicology department of INML, I.P.. Cocaine, benzoylecgonine and ecgonine methyl ester were found in blood (cases 1 and 2), urine and gastric content (case 2), ?9-tetrahydrocannabinol-11-oic acid was found in blood, urine and gastric content (case 2). The number of undetected cases is unknown and the percentage of intoxication may actually be decreasing as packet production improves. Though being at a high risk, only a few body packers die regarding the toxicity due to leakage of an internally concealed container and most of them carry their cargo successfully. Forensic pathologists sometimes discover the concealed drug containers through autopsy of some dead cases with unknown causes.

**Keywords:** Body Packing; Cocaine Overdose; GC/MS

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# ETG HAIR ANALYSIS DEVELOPING A LC/MS/MS METHOD

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**Introduction:** The determination of Ethyl Glucuronide (EtG) in blood, urine and hair may have an important forensic medical application. As a matter of fact EtG is a sensitive and specific marker of ethanol intake and permits the widening of the detection time frame. This could be very interesting to know the alcoholic consumption in past period for different purpose: withdrawal treatment, driving license reissue/renewal, minor adoption, liver transplant and so on. The detection of this molecule in keratin matrix is important to determine the alcohol consumption after the death. The laboratory of Forensic Toxicology of the University of Brescia has worked on chromatographic and mass spectrometry instruments for optimization of triple quadrupole LC/MS/MS method condition for detection EtG in spiked hair. After the validation method, we analysed n. 18 hair samples, collected from autopsy performed by our Forensic Institute of Legal Medicine; for each autopsy was performed alcoholemic analysis too, by a routine method, obtaining negative results for all. A comparison between EtG and alcohol results in all samples was made.

**Methods:** Equipment -Agilent 1260 Infinity LC system consisting of Binary Pump with integrated degasser, High performance autosampler with thermostat and thermostatted column compartment. - Agilent 6460 Triple Quad LC/MS. LC method Solvent A: Water + 0,01% Formic Acid Solvent B: ACN + 0,01% Formic Acid Flow: 0,3 mL/min Gradient: 0 min. 2% B, 7 min. 95% B, /,1 min. 2% B Stop time: injection 10 µL, needle wash in flush port for 40 sec. Column: Inertsil ODS-3 (100 × 3.0 mm - 3 µm) temperature 40°C. MS method Source: ESI negative. Capillary: 3000 V Gas flow: 13 L/min. Nebulizer: 40 psi Gas temp.: 350 °C. Sheath gas temp.: 375°C. Sheath gas flow: 12 L/min. Noozle voltage: 500 V. Sample treatment The treatment of hair sample was as follows: to 100 mg of washed (dichloromethane followed by methanol, 1 mL each) and cut (1-2 mm) material, 700 µL of water, 20 µL of internal standard solution (D5-EtG, 500 µg/L) and 20 µL of methanol were added. Sample were incubated at 25°C overnight and then ultrasonicated for 2 h. Finally, 10 µL were analyzed by LC/MS/MS in negative ion mode. For method validation to an aliquot of blank hair (100 mg) were added 700 µL of deionized water, 20 µL of internal standard solution (0.5 mg/L) and 20 µL of appropriate EtG working solution. Four replicates for each calibration level: 3, 5, 10, 20, 40, 100, 200, 1000, 2000 pg/mg were analyzed. Intra- and interday precision was calculated analyzing the QC samples (5, 20, 30, 40 and 100 mg/pg) in five replicates for four days. The surviving ions of EtG and D5-EtG were monitored together with the following MRM transitions: m/z 221 ?75, m/z 221 ? 85 (EtG) and m/z 226 ? 75, m/z 226 ? 85 (D5-EtG).

**Results:** The condition analyses were performed on the parameters of linearity, reproducibility of injection, detection limit and quantitative limit. It was determined that good linearity (0.998) and injection precision were obtained. Only two samples resulted positive for EtG in hair (cut-off EtG 30 pg/mg).

**Keywords:** Etg Hair Analysis LC/MS/MS

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# A RETROSPECTIVE ANALYSIS (2009-2010) OF TOXICOLOGICAL FINDINGS IN SUICIDE CASES

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**Abstract:** A retrospective study (2009/2010) of all cases of death due to suicide and submitted for toxicological analysis in the Forensic Toxicology Laboratory of the National Institute of Legal Medicine - Centre Branch (STF-C) was undertaken. The evaluated data was obtained using the Laboratory Information Management System STARLIMS® (STARLIMS Corporation), used at STF-C. Further processing of the information was achieved using Excel (Microsoft Corporation). A total of 525 cases (16% of total) were identified as resulting from suicide. Age of victims ranged between 13 and 96 years. 409 individuals (78%) were male (mean age?=?56?years, range 16-95) and 116 (22%) female (mean age=54, range 13-96), focusing in the range between 71 and 80. The cases over 61 years totalized 214, accounted for 41% of all suicides reviewed. The cases concerning younger victims, less than 30 years, accounted for 10% of all suicides reviewed. Forms of suicide included hanging, drowning, self-induced traumatic injuries, poisoning, and the use of firearms. The presence of alcohol was evaluated in 93% of the cases, medicines in 78%, drugs of abuse in 50% and pesticides in 38% The authors present an evaluation of the toxicological findings in cases of death due to suicide that were submitted for analysis at STF-C between 2009 and 2010. Aspects like age, sex, type of suicide, prevalence of drugs, within other aspects, were considered.

**Keywords:** Suicide; Toxicological Analysis

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# AN UNUSUAL COMPLEX HOMICIDE, INVOLVING STRANGULATION AFTER OPIOID INTOXICATION

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**Introduction:** Fentanyl and Buprenorphine are opioid analgesics, their transdermal administration is widely used to control pain. Due to this simple way of administration, a large number of accidental fatalities are described. We report an unusual case of an homicide with a combined system of acute poisoning and strangulation. The case A 78-years-old- woman and her husband were found dead in the bedroom of their apartment. On the woman's body there were 53 fentanyl and buprenorphine patches (13 of Durogesic, 18 Transtec 30 and 22 Transtec 20) spread across the chest, the back, the abdomen and the lower limbs. On the woman's neck there was a ligature mark (histologically confirmed). At autopsy the Authors found injuries that pointed to an acute mechanical asphyxia. The woman was terminally ill and from the crime scene investigation the Authors supposed that her husband put the opioid transdermal patches to impair her consciousness and after he strangled the poor victim , in order to determine a mercy killing. Then the man committed suicide by autostrangulation with an electric tie.

**Method:** Fentanyl, buprenorphine and norbuprenorphine identification was performed by means of GC/MS, of urine and femoral blood, (SPE-Bond Elut LRC-Certfy; derivatisation with MSTFA) monitoring 3 ions for each analyte. Acceptable linear regression was obtained for each calibration curve (R2 = 0.992; 0.997; 0.989 respectively). Inter-day precision and accuracy were always better than 10% for fentanyl. The LLOQ was 0.10 ng/ml for fentanyl and 2.50 ng/ml for both buprenorphine and norbuprenorphine; the LOD was set at the same concentrations. Results Our results demonstrate a postmortem concentration of 10.65 ng/ml and 35.41 ng/ml in blood and in urine respectively for fentanyl; 24.59 ng/ml and 140.54 ng/ml (buprenorphine) and 13.22 ng/ml and 30.71 ng/ml (norbuprenorphine) in blood and in urine respectively. These findings are in agreement with cases of acute and fatal intoxication described in literature, after excessive use of transdermal fentanyl and buprenorphine patches (Edinboro et al., 1997; Hoia et al., 1997; Lagrange et al., 1998; Tracqui et al., 1998; Wu Chen et al., 1999; Anderson and Muto, 2000, Grobosch et al., 2007; Jeong Mi Moon and Byeong Jo Chun, 2008) or in a case of accidental ingestion of transdermal fentanyl patches (Tesque et al. 2007).

**Conclusions :** The finding of fentanyl and buprenorphine acute intoxication, the autopsy and the histological signs of ligature mark suggested that the mechanism of the woman's death was a combination of mechanical asphyxia by strangulation and opioid intoxication. The toxicological findings suggested for a severe cerebral impairment that could be fatal.

**Keywords:** Strangulation; Fentanyl; Buprenorphine; Mercy Killing

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# POSTER SESSION

## Session A2

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# MEASUREMENT FOR FORENSIC SCENES BASED ON PERSPECTIVE TRANSFORMATION OF PHOTOGRAPHY

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**Abstract:** Photogrammetric techniques are used to get more information about the position and/or size of an object seen in a picture based on the theory of perspective transformation. The advantage of the photogrammetric technique is that it can realize the measurement of the scene exactly and flexibly. Especially for traffic incident scene, as the scene can not be kept its original state for a long time, which is unfavorable for investigation over again, photogrammetry can be convenient for investigation over again at any time and get the information about the position and/or size of an object in the incident scene.The method to realizing measurement for forensic scenes utilizing the relation of photographic lens perspective is discussed in this paper. Based on the research of photographic lens perspective transformation, images are collected through the imitated photography experiment. Then magnifications of different points in different lens and various angles in picture are measured, and the curve of magnification of different points in the picture is made through the analysis of data by the statistical theory of probability. Based on the shape of curves, using linear regression and non-linear regression, the functions of magnification of different points in picture are obtained. Therefore, the distance of these two points in the three-dimension can be calculated through the distance between two points in the picture. The Conclusion is that there is 3% error when using the magnification in the picture to measure distance. Furthermore, the photography angle has a big effect on the magnification and the focus has a small effect.

**Keywords:** Photography Perspective; Photogrammetry; Regression Analysis

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# RECONSTRUCTION OF TRAFFIC ACCIDENT SCENES FROM SINGLE IMAGE USING DIGITAL PHOTOGRAMMETRY

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**Abstract:** For speedily investigation of road traffic accident scene, avoiding traffic jams while providing an accurate accident analysis and responsibility judgment, current methods, which are still based on ruler, witness research and simple images record, will not meet all these demands. In this paper, a new method of photogrammetry for traffic accident scene based on single image is introduced, which is carried out based on the relative control theory. Three 2D circles are laid on the crime scene as relative control and a large number of model experiments are conducted on the basis of central projection theory in camera imaging. With the help of ordinary digital camera and computer image processing system, a computing program is developed and the precision analysis is given. The experiments show that the simple method of photogrammetry is feasible for measurement at the scenes of traffic accident. The measurement error of 0.02m is acceptable. The method in this research facilitates the capture of information of the scenes, greatly expedites surveying and mapping the scene and is laborsaving, which makes the survey the measurement and computation through the computer. It proofs to be precise and scientific in favor of the righteous and fair treatment of accident.

**Keywords:** 3D Reconstruction; Single Image; Relative Control; Traffic Accident Scenes; Digital Photogrammetry

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# ESTIMATION OF THE INFLUENCE OF INK ENTRY PREPARATION ON AGING CURVES USING A TDS-GC/MS

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**Abstract:** Recent ink dating methods of ballpoint ink entries on paper focused on the time depending changes of the solvent amounts in the entries. This type of dating approach is dynamic and does not only depend on chemical properties of the target/solvent compounds as a function of time, but also on several other factors. These influence factors can be classified in three categories: (1) the initial composition of ink, (2) the paper properties and (3) the storage conditions of the questioned document. The aging kinetics of solvents in ballpoint inks was generally determined using samples stored under 'normal' conditions. However, those conditions were rarely standardised and could enclose a relative wide range of temperature and humidity. Therefore the question of the variability of the aging curves obtained under different conditions is still very important, especially when results must be compared between two laboratories. Priority objective of this preliminary study was therefore to determine the variability of the aging curves for at least two different sets of ballpoint ink entries. These two sets of samples were made in conditions closed to each other. Thus, two ink cartridges containing the same ink formulation were prepared; entries were made on two different hard copy papers (80g/m2) and stored at different conditions. The first set was stored in a climatic cupboard at 20°C and 55% humidity, the second was stored in an air-conditioned lab at a temperature of approximately 23°C without humidity control. The samples were extracted, derivatised and separated with a thermal desorption system coupled with a gas chromatograph and finally detected and identified by a mass spectrometer. A sequential extraction was performed at two different temperatures. The aging parameter was calculated by forming the ratio of the signal intensities at the lower temperature divided by the total signal intensities at both temperatures. The obtained results showed significantly different aging kinetics between both batches. Additional experiments were carried out in order to determine the parameters which are responsible for the observed changes of the curves.

**Keywords:** Questioned Documents; Ink Dating; Aging; Thermodesorption; GC/MS

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# APPLICATION OF MICELLAR ELECTROKINETIC CAPILLARY CHROMATOGRAPHY FOR DISCRIMINATION OF BLACK INKJET PRINTOUTS

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**Introduction:** Counterfeiting of documents is a common phenomenon in the modern world. A large share of forgeries relates to inkjet printed documents. Hence the need to develop an effective and reliable method for the differentiation and identification of inkjet inks on the questioned documents is evident. Therefore, the aim of presented study was to investigate the possibility of applying the Micellar Electrokinetic Capillary Chromatography (MECC) to forensic analysis of inkjet inks extracted from black printouts. The research was focused on the analysis of original inkjet inks and commercially available substitute inks.

**Materials and Methods:** In order to achieve the above-mentioned aim the capillary electrophoresis system equipped with the diode array detector was used. The separation was performed using a fused silica capillary (60 cm long, 75 µm i.d.) with the background electrolyte composed of 40 mM sodium borate, 20 mM SDS and 10% (v/v) acetonitrile (pH 9.2) at 25°C and 30 kV. Ink samples were extracted from black inkjet printouts with the use of dimethyl sulphoxide (DMSO).

**Results:** Extracts of 51 inkjet inks from black printouts (printed by the printers equipped with the original ink cartridges (30 printouts), with both the original ink cartridges as well as substitute inks (10 printouts) and with the substitute inks only (11printouts)) were separated under above presented conditions. The electropherograms obtained at different wavelengths were compared with each other. Differentiation of inks was based on the number of significant peaks (higher at least three times than the noise level) at different wavelengths, the relative migration times and the characteristic UV-Vis spectra. The electropherograms for most analyzed samples showed characteristic patterns. Only in 7 electropherograms there were no significant peaks originating from the components of inkjet inks. The differences between original inks from various manufacturers, characterized by the presence of the significant peaks in the electropherograms were meaningful. In the case of original inks from the same manufacturer the greatest diversity of electrophoretic profiles was revealed for the documents printed by inkjet Hewlett-Packard technology. The electrophoretic profiles for 6 of 8 printouts made by Canon printers had the same pattern with only one significant peak. All samples printed by Vision Tech substitute inks yielded similar, very complex and impossible to distinguish electropherograms. However, it was found that 94.5% of all possible pairs of samples could be distinguished using chosen MECC method.

**Discussion and Conclusions:** The electrophoretic profiles of the examined samples depend on the printer model, the print technology and the solvent used for the extraction. Most Hewlett-Packard printers use for printing both color and black ink cartridges causing great diversity of electrophoretic profiles of the extracts of black printouts from paper. Printers of other manufacturers and older Hewlett-Packard models print in black using only black cartridge with Carbon Black as the colorant. The analysis of this pigment by capillary electrophoresis is not possible. In this case differentiation of ink samples may be carried solely on the basis of the peaks originating from the additives present in the inks. Analysis of printouts made by printers equipped with substitute ink cartridges is also a challenging issue. For the extracts not showing the significant peaks on the electropherograms and therefore indistinguishable with each other, the extraction process in terms of extracting agent should be optimized. It was shown that applied MECC method enables comparison of the inkjet ink samples extracted from black printouts. In the majority of cases it is possible to differentiate between examined ink samples. Additionally, a database of electrophoretic separation results of inks has been constructed for further forensic use.

**Keywords:** Inject Print Inks; Questioned Document Examination; CE; Forensic Chemistry

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# FORENSIC DOCUMENT EXAMINER TRAINING IN THE CANADA BORDER SERVICES AGENCY

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**Abstract:** The focus of this paper is on the training of forensic document examiners (FDEs) at the Canada Border Services Agency. Some history and current status of the training of FDEs in Canada is also provided. For many decades there has been no substantial training of forensic document examiners by private practitioners, the core training was solely done by public sector entities. The core training provided to FDEs has generally been very good at not only establishing the foundations of document examination but providing a basis for document examination research. Some insight into the future of the training program is provided against the backdrop of a changing forensic science environment in Canada.

**Keywords:** Document Examination; Handwriting; Training

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# "LETTER FROM AN UNKNOWN MAN". FREDERIC CHOPIN'S MANUSCRIPT - 30 YEARS LATER

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**Abstract:** The poster reflects on a case in which there has been a very particular document examined. In the early 70-ies 20th c. it was found a copy of a letter which supposedly could be written by Frederic Chopin (1810-1849 a Polish composer, pianist, and music teacher of French-Polish parentage). Its frivolous content, however, was a little bit shocking that time to a number of critics and really did not suit the composer's image constructed by his official biographers. The Polish Frederic Chopin Society and many famous critics were involved in a vivid quarrel reported also in the media. It was argued both that the letter could be genuine and forged. Therefore the manuscript was eventually subjected to three forensic document analyses. Their results partly conflicted each other, unfortunatelly. In the poster we would like to present the discussion of that time, to show methods used and potential source of errors made. After 30 years some emotions disappeared, so we will try to present the unbiased statement and discuss methods and results of handwriting as well technical document examination applied to museal pieces in general.

**Keywords:** Handwriting Examination; Document Examination; Chopin; Music; Letter

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# TECHNOLOGY OF EXAMINATION OF STROKES' TRACES AND ITS APPLICATION

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**Abstract:** Strokes' trace analysis is a kind of writing trace which is shown in the process of people's writing when they write with writing instruments on something. Both kinds of the writing instruments and the information of identification can all be shown in the features of strokes' trace. Besides, it can also be used to exam questioned documents. In this paper, the theory of examination with strokes' trace is introduced and the features of identification with strokes' trace are concluded. And they are black point and white point, black line and white line, scratch and impression, light stokes and dark strokes, thick strokes and thin strokes, etc. The nature of strokes' trace is clearly defined in this paper. Besides, the applied range of strokes' trace examination and the things that should be paid special attention in practice are mentioned. The study of strokes' trace examination technology shows that it can be used to identify the person and the writing instruments through examining the handwritings which are composed by few words, few strokes or handwriting copy. Besides, it can be identified the right person who alters the documents and the writing instruments which are used to change the documents. And it can identify the person who writes the document and the writing instruments which are used.

**Keywords:** Strokes' Traces; Strokes' Trace Examination Technology; Features of Strokes' Traces

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# ANALYSIS OF THE CHARACTERISTICS OF DISGUISED SELF-WRITTEN SIGNATURES HANDWRITING

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**Abstract:** Based on the statistical analysis of 30 samples of actual cases of imitated handwriting or disguised self-written signatures handwriting written by adults, the article sums up the characteristics of common disguised self-written signatures handwriting, shows the difference between imitated handwriting or normal handwriting, and puts forward the feature points that should be paid special attention in the identification of such cases. Common methods of disguised self-written signatures are: camouflaging by changing font intentionally or changing commonly used writing way, camouflaging by slowing writing speed deliberately, camouflaging by forcibly writing in cursive, etc. Different disguise methods show different handwriting characteristics and there are essential differences between the characteristics of disguised self-written signatures handwriting and imitated handwriting, mainly reflected in two aspects: one is the difference between the two in their own characteristics, the other is the difference of matched and unmatched characteristics reflected in comparison with samples.

**Keywords:** Handwriting; Intentionally Camouflage; Self-Written Signatures

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# GLOBAL INFORMATIVE DEMOSTRATION OF THE PROGRAM SET FOR HANDWRITING INVESTIGATIONS

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**Abstract:** (GLOBALGRAF) support experts in elaborating handwriting examination statements. GLOBALGRAF incorporate 4 programmes: GRAFOTYP, RAYGRAF, KINEGRAF and SCANGRAF.

GRAFOTYP - software for verification of structural, size-related handwriting parameters. It enables the analysis of handwriting structural properties with use of the following: shape coefficient (Wk); size proportion (Pw); graphotype (G). The results of analysis of selected structural parameters can be subject to statistical verification with quantile test.

RAYGRAF - software for verification of structural and geometric handwriting parameters. This programme enables the analysis of such properties of graphical representations, as: length of sections of graphical line; density of handwriting through calculation of morphemic density coefficient (Wgm) and letter density coefficient (Wgl); impulse density of handwriting through calculation of impulse coefficient (Wimp).

KINEGRAF - software for verification of construction and kinetic handwriting parameters.

SCANGRAF - software for visualization of motor features of handwriting ( shading and pressure). This programme allows for the visualization of motor features of handwriting. A comparison between a questioned and reference writing styles, being subject to a transformation, i.e. successive removal of fragments of least coloured lines (the colour of a covering agent does not affect the analytical process) leads to the evaluation of the level of match in distribution of shading of a writing line, being the outcome of change in writing pressure. The main objective of the work is supporting experts in elaborating handwriting examination statements and providing premises for standardization of these examination by creating the possibilities of qualitative evaluation of the degree of stabilization of structural.

**Keywords:** Handwriting Investigation; Software

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# NEW METHOD FOR ANALYZING ALTERED HANDWRITING: WRITING COLORANT ACCUMULATIVE SPOTS ON SHEET FIBERS

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**Abstract:** Observed under a microscope amplified by 100 times, it can be seen that writing colorants are accumulated in one side of sheet fibers. Thanks to the position of colorant accumulation, the running direction of a stroke can be judged. The standard is that the running direction of a stroke is totally opposite to that of colorant accumulation. Using this principle, whether the handwriting has been altered can be analyzed by judging the running direction of strokes. Compared with other approaches, the writing colorant accumulative spots method is much less complex and gives results clearly and accurate, as well as doesn't damage the sample.

**Keywords:** Writing Colorant Accumulative Spots; Altered Handwriting

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# STUDY ON VARIOUS TEXTILE DAMAGE AND ITS IMPORTANCE FROM THE FORENSIC PERSPECTIVE

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**Introduction:** The study of the effects of the impact factors action on textiles and constituent fibers as well as the cause-and-effect relations have provide a basis for drawing more objective inferences about the circumstances of an event and its participants. The presence of thermal damage on a garment may be significant in an arson, fire, explosion, road accidents cases and helpful in determining the cause of the events and whether or not the physical evidence supports a link between a suspect and a scene of crime. The microbiological damage plays often an important role in examination of the textiles coming from exhumations. Washing effects seen on the textiles and constituent fibers during the normal use of a garment can help to define its life cycle. A number of different agents, including textile construction and fiber composition influence the results of damage, therefore such a study are interdisciplinary and complex.

**Materials and Methods:** The following kinds of impact factors were chosen for examination on the basis of their great frequency of occurrence as well as their significance in forensic practice: thermal (an open flame, contact with a hot plate), the action of an explosive shock wave, a stay in the biologically active soil, a long-term influence of solutions of laundry detergents. Textile materials were selected for the study on the basis of the analysis of consumer preferences for apparel and the results of the research into the frequency of occurrence of certain fiber categories in surroundings. Textile and fiber damage has been studied by optical microscopy (brightfield, polarized, fluorescence), scanning electron microscopy, visible microspectrophotometry and FTIR microspectroscopy.

**Results:** The results of the presented study show, that the transformations of textiles and fibres subjected to various thermal factors, including an explosive shock wave, are different and characteristic for the type of impact and the thermal properties of examined material. The changes of the morphological structure of textile undergoing the process of biodegradation depended mainly on the duration of their burial in the soil. The assessment of the colour changes that occur in textiles and their constituent fibres resulting from the long-term influence of solutions of laundry detergents indicated that the degree of colour change was mainly contingent upon the amount of time the samples were treated. The type of fibres, its physical and chemical structure, the type of dye used, the finishing process applied as well as the composition of the detergent used had a considerable influence on the kinetics of colour changes.

**Conclusions:** The presented studies carried out in the field of damaged textiles and fibres, particularly in the area of interpretation of analytical results have produced learning points for future forensic investigations and will lead to better comparability and repeatability of such examinations and to an increase in the evidential value of fibre and textile traces.

**Keywords:** Textile; Fiber; Thermal Damage; Explosion; Microbiological Damage; Washing; SEM; MSP

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# DETERMINATION OF COLOR AND COLORANTS OF SELECTED EVIDENTIAL MATERIAL.

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**Introduction:** The analysis of the sample images from an optical microscopy are always on the beginning of the analytical procedures for comparative examinations of fiber, paint and ink evidence. Microspectrophotometry in a visible and ultraviolet range is applied to distinguish between evidence material of a similar color. Establishing of colour of the investigated evidence by the assignment of its definite numerical value according to the CIELAB theory can also be applicable in forensic examination. Raman spectroscopy can provide information about the chemical composition of pigments and dyes present in an evidence and is regarded as complementary method to infrared spectroscopy, in which usually no dyes or pigments are detected. The aim of the paper was to investigate the type of colorants included in chosen samples of blue fibers, blue car paints and blue inks and differentiate between samples in each group of similar color.

**Materials and Methods:** Evidential material, i.e. single fibers, paint chips, writing lines on the documents were examined by the use of:

1. various optical research microscopy.
2. microspectrophotometry in VIS range - spectra obtained by means of JM Tidas combined with Zeiss Axioplan microscope.
3. Raman spectroscopy - spectra measured by the use of Renishaw In-Via spectrometer at the three excitation laser wavelengths: 514, 633 and 785 nm.

**Results:** Several types of colorants were identified, commonly used in fibers, paint and inks. The differences in colorant contents were found and so, the differentiation between examined samples of the same color was possible. The selected examples of complex studies, where color, pigments and dyes of fibers, paints and ink evidence were determined, will be presented and discussed in details.

**Conclusions:** The applied methods enabled differentiation between samples very similar in color. The identification of main dye and pigment present in evidential material is often possible, in spite of very complex chemical composition of the #8220;real#8221; samples encountered in the forensic casework.

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**Keywords:** Color; Fiber; Paint; Line on Document; Microscopy; Microspectrophotometry; Raman Spectroscopy

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# APPLICATION OF INFRARED AND RAMAN SPECTROSCOPY TO IDENTIFICATION OF CHEMICAL COMPOSITION OF SELECTED FORENSIC TRACES

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**Introduction:** Spectroscopic methods are routinely applied in identification and differentiation of forensic traces like single fibers and paint chips. In addition to the polymers and resins identification, infrared spectroscopy provides the possibility of characterization of inorganic pigments and fillers while Raman spectroscopy mostly organic colorants and additives. The most important advantages of Raman technique such as its sensitivity and discriminative character enable examining in situ very small samples and to conduct the Raman chemical imaging. The aim of this presentation was to demonstrate the usefulness of infrared and Raman spectroscopy in identification of chemical composition of single fibers and paint layers visible on cross-section of the paint coat.

**Materials and Methods:** Samples of multicolored fibers coming from the market and red and blue paint chips originating from different car bodies, were examined directly by the use of infrared spectroscopy (FTS 40Pro with UMA 500 microscope, Digilab, USA) and Raman spectroscopy (InVia, Renishaw, UK; excitation laser wavelengths: 514, 633, 785 nm). Additionally Raman spectroscopy mapping was performed for selected fibers and paint samples in order to detect and follow the distribution of particular colorant inside the sample.

**Results:** It was possible to differentiate the fibers and paint samples of similar color and similar polymer composition, which contained various colorants and additives. The majority of the obtained Raman spectra provided information about the main colorants present in the sample; the use of all available excitation laser wavelengths allowed for better identification.

**Conclusions:** Both, infrared and Raman spectroscopy proved to be complementary methods and the sources of information useful for forensic purposes for characterization of fiber and paint chemical composition.

*Supported by the Polish Ministry of Science and Higher Education. Project - 1150/B/T00/2009/36.*

**Keywords:** Infrared Spectroscopy; Raman Spectroscopy; Chemical Composition; Fiber; Paint; Colorants

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# ESTIMATION OF AGE-AT-DEATH USING BONE DENSITOMETRY: PROSPECTS AND DRAWBACKS

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**Abstract:** Age-at-death estimation is of paramount consequence in a forensic setting involving skeletal remains. The assessment of age-at-death in adult skeletal remains renders poor estimates of both biological and chronological age. As such, to assess age-at-death in adult skeletons it is appropriate to use as many techniques as possible. It is widely acknowledged that bone mineral density (BMD) decreases with age, remarkably in females. This study aims to develop an age estimating method for skeletal remains using bone densitometry in the proximal femur. BMD was obtained in a reference skeletal sample ("Coimbra Identified Skeletal Collection") of 100 females ranging from 21 to 92 years of age. Densitometry parameters calculated in this study included BMDneck, BMDtotal hip, BMDtrochanter, BMDintertrochateric and BMDWard. BMDneck showed the highest correlation coefficient with advancing age (r=0.744). The resulting regression formula was evaluated in two samples ("Coimbra Identified Skeletal Collection" and "Identified Skeletal Collection of the 21th Century") of 25 female individuals each.

**Keywords:** Age-at-Death; Bone Densitometry; Forensic Anthropology

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# ESTIMATION OF THE AGE OF 15-25 YEAR-OLD USING DEMIRJIAN'S DENTAL TECHNIQUE. STUDY OF A POPULATION FROM THE ANGERS BASIN, FRANCE

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**Introduction:** After 15 years of age, there are few techniques which can be used to determine the age of adolescents and young adults. The third molar is the only dental element which undergoes change. The technique advanced by Demirjian et al. published in 1973 and further developed by Mincer offering an estimation of biological age based on dental development. The objective of this study is to test Demirjian's technique on a non-forensic population based in Angers, France and to compare our results with those found in literature.

**Materials and Methods:** The population used for the study is made up of 209 individuals (115 girls and 94 boys). The subject are white Europeans, aged between 11 and 26 years old. They have been treated in the dentistry and maxillofacial surgery department either for orthodontic care or to undergo wisdom tooth removal. Method : We used panoramic dental radiographs. Reading of the dental panoramic radiographs was carried out by two observers and using a negatoscope. Assessment of the development stage for each wisdom tooth was carried out based on the technique put forward by Demirjian et al. which describes 8 stages of development in wisdom teeth (A to H).Boys and girls were studied separately due to the difference in time of dental eruption according to gender, since female subjects'teeth erupted more quickly. Statistic analysis : descriptive analysis and a linear regression model were used. Statistics were created using the SPSS 15.0 software package. The t student test was used to make comparisons of average.

**Results:** The observers noted the same stage of development in 95.6% of cases for tooth 18, 94.7% of cases for tooth 28, 94.2% of cases for tooth 38 and in 96.6% of cases for tooth 48. We could not find any statistically significant difference in development between the maxilla wisdow teeth and the mandibular wisdom teeth. We could not find any statistically significant difference between right and left hemi-maxillas. We represent the various results concerning averages, standard deviations and numbers for each stage of wisdom tooth development and for each gender according to Demirjian's method. Statistical analyses have shown a close relationship between chronological age and development of wisdom teeth (r2=0.32 for women and r2=0.5 for men).

**Discussion:** Our results fit in with the data available in the literature. Furthermore, we can see that radicular development of the third molar is faster for boys than for girls, which is in line with Mincer's study and other studies. When we compare our results with thoses others studies, we can see a hight correlation with those obtained by Prieto in 2004 (Spanish population) wich confirms earlier development of the third molar in southern european populations than in the Canadian population studied by Demirjian and faster development than in the American, German and Japanese.

**Conclusions:** Despite the considerable variability in the third molar, wich does not allow an accurate age to be given, its use is sometimes practical in the absence of more concrete criteria. But we can thus confirm the difference in development of third mo

**Keywords:** Physical Anthropology; Age Estimation; Teeth

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# MULTISLICE COMPUTED TOMOGRAPHY QUANTIFICATION OF HUMAN PELVIC BONE SEXUAL DIMORPHISM: SEX DIAGNOSIS USING METRIC ANALYSIS

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**Introduction:** The sexual diagnosis is a crucial stage during the discovery of osseous rests in particular for forensics cases. Our study aims to collect metric data and find new measurements on the coxal bone in order to have one or several measures already tested; independently of the part of bone remain with the final aim of sexing it.

**Materials:** We used 20 LM for each coxal bone located in a geometric morphometric study and collected a significant number of measures (190).

**Methods:** In this study we performed a Linear Discriminant Analysis (LDA) which is a statistical method that allows classifying individuals in groups according to continuous variables. Then we performed an Artificial Neural Network (ANN) which is a mathematical tool that is inspired by the structure and functional aspects of biological neural networks. Finally we applied a ten-fold cross validation on both LDA and ANN results and a Bootstrapping method on ANN results in order to improve the robustness of our predictive model.

**Results:** The inter- and intra-observer error was lower than 5 % for all the landmarks. The linear discriminant analysis using the 190 measures had an accuracy rate of 100%. After the ten-fold cross validation the percentage of individuals correctly classified was 81.4%. The application of artificial neural networks on the whole dataset always led to 100% correct classification. After the ten-fold cross validation, the correct classification percentages never exceeded 91%. And after the bootstrapping methods the percentage of correctly classified individual was 93%.

**Discussion and Conclusions:** These results are in accordance with previous classical osteoscopic or metric studies. Our study takes place in a practical forensic context; it presents the greatest advantage to combine the simplicity of the metric methods on dry bones with the added po

**Keywords:** Forensic Science; Forensic Anthropology; Osteometric Analysis; Sexual Dimorphism; Coxal Bone

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# MORPHOLOGICAL AND MORPHOMETRIC CORRELATION BETWEEN SHAPE AND PARAMETERS OF THE NOSE ACCORDING TO THE UNDERLYING BONY STRUCTURE OF THE SKULL - PART I

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**Introduction:** Over many decades of research have been developed and described several methods of facial reconstruction at the skull base, which evolved over time and with the development of techniques - drawing, art or computer methods. Reconstruction of facial appearance is not an easy process from the viewpoint of the possibility of having the appearance of a person. This follows from the fact that some elements exhibit a wide range of variation, others show no connection with the construction of the skull. In addition, there is the impact of external conditions and individual characteristics associated with different pace and severity of the aging process. All the methods developed in order to reproduce the appearance of the face are based on knowledge of the correlation occurring between soft tissue and skeletal substrate, the achievements to date conducted measurements of soft tissue thickness at different points of anthropometric head and developed for different populations. Reconstructing different elements of the face from the skull we rely on the relationship between the soft tissue and features of underlying bony elements.

**Materials and Methods:** CT scans were used to obtain measurements of the soft tissue thickness. A set of anatomical skull and head landmarks were manually located for this purpose. Measurements were taken in frontal and sagittal plane. Reconstruction 3D of the skull and face each subject were used to investigate morphological and morphometric correlation between shape and parameters of the nose and features and parameters of bone construction. The sample consisted of 54 adult Polish patient aged 20-70 years old.

**Results:** Significant correlation were found between soft- and hard-tissue shape and parameters of the nose.

**Keywords:** Soft Tissue Thickness; Identification; CT Scans; Face Reconstruction

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# CAN THE MORPHOLOGY OF THE HYOID BONE BE HELPFUL IN ASSESSING MECHANISMS OF INJURIES?

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**Abstract:** In the framework of forensic sciences, the hyoid bone, otherwise one of the most neglected elements of the human skeleton, serves as a valuable indicator of victim's biological profile and occasionally of cause of death. The size, shape and symmetry of the hyoid vary according to individual's origin, sex or age and have capacity to aid, for instance, in the sex determination. Moreover, as far as neck injuries are concerned, the hyoid morphology together with the stage of fusion between body and greater horns is regarded as a significant factor intervening with an occurrence of hyoid fractures. Isolated hyoid bone fractures may suggest accidental trauma (falls, car accidents), self-inflicted injuries (suicide by hanging) as well as assaulted injuries (manual or ligature strangulation, attack with a blunt instrument), but also artificial postmortem damage as a consequence of removal at autopsies. The present study, performed on a sample of 300 hyoid bones (fused and unfused) extracted at medicolegal autopsies, aims at exploring the effect of the hyoid morphology and stages of development upon maintaining bone integrity under various causes of death (natural, hanging, strangulation) and additional intervening factors (e.g. sex, age at death, cause of death, weight, height, lung weight, stage of bone fusion, state of integrity before/after autopsy/tissue removal). While the hyoid morphology was recorded by using MicroScribe G2LX, portable digitizer and NextEngine, 3D laser scanner interactions between bone attributes and associated characteristics were studied by means of advanced descriptive and analytical tools (Generalized Procrustes Analysis, elliptical Fourier analysis) and multivariate statistics. Shedding light on the interplay between hyoid morphology and origins of hyoid fracture results suggest correlations which may prove to be helpful in detecting perimortem and postmortem trauma and be of interests for forensic pathologists as well as forensic anthropologists.

**Keywords:** Hyoid Bone; Neck Injuries; Geometric Morphometrics; 3D Laser Scanning

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# A CASEWORK APPLICATION OF PROVENANCING HUMANS BY ISOTOPES

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**Abstract:** Isotope analyses were applied to provide provenance information for an unidentified deceased Caucasian male who was found at a parking lot to the north of Amsterdam, The Netherlands. The cause of the victim´s death was not apparent. His age is estimated to have been between 20 - 30 years, his body length was 182 cm and his physique slim. The man had ginger hair and blue eyes. The police hinted that the victim might originate from the United Kingdom. Results from both light elements' (hydrogen, carbon, nitrogen, oxygen) and heavy elements' (strontium, lead) isotope ratio measurements on various body tisues (teeth, hair, nails, rib, femur) of the unidentified dead man were used to provide information on the geographical origin of the deceased as well as on his more recent geographical movements and his diet. From tissues provided, appropriate subsamples or - when applicable, aliquots - were selected for analyses. Beforehand, samples were cleaned and subjected to further pre-treatments. Isotope analyses on bio-elements H, C, N and S were performed by means of a continuous flow elemental analyser-isotope ratio mass spectrometer (CF-EA-IRMS) at Isolab GmbH. Analyses of Sr and Pb by thermal ionisation mass spectrometry (TIMS) were performed at the Bavarian State Collection for Palaeontology and Geology, Munich, while C and O (on structural carbonate in bone and tooth apatite) were analyzed by IRMS at the Berlin Museum of Natural History. The isotope results can be explained in the following scenario: The unidentified man was an omnivore with relatively low amounts of meat or fish in his diet. He consumed cereal and other C3-plants (such as potatoes) but (almost) no maize or cane sugar (suggested by C and N isotope ratios). The man lived until an age of approximately 15 in a relatively cold to moderate climate (as indicated by oxygen and hydrogen isotope ratios). Most likely he grew up somewhere in the region spanning from Bulgaria up through Poland and the Baltic states (inland) or parts of the Ukraine adjacent to Romania. The Russian regions adjacent to the Baltic States cannot be excluded. The authors feel though that within this large region the man most likely came from the region of northern Romania or Bulgaria because of relative extreme Pb isotope ratios. The unidentified man changed the nature of food intake and/or location after an age of 19 - 21 and between 7 and 2.5 months before death. In this period he travelled to Northwestern Europe, such as the Netherlands, within 7 months of his death. There, he was exposed to environmental lead and strontium with an isotopic composition that is ubiquitous in the Netherlands and neighbouring countries. The isotopic results cannot be explained in an alternative scenario in which the unidentified man ate a lot of meat, originated from the United Kingdom and did not change eating habits after an age of 19 - 21 and between 7 and 2.5 months before death. Acknowledgments We wish to acknowledge dr. Lehn (Munich Institute of Forensic Medicine, Munich, Germany) for sample preparation, dr. A. Rossmann (Isolab GmbH Laboratory for Stable Isotopes, Schweitenkirchen, Germany) for the measurement of H, C, N and S isotopes, prof. dr. S. Hölzl (Bavarian State Collection for Palaeontology and Geology, Munich, Germany) for the measurement of Sr and Pb isotopes, and dr. U. Struck (Berlin Museum of Natural History, Berlin, Germany) for the measurement of C and O isotopes in structural carbonate in bone and tooth apatite.

**Keywords:** Human Provenance; Isotopes; Diet; Hair; Teeth; Bones

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# A TEST OF THE FOJAS ET AL. SPATIAL ANALYSIS METHOD TO RECOGNIZE ABNORMAL BURN PATTERNS IN BURNED BODIES

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**Introduction:** The recognition of an abnormal burn pattern is invaluable for forensic investigators when confronted with a burned body as much evidence can be quickly lost during transport or when handling such remains. Symes and colleagues (2008) provided a preliminary model for the normal pattern of changes to a body as it is exposed to fire with specific reference to tissue thickness and body position. Deviations from this pattern may imply special burning conditions such as protective shielding, the presence of accelerants, or pre-existing trauma. Recently, Fojas and colleagues (2011) created a spatial analysis model using a Geographic Information Systems (GIS) application developed from known forensic cases (n=74). Their results suggest "a general rule of thumb would be to more carefully examine any individual with less than 80% of the total body surface burned and burned bone exposed." The goal of this presentation is to apply this model to a small number of known forensic burned body cases from Portugal to examine if these patterns are consistent with the results of the previous model.

**Materials and Methods:** Seventy-four cases were previously charted and entered into the GIS model developed by Fojas and colleagues (2011). All cases were charted from autopsy photographs by a single author who had no prior information as to the context of the individual. The burn patterns were charted in homunculi diagrams, with an anterior and posterior chart for each body. The degree of heat alteration was coded into five categoriesfrom: 1 = no burning/minimal burning, to 5 = missing or fragmentary bone. Individuals were ranked based on degree of burning, where individuals displaying level 5 alterations would always rank higher than individuals showing only level 4 and lower alterations, and so on. Fojas and colleagues (2011) previously found a strong correlation (R2=0.98) between the rank-order degree of alteration (burning) and the proportion of the area affected (body surface) using the GIS model. Given the strong correlation, this model can be used assess a body does conform to the typical burned body pattern. Three burned body cases from the Portuguese National Institute of Legal Medicine, North Branch were documented following the same procedures and compared to the previous (2011) baseline study. The context, cause, and manner of death of each individual were known, but blinded until after data entry.

**Results:** Cases 1 and 2 were elderly men who were killed when an arsonist set their house on fire. The older individual (Case 2), was bedridden. Blood-work and autopsy findings confirm both died of smoke inhalation. Case 3 was a male who committed suicide using accelerants (propane gas) inside his vehicle. Witnesses reported hearing three explosions, after which they saw fire in the woods, and ran to investigate; responding firemen took several hours to extinguish the fire. Of these individuals, only Case 1 classified as "abnormal" exhibiting less than 80% of the total body surface burned with burned bone exposed. Case 2 did not meet the criteria for an "abnormal" burned body pattern. Case 3 was extensively burned and, accordingly, did not meet the "abnormal" burn pattern criteria. Case 3 was also the most burned body in the sample to date (n=77).

**Discussion and Conclusions:** These three cases serve as a successful test of Fojas and colleagues' (2011) model for detecting "abnormal" burn patterns in human remains. Cases 1 and 2 were both homicides, and Case 3 was a suicide using accelerants, however only Case 1 classifies as an abnormal burn pattern. While the burn pattern of Case 1 classified as "abnormal" and Case 2 did not even though both fell victim to the same fire circumstances, this is likely due to the fact that the burns on Case 2 were too extensive; the same reasoning applies to Case 3. Based on this model, once more than 80% of the body is burned, you may expect to see any and all levels of burning present (stages 1-5) and thus lose the ability to classify a pattern as "abnormal".

**Keywords:** Forensic Science; Forensic Anthropology; Burn Patterns; GIS

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# PROVISIONAL EVALUATION OF SEVEN CRANIO-FACIAL MEASUREMENTS FOR THE ESTIMATION OF ANCESTRY IN BRAZILIAN SKULLS: RETZIUS REVISITED

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**Introduction:** The use of craniometric landmarks of the skull in the estimation of ancestry was firstly described by Retzius (1840). It is questionable, however, if these indices are reliable, particularly when applied to a recently admixed population like that of Brazil. There is also a lack of detailed description in the literature of how to perform these measurements with accuracy and reliability. OBJECTIVE: The aim was to describe and standardize the craniometric measurement of the skull based in Retzius descriptions, to assess precision, accuracy and reproductibility, as a prerequistie for the establishment of craniofacial indices useful for the estimation of ancestry in Brazilian skulls.

**Materials and Methods:** We analyzed all 42 skulls from skeletons available at the Medico Legal Center of the Faculty of Medicine of Ribeirão Preto, University of São Paulo (CEMEL/FMRP-USP). Precision digital calipers (Starrett Tools, Brazil; Digimess Precision Intruments, Brazil) were used for measurement. Retzius descriptions for cranial measurements (maximum skull width, length and height; maximum facial width and height; and maximum nasal breadth and height) were used to establish rigorous guidelines. These seven Retzius measurements were taken three times for each skull in the sample. The measurements were used to calculate five craniofacial indexes (horizontal, sagital, transverse, superior facial and nasal) anticipated to be parameters for the assignment of ancestry (Caucasian, Negroid and Mongoloid). The means obtained for the 3 repeated measurements and the means of the indexes obtained were compared in order to assess repeatibility.

**Results:** Detailed descriptions for each of the seven measurements were established, which included positioning of the skull, craniometric landmark identification and use of the precision calipers. The statistical analysis of the three series of measurements showed that the index of the means for the 3 repeated measurements was equal to the mean of the indexes obtained for the 5 cranio-facial indexes.

**Conclusions:** Detailed descriptions of the seven measurements used by Retzius were established, which when applied to 42 skulls, yielded reproducible values for the craniofacial indecis anticipated to be useful in the assessment of ancestry. Further work will be necessary to establish whether Retzius parameters can be applied to ancestry estimation in a Brazilian population.

**Keywords:** Forensic Anthropology; Skulls; Cranio-Facial Indexes; Ancestry; Retzius; Brazil

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# STUDY ON THE LNDIVIDUAL LDENTIFICATION BASED ON MULTIMODE OF FOOTPRINT

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**Abstract:** In this paper, Footscan system and three-dimensional video capture system are used to acquire the non-real-time synchronized cumulative foot pressure images and videos of human gait, as well as physiological information of volunteers participating in the experiment. Then the classification system, procedures and methods of human motion gestures are designed and a database of human walking gait and foot pressure image features is established. Based on the study of the database of these two characteristics, a system of the human walking motion analysis and recognition is brought about in this paper by combining gait video and plantar pressure images. Information provided by this system through characteristics analysis includes the age, BMI (body mass index = weight / height ^ 2) and gender of the subject, and identity recognition of different people. Experiment is made with the database of 96 (each of them has completed 10 measurements) people on which 5 measurements are randomly chosen as the training samples, well in the same time, the other 5 as the test samples. Considered video of pedestrian gait alone, the accuracy of personal identification can reach 94%; when considered foot pressure image alone, the accuracy can reach 91%; with two features considered together, the accuracy can reach as high as 99%. Results show that the method of combining gait video and plantar pressure images in individual identification is feasible.

**Keywords:** Ootprint; Gait Video Image; Plantar Pressure Image

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# DISAPPEARANCE OF A CLANDESTINE BURIAL FEATURE IN VIETNAM DUE TO GLEYING OVER 40 YEARS

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**Case Report:** Forensic anthropologists from the Joint POW/MIA Accounting Command-Central Identification Laboratory (JPAC-CIL) conduct excavations in a variety of environments to recover the remains of unaccounted-for U.S. military servicemembers. One of the most common types of sites investigated is the isolated burial, where a witness has indicated an area within which a servicemember is purportedly buried. CIL recovery leaders use standard archaeological methods to look for such burials. Generally, the indicated area will be excavated down to an "incident-sterile" horizon, the point at which it is clear that the unexcavated sediment predates the burial. To assess incident sterility, the recovery leader considers the natural soil formation processes as well as any artifactual content. A metal detector is used to ensure that no metal objects are present in the subsoil. It is not generally necessary to excavate the entire area under investigation to the depth of an actual burial; instead, it is assumed that any burial within the relevant time frame (generally from 1941 through 1975) will produce a recognizable feature in the soil. If incident-sterile subsoil is exposed, and there are no signs of a feature intruding into it, then presumably no burial occured in that location. In the summer of 2010, a JPAC team excavated a burial site along the central coast of Vietnam. This recovery followed eighteen years of investigation of the case of a missing Marine. Throughout this time period, multiple witnesses consistently reported that the man had been buried in the same location. In 1995 a team excavated a 2-x-2 m unit but found no evidence of the Marines burial. The site was located in an approximately 60 cm tall berm between a rice paddy and a marsh. The brown sandy soil of the berm contained a large quantity of artifactual material that was unrelated to the burial, including wartime debris as well as modern household trash. It was underlain by a uniform gray wet sand. Metal detector survey revealed occasional ordnance fragmentation debris buried within this gray sand, but no other artifactual material. In one location, this gray sand was penetrated by an area of mottled brown and yellow soil from the higher levels. This was interpreted as an old, refilled excavation, but was too small to be a burial feature and contained no osseous or material evidence. It most likely represents the bottom of the 1995 excavation. Approximately two meters away, the team located an intact primary burial of a single supine individual wearing boots. This burial was contained almost completely within the waterlogged gray sand that was thought to be incident-sterile, with no sign of a feature. The toe of one boot projected into the higher brown soil, however, leading to the discovery of the remains. (Note that if the toe had not projected, a metal-detector sweep of the "sterile" level would also have located the burial, due to metal components in the boots.) The mottled fill previously encountered and interpreted as the result of the 1995 excavation was what the recovery leader expected to see in any burial feature excavation into the gray subsoil: When someone digs a hole through layers with such clearly distinct colors and then refills it, the fill will be a mix of all the layers. Presumably, the 1968 grave originally looked like this. In this location, however, the clear break between gray and brown soils is not a stable historical artifact. Instead, it is the result of the high water table. Soil that is saturated undergoes a process of gleying over time, in which anaerobic bacteria reduce ferric oxide to ferrous oxide, thereby removing the dominant red pigment. In this setting, gleying has been rapid enough to remove any sign of a 42-year-old burial, while still leaving a clear feature from a 13-year-old excavation. This case provides a cautionary lesson for those excavating clandestine burials in settings with a high water table.

**Keywords:** Archaeology; Clandestine Burial; Taphonomy

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# NURSES AND NURSING STUDENTS AWARENESS OF ELDER ABUSE AND NEGLECT

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**Introduction:** Evidences indicate that elder abuse appears to be an extremely widespread condition, even if underestimated and not sufficiently reported, with big human and financial price. Recent literature reveal that health professionals have inadequate levels of knowledge regarding elder abuse. Our study want to investigate nurses and nursing students acknowledgement of elder abuse and neglect.

**Materials and Methods:** We questioned 269 professionals including 193 nursing students in their third (and final) year of the Medical Faculty of Bologna campus of Rimini (Italy) and 76 nurses attending the master for nursing management. During the first legal medicine lesson of both courses, we explained to the students the argument of the research and how we would gather data, gave out an anonymous questionnaire and collected them immediately after completion. An oral informed consent was asked all students, at both courses, to participate. The Caregiving Scenario Questionnaire (CSQ) developed by Selwood et al. (2007) was used in order to compare our data with those obtained in literature.

**Results:** We questioned nurses and nursing students because they represents the professional care provider nearer elder patients. One hundred-ninety three of the 269 individuals (71.75%) were represented by the third year nursing students (49 males and 144 females) , the remaining 28.25% (76/269) were nurses attending master (15 males and 61 females). The entire group was formed by 64 (23.79%) males and 205 (76.21%) females. We focused our attention on definitely abusive items comparing separately males and females in each group. In terms of correct identification of abusive responses, 89% of male nursing students, 100% of male master nurses, , 97% of female nursing students and 100 % of female master nurses correctly identified trapping someone in armchair. Concerning the abusive strategy of locking person in house when the caregiver works all day, 51% of male nursing students and 33% of male master nurses and 52% of female nursing students and 61 % of female master nurses correctly identified this item. Only 20.41% of male nursing students and 40% of male master nurses correctly recognized the neglect item (accept when personal hygiene deteriorates); as regards female, 20% of each group identified the abusive strategy. Neglect is the most common form of abuse against elder, but still the less recognized by healthcare professionals. Furthermore, we create an ad hoc variable "abuse" in order to assess the correct acknowledgement of abusive strategy and factors influencing the statistical evaluation : as regards males, 14% of nursing students and 13% of master nurses properly identified all the abusive items, while 12% of female nursing students and 6.5% of female master nurses recognized it. Not considering sex division, 12.95% of nursing students and 7.89% of master nurses correctly recognized all the abusive strategies.

**Final Comments:** The results indicate that formal education and specific training in healthcare professionals are required to improve awareness and response to elder abuse.

**Keywords:** Nursing; Elder Abuse; Neglet

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# EMERGENCY MEDICAL AND VIOLENT DEATH

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**Abstract:** In our society today, more and more emergency medical teams, are required to meet the diverse situations that include patterns of violent death. It is therefore very important that the actors are awakened to their approach and have the ability to recognize each case they arise in order to act accordingly. Since the absolute priority for emergency care to the victim, the preservation of traces and protect the site, they also represent a very important action for the emergency teams. Once in place, be sure that after the police, the medical team should focus on emergency care, which is the top priority. If the victim is dead, it should preserve the site. Preservation begins immediately with small gestures and actions that are fundamental, such as: play only what is really necessary, move only what is to move, to restrict the entry of people on site if possible using a single input and output, and try not to step fluids, not smoking, eating or drinking on site. The preservation of traces is very wide, depending on the situations that occur. The preservation of traces follows the establishment of rules, one being very important, the chain of custody. Chain of custody begins when a person first begins to collect the remains, and continues with the authority. There is a wide range of situations from different etiologies, I think is interesting from the standpoint of medical-legal, to present the various criminogenic situations that occur in the context of pre-hospital and provide copies of traces that must be preserved.

**Keywords:** Violent Death; Medical Emergency; Evidences in Pre-hospital; Preservation Evidence; Forensic

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# FORENSIC NURSING: THE NEW REALITY IN PORTUGAL

**Author(s):** Gomes A[1]

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**Abstract:** The overall increase in violence triggers the need for preparedness of health professionals for preventive education to interpersonal violence and signs of victimization. Nursing, has gradually gained recognition in the forensic field, due to its wide performance in the care of individuals and groups. The term forensic gained more specificity to be included in the areas of professional work related to health (nursing, medicine, dentistry). Forensic Nursing in the United States, Canada, China, Italy and England, has been practiced routinely, where nurses assess, collect evidences and provides nursing care to victims of violence. Forensic Nursing in Portugal is still little known and rare performances as a speciality. Although many nurses working with victims of violence, there are no adequate and specific training in this area. The initiative for the promotion of Forensic Nursing, has been developed by the School of Nursing S. Francisco das Misericordias who launched the 1st Graduate Forensic Nursing. The aim is to train nurses for the detection of physical injuries and psychological violence, as well as teach the nurses to collect and preserve evidences with medicolegal relevance. The aim is also to develop skills for nurses: addressing the sexual abuse victims; apply the nursing process to court proceedings and address the victims of trauma and violence in the medical-legal context. It is intended for the short term, create a working group, which may constitute the powers of the Forensic Nurse in order to establish a subspecialty in Portugal. Conclusion The performance of the forensic nurse is very diverse, including regular checkups, to collect evidences, detection and treatment of injuries and trauma in victims of physical, emotional, sexual or death and emotional support to victims and their families. Examine, recognize, collect and preserve, are actions / functions essential to the practice of forensic nursing, as well as educate the public against interpersonal violence. Whereas a complete physical examination may take up to three hours, the expert nurse dedicated to making a full and complete examination of the victim. In case of death, the forensic nurse works in investigating the possible cause of death, preserving physical traces, investigating the body, where it was found, bearing in mind all the details. The work of the forensic nurse is not limited to examinations and collection of evidences, also extends to legal persons involved, in any form of violence and neglect, including victims of human trafficking, accidents, medical malpractice and religious cults . It is necessary to consider the benefits that victims who are scrutinized get, like, people falsely accused. Since violence is a global problem, I suggest that schools of nursing consider the introduction into the curricula of undergraduate course, general knowledge of forensic nursing.

**Keywords:** Forensic Nursing; Sane; Forensic Nurse

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# A FIVE GUNSHOT SUICIDE - CASE REPORT

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**Introduction:** Multiple gunshot suicide occur when an individual commits suicide by inflicting multiple gunshots upon themselves before becoming incapacitated. These suicides, although uncommon, are by no means rare. In fact, as many as 8% of suicides by firearm involve multiple gunshots, and suicides involving as many as six self-inflicted gunshots have been documented. The authors present an unusual case of suicide involving five gunshots to the head and neck.

**Case Report:** A 58-year-old male, escaped from a hospital ward. When found by police officers, he tried to escape firing at the officers and kept running away into the woods. His corpse was later found, the face and neck being riddled with bullet holes. Crime scene investigation revealed a small calibre handgun near the body. The post mortem exam revealed 7 wounds to the face and neck, 5 of which corresponded to entrance wounds and 2 to exit wounds. Only 4 bullets were recovered during the autopsy and toxicological results came back positive for alcohol (0,14g/L).

**Discussion and Conclusions:** A case such as this one could engender controversy given the existence of a police pursuit, allied to the popular misconception that it is impossible for an individual to inflict more than one gunshot upon themselves, implying the police officers involvement in this particular death. With this presentation the authors intended to emphasize the importance of a thorough forensic autopsy, as well as the participation of the medical examiner in crime scene investigation, in order to help clarify this fallacy. Two of the wounds, located on the nasal region, corresponded to the 2 exit wounds mentioned above. The remaining 5 shots were all located on the cervical region, except one located on the face. All these latter injuries shared similar characteristics, of close range shots, and the trajectories were all and from left to right and upward. Although right-handed, the victim had a history of pathology of the right clavicle, which impaired the limb's free movement. This pathology was substantiated by autopsy findings and the use of the left hand was in accordance with the determined trajectories, having the post mortem exam been crucial in concluding it to have been a suicide.

**Keywords:** Forensic Pathology; Multiple Gunshots; Suicide; *Post Mortem*

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# HONOUR KILLING - A COMPARISON OF TWO CASE REPORTS

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**Abstract:** An honor killing (also called a customary killing) is the murder of a female family or clan member by one or more fellow family members, where the murderers and potentially the wider community believe the victim to have brought dishonor upon the family, clan, or community. This perceived dishonor is normally the result of (a) utilizing dress codes unacceptable to the family (b) wanting out of an arranged marriage or choosing to marry by own choice, (c) engaging in certain sexual acts or (d) engaging in relations with the same sex. These killings result from the perception that defense of honor justifies killing a person whose behavior dishonors their clan or family. Honor killings have been reported from antiquity from all over the world, however the recent past has shown an alarming and disturbing resurgence of this inhuman deed. This paper presents two cases related to honour killing: the first a dual homicide of two lovers who were killed in the name of preserving family honor and hanged after death together by the entire village; the second in which a foster father killed his adopted teenage daughter after he found out that she was having an affair with a classmate. The pattern of injuries in both cases and crime scenes are compared discussed in detail.

**Keywords:** Honour Killing; Homicide; Lynching

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# WHEN A NATURAL DEATH TURNS OUT TO BE A HOMICIDE

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**Case Report:** The manner of death (violent or natural death) means the legal form of death, and in fact is a priority for prosecution, but it is important to know the cause of death. In forensic practice as existed natural death with no signs of violence, there are violent death without external signs of violence. Our case is found dead in her apartment. Police and MDI did not notice any signs of violence committed to her, so they considered it as a natural. After receiving information from the police for domestic violence to warn earlier this family has led the prosecutor to decide to perform the autopsy of the dead body. In autopsy room externally there were several fresh abrasions, contusions, abraded contusions on the face mainly around the nose and mouth and also in the back of the head and in the neck in the hand. Internally there were corresponding soft tissue injuries. There were signs of asphyxia. No autopsy signs of significant natural diseases. There was autopsy evidence of trauma to back of head consistent with application of pressure and also a pale area around the nostril and mouth.

**Keywords:** Abrasions; Asphyxia; Contusions; Natural Diseases; Violent Death; Natural Death

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# PSYCHIATRIC EXPERTISE OF THE MINOR - METHOD OR INVESTIGATION OF JUVENILE CRIMES

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**Introduction:** We studied the psychiatric forensic expertise of the minor in order to evaluate the aspects of the legal criminality.

**Materials and Methods:** For the past 3 years of the Institute of Forensic Medicine Timisoara, we have performed a number of 386 of psychiatric expertise for cases who committed underaged crimes.

**Discussion:** The annual average of the expertise was 128,6 cases. In 12 cases the age at the moment of the expertise was over 18 years old, but the crime was committed while underaged, 89% of those expertised were males, 80% come from an urban environment. Most of the crimes commited were thefts ( 92% ), the rest being aggressions ( 5% ) and sexual aggressions ( 3% ). We present a case in which a young man at the age of 17 years commited multiple sexual aggressions ( rapes and attempted rapes ) on 4 underaged girls, relatives of different grades. The young man was repeatedly evaluated psychological and psychiatrical, the expertise concluding that he had slightly reduced descernment when h commited the felony for which he was accused.

**Conclusions:** For a rigurous psychiatric evaluation, the expertise required a good collaboration between the phychiatrist, the psychologist and the forensic expert, a repetition of the examination and, in some cases, the hospitalization of the minor.

**Keywords:** Juvenile; Psychiatric Expertise

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# WAS DEATH CAUSED BY ANTEMORTEM INCISED WOUNDS? A CASE WITH PROGRESSED DECOMPOSITION

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**Case Report:** A case described in this report is of a 66-year-old female who was found dead with progressed decomposition on a landing in the stairway in apartment house. She had been previously admitted into a hospital due to depression, but had not regularly seen a doctor for follow-up. About a month before death, she had been reported to the police by neighbors as she had been inebriated and lied on the grounds outside. Her husband of the accused was living with her dead body about a month. Afterwards he took the body outside room because he could not stand the odor from the decomposed body and called for an ambulance. The body was not transferred to a hospital due to the developed postmortem changes. At forensic autopsy, there were a number of incised wounds including chop wounds on the head, face, neck, upper back and upper extremities in the external examination, accompanied by defense wounds of the back of the forearm and cutting-off of fingers. Due to dry alterations of the wounds and leaking-out of hemolyzed blood into the tissues, whether the wounds were made before death was undetermined except for defense wounds. By the internal examination, multiple cutting of underlying bone with linear fracture in the skull and single fractures of four ribs in the left and five ribs in the right were found. Thin subdural hematoma in the both temporal lobes and posterior cranial fossa was grossly observed and was positive with Berlin-blue stain in histological examination. Furthermore, food mass obstructed her airway at the larynx and pharynx and foreign bodies were found within brochi in the histological examination. In toxicological analysis, ethanol of 2.82 mg/ml, n-propanol of 0.095 mg/ml and zolpidem (hypnotic drug) of 3.78 mg/l were detected in the gastric contents, although blood sample was not collected due to decomposition at autopsy. The direct cause of death may be suffocation due to food aspiration, but whether multiple incised wounds associated with the suffocation was undetemined. The husband admitted the assault with his hands on her face before death, but he stated that incised wounds of her body were made after death by small axe with 7.5cm of the length of the cutting edge. According to the crime scene investigation, bloodstains were found on the bed and the wall in the room, but not large. The fingers that were cut off were not found after all.

**Keywords:** Incised Wounds; Decomposition; Suffocation; Chop Wound; Head Trauma; Alcohol Intoxication

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# MULTIDISCIPLINARY EXAMINATIONS OF MUMMIFIED BODY #8211: CASE REPORT

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**Introduction:** This paper presents results of a multidisciplinary examinations of mummified body, which is exhibit in the museum of Department of Forensic Medicine in Pozna University of Medical Sciences. Forensic study was aimed to determine the manner of death. Anthropological, toxicological, genetic and radiocarbon dating study were conducted

**Methods:** Multi-slice computed tomography (MSCT) was performed to establish the set of biological features of the mummy. Fragment of patella was subjected to 14C dating using the technique of accelerator mass spectrometry (AMS). Hair sample was analysed to check level of heavy metals (ICP-MS technique) and presence of drugs of abuse - cannabinoids and opioids (HPLC-MS/MS technique). DNA testing of patella and skin fragments was conducted.

**Results:** The length of the body was 151,5 cm and it weights 7,7 kg. The colour of the skin is blackish-brown, the body does n#8217;t smell. The mummified body was estimated as a male 35 years old. Radiological examination of the body does n#8217;t reveal any abnormalities. Hair analysis yielded negative results for drugs of abuse. Concentration of lead #8211; 99 #956;g/g and copper 84 #956;g/g was 5-50 and 3.3 #8211; 5.6 times above the reference concentration. However, mercury level 0.5 ppm lies within reference concentration. Radiocarbon age of the body was estimated as 235 #177; 25 BP. The DNA analysis determined the body sex and place of origin as a male from western Asia.

**Keywords:** Mummified Body; Anthropological Identification; Toxicological Analysis; Genetic Analysis

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# A CASE SERIES OF TUBERCULOSIS RELATED SUDDEN DEATH

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**Case Report:** Forensic Pathologists deal not only with criminal, accidental suicidal deaths, but also with a wide range of deaths from natural causes. Many of these deaths are sudden, unexpected, clinically unexplained or obscure, even though there need be no criminal element in their causation. Unnatural deaths have always to be investigated by the police, but very often natural deaths forms the basis of medico legal investigation, if they had occurred suddenly in apparently healthy persons. Often at autopsy these so called unnatural deaths may turn out to be natural and vice versa. Tuberculosis is one of the most common infectious diseases in India. Deaths due to its complications are rare but reported. Sudden deaths due to Tuberculosis constitute a major public health problem in the developing countries. These cases pose a danger to the community both during life as well as after death. Three cases of sudden death due to tuberculosis are discussed. All the 3 victims were unknown males and collapsed suddenly in outdoor locations. Absence of any external injury and past history raised suspicion and autopsy was conducted. Chemical analysis was negative. Disseminated Tuberculosis was suspected at autopsy due to widespread granulomatous lesions and findings were confirmed by histopathology.Tuberculosis is a treatable disease but its fatality is attributed to its association with HIV infection to immuno compromised state of patients with immunosuppressive therapy. In present cases HIV testing was done on deceased and was found negative.

**Keywords:** Sudden Death; Tuberculosis; Miliary Tuberculosis

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# A RARE CASE OF AN INTERSEXED PERSON IN THE MEDICO-LEGAL PRACTICE OF ALBANIA

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**Case Report:** Introduction One of the main issues of the forensic medicine of gender has to do with gender determination, which in some rare cases of individual with disorders of sex development (intersexed person) is very challenging. In Albania, by enactment of the law on civil status (nr.10129, dated 05/11/2009), which in Article 8 indicated that even gender can be changed in the cases and manner prescribed by law, was made possible the review by courts of such civil cases, which in fact rarely are encountered in practice. Case report Presented in this paper is a case of citizen K.., born in Albania in 1987, registered in the registry as a boy, but male external genitalia were not normal and exhibited feminine behavior. Later in 2008, he has a testicular removal procedure performed in Greece and the creation of external female organs and vagina. In this new situation, taking a feminine psychosexual direction and, at the request of the Albanian court, forensic examination was conducted, in the end of which, resulted in the approval of gender change from male to female. Discussion Then presented are detailed data of the forensic examination of this case and analysis of the relevant literature regarding issues of intersex, disorders of sex development, hermaphrodism, etc. In conclusion, it is underlined that the recognition of these issues helps in the accurate resolution of such cases in the forensic practice of Albania.

**Keywords:** Intersexed Person; Disorder of Sex Development; Hermaphroditism; Medico-Legal Expertise

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# IDENTIFICATION OF THE CORPSES FOUND IN WATER IN ALBANIA

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**Abstract:** An important problem of the identification of unknown corpses belongs to the cadavers found under water. In fact, Albania is a country very rich with waters: seas, lakes, rivers etc., generally common with neighbouring countries, where the medico-legal mortal cases from drowning are very frequent, especially during the summer. An interesting characteristic with the corpses that have been under water for a long period of time has to do with the fact that they travel in many cases due to underwater sea currents and river flow, in some cases in large distances.

In some cases, the victim murdered or drowned in Saranda (south of Albania) is found later in Durres. In drowning of girl in river Bune, near Shkodra, her corpse was found in the sea near Porto Palermo, Durres. In drowning of a child in the river White Drin in Kosovo, his corpse was found in Fierza lake near Kukes In Albania.In the paper are presented some cases of our practice with unknown cadavers found in water, where are used different methods of identification as skull-photo superimposition, forensic odontology etc.

**Keywords:** Unknown Cadavers Found in Water; Identification; Albania.

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# THE IMPORTANCE OF MEDICO-LEGAL EXAMINATION REGARDING THE MECHANISM WHICH CAUSES A THANATOGENERATOR LESIONS

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**Case Report:** The authors present the case of a 29 years old male deceased because of a thrust-cut wound on the anterior side of the left hemithoraces, between medio-clavicle line and axilary anterior, at 12 cm under the acromio-clavicle joint. In the begining, due to the antecedents and his spous's declaration, the case was labeled as a suicide. Subsequently, after analising the case based on the location of the lesiune, the depth of it and it's direction, also based on the corner's observations regarding a few small superficial lesiunes on the victim and on his spous also, it was proven that the lesion was caused by the women, therefore it is a homicide. For a complete elucidation of the case an experiment was made on a model, which only proved once more that it was impossible for a person to cause itself such injuries. The before and after behavior of the aggressor (victim's wife), including the phone conversationts proved that she was the author of the homicide.

**Keywords:** Punctured Cut Wound; Thantogenerative Lesion; Suicide; Homicide

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# REVALUATION OF FORENSIC-MEDICAL EXAMINATION IN ORDER TO CREATE A PROFILE OF THE SUICIDE IN BIHOR-ROMANIA

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**Case Report:** The authors, due to their coroner or medical examiner profession, have a wide activity which includes suicidal cases, first of all because almost entirely they perform autopsies on bodies killed by a violent death through suicide, and when it comes to parasuicide they often perform psychiatrically medico-legal examinations. Due to specific ethnicity, culture, religion, the frequency of suicides in Bihor County has the one of the highest rates in the country (ranked number five). 1250000 medico-legal examinations had been performed for the last thirteen years in cases of suicide and parasuicide, and following a great number of items, the authors framed the profile of the suicidal man/woman in Bihor County; then they determined the particularities of the analyzed suicidal cases. Their conclusions surpass the statistical aspect and have a prophylactic nature concerning this phenomenon.

**Keywords:** Profile; Medico-Legal Examination

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# AETIOLOGY-PULMONARY SUDDEN DEATHS IN YOUNG PEOPLE: MEDICO-LEGAL AND JUDICIAL ASPECTS

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**Case Report:** The law in Romania stipulates that the forensic departments perform autopsies in every case of violent, sudden and suspect deaths. In sudden deaths categories it is included the death that happens unexpectedly usually to young people that are not known for having different diseases. Only the autopsy and especially the anatomo-pathologic examination can establish for sure what the aetiology of the death was. The authors present a 5 years study based on the autopsies performed at Medico-Legal District Department Bihor-Romania. First it is presented the report between violent deaths, suspect and sudden. Regarding the sudden deaths it was analysed the age, gender, background and foremost the cause of death. Cardio-respiratory aetiological deaths are most frequent, first place been taken by interstitial viral pneumonia. Followed at a considerable distance by the deaths caused by toxico-septics conditions that are part of the broncho-pneumonias and lumbar pneumonias, then the ones with cardiac aethiology (myocardials, coronopathies, myocardial attacks, pulmonary thromboemly). It was presented the records in young people, by young people understanding persons up to 30 years. The conclusions of this works have predictive nature and offer a real image of the medical causes that lead to sudden deaths in young people.

**Keywords:** Medico-Legal Autopsy; Sudden Death; Young Persons; Cardio-Respiratory Aethiology

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# THE NEED OF PERFORMING A MANDATORY AUTOPSY ON ALL THE VICTIMS INVOLVED IN CAR ACCIDENTS

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**Case Report:** In Romania, the legislation states that it is mandatory to perform an autopsy in all situations of violent, sudden and suspicious deaths. The death of victims involved in car accidents in the majority of the cases a violent one, hence the medico-legal autopsy is compulsory. This benefits the investigators when it comes to correctly solve the cases. In fact the driver's autopsy reveales the cause of death, but it can also show pathological modifications, that might have led to disorders that favored the accident (for example: cerebral or myocardial lesiunes). The autopsy also reveales the driver's blood alcohol. The autospy of the occupants (occupant) in the vehicle reveals the cause of death, and the lesiunes they present can suggest the seat they had in the vehicle, if they had a seatbelt or not, etc., elements that matter if the victimis had insurance. Also, it is very important from a judicial point of view to establish the time order of death of the victimis of the accident ( at the same time, first the husband then the wife, or all the possible alternatives among family members involved in the car accident.) The pedestrian - the autopsy reveals the cause of death, the blood alcohol; the lesions that are being presented reveal the generative mechanism of the accident and the position that the pedestrian had when the impact with the vehicle took place. When the victims were bikers or motorcyclist, besides the cause of death, based on the violent lesiunes the autopsy also proves the position of the vehicles involved in the accident. This work is apleading for the medical and judicial importance of performing autopsies on car accidents victims.

**Keywords:** Car Accident; Medico-Legal Autopsy

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# SITUATIONS IN WHICH THE MEDICO-LEGAL AUTOPSY IS MANDATORY IN ROMANIA

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**Abstract:** The authors present the situations in which the law stipulates that the medico-legal autopsy is compulsory and prove how useful it is medically, socially and judicially to perform such autopsies. The starting reason is that there were situations in which they had to perform examinations on deceased Romanians in other European countries (such as: Italy, Spain, France, Great Britain etc.) an autopsy was not performed and that is why the cause of death remained uncertain. The consequences of these situations led to numerous difficulties for the family of the deceased, such as: 1) From a medical point of view: they did not know whether the deceased was sick or not, what disease they had or if a certain medical treatment was followed correctly or wrong. Not knowing the cause of death the descendants, mainly children, were not able to find out what their hereditary-side antecedents are, in order to be able to protect themselves from potential infection risks that their mother or father had. 2) From a social, economical point of view: the successsors of the deceased could not profit from any form of insurance that the deceased had because in the insurance contract it is mentioned the mandatory nature of the autopsy in order to establish whether the death was violent or not violent; 3) From a judicial pooint of view: due to the lack of an official autopsy report the authorities don't know the conditions and circumstances of the death, so they cannot hold responsible ( bring charges) persons or institutions that have favored in a way the death. This study is a pleading for maintaining the present Romanian legislation despite the fact that it is not completely according to the European norms.

**Keywords:** Medico-Legal Autopsy; Medical; Judicial; Social And Economical Consequences

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# AN ATYPICAL CASE OF INCAPRETTAMENTO (RITUAL LIGATURE AND STRANGULATION)

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**Abstract:** Incaprettamento represents a rare form of strangulation that the Italian literature review essentially refers usage to the criminal underworld or mafia. This type of homicide includes one end of a rope creating a slipknot around the throat of the victim while the other end is used to tie the limbs behind the back. The death is caused by asphyxia due to strangulation. In other criminal cases, incaprettamento is still implemented however; the subjects are killed by other means (for example by fire arm). The authors describe a case of atypical incaprettamento due to the unusual methods of the actual binding and by the circumstances that the death occurred. In fact, this case involves a passion crime where the victim was found in a submissive position with a cotton t-shirt acting as the tie. One end of the t-shirt was bound around the neck and the other end was bound around the wrists. The ankles were bound by adhesive tape. During the autopsy and the histology investigation vital signs of strangulation were found including numerous contusions and localized abrasions of the upper limbs and fractures to the maxillary bones.

**Keywords:** Incaprettamento; Ritual; Strangulation; Ligature

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# WHEN DID THE "BUBBLE" BURST?

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**Abstract:** Cerebral aneurysms are pathologic focal dilatations of the cerebrovasculature that are prone to rupture. Saccular, berry, or congenital aneurysms constitute 90% of all cerebral aneurysms and are located at the major branch points of large arteries. These aneurysms are situated in the anterior circulation in 85-95% of cases. They frequently rupture into the subarachnoid space, accounting for 70-80% of spontaneous subarachnoid hemorrhages, with diffuse or focal forms of vasospasm that may lead to ischemia and infarction. Aneurysmal subarachnoid hemorrhage has devastating consequences. Mortality rate has been estimated to be as high as 65%, with most deaths occurring early in the clinical course. Establishing the relationship of rupture of an aneurysm and a traffic accident can be a difficult area. It may be impossible to determine whether the rupture caused the accident or if it was a consequence of the accident himself. The authors present a case of a man that suffered a traffic accident. The CT-scan revealed the rupture of a saccular aneurysm of the anterior communicating artery. He was submitted to surgery but died eleven days later. The problem, in this case, was to establish the moment when the aneurysm ruptured: before, during or after the accident. The answer would make the difference between violent and natural death, which will imply or not an insurance compensation.

**Keywords:** Cerebral Aneurysm; Traffic Accident; Cause of Death.

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# SUBARACHNOID ANEURYSM RUPTURE IN A YOUNG WOMAN WITH ALAGILLE SYNDROME

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**Case Report:** The Alagille syndrome is a rare congenital disease with a prevalence of about 1:100,000. The Alagille syndrome is associated with a typical appearance of the patient, and abnormalities in various organs hypoplasia of the biliary tract of the liver, pulmonary valve stenosis, malformation of the arterial blood vessels and vertebral anomalies. The severity of the disease is highly variable, the diagnosis may be difficult in milder forms. In severe cases, liver transplantation is rarely needed at an early age. The case of a 25-year-old woman with Alagille syndrome is presented. At the age of 7 and 8 years liver transplantations have been performed. The young woman died suddenly and unexpectedly despite stable health and regular medical treatment. The cause of death was a subarachnoid haemorrhage due to a large ruptured aneurysm of the cerebral arterial circle. Vascular malformations of the aorta and arterial vessels are described in the Alagille syndrome, 16 % of wich are intracranial malformations with haemorrhage or ischemic infarction being a possible cause of death.

**Keywords:** Allagille Syndrome; Aneuryms; Vascular Malformation

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# ARTIFICIAL PENILE NODULES - CASE REPORTS

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**Abstract:** Implantation of beads under the skin of the penis to enhance coital excitement and orgasm of the sexual partner during intercourse is not uncommon in the Far East and South East Asia. The term artificial penile nodule has been suggested for the condition resulting from this practice. The phenomenon is unusual in Greece. The article reports on two cases of penile modifications, known in medico-social literature as artificial penile nodules, observed during the autopsy examinations of two males of Russian origin.

**Keywords:** Implantation of Beads; Artificial Penile Nodule

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# THE DIAGNOSIS OF AMNIOTIC FLUID EMBOLISM IN THE VIEW OF FORENSIC PATHOLOGY

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**Introduction:** Amniotic fluid embolism (AFE), so-called anaphylactoid syndrome of pregnancy is a fatal catastrophic condition during pregnancy, labor, and shortly after delivery. We often have experience about these cases through medico-legal disputes. The diagnosis of AFE is usually done based on the clinical constellation of signs and symptoms such as hypotension with cardiogenic shock, respiratory distress, disseminated intravascular coagulation in the absence of other medical condition. Traditionally, the pathological diagnosis (amniotic fluid components such as fetal debris on pulmonary vasculature) wasnt considered all that important. But in practice, we, as forensic pathologists, still faced some difficulties and limitations by its definition. As such, the diagnosis of AFE has remained a subject of controversy. Therefore, we analyzed cases where death has occurred during peripartum and delivery and tried to search out more reliable diagnostic criteria that may be helpful for the management of AFE.

**Materials and Methods:** We selected 44 autopsy cases where death occurred during peripartum and shortly after delivery between 2004 and 2009 in National forensic services in Korea. And we classified the cases, met by clinical criteria and pathologic criteria of AFE as described above and analyzed them.

**Results:** Of all 44 cases, 25 cases were sufficient to be included by both criteria, diagnosed as AFE. 19 cases (76%) were met by both clinical and pathological criteria and 6 cases (24%) were done only by clinical diagnosis. For clinical criteria, all cases with AFE had just one or more of the features and they did not show all symptoms and signs. The other cases that were not included as AFE consisted of the cases with other medical condition such as placental abruption, uterine atony, eclampsia, aortic dissection, cerebral hemorrhage, heart disease so on and the cases with unknown clinical history that found as a decomposed body after delivery. And in these cases, on histological examination, amniotic fluid components were not found, even though they have similar symptoms and signs of AFE.

**Conclusions:** In postmortem examination for medico-legal cases during periapartum and delivery, the pathological examination can be a reliable diagnostic criterion for AFE although the cases have just one or more features in clinical diagnostic criteria.

**Keywords:** Amniotic Fluid Embolism; Forensic Pathology; Diagnosis

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# SURVIVAL FROM NEAR-HANGING AFTER RUNNING INTO AN AMBUSH ROPE WHILE DRIVING A MOTORCYCLE

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**Case Report:** We report an unusual incident of near-hanging in a male who ran into an ambush rope used to tie secure a goat at a tree trunk located at one side of the road, while driving his motorcycle. The goat had vertically crossed the road to climb on an olive tree. The driver failed to notice the rope which extended in parallel with the ground. He presented with pain, anterior and lateral neck region swelling, dysfagia, bradycardia, dyspnoea and voice hoarseness. There was a rope mark around the neck with some facial mottling but neither petechiae nor subconjunctival haemorrhages. After a while he became disoriented and suffered memory loss regarding his accident and the next two hours thereafter. No abnormal neurological findings were discovered. Simple and soft tissue X-rays were normal, while Doppler ultrasound showed soft tissue edema and regional subcutaneous/muscle hematomas. He made a full recovery with only a residual memory loss. Near-hanging should prompt for evaluation of potential complications due to local damage to the pharynx, thyroid, larynx, blood vessels and cervical spine. We wish to emphasize on the importance of admitting such patients for imaging, laboratory testing and continuous monitoring of vital signs, respiratory function and neurological status.

**Keywords:** Near-Hanging; Case Report

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# OCCUPATIONAL FATALITIES. TWO UNCOMMON CASES WITHIN FARMING ACTIVITIES.

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**Abstract:** Occupational fatalities are defined as sudden and unexpected events suffered by an individual on the workplace and/or during working hours, and whose death occurs up to one year after the day of the accident. Workers' health, safety and well-being are vital concerns to hundreds of millions of working people worldwide, but the issue extends even further beyond individuals and their families - it is of paramount importance to the productivity, competitiveness and sustainability of enterprises, communities, and to national and regional economies, embracing other important determinants, including working hours, salary, workplace policies, health promotion and protection provisions. Currently, an estimated 2 million people die each year as a result of occupational accidents and work-related illnesses or injuries (World Health Organization Statistics). The Portuguese legislation predicts a forensic autopsy in case of an immediate death caused by a work accident (Law n. 45/2004, 19th August). Of the 2497 autopsies performed between January 2002 and December 2008, in the Forensic Pathology Department of the Centre Branch of the National Institute of Legal Medicine, IP (INML, IP), 148 were related to occupational hazards (5.93%). The majority of the victims were farmers (16.89%), due to the fact that this is a region of important agricultural activities. The most frequent cause of death was occurrence of traumatic lesions by a blunt object and the most frequent triggering event of all occupational fatalities was falling from high places (33.11%). The authors present two uncommon cases of violent accidental deaths related to occupational hazards that occurred on the context of farming activities. Both deaths were due to traumatic lesions caused by perforating-blunt instruments which causes major vascular lesions. It is crucial to emphasize the importance of circumstantial information in cases such as these, given the specificity of the objects that stroked the victims.

**Keywords:** Occupational Fatalities; Autopsy; Forensic Pathology

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# BLAST INJURIES

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**Abstract:** The poster present three cases of different blast injuries in South Slovakia between 2005-2010. Illegal bombs have been used during revenge of mafia (underworld) in two cases. The bomb has been used to kill relatives as well in the second case. In the third case there has been an accidental explosion of building material - metal bars. In all these cases the victims died and much damage was caused. Fortunatelly mortal blast injuries are still very rare causes of death in Slovakia.

**Keywords:** Blast Injuries; Bombs

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# VIRTUAL AUTOPSY AND CRIMINAL JUSTICE SYSTEM: USEFULNESS AND LIMITATIONS OF MODERN SCIENTIFIC METHODS IN CRIMINAL PROCEEDINGS

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**Introduction:** Autopsy is one of the oldest instrument of which medical science has to answer to the questions of scientific and forensic interest to the circumstances and causes of death of people. Like any other scientific tool, the technique evolved in step with technological progress, with the cooperation of other branches of medical knowledge and enriched with new knowledge. In this context it is not surprising, therefore, the recent meeting between the investigation and autopsy imaging. This collaboration created the virtual autopsy, a new method of examination of the corpse that does not use the knife and allows the display of the various organs using MSCT and MRI. One of the first studies on the application of CT in the forensic field was led by Wüllenweber et al. in 1977, in a case of gunshot wound [virtopsy minimally invasive ], but the impetus for the evaluation of imaging applications cadaver was born at the Institute of Forensic Medicine, Diagnostic Radiology and Neuroradiology, University of Bern in the mid-90s, with the birth of the project virtopsy ®. Since then several studies have evaluated the usefulness of the application of imaging techniques in various situations. Many Authors have proposed the use of CT for the identification of unknown corpses. To this end Tatlisumak et al. have suggested the evaluation and comparison of some parameters of the frontal sinuses through the use of CT scans. Silva et al. report a case of a male subject identified by comparison of ante and post mortem CT scans. A similar approach is the basis of a study by Ruder et al. having examined 100 post-mortem CT in order to find matches with 25 scans ante mortem in the frontal sinuses, maxillary and sphenoid. The identification of the bodies is of fundamental importance in the context of mass disasters and the use of imaging techniques (CT Mobile) in this area can be extremely useful both for the tremendous time savings they imply and for the assessment and identification of bodies, such as integrating the required items from Interpols Disaster Victim Identification Guide with CT findings.

**Materials and Methods:** Are carefully studied all the sources of scientific literature on the subject. Qundi were analyzed court cases dealt with: no support of CT and MRI, with only the CT and MRI support, support "in combination " autopsy and CT or MRI. The instruments used were RM Philips Achieva whole mod Nova and Philips Brilliance 64 CT (MDCT). Finally, the results were critically evaluated with respect to the Italian reality of the case, with particular reference to the real impact of the method on the judicial system.

**Results:** From the foregoing it includes the great potential of the post-mortem imaging techniques and the many benefits they offer: - the possibility of a reworking of the 3D data that allows you to appreciate the anatomical details, not fixed in two dimensions, to improve the assessment of the dynamics of road traffic accident and also to examine bodies in an advanced state of decomposition; -the elimination of the biological risk for the personnel involved in forensic autopsy practice; -the ability to create a digital documentation in which the data can be transmitted at a distance, allowing easy comparison between experts; - the opportunity to run multiple virtual autopsies on the same subject without having to collide with a previous dissection; -the autopsy investigation less opposition from some religious cults, such as Orthodox Judaism and Islam; - the huge savings in time and the chance to drive any conventional autopsy to the most significant findings, further reducing the time of investigation; -the ability of MSCT to highlight the collected gas (which is reflected investigations with the classic autopsy techniques), which can be of great help in studying the origin of the Intravascular gas and evaluation of any correlation between this and the resuscitation cardio -lung. Of course, despite these advantages, the virtual autopsy is also characterized by a number of limitations: - the higher costs associated with the use of imaging techniques; - the interpretation of the images displayed by the various methods require highly skilled people who not only is familiar with the reading of the images provided by CT, MRI or by dallangiografia, but having the knowledge to correlate these findings in a field other than clinical; - the inability of many sites that you have the proper equipment to enable the implementation of virtual autopsy and logistical problems faced by some centers to take advantage of the imaging instruments (the use of MDCT, MRI, etc. in at night); - the difficulty in comparing large-scale imaging techniques with the traditional autopsy investigation, due to the heterogeneity of the samples and

procedural protocols used in different centers; - impossible to obtain histological samples required for pathologic analysis. Compared to the latter point it is necessary to emphasize that there is the possibility of CT-guided biopsies, which can be used to provide samples for pathological analysis. This type of approach ("needle autopsy) is still characterized by some limitations, including the operators exposure to radiation and the fact that the needle should be inserted parallel to the scanning in order to assess correctly the direction. These problems can eventually be resolved through the use of robotic systems, as virtobot, technological evolution of the various techniques discussed so far.

**Conclusions:** The potential of imaging in forensic pathology are enormous. The technology of CT and MRI is periodically reviewed and improved and the sensitivity and specificity of the morphological data appear to be more valid. Since the task of the forensic pathologist is to provide justice to the technical elements scientifically valid that can be used to clarify legal questions more or less complex, we must ask ourselves what can be trusted and used exclusively as an "image". While accepting that the CT and MR image data provides reconstructive compatible with the reality studied, it must recognize the weakness in relation to the figure for the tissue. If the data in a court case was histologically "diriment" means that there can not express the criterion of certainty but of probability. And in many criminal justice systems, as in Italian, a diagnostic doubt has an important value in the decision of a Judge.

**Keywords:** Virtopsy; Sensitivity; Specificity; Criminal Justice Systems.

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# CELL PRESERVATION AND DNA ANALYSIS OF COMPACT BONE OF THE FEMUR OF HUMAN REMAINS UNDER NATURAL ENVIRONMENT IN BRAZIL

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**Abstract:** Brazil has the 6th highest rate of homicides in the world (25 per 100 000 inhabitants) and there are many cases in which post-mortem human remains especially bones that have been exposed to taphonomic conditions are the only materials available for human identification. In the molecular analysis, the possible sources of DNA from bone tissue are its typical cells including osteocytes and endothelial cells, since the mineralized matrix is nourished by blood vessels. Environmental conditions as heat, soil pH, moisture level, attacks of micro-organisms and the time that these bones were on the ground can exert direct influence on the microscopic morphology, cell quantity and consequently on the DNA amount, making the identification process a challenge. Brazil has a predominantly tropical climate with high rainfall, temperature and sunlight, in addition to having acidic soils. These particular conditions damage even more the bone material and cause changes in the microstructure and cell loss. Aim : To study the microstructure and also the presence of osteocytes and endothelial cells in the femoral compact bone tissue from human remains that have been under harsh environmental conditions in Brazilian territory, correlating it with the amount of human DNA extracted.

**Materials and Methods:** Were used fragments of compact bone of the femoral diaphysis of 20 skeletonized corpses found in the period 1998 to 2009 in Ribeirao Preto, São Paulo, Brazil. Fragments of 1cm3 of each of the 20 samples were crushed and pulverized in a blender with metal cup (Waring Product, CT, USA). DNA was extracted employing the QIAamp DNA Mini Kit (QIAGEN) with the addition of EDTA in the lysis step, and quantified with the Duo DNA Quantification Quantifiler kit (Applied Biosystems). For the morphological analysis, samples were fixed in formalin and immersed in decalcifying solution, inclusion in paraffin blocks and the slices obtained were stained with H E. From the most cellular area, were selected 10 consecutive fields by a pathologist and the software Image Tool (UTSCH-USA) and Image J (NHI-USA) were used for cellular analysis. The presence of endothelial cells was verified by immunostaining of CD31 and CD34 monoclonal antibodies (endothelial markers) by the method of the complex streptavidin-biotin, consisting of deparaffinization, hydration, endogenous peroxidase blocking, antigen retrieval, interaction with primary and secondary antibodies, reaction with peroxidase, chromogen staining, counterstaining with hematoxylin and dehydration.

**Discussion and Conclusions:** There was preservation of bone architecture in 55% of the cases. The average cellularity of osteocytes per bone area was 0.000041 cells per micrometer. Osteocytes were observed in all cases ranging from 1 to 40 (average 6.45). We found a significant correlation between the amount of DNA extracted and the number of nuclei of osteocytes observed in microscopy. There was no expression of the CD31 and CD34 endothelial markers

**Final Comments:** In general, this study showed preservation of osteocytes, but not of the endothelial cells in fragments of femoral compact bone exposed to the tropical climate. This indicates that osteocytes are the source of DNA in this kind of sample and helps clarify the amount of human DNA extracted .and quantified. The fact that many nuclei of osteocytes were pyknotic or in karyolysis, and few had a well-defined nuclear membrane is another factor involved in the difficulty of obtaining DNA. A preliminary analysis of the morphology in skeleton samples can predict the success in extracting DNA from these samples, since a significant correlation was found in this work.

**Final Comments:** Finantial support FAPESP 2010/19127-2, CAPES

**Keywords:** Bones; Human Remains; Human Identification; Dna Analysis; Histopathology; Brazil

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# GENETIC TESTS IN 73 CASES OF CARDIAC SUDDEN DEATHS IN SE SPAIN

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**Introduction:** In Spain approximately 12% of all natural deaths occur suddenly, and 88% of them have a cardiac origin. In the past two decades, numerous genetic defects responsible of inherited cardiac disease predisposing to arrhythmias have been identified.. Nowadays genetics testing for some of these diseases are available allowing for the identification of individuals at risk of developing fatal arrhythmia. Opening new horizons for prevention and treatment of these pathologies (risk stratification, treatment selection and reproductive counselling).

**Materials:** In Spain approximately 12% of all natural deaths occur suddenly, and 88% of them have a cardiac origin. In the past two decades, numerous genetic defects responsible of inherited cardiac disease predisposing to arrhythmias have been identified.. Nowadays genetics testing for some of these diseases are available allowing for the identification of individuals at risk of developing fatal arrhythmia. Opening new horizons for prevention and treatment of these pathologies (risk stratification, treatment selection and reproductive counselling).

**Methods:** We have studied 409 cardiac sudden deaths autopsied at the IML of Murcia during the period 2003-2009.. We performed a complete autopsy with complementary proofs (biochemical, toxicological, microbiological, and in 73 cases diagnosis cases we have performed a genetic study)

**Results:** In 202 cases the cause of death was an ischemic process (myocardial infarction) (49,38%), in 33 cases we didn't found a clear diagnosis, in 47 cases we found an hypertrophic cardiomyopathy and in 15 cases a dilated cardiomyopathy. In the 73 cases with genetic testing we found genetic alterations in seven cases with the following alterations: TNNT2, Arg173Gln, Plakophilin-2, G712R, MYBPC3, V38AfsX42, MYBPC3, A833V, Plakophilin-2, S140F, RyR2, 4771. We want to point out the need to incorporate genetic studies in cardiac sudden deaths

**Keywords:** Genetic; Test; Sudden Death

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# POSTER SESSION

## Session B1

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# THE CONTRIBUTION OF TRACE EVIDENCE ANALYSIS IN FORENSIC EXAMINATIONS - THE LPC PHYSICS SECTION EXAMPLE

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**Abstract:** The LPC Physics Section performs analysis of several types of trace evidence, such as Fibres, Paint, Security Ink, Glass, Tape, GSR and Coins. This type of evidence is submitted to the lab for the investigation of violent crimes, rapes, hit and run accidents, robberies, counterfeiting, etc. The most commonly applied techniques are optical microscopy, electron microscopy with X-ray microanalysis (SEM/EDX), Infrared spectroscopy (FTIR) and Thin Layer Chromatography (TLC). Is this communication some cases are given showing examples of expertises and their contribution to crime investigation.

**Keywords:** FITR; SEM/EDX; TLC

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# SHARP FORCE SUICIDE IN THE NORTH OF TUNISIA

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**Introduction:** Suicides have become a public health problem worldwide. Victims commit suicide most often by hanging and firearms, sharp force suicides remain rare. The objective of this study is to develop a profile of sharp force suicide victims in northern Tunisia and to determine predictor's signs of suicide among the forensic population.

**Methods:** This is a prospective study over a period of 6 years and 6 months (1 January 2005 to December 31, 2011) on suicide by stabbing autopsied in the Department of Forensic Medicine of the Charles Nicolle hospital in Tunis.

**Materials:** Data were collected from the families, the minutes of the judicial police and autopsy reports. We have collected the epidemiological data (age, sex, origin, profession, psychiatric history ...), data relative to the act (date, place, reason ..) and autopsy findings (morphology, location, number of wounds, the presence of hesitation wounds ...)

**Results:** During the study period we counted 11 cases of sharp force suicide with a male (10 of 11 victims). The average age is 41.6 years. 7 among the 11 victims had a known history of psychiatric illness (3 schizophrenics, 4 patients with depression). 6 of 11 victims have a history of suicide attempts. 8 of the 11 suicides were committed in the victims home. One victim left a suicide note explaining the reason for his suicide. The wounds are most frequently located in the neck or the front of the upper limbs. 6 of the 8 victims have submitted hesitation wounds. No victim presented clothes lesions in front of skin wounds.

**Keywords:** Suicide; Sharp Force; Wound; Autopsy

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# EVALUATION OF THE IDENTIFICATION AND CLASSIFICATION OF BLACK TONERS USING PYROLYSIS GAS CHROMATOGRAPHY MASS SPECTROMETRY BY BAYESIAN NETWORK AND OTHER STATISTICAL CHEMOMETRIC METHODS

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**Institution(s):**[1]NATIONAL FORENSIC SERVICE; [2]HANYANG UNIVERSITY

**Abstract:** The identification and classification of black toners using pyrolysis gas chromatography mass spectrometry (Py-GC/MS) has been attempted through Bayesian network and diverse chemometric methods. The 45 standard samples were analyzed. To evaluate the accuracy of identification, Bayesian network model was performed and the results were expressed in the form of a likelihood ratio (LR). Seven peaks were taken and ranked among about 300 peaks of pyrolysis component for a toner. When the likelihood ratios of 5 samples arbitrary selected were compared each other the false rate was 7 %. For the purpose of the classification of samples, diverse chemometric methods such as principal component analysis (PCA), Mahalanobis distance and Random Forest method were performed and the resulting score distribution was examined in the relation with the manufacturer and a type of toner. Leave-one-out cross-validation was used as a validation method. The result of the evaluation of identification performed by Bayesian network models was compared with the results of other chemometric methods.

**Keywords:** Toner; Pyrolysis; Chemometrics

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# APPLICATION OF ON-LINE DERIVATISATION TECHNIQUE IN EXAMINATION OF RUBBER SAMPLES BY PYROLYSIS-GC/MS

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**Institution(s):**[1]JAGIELLONIAN UNIVERSITY; [2]INSTITUTE OF FORENSIC RESEARCH

**Introduction:** Rubber traces are often revealed on road accident's place as skid marks left on the road surface by tires of suddenly braking or accelerating vehicle. Besides natural and synthetic rubber, a tyre includes a number of chemical compounds (e.g. carbon black, zinc oxide, fatty acids, extender oils, organic peroxides) which are added for improvement of the physical and chemical properties of the final product. Numbers and types of these compounds depend on the tyre model and manufacturer. The main aim of our research was to develop the procedure of the analysis and discrimination of rubber traces for forensic purposes. The work was focused on an on-line derivatisation of rubber samples using tetramethyl ammonium hydroxide (TMAH). This technique, also known as „flash methylation" enables one to analyse non-volatile constituents of the sample, e.g. fatty acids.

**Materials and Methods:** All samples were collected from used car tyres (23 summer, 8 winter and 2 all-season). Slices of about 10 ?g were placed in quartz tubes filled with quartz wool damped with 3% v/v TMAH water solution (quartz wool was used for longer and better contact of the derivatising agent with the sample). All samples were pyrolysed using a PyroProbe 2000 filament pyrolyser (CDS Analytical) in temperature 550 °C, and then separated on a DB-35MS capillary column (30 m x 0.25 mm x 0.25 µm) installed into AutoSystem XL gas chromatograph coupled with a TurboMass Gold Mass Spectrometer (Perkin Elmer Instruments) using a standard temperature program (40°C for 2.5 min, 40-320 °C at 10.5 °C/min and 320 °C for 5 min with solvent delay between 1.00 and 1.70 min). Each sample was analysed at least three times.

**Results:** During the study we found the best conditions for derivatisation. A series of measurements in the range of 400 - 650 °C showed that the efficiency of derivatisation grows up to 550 °C and then decreases rapidly at a temperature of 600 °C. The best results were obtained in 550 °C for the samples treated with TMAH immediately before the pyrolysis (without drying). Pyrolysis time (measured in the range of 5 - 20 s) has no significant influence on the obtained results. In all analyzed samples we observed the presence of methyl palmitate (tr = 20.50 min) and methyl stearate, (tr = 22.50 min). In one sample peak from methyl stearate had much higher intensity than peak from methyl palmitate. In other cases peak from methyl stearate had comparable (12 samples) and significantly lower (20 samples) intensity than peak from methyl palmitate. In 12 samples methyl myristate (tr = 18.40 min) was found, but intensities of obtained peaks was very low or peaks were visible only on one or two chromatograms. On the chromatograms of samples containing benzothiazole (25 out of a 33) a peak originated from its methyl derivative, methylthiobenzothiazole was visible (tr = 19.24 min). The intensity of the peak was dependent on the tire model from which came the analyzed sample. In most cases it was lower than the intensity of the peak of methyl palmitate and methyl stearate. The study showed no correlation between the intensity of the peaks from the derivatized compounds and a category of tires (summer, winter, all-season).

**Conclusions:** As a result of the study, a rapid and simple method for derivatization of rubber samples using an aqueous solution of TMAH was developed. The compounds obtained by derivatization provide an additional (compared to the standard test procedure) information about the sample, the number of characteristic features particularly important in comparative studies in criminalistics has a chance to be increased. On the other hand, derivatization process leads to reduction of repeatability and sensitivity for several contaminants. Therefore, the method seems to be only a complementary to the standard procedures and should be used in cases when unambiguous sample discrimination is impossible.

**Keywords:** Pyrolysis; Gas Chromatography; Rubber Traces; Forensic Chemistry

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# THE FORENSIC NURSING TRAINING PROGRAM: A CULTURAL RESPONSE TO CRIME

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**Abstract:** The expert in Forensic Nursing is generally a modern professional, who is able to provide specific answers to requests for cooperation of the Health Service of the country where it operates. In Italy it is strongly demanded of public and private institutions. The establishment of the figure of a degree in Health Professions, an expert in Forensic Nursing supports the coroner, the Medical Health Department and the medical management in general, in the business of counseling, direct assistance, ongoing assessment of quality. Health care in Italy is evolving, based on the experience of American and Anglo-Saxon world, towards an inevitable need for qualified health professionals in addressing their critical scope of Public Health, more and more in touch with the world of law and specifically to the forensic field. The area of Public Health, which includes the disciplines of Forensic Medicine, Occupational Medicine and Hygiene, requires medical personnel specifically trained in a position to adequately cooperate with the activities of medical management. And now the everyday needs of staff in hospitals to have qualified and trained professionals in targeted support to the management of critical organizational and legal which will inevitably reflect on the management of individual local and national. Crucial also is becoming the qualification of professionals who are able to provide appropriate technical input to the Directorates General Directorates of Health and Hospitals (AO) and Provincial Health Authorities (ASP), the Units of Forensic Medicine, the NARC (Clinical Risk ), the SERT, the Inmates, the social security institutions such as Social Security, INAIL to Police: State Police, Carabinieri, Forestry, Municipal Police and the Armed Forces. Existing and operating in the realities of Anglo-Saxon derivation, the expert in Forensic Nursing, is also in Italy that a degree in health professions that is able to provide adequate assistance in all areas of public administration and the private sector where the his work is required The University of Catanzaro Magna Graecia has developed a training program for forensic "targeted" in order to provide the employment of highly qualified professionals who have made one year intensive course on major issues of the Bar. The training program provides for the division of Forensic Nursing in thirteen areas, each of which disciplinary assigned to a coordinator. Thus, after a year of progress, the goal is to have provided students already hospital employees, who are already working then, a correct method of operation to be taken at events that require skilled intervention, while for those who wish to pursue a career in forensics, he provided the solid foundation on which incardinate a learning specialist. The authors deal with the first experience teaching and coordinating the results and the real impact of this training project in a region such as Calabria, a region of high density of crime

**Keywords:** Forensic Nursing; Forensic Pathology; Criminal Court

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# CHEILOSCOPY: A METHOD OF FORENSIC IDENTIFICATION AND ITS IMPORTANCE IN FORENSIC ODONTOLOGY

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**Introduction:** Cheiloscopy is one of expertise of Forensic Odontology of great relevance concerning to forensic research and human identification. Its objective is study, record and classifies patterns of lip prints. The aim of this study is to determine and differentiate sex by means of patterns characteristic present in lip prints.

**Materials and Methods:** This study comprehended 100 students of the 4th and 5th years of Fernando Pessoa University, 50 females and 50 males. The selection was made by excluding individuals with pathology, lesion or lip trauma and hypersensitivity to lipstick. Red lipstick was applied and students were asked to spread it with friction movements of upper lip on lower lip. To obtained prints were put in white card in order to preserve permanently their characteristics and allow a correct analysis of collected data by means of cellophane tape and a photograph was made off each one. All prints were visualized with a magnifying glass, recorded and encoded so that, until the moment of analyses, the sex of the individual was not revealed.

**Discussion:** In the analyzed sample, a wide variability and individuality among prints has been observed, confirming the idea that lip print is unique for each individual. From this results we can conclude that there are lip patterns or traces more characteristic and specific in men than in women, concluding that this is a good method for differentiation and identification in Forensic Odontology.

**Conclusions:** Lip prints present characteristics that make them unique and individual for each person even in homozygous twins, are immutable and perennial, persisting whole life.

**Keywords:** Cheiloscopy; Lip Prints; Forensic Odontology

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# DEVELOPMENT AND VALIDATION OF A METHOD FOR THE ANALYSIS OF AMPHETAMINE-TYPE STIMULANTS IN WHOLE BLOOD BY SPE-GC-MS

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**Introduction:** Abuse of stimulants has been largely confined to amphetamine and its derivatives. However, over the last decades the consumption of synthetic drugs of abuse has increased and diversified. Indeed, in recent years, several amphetamine-type stimulants (ATS) have entered the illicit drug market as designer drugs, and these have acquired large significance as substitutes of MDMA (and other club drugs), partly because some of those compounds are not subjected to control legislation. Methods for analysis of several ATS (including the more recent 2C-T-2 and 2C-T-7) in blood samples by gas-chromatography-mass spectrometry (GC-MS) are scarce in the scientific literature, and this motivated the development and validation of a new method for the screening, confirmation and quantization of ephedrine, norephedrine, methcathinone, PMA, PMMA, 2C-T-2 and 2C-T-7 in whole blood. The inclusion of those compounds was deemed necessary, since most consumers are poly-drug users, and amphetamine derivatives (e.g. MDMA) are often consumed together with these drugs, or may be present in illicit pills.

**Materials and Methods:** Using a sample amount of only 0.5 mL whole blood, the ATS were extracted by mixed-mode solid-phase extraction (SPE) and derivatized with MBTFA prior to GC-MS analysis. The method was linear from 5 (lower limit of quantification, LLOQ) to 500 ng/mL (weighted least squares regression), with determination coefficients (R2) higher than 0.99 for all analytes, except for methcathinone (0.97). The limits of detection (LOD) were 1 ng /mL for all analytes. Intra and inter-day precision ranged from 7 to 14%, while accuracy was within a ± 15% interval for all analytes, except for ephedrine at the highest QC level (17%) and methcathinone. Extraction efficiency was higher than 80% for all analytes.

**Conclusions:** The method has demonstrated to be reliable when analyzing routine samples and the short analysis time resulting from a simple sample preparation and a rapid instrumental analysis allow a fast turn-around time and makes it of great interest for forensic toxicology.

**Keywords:** Amphetamine Type Stimulants (ATS); GC-MS; Whole Blood

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# DETERMINATION OF ANTIDEPRESSANT DRUGS IN PLASMA BY RAPID RESOLUTION LIQUID CHROMATOGRAPHY

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**Introduction:** The present work describes the quantification of venlafaxine, trazodone, amitryptiline, nortriptyline, clomipramine, fluoxetine, maprotiline, dothiepin, and sertraline in human plasma for application both in clinical and forensic toxicology.

**Materials and Methods:** Quantitative analysis was performed by rapid resolution liquid chromatography combined with diode array detector (RRLC-DAD) using a Zorbax -C18 column (15 × 4.6 mm; 45 µm) with a mobile phase consisting of 25mM phosphate buffer and acetonitrile (60:40). Cation-exchange solid-phase extraction (OASIS® MCX) was used to extract these compounds, and protriptyline was used as internal standard.

**Results:** The validation was performed according to the guiding principles of the FDA and ICH, and the studied parameters included selectivity, linearity and limits, intra and inter-day precision and accuracy, and recovery. Calibration curves were linear from 0.1 (LLOQ) to 5 µg/mL for all compounds, with coefficients of determination (R2) greater than 0.99. Precision and trueness varied from 1.6% to 14.9% and 8.6% to 10.5%, respectively. Absolute recoveries ranged from 71 to 95%.

**Conclusions:** In general, this SPE-based procedure has demonstrated to be adequate for the sensitive determination of these antidepressants in plasma due to the presence of lower amounts of interfering endogenous substances and to the simplicity and ease of automation presented.

**Keywords:** Solid Phase Extraction; Antidepressant Drugs; Rapid Resolution Liquid Chromatography

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# AN OLD-NEW ILLICIT DRUG - MEPHEDRONE

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**Introduction:** New natural and synthetic compounds are continuously introduced into the illicit drug market. Their origin, composition, main and side effects are often not exactly known by the users themselves. Thus, the control of these substances is extremely difficult.

**Methods:** A new synthetic drug called mephedrone (2-metilamino-1-(4-metilfenil) propan-1-on) was introduced into the Hungarian market in 2008. This work summarizes its frequency in the biological samples investigated for illicit drugs in Hungary, and experiences of the medical examination of mephedrone-users.

**Results:** Toxicological analyses of biological samples of suspected drug users (urine and/or blood) were carried out by GC-MS at the Institute of Forensic Medicine (Budapest), and at the Department of Forensic Medicine, Univ. Szeged (Szeged). Altogether 5386 samples were analyzed in 2010 (4922 in Budapest and 464 in Szeged), and mephedrone was identified in 363 cases (7%).

**Conclusions:** Mephedrone is banned in Hungary since January 2011 but it is still present in the illegal drug market. At present we do not have sufficient experience with its long-term effects, tolerance, addiction, withdrawal symptoms or toxic dose. Thus, it is still difficult to establish whether addiction and/or mental disorder occurred.

**Keywords:** Khat; Mephedrone; Toxicological Analysis; Drug Addiction

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# DIGITALICS DETECTION BY UPLC-MS/MS

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**Introduction:** Digitalis glycosides are the drug of choice for the treatment of congestive heart failure and certain disturbances in cardiac rhythm, producing a positive inotropic activity and increase myocardial contractility. Digoxin and metildigoxin are the compounds most often prescribed for the treatment of such diseases. These compounds have a narrowest therapeutic range, so than can frequently lead to intoxication, involving suicide, homicide and accidental poisoning cases. Therefore, it is essential that toxicology laboratories are capable to detect and quantify this group of substances in post-mortem samples. The authors present the development and validation of a rapid method for the determination of digoxin and metildigoxin in whole blood by UPLC-MS/MS, with electrospray ionization in positive mode.

**Materials and Methods:** Whole blood samples (1 ml) were subjected to a pre-treatment with 2M ammonium acetate before the solid phase extraction using Oasis HLB ® 3 cc. The chromatographic separation was performed using an Acquity UPLC HSS Column T3 (2.1 x 100 mm, 1.8 mM), at 35 ºC. The mobile phase consisted of acetonitrile: 5 mM ammonium format (70:30) with a flow rate of 0.3 mL / min. Multiple reaction monitoring (MRM) was used to detect digoxin and metildigoxin with two transitions of ammonium adduct of each analyte, one for quantitation and other for confirmation.

**Results:** The method proved to be specific and linear over the range (0.3-10) ng/mL. This technique also showed high sensivity with a detection limit of 0.09 ng/mL for both compounds and a quantitation limit of 0.28 ng/mL. Percentage recovery was calculated at three concentration levels (1/3/8 ng/mL) and ranged from 83 to 100% for digoxin and from 62 to 94% for metildigoxin. The intra and interday precision coefficients of variation were =10%.

**Discussion and Conclusions:** Since the digitalis glycosides have a narrow therapeutic range, digitalic intoxication can easily occur, accidentally or intentionally. As so, toxicology laboratories must be able to detect and quantify this group of substances. The described method is fast, specific and selective, allowing quantitation limits under therapeutic range. It also proved to be linear and precise. Thus, this technique has great potential in forensic toxicology and could be applied in the Forensic Toxicology Laboratories, whenever it is needed digitalics detection, confirmation and quantitation.

**Keywords:** Digitalics; Digoxin; Metildigoxin; UPLC-MS/MS

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# INTRODUCTION OF HPLC/LTQ-ORBITRAP MASS SPECTROMETRY AS SCREENING METHOD FOR DRUGS OF ABUSE IN HUMAN URINE

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**Abstract:** A new wide-scope toxicology method has been developed, for the analysis of drugs abuse in human urine, using HPLC/LTQ-Orbitap equipped with PFP (pentafluorophenyl) column. The developed method allows the detection of 54 compounds, including amphetamines, opitas alkoids and hallucinogen. After solid-phase extraction with Oasis HLB cartridges, 54 drugs of abuse were investigated in the samples by LTQ-Orbitrap using electrospray interface under positive ionization mode, with MS data acquired over an m/z range of 100-650Da. The mass accuracy of this method is better at 1 ppm with external standard. The detection limit for most compounds tested was better than 2ng/ml. The recoveries of most analytes were above 80% . The relative standard deviation(RSD) of the intraday precision(n=6) <15% , depending on the solute concerntration investigated.

**Keywords:** Screening Method; Drugs of Abuse; LTQ-Orbitrap; Urine

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# DEVELOPMENT AND VALIDATION OF A GAS CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY METHOD FOR THE QUANTITATION OF NICOTINE, COTININE AND TRANS-3-HYDROXYCOTININE IN ORAL FLUID

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**Abstract:** A selective and sensitive gas chromatography-tandem mass spectrometry (GC-MS/MS) method for the simultaneous quantitation of nicotine and its main metabolites (cotinine and trans-3-hydroxycotinine) in oral fluid was developed and validated. Using only 0.2 mL of sample, the analytes were extracted by mixed-mode solid-phase extraction. After derivatization with MSTFA, the extracts were injected into the GC-MS/MS system in the multiple reaction monitoring mode, and the monitored transitions were 132.2 > 105.1 and 132.2 > 117.1 for nicotine, 174.6 > 104.1 and 174.6 > 118 for cotinine, and 284.4 >175.1 and 284.4 >218.1 for trans-3-hydroxycotinine. The validation was performed according to the guiding principles of the FDA and ICH, and the studied parameters included selectivity, linearity and limits, intra- and interday precision and accuracy, recovery and stability. Calibration curves were linear from 0.5 (LLOQ) to 1000 ng/mL for all compounds, with coefficients of determination (R2) greater than 0.99. The methods imprecision was less than 9% for all analytes in all runs, while the calculated concentrations were within a 7% interval from the theoretical concentrations. Absolute recovery ranged from 92 to 99%. Gas chromatography coupled to tandem mass spectrometry has shown to be a powerful tool, providing highly sensitive analysis of nicotine and metabolites in low volume oral fluid samples. Therefore, it can be successfully used for the measurement of those biomarkers of tobacco exposure, allowing assessing both passive and environmental exposure to smoke.

**Keywords:** Biomarkers of Tobacco Exposure; Oral Fluid; GC-MS-MS

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# 1,5-ANHYDROGLUCITOL AND METHYLGLYOXAL - NEW POST MORTEM MARKER FOR GLUCOSE METABOLISM DISORDERS?

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**Introduction:** Post mortem diagnosis of diabetes and a diabetic coma can be difficult because of the lack of characteristic morphological findings. Furthermore, glucose might be an unreliable factor because of its metabolism into lactate by glycolysis after death. Hemoglobin A1C or fructosamine can not predict rapid changes in glycemia. 1,5-Anhydroglucitol (1,5-AG), the 1-deoxy form of glucose, competes with glucose for reabsorption in the kidneys. Therefore, diabetics with a permanent hyperglycemia show significantly lower serum concentrations of 1,5-AG than non-diabetics. Methylglyoxal (MG), an alpha-oxoaldehyd, is mainly derived from intermediates of glycolysis, so diabetics show higher serum concentrations than non-diabetics. Both parameters are tightly associated with glucose fluctuations and postprandial glucose and can predict rapid changes in glycemia. Our objective was to develop liquid chromatography tandem mass spectrometric (LC-MS/MS) methods for the determination of both parameters in serum and blood and to see if an ante-mortem hyperglycemia can be proved by the analytes.

**Materials and Methods:** For 1,5-AG 50 µl of serum was treated as follows: after a protein precipitation step the supernatant was diluted 1 to 5 with acetonitrile and separated isocratically over a polar NH2-endcapped column. Sample preparation for MG demands protein precipitation and liberation of MG from its high plasma protein bond with perchloric acid and a derivatization step (24h, 4°C with 2,3-diaminonaphthalen) due to the high reactivity of the dicarbonyl compound. MG and the IS are separated over a C18 column. As internal standards, 1,5-Anhydro-D-[13C6] glucitol and 3,4-hexandione were used. Mass spectrometric detection was made in multiple reaction monitoring mode for both analytes with atmospheric pressure chemical ionization in negative mode for 1,5-AG and ESI in positive mode for MG. The assays were validated according to GTFCh guidelines. Serum of diabetics from a diabetic clinic and non-diabetics

**Results:** Validation of the assays showed linearity from the limits of detection (0,34 µg/ml for 1,5-AG and 1,3 ng/ml for MG) up to 50 µg/ml for 1,5-AG and 500 ng/ml for MG. Precision data at three concentrations (3 µg/ml, 15 µg/ml and 40µg/ml for 1,5-AG and 15 ng/ml, 125 ng/ml and 400 ng/ml for MG) were in accordance with the guidelines of the GTFCh (<15%). Reference concentrations for both parameters of hypo- / normo- and hyperglycemic diabetics and non-diabetic volunteers in relation to other parameters of the glucose metabolism (glucose, lactate, HbA1c, human insulin, C-peptide) are presented and discussed. In post-mortem assays an antemortem unknown diabetes could be detected by determination of 1,5-AG or MG, thresholds are discussed. Concentrations could not distinguish reliably between deaths due to diabetic coma and other causes of death in diabetics.

**Keywords:** Hyperglycemia; 1; 5 Anhydroglucitol/Methylglyoxal; LC-MS/MS

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# DO DUI ENFORCEMENT PROCEDURES MISS DRUGS WHEN ALCOHOL IS PRESENT IN DRUNKEN DRIVING CASES?

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**Introduction:** In Finland, the police are authorized by law to submit drivers to on-site breath test screening for alcohol. In suspicion of use of drugs, the external symptoms of drug use are documented and on-site oral fluid drug testers can be used. If the breath screening test is positive for alcohol, an evidential breath-alcohol test is conducted or a blood sample is taken. If the police officer suspects use of drugs, a blood sample is taken. The police can request one of three options: only blood alcohol concentration (BAC) is analysed, only drugs of abuse or medicinal drugs are analysed or both alcohol and drugs are analysed.

**Materials and Methods:** All DUI samples (N=475) that were sent to the laboratory during a two week period in spring 2008 (5th-18th of April) were included in this study. BAC was analysed by head-space GC-FID and drugs by GC-MS. The substance classes analyzed included drugs harmful for traffic safety like amphetamines/stimulants, cannabinoids, opioids, benzodiazepines, other hypnotics/sedatives, antidepressants and analgesics.

**Results:** Of the 475 blood samples arriving in the laboratory during the study weeks, alcohol analysis only was requested for 301, drugs only for 130 and both alcohol and drugs for 44. Only 7 samples were negative for all substances. In addition to alcohol (N=300), benzodiazepines (N=146), amphetamines (N=112) and cannabinoids (N=49) were the most common findings. 22% of all suspected DUI drivers were positive for only one group of drugs, 17% for two groups of drugs and 6% for three or more groups of drugs. 31% of the drivers had taken benzodiazepines (N=146) and poly-drug use with benzodiazepines was common. The mean positive alcohol results were: 1.91 when only alcohol analysis was requested; below the legal limit (0.5) when only drugs were requested; 1.30 when both alcohol and drugs was requested. When only alcohol analysis was requested (N=301), alcohol was positive in all cases, except one. In addition, drugs were found in 22% of cases suspected for alcohol only (N=66), these were mainly benzodiazepines. The predominant findings were diazepam and nordiazepam (10%) at concentrations of 0.1-1.8 mg/l. In several cases, use of temazepam (0.1-1.4 mg/l), alprazolam (0.02-0.48 mg/l), chlordiazepoxide (0.2-4.0 mg/l), clonazepam (0.01-0.12 mg/l) and oxazepam (0.1-0.6 mg/l) was detected. Two amphetamine cases (0.03 mg/l and 0.15 mg/l) were found in the alcohol only group. Of the cannabinoids, only the inactive metabolite THC-COOH (N=10) was found when alcohol only analysis was requested.

**Conclusions:** The study shows that opting for alcohol only analysis as a result of the alcohol breath test seldom led to illicit drugs being missed in the Finnish DUI enforcement procedure. The excellent detection of illicit drugs use was achieved by training the police officers to recognise external symptoms of drugs and by providing them with on-site oral fluid devices. Benzodiazepines are a more challenging group to recognise at the road side when alcohol is present.

**Keywords:** Drunken Driving; Drugs; Enforcement

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# COMPARATIVE EFFECTS OF THIOPENTAL AND PROPOFOL ON ATRIAL VULNERABILITY: ELECTROPHYSIOLOGIC STUDY IN A PORCINE MODEL OF ACUTE ALCOHOLIC INTOXICATION

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**Introduction:** Atrial tachyarrhythmias, frecuently complicate the perioperative period, and is now recogniced as a major cause of morbidity.The mechanism of these arrhythmias is usually reentrant. Two electrophysiologic factors are critical for reentrant arrhythmia: conduction velocity (CV) and effective refractory period (ERP). Among the causes for atrial tachyarrhythmias during anesthesia are the adverse effects of anesthetic agents on electrical properties of the heart that could affect the genesis of arrhythmias. The information regarding the effects of intravenous anaesthetic agents: thiopental and propofol in this setting is limited. We have previously developed a closed-chest porcine model in which atrial tachyarrythmias are facilitated by an infusion of ethanol. We aimed to compare the effects of thiopental (T) and propofol (P) on atrial electrophysiologic properties and vulnerability to atrial arrythmias in this model.

**Materials and Methods:** The experimental model was attemped in 30 large white pigs with a mean weigtht of 35 kg. The animals were premedicated with ketamine and randomly assigned to undergo heavy sedation with thiopental (n=15, 4mg/kg for induction followed by an infusion of 0,09 to 0,3 mg/kg/min), or propofol (n=15, 2mg/kg, followed by an infusion of 3-4,5 mg/kg/hour). Six of the animals died during anesthesia, instrumentation, or alcohol infusion (4 of the T group and 2 of the P group). The remaining 24 formed the basis of this study. Then, a right atrial electrical stimulation protocol with up to 3 extraestimuli and burst pacing was performed on the baseline and during continous ethanol infusion (mean venous ethanol concentration of 3g/dl).

**Results and discussion:** The electrophysiological findings on the baseline did no show statistically significant differences. Data during ethanol infusion are shown in the Table.

| | ERP400 | ERP300 | CI400 | CI300 | MinCL | CIMinCL | D-CL | Arr-dur | AF/AFL |
|---|---|---|---|---|---|---|---|---|---|
| **Thio** | 150 | 144 | 56 | 57 | 145 | 79 | 22 | 74 | 13/2 |
| **Prop** | 143 | 138 | 51 | 53 | 164 | 83 | 30 | 141 | 6/15 |
| **p** | NS | NS | NS | NS | <0.01 | NS | <0.01 | <0.03 | <0.001 |

*Values are reported as mean+- SD. CL: cycle length. ERP (in ms):effective refractory period at CL of 400 and 300 ms. CI (in ms) intraatrial conduction interval measured between 2 atrial sites 4 cm apart, at a CL of 400, 300 and minCL. Min CL (en ms): is the shortest CL with atrial capture 1:1. D-CL(in ms): rate-related slowing in conduction, represented by difference in CI between the shortest CL and CL of 300ms. Arr Dur (in sec): longest duration of the induced arrhythmias for each stimulation protocol. AF/AFL percent of stimulation protocols in which atrial fibrillation (AF) or atrial flutter was induced.*

**Conclusions:** In this model, propofol was more arrhythmogenic than thiopental, as manifested by a higher proportion of animals having sustained atrial arrhythmias, and a longer duration of induced arrhythmias

**Keywords:** Thiopental; Propofol; Atrial Vulnerability

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# POISONING BY PESTICIDES SERIES BETWEEN 2005 AND 2009 IN MADEIRA ISLAND

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**Introduction:** In Madeira numerous cases of intoxication by pesticides have been reported. Over the years, their use in Madeira has been associated with the growing number of cases of pesticides poisoning. The data acquired at the Medico Legal Office of Funchal, between 2005 and 2009 reveals 167 positive cases of intoxication by Pesticides. The most common etiology was suicide and the easy access and little information could be the cause of the increase in the number of cases. Serious accidental or occupational poisoning was comparatively rare, and when it occured, it was usually due to inappropriate handling of the product. The aim of this work is a retrospective assessment of cases of pesticides poisoning in Madeira between 2005 and 2009, confirmed at autopsy report, whose results were previously confirmed by the Toxicology Department of Central Branch of the Portuguese National Institute of Legal Medicine, IP.

**Materials and Methods:** The data was obtained at the Medico-Legal Office of Funchal, from autopsies performed between 2005 and 2009, whose report stated pesticide poisoning as the cause of death. The data was grouped by region, age and gander of the victim and suspected etiology involved.

**Discussion and Conclusions:** In total 167 positive cases were detected, and the area of Funchal has the highest number of registrations, followed by the region of Machico. In percentage, it appears the higher incidence falls on the regions of Ribeira Brava and Santana. The pesticide mostly involved was Methomyl (Lannate®) and Paraquat (Gramaxone®). And there was a higher incidence of male gender, in 84% of cases. In respect to the etiology of death, suicide was the most common, although there was 1% of accidental and homicidal intoxications. 2007 was the year that showed the greatest number of poisoning cases (51 in total) since records began in the Medico-Legal Office of Funchal.

**Keywords:** Intoxication; Pesticide Poisoning; Madeira; Suicide; Office of Coroner at Funchal

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# DEVELOPMENT OF AN ANALYTICAL METHOD AND METROLOGICAL MODEL FOR THE QUALITATIVE AND QUANTITATIVE ANALYSIS OF TEAR-GAS WEAPONS

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**Abstract:** The tear gases are the most widely used non-lethal weapons, both by security forces and by the general public. One type of these weapons is the pepper spray, whose active principle is capsaicin (from oleoresin capsicum). This is the only self-defense aerosol allowed in Portugal, where capsaicin concentration must be below 5% (Decreto-Lei 17/2009, 6th of May). Due to this legal requirement it is necessary to ensure the quality of quantitative evaluations by using a valid measurement procedure. The cost effective evaluation of the compliance of self defense weapons with legislation involves a two stages analytical procedure. Samples are first analyzed by GC-MS for active principle identification. If it reveals (only) capsaicin, a quantitative analysis is required. The quantitative procedure is divided also in two parts: a semi-quantitative evaluation based on single-point GC-FID calibration and, if the first evaluation is inconclusive, a quantitative evaluation of sample compliance using multi-point GC-FID calibration. This work aims at developing metrological models of the performance of both semi-quantitative and quantitative procedures and defining metrologically sound criteria for samples compliance evaluations. The developed models include the evaluation of the impact of instrumental performance, sample dilution and standards preparation on measurement uncertainty. A strategy for the estimation of the reference substances purity is also presented.

**Keywords:** Capsaicin; Tear-Gas Weapons; Metrological Model; Qualitative and Quantitative Analysis

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# DIAGNOSIS VALUE OF A DECREASE OF THE CHOLINE ESTERASE LEVEL IN THE PUTREFIED CORPSES

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**Introduction:** Pesticide ingestion is a frequent mean of suicide in Tunisia, due to their availability and their low price. In the living, the diagnosis is suspected by clinical symptoms and biological perturbation: decrease of the level of acetylcholinesterase (AchE) and butyrylcholinesterase (BchE). The diagnosis is confirmed by the identification of the pesticide. Our work aims to study the contribution of the AchE and BchE in the cases of putrefied corpses to establish the cause of death.

**Methods:** Our study concerned 44 cases of advanced putrefied corpses autopsied during a period of four years (2005 - 2008) in the Department of Forensic Medicine of Tunis among 6120 autopsies. Cases where blood sampling was impossible to obtain, were excluded. The AchE and BchE levels were measured following the Ellmann and the kinetic enzymatic method. The sample was cardiac blood in all the cases. The research of the pesticide and their metabolites was performed using thin chromatography and confirmation with GC/MS. The samples were gastric liquid and urine.

**Results:** In all the cases there was no orientation to a manner of death. The gender ratio (M/F) was 3/1. Mean age was about 30 years old, most of the cases were in the age range 19-39 (32%). Only 3 cases had a known illness (Diabetes) and 6 cases were known to have psychiatric disorders. The corpses were found after a mean delay of 4,7 days (3 to 10 days). 73% were found in the person's domicile, 18% in an aquatic place and 9% in a hidden place. We found the presence of orientation signs of pesticide ingestion in only one case. We found a decrease of the level of AchE and BchE in 13%, a normal level in 77% and the measure was not possible in 9% of the samples. We found the presence of organophosphorus with GC/MS in only one case.

**Discussion and Conclusions:** The AchE and BchE level is insufficient to confirm the diagnosis of pesticide intoxication with a high level of false positive cases.

**Keywords:** Forensic Toxicology; Organophosphorus Pesticide; Choline Esterase; Putrified Corpses

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# DETERMINATION OF ETHYLGLUCURONIDE (ETG) IN MONITORING OF ALCOHOL ABUSE AND TREATMENT AND FORENSIC CASES, AND ITS IMPORTANCE

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**Introduction:** Ethanol abuse is one of the major public health problems in the world. Monitoring of alcohol abuse is also important in the evaluation of alcohol treatment programs or prevention efforts as well as in driving liability examinations or even in forensic cases. The markers of alcohol consumption are fatty acid ethylesters(FAEEs), ethylglucuronide (EtG), cocaethylene (CE), carbohydrate-deficient transferrin (CDT), phosphatidylethanol (PEth), 5-hydroxytryptophol (5-HTOL), dolichol, ketonebodies, acetaldehyde-protein adducts, and salsolinol (SAL). Some of these markers for alcohol consumption do not only indicate previous ethanol ingestion, but also the approximate amount of intake and the time that ethanol ingestion last occurred. Ethanol is recovered as ethylglucuronide (EtG) in urine in humans, shortly after the initial consumption of even small amounts. The determination of EtG should be seen as a marker of alcohol intake and minor marker of chronic abuse or dependence and consequently can be used in the detection of relapses in alcohol dependent patients or in forensic cases to determine recent alcohol consumption.

**Methods:** Currently in our study, an LC/MS/MS method is developed following SPE technique for identification and determination of ethylglucuronide in urine. Propyl glucuronide was used as the internal standard. Pump program, mobile phase and MS-MS parameters were optimized for EtG and propyl glucuronide. The most stable ions with the highest intensity for the analysis were determined as 220>74.7 and 220>85.40 for EtG and 235>75.0 for propyl glucuronide. Aminopropyl cartridges were used for SPE and clean extracts were obtained. The method was validated and linearity, LOD, LOQ and recovery parameters were determined. Real samples from 30 alcohol addicts and a control group of 20 were analyzed using this method.

**Comments:** The developed method is suitable for routine EtG analysis with a short elution time.

**Keywords:** Alcohol Abuse; Ethylglucuronide; Solid Phase Extraction; LC/MS/MS

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# SCREENING ANALYSIS OF COCAINE BY ENZYME IMMUNOASSAY. METHOD DEVELOPMENT AND VALIDATION

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**Abstract:** Immunoassays play an important role as screening methods for the determination of abused drugs in biological samples (e.g. blood, serum, urine, saliva). This is particularly important when the number of analysed samples is high, and the number of samples expected to test negative is also high. The enzyme-linked immunosorbent assays (ELISA) have been widely used immunoassays to detect and "quantify" antigens in whole blood samples in forensic toxicology. In general those screening procedures are very cost-effective, due to the ease of sample preparation (e.g. simple dilution with buffer or specific diluents) and to the possibility of analysing simultaneously a big number of samples. Although ELISA procedures is well suited for the screening of abused drugs in biologic fluids, they have a major disadvantage: they provide only a preliminary analytical result; the cross-reactivity of structurally-related compounds claims for a more specific chemical method, which must be used to confirm unequivocally the analytes. Although reliable results may be obtained following the manufacturers recommended procedures, several problems may be associated to postmortem blood specimens such as clotting, heterogeneity of specimens and interfering compounds and contaminants (matrix effects). Therefore they require some modifications in forensic toxicology, for example matrix-matched calibrators and controls, lower sample volumes or higher dilutions factors. In this work, the validation study results of a modified ELISA screening test for the analysis of cocaine and its metabolites in whole blood are presented. The authors intend to reveal the impact that the analytical protocol changes had in the method performance, particularly in its ability to distinguish between negative and positive samples. The ELISA immunoassay was performed on a CODA Automated EIA analyzer with cocaine metabolite intercept micro-plate EIA. The adaptation was made based on the use of a specific matrix for the main test and in the study of the sample volume used to perform the assay. True positives, true negatives, false positives, and false negatives were determined for the ELISA results against gas chromatography-mass spectrometry (GC-MS). For validation, the following parameters were studied: sensitivity, specificity, and percentage displacement to cutoff between the negative and cut-off calibrators. The results obtained were considered adequate. The average value observed for the percentage displacement to cutoff between the negative and cut-off calibrators was about 50%. The clear separation between negative and fortified (e.g. cut-off) samples allows an effective decrease in the rate of false positives, total analysis time and a lower cost of the global analysis.

**Keywords:** Elisa; Cocaine; Blood

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# VALIDATED UPLC-MS/MS ASSAY FOR THE DETERMINATION OF SYNTHETIC PHOSPHODIESTERASE TYPE-5 INHIBITORS IN POSTMORTEM BLOOD SAMPLES

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**Introduction:** The use of synthetic phosphodiesterase type 5 (PDE5) inhibitors for the treatment of erectile dysfunction: sildenafil citrate (Viagra®), tadalafil (Cialis®) and vardenafil hydrochloride (Levitra®) has increased dramatically over the past 2 years. These substances should always be prescribed and administered under medical supervision, however they can be easily obtained over the internet from illegal sites, representing a risk to public health.

**Methods:** The aim of this work consisted of the development of an electrospray ionisation (ESI) ultra performance liquid chromatography tandem mass spectrometry (UPLC-MS/MS) procedure for the simultaneous identification and quantification of three PDE5 inhibitors, in blood samples. Samples were prepared using Oasis® HLB solid-phase cartridges (3 cc, 60 mg) and chromatographic separation was achieved on an Acquity UPLC® HSS T3 (100x2.1 mm i.d., 1.8µm particles) column with a gradient mobile phase of 0.1% formic acid and acetonitrile at a 0.5 mL/min flow rate. Quantification was achieved by multiple reaction monitoring (MRM) of two transitions per compound: m/z 475.1>58 and m/z 475.1>311.1 for sildenafil; m/z 389.9>267.9 and m/z 389.9>134.8 for tadalafil and m/z 489>71.9 and m/z 489>150.9 for vardenafil. Zolpidem-d6 (m/z 314.5>235.3) was used as the internal standard.

**Results:** Calibration curves were linear over the concentration range of 5-1000 ng/mL, with correlation coefficients better than 0.997. The lower limits of detection for these substances were =3 ng/mL and for quantification were =8 ng/mL. The method showed a satisfactory sensitivity, precision, accuracy, recovery and selectivity.

**Discussion and Conclusions:** A rapid, selective and sensitive UPLC-MS/MS method using solid-phase extraction was developed for the simultaneous determination and quantification of sildenafil, vardenafil and tadalafil in blood samples. The validated method has been successfully used to analyze postmortem blood samples in routine forensic investigation.

**Keywords:** Sildenafil; Vardenafil; Tadalafil; UPLC-MS/MS

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# CRITICAL ANALYSIS OF THE ENVIRONMENTAL LAW FOR WATER AROMATICS POLLUTANTS IN BRAZIL

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**Abstract:** When environmental damage occurs, it must be characterized and provide grounds to press charges to the responsible for the problem. For an enterprise to be safe, the environmental impacts inherent in the activity must be evaluated. In the case of environmental damage, it is necessary to make a technical examination, which aims to determine its extent, scope and economic valuation. In Brazil, there is no specific way for determining the extent of the environment damage and different techniques can be used. When addressing chemical pollutants, it is necessary to know the compounds toxicity. The objective of this study is to address some aspects of Brazilian legislation related to water pollution and perform a comparative law analysis. We will focus specifically on chemical aspects of aromatics pollution. The quality of water resources is strongly threatened by the dispose of aromatic compounds from industrial activities. The Brazilian environmental legislation establishes maximum allowed limits for such compounds, 1 which correspond to higher limits than those foreseen by European Water Quality Objectives (WQO) and United States standards.2-4 Moreover, some substances, addressed by international standards, are not even mentioned in Brazilian Standards. As a consequence there is no control over their disposal in the countrys water resources and thus compromising its quality. In this work, 23 aromatics, legally foreseen by Brazilian and European Standards, were compared regarding their allowed quantities limit. We found a weak correlation between Brazilian amount limits of these compounds and those used by European WQO: R= 0.54348. The correlation between Fish toxicity2 was also evaluated for Brazilian foreseen quantities and the correlation coefficient equals is -0.70976. For the European WQO, the correlation coefficient is -0.81135, i.e., it is more correlated than the Brazilian one. The correlations with Daphnia and Algae toxicity are under study. In conclusion, there are no foreseen rules for some toxic compounds and results also show a weak correlation between Brazilian standards and toxicity, especially when compared to the European WQO. Results suggest to a legislation review in Brazil.

**Keywords:** Environmental Damage; Aromatics; Brazilian Law

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# IMAGE AUTHENTICATION BASED ON THE CONSISTENCY OF ILLUMINATION DIRECTION

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**Abstract:** This paper studied the authentication of a kind of digital images by estimation of the illumination direction in digital images. First searched regions of interesting by gradient operators, located the incredulous areas and the reference area according to the extremum(max and min)of gradient operators. After that used improved pentland algorithm to estimate the illumination direction of the regions of interesting, and defined the difference threshold of illumination direction, then authenticated whether the illumination direction between the incredulous areas and the reference area is consistent with each other or not. The experiments indicate that this method can recognize the splicing digital images accurately and efficiently.

**Keywords:** Image Authentication; Consistency of Illumination Direction; Region of Interesting; Gradient Operato

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# IDENTIFICATION OF IMAGES BASED ON THE BASIC NOISE OF DIGITAL CAMERAS

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**Abstract:** The thesis has studied further, based on the theory relevant to the digital camera, the feature of the image sensor and the theory of the basic noise and by using the related software, the rules of the noise coming out from the digital camera and the main factors that cause it to change and proved in large numbers of experiments the practicability that the image and the camera can be identified by using the noise of the digital camera and test the theory of the originality. The experiment has been done as follows: 1. To take photos of wholly black by various types of cameras in different filming modes, file styles, sizes of the image, time of the exposure, film speeds, condensing ratios and time of opening and closing the camera, etc, and to examine the disposition of the noise from the photos mentioned above by using Dead Pixel Test, the software specialized in testing noise. Thus the rule of noise existing in the photos was established and the features of it were summarized. 2. To compare the condition of noise in a photo and the feature of the noise from the corresponding digital camera, so as to confirm whether the photo was taken in this camera or not. The other way round, that a photo was taken in a camera has been confirmed, then by calculating whether the corresponding basic noise was existing or not, the originality of the photo is determined. In the experiment, the feature and rule of the noise of the image sensor have been obtained,meanwhile the thesis suggested the prospect of application of the noise and brought forward a new way for the verification and identity of the originality of the photographs.

**Keywords:** Image Sensor; Verification of Originality; Base Noise; Dead Pixel Test

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# ALGORITHM OF SOFTWARE SIMILARITY MEASUREMENT BASED ON SEGMENTED DIGITAL FINGERPRINT

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**Abstract:** Analysis and identification on software infringement is not an easy work which cannot be completed in law enforcement scene but need to be done in lab. However, checking whether suspect software infringes upon other's copyright is the necessity in software infringement cases. An algorithm of copyright checking based on digital fingerprint is provided in this paper, which computes software similarity through segmenting files compared, searching boundaries by sliding window and finding the same digital fingerprints of file segments with simple and complex hash. The algorithm, fit for the law enforcement on the spot of software infringement case, has the attribute of efficiency and reliability.

**Keywords:** Compute Forensics; Digital Fingerprint; Software Similarity; Software Infringement

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# UNUSUAL INJURIES INDUCED BY FATAL LOW-VOLTAGE ELECTROCUTION

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**Introduction:** Electrical injuries consist mainly in external burn marks. Internal injuries are rarely observed specially in low-voltage electrocution. The aim of this paper is to report two fatal cases due to electrocution by low voltage current (220volts), with a special emphasis on pathological changes.

**Case Report:** Case 1: A 30 year-old man died after a low-voltage electrocution. External examination of the body showed an electrical mark on the chest wall. Autopsy showed necrotic injuries on pulmonary artery and aorta wall. There was an hematoperitoneum due to capillary ruptures. Case 2: A 20 year-old man died in an intensive care unit two days after a low-voltage electrocution. External examination showed an electrical mark in the right hand. At the autopsy, we found a pneumothorax in the left side of the chest. Necrotic lesions were observed in the right lung and the liver. Heart dissection showed multiple myocardial infarction areas.

**Conclusions:** Death after low-voltage electrocution is mostly caused by serious physiological disturbances such as ventricular fibrillation and respiratory arrest. Nevertheless, unusual associated injuries can be fatal.

**Keywords:** Low-voltage Current; Electrocution; Internal Injuries Autopsy

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# THE KEY ROLE OF FORENSIC DENTISTRY FOR BITE MARK IDENTIFICATION: A HOMICIDE CASE REPORT (II)

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**Case Report:** The identification of an individual from dental traces collected at the crime scene is one of the objectives of the criminal investigation. When, at the crime scene, objects are found with tooth marks, the intervention of Forensic Dentistry may represent the only way to obtain positive identification of the authors bite mark. The forensic analysis of a bite mark consists of detection, recognition, description and comparison of bite marks on either individuals or inanimate objects. The forensic investigation involves several steps. The first question that arises is whether this injury is a bite mark, or may have been caused by another factor. The second question that arises after establishing the injury as a bite mark and human, whether it was caused by an adult or a child. The third question that arises in research identification, after recognizing trauma as a bite mark, if it is comparable to exclude or include - establishing the causal link with the subject, establish the identity of the perpetrator in a bite mark case. Objectives: In this medico-legal case, a homicide, the alleged perpetrator had at the time of arrest, a mark on left arm consistent with bite mark, probably from the victim of crime in self-defense. The Portuguese Criminal Police requested to South Branch of National Portuguese Institute of Legal Medicine, expert forensic odontologist examination of photographs sent by the German police of the alleged perpetrator and oral autopsy from the victim. The objectives in this case were: 1) study of genetic profile of the presumable murder, if any biological material containing DNA were identified at the victims body; 2) reconstruction of the morphological profile of the bite mark in the arm, sent by photo, of the presumable aggressor, and 3) identify the author of the bite mark - the inclusion or exclusion of the dentition of the murder victim. Each stage of the analysis adds to the confirmation (or rejection) of concordance between the dental features present on the arm of the homicide suspect and the dentition of the victim. Materials and Methods: In this study, we used the guidelines of ABFO and IOFOS for the reconstruction and analysis of morphological profile of bite marks on human skin and collection of dental morphological profile of the victim, alleged perpetrator of the bite mark to establish the identity to a high degree of certainty. Results: After reconstruction of the profile of bite mark, the identification or exclusion from the person who produced is based on a comparative scientific method, which must take into account the chain of custody and all the useful information related to this case study. Discussion and Conclusion: The protocol followed in this medico-legal case study is a scientific analysis of the facts which when presented in the court will be defendable under ruthless cross-examination. The pattern association of dental features in this homicide case clearly demonstrated the concordance degree present between the tooth marks and victim's dentition. The photographic images were enlarged so that the features could be visualized. This medico-legal case has demonstrated a positive concordance of skin bite mark of the presumable murder and the victim's dentition.

**Materials and Methods:** In this study, we used the guidelines of ABFO and IOFOS for the reconstruction and analysis of morphological profile of bite marks on human skin and collection of dental morphological profile of the victim, alleged perpetrator of the bite mark to establish the identity to a high degree of certainty.

**Results:** After reconstruction of the profile of bite mark, the identification or exclusion from the person who produced is based on a comparative scientific method, which must take into account the chain of custody and all the useful information related to this case study.

**Discussion and Conclusions:** The protocol followed in this medico-legal case study is a scientific analysis of the facts which when presented in the court will be defendable under ruthless cross-examina

**Keywords:** Forensic Dentistry; Individual Positive Identification; Bite Mark

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# "CAUSA MORTIS" OF THE FEDERAL DISTRICT CIVIL POLICEMAN DIED BETWEEN 1964 AND 2010

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**Introduction:** The high levels of social violence in Brazil, associated with unsatisfactory working conditions and occupational health, makes the police activity, also dangerous, causing physically and mentally illnesses. This study investigated the causa mortis of the Distrito Federal civil policemen who died between 1964 and 2010 so as compared to the general population to determine the occurrence of diseases, mortality related to work and to calculate life expectancy for this population.

**Methods:** Review the literature with search of articles on search sites (PubMed, LILACS and SciELO) using the terms "police deaths", "policemen mortality" and "policemen health", added the document searching public records of deaths. Critical analysis of the subject.

**Results:** In this period 883 deaths were observed, of which 280 civil policemen still on active duty and 603 retirees. It was possible to determine the most frequent causes of death, deaths due to accident on duty, the suicide rate and age at death. Also, was estimated life expectancy for a civil policeman in the Distrito Federal.

**Conclusions:** The study population has high incidences of death from external causes, high rates of work-related death and lower life expectancy than the general population.

**Keywords:** Police Deaths; Policemen Mortality; Policemen Health; Forensic Pathology; Legal Medicine

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# SUDDEN DEATH CAUSED BY PUMONARY EMBOLISM IN NORTH TUNISIA.

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**Abstract:** Sudden death may represent the inaugural symptom of a pulmonary embolism (PE), which constitutes the third cause of deaths caused by cardio-vascular diseases. However, PE is an affection that benefits from a primary prevention and also from an efficient treatment. But it still be frequent and potentially lethal. We carried out a prospective study at the department of forensic medicine of Tunis trying to describe epidemiological characteristics, associated risk factors as well as clinical and pathological profiles of deaths caused by PE. In the study period of 19 months (from October 2009 to April 2011), 32 cases of PE were registered from a total of 427 cases of sudden cardiac death. All cases were considered sudden natural deaths, which represents 1.4% of the total autopsies and 7.5% of natural deaths. Nineteen cases (59,4%) were men with a mean age of 53,32 +/_ 14,33 and thirteen ceases (40,6%) were women with a mean age of 52,77 +/_ 14,79. In 12 cases (37,5%) death occurred in a health care centre. In 84,4% death occurred at rest; in only one case it happened after a physical effort. Several risk factors were found. The most common was surgical interventions, which had been carried out in 9 cases (28,2%), obesity was found in 12 cases (37.5%), 22 cases (68.8%) were at bed rest for more than 15 days. The most frequent symptom prior to death was dyspnea (31,2%) and in 11 cases (34,4%) sudden death constitutes the first and the last symptom of the affection. The surprising fact was that 8 cases (25%) were examined in the seven days prior to death in an emergencies department for symptoms compatible with PE but the diagnosis was missed in all these cases. The possibility of avoiding the fatal outcome would have existed if PE was considered as one of the different diagnostic options and adequate therapeutic measures would have been adopted.

**Keywords:** Pulmonary Embolism; Prospective Study; Epidemiologie; Risk Factors; Prevention

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# FATAL AORTIC DISSECTION IN A YOUNG PERSON: FOUR OBSERVATIONS.

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**Abstract:** Acute dissection of the aorta represents a rare cause of sudden death of cardiac origin in young person. It usually occurs in victims suffering from hereditary or congenital dystrophic disorders. We report on four observations of fatal aortic dissection, discovered at autopsy, occurring in young patients aged between 17 and 22 years of age with autopsies carried out in the department of forensic medicine in Tunis. In three cases the victims had Marfan's syndrome and the fourth case involved a young man who had coarctation of the aorta associated with a bicuspid aortic valve. Thanks to these cases we discuss the particular aspects of aortic dissection in young people, the various etiologies and the necessary preventive measures. Key-words : aortic dissection, young patient, Marfan syndrome, coarctation, prevention.

**Keywords:** Aortic Dissection; Young Patient; Marfan Syndrome; Coarctation; Prevention

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# ACCIDENTAL LIGATURE STRANGULATION: THREE CASES STUDIES

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**Abstract:** Death by strangulation is a violent death secondary to an active and transversal constriction of the neck by ligature or hand. In most cases, this is a criminal act and it is rarely accidental or suicidal. We report three cases accidental strangulation causing the death of three farmers. In all cases, the ligature responsible was a scarf, which was caught on the belt of a tractor in two cases and on a drill pipe in one case. Death occurred on the site of accident in two cases and an hour after the arrival of the victim at emergency in the last case. The external examination highlighted a marked asphyxiation syndrome associated with a large strangulation mark on the neck of the three victims. Autopsy data revealed large hemorrhagic and ecchymotic infiltrations of the neck muscles in addition to a rupture of the trachea and the esophagus. These two latter lesions are not classic strangulation lesions but are explained by the brutality and violence of the traction exerted on the neck.

**Keywords:** Ligature Strangulation; Accidental; Autopsy; Lesions

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# TOXIC DEATHS IN NORTH TUNISIA

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**Abstract:** Toxic deaths are resulting from the action of a toxic agent. Toxic agents are not frequently used to commit homicides. However they are usually linked to suicides and domestic accidents. We carried out in department of forensic pathology of Tunis a comparative study focusing on changing patterns of toxic deaths. We compared cases of toxic deaths during three periods. The first period from January 1976 to December 1986, the second one from January 1999 to December 2003 and the third from January 2007 to December 2010. For the cases considered within these studies we observed that they were mainly men. Age of the cases ranged from 15 to 24 years for the two first periods and from 20 to 29 years in the third one. Regarding the manner of death, we noticed that rate of accidental intoxications increased from 37% in the first period to 58% in the second, before reaching 64% in the third one. On the other side, rate of suicides decreased from 59% in the first period to 38% in the second period and finally 36% in the third period. When it comes to the implication of toxic agents, the frequency of carbone monoxide and drugs increased. On the other side, the frequency of pesticides and alcohol decreased during these three periods.

**Keywords:** Toxic Death; Changing Patterns; Toxic Agents; Suicide; Accident

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# ELLIS-VAN CREVELD SYNDROME AND SUDDEN DEATH

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**Abstract:** Ellis-Van Creveld syndrome is a rare autosomal recessive disease resulting from a genetic defect located in chromosome 4p16. The four principal characteristics are chondrodysplasia, polydactyly, ectodermal dysplasia and congenital heart defects. We report a case of a child aged 11 months, died suddenly after multiple episodes of bronchitis. The child is from a consanguineous marriage. On external examination, he had a small stature, polydactyly of both hands and cyanosis of lips and nails. The autopsy found agenesis of the atrial septum and the upper half of the ventricular septum, signs of asphyxia and bilateral pneumonia. We present, through this observation, the features of this syndrome, specific autopsy findings and means of diagnosis and prevention.

**Keywords:** Ellis-van Creveld Syndrome; Genetic; Characteristics; Autopsy Findings; Sudden Death; Prevention

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# COMPLETE CUT THE ABDOMEN IN A TRAFFIC ACCIDENT

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**Abstract:**: Introducing a car accident resulted in complete section of the trunk of a man running a very intense dynamic. Materials and methods: of all autopsies performed in the last three years is the only section in the case of fatal road accidents. Results and discussion: Timis county in the period 2008-2010 were 360 autopsies performed in cases of accidents. The victim, 37 year old man, was circulated as a pedestrian with a blood alcohol level of 2.55 g/1000 having an impact by a vehicle was cut off at the higher sacred abdominal section blank. At the site of initial impact occurred two bilateral fractures in legs being fractured both bones, then the body was swung over the bonnet, cephalic extremity and upper chest had entered the vehicle. On sectioning has contributed very sharp upper edge of the windshield frame. The prosecutor asked the dynamics of the accident investigation.

In special conditions, high speed, frontal impact the human body can be tilted and the car completely severed. Usual risk factors are exacerbated by poor lighting and road law which may occur in road accidents.

**Keywords:** Road Accident; Victim Sectioning

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# ANALYSIS OF INFANTICIDE CASES IN VARNA DISTRICT FOR 40 YEARS (1971-2010)

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**Abstract:** The results of medico-legal autopsies performed at the Department of Forensic Medicine in the Medical University of Varna were studied. During the period of 40 years (1971-2009) there were 16958 autopsies carried out. Of these 88 were newborns, respectively 0.519% of all autopsies. Of all newborns 74.38% were in full-termin and 25.62% were premature and stillborn. The distribution by sex is: 46.15% boys and 53.85% girls. Of all infants examined 72 were admitted for infanticide. Causes of death are divided in four groups: mechanical asphyxia - in 57.14% of all infanticide. Second are the cerebral trauma and blunt corporal trauma - 14.29%, trauma by sharp objects - 6.12% and the group of other causes of death, which includes passive infanticide - a total of 22.45%. In over 72% of cases the mother of the found newborn was unknown. The analysis of the place is also specific - babies were usually discarded in garbage containers, waste dumps, wooded locality, very rarely in public or other buildings. In the years after 2003 the number of cases of infanticide slightly decreased, but does not disappear as a phenomenon. The change of the law concerning a liberalization of abortions did not reflect on the numbers. It is possible that in recent years the cases of infanticide were also associated with socio-economic problems of the political transition.

**Keywords:** Infanticide; Cause of Death; Epidemiology of Infanticide

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# USEFULNESS OF POSTMORTEM TRACE ELEMENTS IN VITREOUS HUMOR IN THE DIAGNOSIS OF DROWNING

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**Abstract:** Drowning is the second leading cause of death from unintentional injury. The determination of trace elements in vitreous humor, has proven many times a suitable fluid for the postmortem study of several markers that confirm the cause of death and the interpretation of other autopsy findings. The aim of this study was to determine the concentrations of strontium, bromine and boron in cases of drowning and other causes of death in the vitreous humor, peripheral blood and in the case of drowning in drowning medium to evaluate their possible application to the diagnosis of drowning. We found significantly higher levels of strontium, bromine and boron in peripheral blood and vitreous humor in drowning in other causes of death. Direct and statistically significant correlations found between their levels in peripheral blood and vitreous humor. In drowning also significantly correlated levels of these markers in peripheral blood, vitreous humor and drowning medium. Although more research is necessary determining strontium, bromine and boron in vitreous humor may be a useful complementary methods for the diagnosis of drowning.

**Keywords:** Drowning; Vitreous Humor; Trace Elements

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# THE IMPORTANCE OF A THOROUGH CRIME SCENE INVESTIGATION AND FORENSIC AUTOPSY: HOMICIDE OR SUICIDE? A CASE OF UNUSUAL DEATH

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**Introduction:** Owing to the unusual means of suicide used by victims, it is sometimes difficult to differentiate between suicide and homicide. Investigating cases of unusual suicides hence provides considerable challenges to medical examiners and other involved authorities. In order to exclude or suspect homicide it is mandatory to correlate the autopsy findings with the scene analysis.

**Case Report:** The authors present a peculiar case of a 42-year-old man found lifeless in the kitchen of his home. The victim was sitting on a chair with an unfastened leather belt placed around his neck and a wound in the middle of the occipital region. Due to this injury, homicide was suspected first. Nevertheless, the scene investigation led to discover several psychotropic drugs, in particular benzodiazepines and tricyclic antidepressant. Moreover, the lack of signs of burglary, the place in which the corpse lay, the bloodstains found on the floor, the presence of the untied belt around his neck and the pale depressed area immediately beneath it, which was compatible with a compressive trauma, led to an hypothesis of an unsuccessful self-hanging followed by a downfall to the floor causing the head injury.

**Discussion:** To cast light on the events a complete necroscopic examination was performed. The autopsy revealed a subdural 90 grams clotted blood haematoma with a fracture ridge starting from the posterior fossa to the right occipital area just under the wound in the scalp. In the cervical region only a small haematic infiltration of the right muscles was found, in correspondence of the depressed area in the skin. There were nor signs of asphyxia nor petechiae in the examined tissues. No other pathological findings were observed. Hence, data gathered both from scene analysis and necropsy suggested that a traumatic death was more likely than an asphixyal one. The final hypothesis was that the man attempted suicide by hanging himself with his belt. While hanging he probably fell and hit a hard surface with the head. It is possible that afterwards he moved to the chair next to the window rapidly becoming unconscious and died because of the pressure exerted on the brain by the haematoma.

**Conclusions:** In this case a thorough forensic analysis of all data helped to rule out the initial suspicion of homicide. Particularly, the combination of autopsy findings with data collected during the scene investigation played a pivotal role in order to define the mechanism of death. A superficial crime scene investigation could have lead to a completely different reconstruction in respect to the real facts thus hindering the possibilities of solving such a complex case. What emerges from this report is a general but fundamental consideration: a careful analysis of circumstances and investigation of death scene is required before excluding or suspecting homicide in cases of traumatic injuries as a cause of unusual suicidal death.

**Keywords:** Crime Scene Investigation; Thorough Forensic Approach; Suspected Homicide; Unusual Suicide

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# WEIGHT MEASURES AS A MARKER OF ABUSE OF ANABOLIC ANDROGENIC STEROIDS

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**Abstract:** The use of anabolic androgenic steroids (AAS) has been associated with intentional death (homicide and suicide) as well as sudden cardiac death. Therefore, a history of AAS use might be of interest in medico-legal death investigations. Both cardiac changes, e.g. left ventricular hypertrophy and testicular atrophy are well known side effects of AAS use. Since urine analysis of AAS are expensive and time consuming, such analysis cannot be part of the routine screening. Instead AAS analysis has to be restricted to cases with a reasonable suspicion of such use. With the aim to find an easily accessible marker for suspected AAS use we have now investigated if weight measures can be used as a sign of AAS-use. The body mass index (BMI) was significantly higher among 68 AAS deceased users compared with 61 randomly selected age matched controls (mean AAS: 28.4, mean Controls 22.2, $t127 = 5.76$, $p < 0.0001$). The heart weigh was significantly higher in the AAS group (mean AAS ($n = 78$): 415.0 g, mean Controls ($n= 65$): 359.5 g, $t141 = 5.52$, $p = 0.006$). The testis weight (sum of both testicles) was significantly lower among 10 AAS users compared with 24 controls (mean AAS: 29.1, mean Controls: 36.5, $t32=2.34$, $p = 0.03$). Finally, when comparing the ratio between testis and body weight, there was a significantly lower ratio in the AAS cases (mean AAS: 0.31, Controls mean: 0.45 g/kg, $t32 = 3.35$, $p= 0.002$). Further evaluation of the data revealed that the most solid finding indicating a history of AAS use was a ratio between testis weight and body weight not exceeding 0.4 g/kg, provided that the deceased did not have a high BMI as the result of obesity. We conclude that the combination of a high BMI (not obesity), high heart weight, and low testis weight is highly suggestive of a period of AAS use in connection with death.

**Keywords:** Autopsy; Weight Measures; Anaboblic Androgenic Steroids

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# SUICIDES AND ECONOMIC CRISIS

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**Abstract:** Increase in suicides due to economic crisis has recently been ascertained clearly in the EU countries (e.g. France, Italy etc.) and not only (e.g. India, in an earlier crisis). The financial crisis and job insecurity appear to increase significantly the symptoms of depression and (in double rate) the anxiety symptoms. The increase in unemployment is accompanied by a corresponding increase in suicides, which is particularly important when unemployment is over 3%. Increased deaths from pathological causes related to stress (e.g. heart attacks) and depression (which promotes alcoholism) and reduced traffic accidents come along. The suicide in times of economic crisis increases in all social levels including managers in enterprises (e.g. Italy), unemployed workers or not, and particularly economic migrants, whose suicides are increasing in the reception centres of the host country, a situation often called "culture shock", whose restriction depends on the "shock absorbers", wich implies a psycho-social approach to the economic crisis. In this study we present some cases of suicide due to the increasing economic crisis of 2009 - 2010.

**Keywords:** Suicides; Economic Crisis

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# THE FORENSIC PATHOLOGICAL DIAGNOSIS AND EVALUATION OF SUDDEN DEATH FROM MINOR HEART LESION: 3 AUTOPSY CASES

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**Case Report:** Most cases of sudden cardiac death (SCD) could be determined in forensic practice, after external, internal and pathological examinations. In a few cases, minor cardiac lesions could be detected after systematic autopsy, and it is hard to make a diagnosis for the heart disease. The cause of death can not be determined based on these minor cardiac lesions. After excluding the possibility of violent death such as injury, asphyxia and poisoning, and the cause of death can be determined to SCD combining with the investigation of case and the process of death. It cannot be concluded directly as SCD by those cardiac lesions, so it's called "minor heart lesions" based on morphological feature. Based on the data in the recent decade of our forensic center, some of these minor heart lesions were localized, and some were cardiac pathologic changes in the early stage. These lesions include increase in heart weight, heart dilatation, cardiomyocyte hypertrophy, cardiomyocyte atrophy, cardiomyocyte disordered, myocardial interstitial fibrous proliferation, myocardial focal fibrosis, inflammation cells infiltrating in cardiac conduction system, the wall thickness of myocardial tiny artery, myocardial bridge of coronary artery etc. The death cases with minor heart lesions always show the inducing factors which obviously aggravate myocardial load, such as running, sentiment undulation, trauma, etc. The determination of cause of death should be carefully. Some tips we should be attention when minor heart lesions are diagnosed and evaluated: 1) systemic autopsy and histopathological examination: avoiding missing minor lesions of the heart or making misjudgement for cause of death; 2) a detailed case investigation: the process of death is suddenly and quickly; 3) exclusion of violence death; 4) collect clinical data as the auxiliary evidence of the judgment to the possible cause of death.

**Keywords:** Forensic Pathology; Sudden Unexpected Death; Heart; Pathological Diagnosis

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# SUICIDE BY SELF-IMMOLATION. A 20-YEAR RETROSPECTIVE STUDY (1990-2010) OF ALL AUTOPSY CASES CONDUCTED BY THE FORENSIC MEDICAL SECTOR AT THE UNIVERSITY OF FLORENCE

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**Abstract:** Suicides caused by combustion in high-income countries like Italy are marginal. A 20 year retrospective study (1990 - 2010) of all cases of forensic autopsy performed at the University of Florence, showed 6 cases of self-immolation and the absence of the same means for homicide. In our series, self-immolation resulted in 2,2% of suicides, data that appears to be in line with other European case studies and confirmed by a recent literature review, whereas, other countries result in cases more frequent (19,7% of the total). The literature reported a general classification of suicide. First of all suicides are divided into simple versus complex. Complex suicide is used to refer cases which present more than one suicidal method. Complex ones are then divided in planned and unplanned. The term planned complex suicide means that two or more complex methods are premeditated in advance to ensure that death occurs when one of the methods fails. In contrast to this, the term unplanned complex suicide refers to the case in which the first method fails and the victim searches out an alternative one to get to the death. Complex suicides are then further classified in primary and secondary. Primary complex suicide refers to the simultaneous application of the methods. On the other hand secondary complex suicide represents a case where the two or more methods are applied one after the other. Complicated suicide is used for planned or unplanned suicides which are characterized by an injury which occurs after the first, regardless of the victim. Analyzing our case studies, two of the six were simple suicides by self-incineration; three cases involved complex and planned suicide methods including combustion. Two of the three cases. as primary complex suicides, involved more than one method of suicide that was put in place simultaneously (gunshot and burning, hanging and burning). In the third case of planned suicide there has been a rapid succession of events as caustic ingestion and incineration. This was a secondary complex suicide. In only one of the cases we examined a complicated suicide, characterized by an unintentional secondary burnt following the original suicide that should be treated as a complication since the combustion was caused by an overheated motor and not voluntarily enacted as the method for the suicide. In our series the blood carboxyhemoglobin was significantly positive only in one case.

**Keywords:** Self-Immolation; Suicide; Complex Suicide

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# STRONTIUM ANALYSIS OF HUMAN TEETH BY LASER-INDUCED BREAKDOWN SPECTROSCOPY: ITS APPLICATION TO DIAGNOSIS OF DROWNING

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**Abstract:** The recovery of a corpse from the water raises always multiple and varied questions. Strontium concentration in the blood are a good method for diagnosing death by drowning. But on several occasions it is necessary to investigate other biological matrix. Since dentin is the most vascularized tooth we analyze the concentration of strontium in drowning and other case of death. In the last few years, laser-induced breakdown spectroscopy (LIBS) has emerged as a promising method in the examination and determination of trace evidence in forensic analysis. The particular advantages of LIBS in terms of no sample preparation, fast analytical response, and potential for field portability make this method attractive to forensic science. In this work, we report on the application of LIBS to the analysis of trace elements within the teeth matrix. For this purpose, a set of human teeth has been examinated by using a conventional LIBS configuration. A Q-switched Nd:YAG laser operating at 1064 nm was employed to generated plasmas at the sample surface. Chemical evidences detected by LIBS may offer crucial information on the cause of death. In this case, the determination of the concentrations of strontium by LIBS in dentin seem to be a promising complementary tool for the diagnosis of death by drowning.

**Keywords:** Drowning; Teeth; Strontium; Laser-Induced Breakdown Spectroscopy (LIBS)

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# THE KEY ROLE OF FORENSIC DENTISTRY FOR HUMAN SKELETAL IDENTIFICATION: A HOMICIDE CASE REPORT (I)

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**Case Report:** The positive identification of skeletal by individual dental parameters is one of the objectives of the criminal investigation. The intervention of Forensic Dentistry can represent the only way to obtaining a positive identification of the unidentified body. The teeth constitute a scientific method in forensic identification, principally due to the great resistance to the agents, who provoke the destruction of the soft tissues in the corpses (putrefaction, traumatic, physical and chemical agents) and to the high morphological variability of the human teeth. The identification in Forensic Dentistry is made by two ways: comparative and reconstructive. The identification allows the determination of several parameters of forensic interest: specimen, population affinity, sex, age, stature and individualization's factors. The Forensic Dentistry is the most important field in individual identification, because teeth have less variability in the chronology of events such digital crypts in fingerprinting by dactyloscopy, in terms of the reconstructive way. On the other side, in terms of the comparative way, this area is important, because of the individualization's factors: positive identification in individual cases and in mass disasters. In this forensic case report, a homicide case, the objective of the medico-legal investigation was a positive identification of the skeletal unidentified corpse, found one year after the crime, July 2010. The Portuguese Criminal Police of Lisbon, Homicide Group, requested to South Branch of the Portuguese National Institute of Legal Medicine, a forensic examination by a Forensic Odontologist for dental positive identification. The objectives were: 1) reconstruction of the dental profile post mortem of the victim; 2) obtain the information ante mortem of the presumable victim; 3) comparison of the information post mortem with the information ante mortem, for positive identification of the presumable homicide victim. Materials and Methods: In this field of dental investigation, the guidelines of the IOFOS were used for reconstruction of the dental profile post mortem, register ante mortem information of the presumable victim and comparison for individualized dental factors, by using Interpol DVI Forms for Individual Case, F1 and F2 post mortem and ante mortem. Results: The homicide victim unidentified was positive identified (identity established) by dental parameters, more than 12 individual dental characteristics, when the other fields failed to identify. Conclusion: The Forensic Dentistry is a very important and simple field for individual identification of unidentified skeletal corpses for criminal law.

**Keywords:** Forensic Dentistry; Individual Positive Identification; Individual Dental Factors.

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# ELDERLY SUICIDE TARRANT COUNTY, TEXAS

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**Abstract:** Suicide is a preventable, major public health concern. The method of suicide employed varies over time, with age, gender and socio-cultural factors. The World Health Organization describes geriatric age group as the population aged 65 years or older. The elderly and young adults are the groups at greatest risk. The elderly have the highest rate of suicide and they make more lethal suicide attempts. Suicide represents a major cause of death in the United States, accounting for 32,500 deaths in 2005. Elderly patients, particularly men, are more likely to successfully commit suicide. It is documented that the highest suicide rate is noticed in the male population age 75 and over with a ratio as 37.8/100000. External examination or autopsies were performed on 10,486 bodies at the Medical Examiner's Office in Tarrant County during the period between 01 January 2006 and 31 December 2010. These cases were analyzed retrospectively. One hundred and thirty three geriatric age (65 years and over) deaths were included in the scope of this study. The records of crime investigation, autopsy and laboratory findings were examined. All of the cases were analyzed regarding age, sex, the method and the tools used in those suicidal attempts. There were 133 (1.26%) geriatric suicides out of all autopsies (10,486) during 2006-2010. The majority of the victims (114- 85.71%) were male, while 19 (14.18%) were female and ages were ranged from 65 to 95 years. The overwhelming majority of cases (63) were between age 65 and 74. The most preferable method in those suicide cases was found to be due to firearms (119 cases), followed by toxic agents. Most of the firearm wounds were located at the right temporal region (50 cases), followed by the oral cavity in 25 cases. In 21 of the cases there were suicide notes. We had noticed antidepressant agents in 27 cases while ethyl alcohol was present in 10 cases. This study will discuss the general features of geriatric suicide deaths in light of the literature.

**Keywords:** Suicide; Elderly; Autopsy

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# THE KEY ROLE OF FORENSIC DENTISTRY FOR AGE ESTIMATION: A HOMICIDE CASE REPORT (III)

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**Case Report:** Most critical, of course, to the identification of immature individuals from skeletal samples is the problem of age estimation. Juvenile age at death estimations are more accurate than adult age estimations because of the telescoped time span of human growth relative to the total life span over which age variability is assessed. Age estimation of the skeleton involves establishing physiologic age (developmental changes in the tissues) and then attempting to correlate this with chronological age at death. Additional sources of error besides the sex difference contribute to the discrepancy between physiologic and chronological age. These sources include 1) random individual variation in maturation and 2) the systematic effects of environmental and genetic factors on growth. Tooth emergence has been studied extensively and used widely in forensic cases to estimate age at death of unknown skeletons. However, many local factors can affect tooth emergence such as infection or premature extraction of the deciduous predecessor. Because of greater variation in the timing of tooth eruption, dental mineralization is a better measure of physiologic maturity. The formation of tooth crowns and roots is much less affected by hormonal influences, local and general environmental factors, nutrition and social factors than tooth emergence, skeletal development, weight or height. Developing teeth show morphologically distinct stages of formation and mineralization that can be identified radiographically and clinically. There are two major advantages to forensic dentistry age estimation. First of all, dental formation is independent of skeletal maturity and most closely approximates chronological age. Second, the dental formation system is the only system that is uniformly applicable for estimating age from prenatal stages to late adolescence since formation is a continuous process. The forensic dentistry objectives of this medico-legal case were 1) age estimation of unidentified immature skeletal, and 2) identify the immature skeletal - the exclusion or inclusion the identity (age) to a missing child disappeared since July 2010 and related to other homicide's victim, her mother. According to the state of the art the forensic examination was performed at South Branch of INML, by the forensic odontologist. This case study has demonstrated a positive concordance between the age of the immature skeletal and the missing child related as a homicide's victim. Later on, the results from the forensic genetic report confirm the profile from the missing child.

**Keywords:** Forensic Dentistry; Individual Positive Identification; Age Estimation.

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# FEMALE HOMICIDE IN NORTH TUNISIA

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**Abstract:** Gender-based violence persists as a global public health, social and human rights problem. Female homicide represents the most extreme form of violence perpetrated against women. There has been a proliferation of international studies on female homicide over the last decade. These studies aimed at exploring the patterns and correlates of homicide victimization among women. In Tunisia, however, very little is known about female homicide victimization. This retrospective epidemiologic study was carried out in the Forensic Department in Tunis. All unnatural deaths occurring in the North of Tunisia are investigated in this department. The files of all female victims of homicide autopsied in the forensic department in Tunis over the past five years were reviewed and the victims characteristics identified. The aim of this first Tunisian autopsic study was to determine a risk profile for female homicide and eventually set gender-specific initiatives to address this form of violence.

**Keywords:** Femicide; Violence Against Women; Domestic Violence; Intimate Partner Violence

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# MOLECULAR ANALYSIS OF FRAGMENTS OF SPLEEN, LIVER AND BRAIN FIXED IN FORMALIN AND PARAFFIN EMBEDDED (FFPE) OBTAINED FROM AUTOPSY CASES. ANALYSIS OF SHORT TANDEM REPEAT (STR) PROFILES AND THE MITOCHONDRIAL DNA (MITDNA) HVI AND HV2 SEQUENCING

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**Introduction:** Post-mortem archival of formalin-fixed paraffin-embedded (FFPE) tissues are potential samples for DNA extraction and subsequent genetic testing for forensic and pathology applications studies. However, its DNA analysis by PCR remains a challenge. The DNA extracted from these samples is often fragmented to various extents, due to the formalin fixation and inclusion procedures (type of fixatives and time of fixation, time and storage conditions ). The corpses sent to the service of pathology and post-mortem examinations are performed after a minimum period of six hours (in Brazil, its implementation is not allowed before this period) and a maximum of 24 hours after death. When this time is exceeded, the cadavers are stored refrigerated at 4º-8º C in the refrigerator. The aim of this study was to compare two methods of DNA extraction and evaluate the effect of the process of formalin fixation and paraffin embedding in the analysis of short tandem repeat (STR) profiles in those autopsy samples. Also the mitochondrial DNA (mtDNA) HVI and HV2 sequencing, in these autopsy samples were evaluated.

**Materials and Methods:** Healthy tissues of spleen, liver and brain from the same individuals (n=4) were obtained from autopsy and formalin fixed for 24 hour and routine procedures of paraffin embedding carried out. DNA was extracted using phenol-chloroform and commercial kit (QIAamp, Qiagen). The DNA analysis was performed using standard techniques for forensic genetics, the multiplex STR Identifiler®, and also the minifiler® kit (both Applied Biosystems). A preliminary study of PCR amplification of HV1.and HV2 was performed with only one individual using the three tissues, liver, spleen and brain. Amplified products were purified and sequenced using Big DyeTM Terminator v 3.1 Cycle Sequencing kit (Applied Biosystems). The sequenced products were precipitated, followed by electrophoresis in ABI 3130 Genetic Analyzer (Applied Biosystems), as well as the STR analysis fragments.

**Results:** After having compared the 2 methods of DNA extraction, and the three tissues, the following results were obtained:Phenol-chloroform extraction recovered highest DNA concentration and better purity (260/280nm). The commercial kit yield more amplifiable DNA. Profiles obtained using the Identifiler® system were generally incomplete, only small fragments, less than 200 bp being amplified. The minifiler® system was more efficient, as expected. The successful PCR analysis were obtained with spleen and liver similarly and the less successful with the brain samples. The FFPE as well all the procedures for inclusion of samples seems to inhibit the complete PCR amplification, with lack of results in some loci, specially in the fragments with more than 300 pb, but no artifact was observed.

**Discussion and Conclusions:** With the development of molecular biology and its diagnostic tools, it is necessary to standardize the reagents used in routine pathology at autopsy. The quality of the fixatives, such as formaldehyde, and reagents used in the process of embedment of autopsy tissues require similar care to those materials of biopsy surgeries, so they would be used in subsequent molecular analysis. This preliminary results, could suggest that in autopsy samples the number of fragments or slices used for DNA extraction and the number of PCR reaction should be carried out in duplicate or repeated in order to obtain the fragment analysis of all loci, as well the complete sequencing of mtDNA.

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**Keywords:** FFPE; PCR; Autopsy; Molecular Biology; DNA

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# RADIO FREQUENCY IDENTIFICATION DEVICE (RFID) AT THE CATALONIAN INSTITUTE OF LEGAL MEDICINE (IMLC)

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**Introduction:** Having an effective system for identifying bodies (SIB) is one of the requirements that a modern Institute of Legal Medicine must meet. A SIB provides information about the traceability management of bodies at all times and in real time, immediately locating the great number of corpses stored in the event of major disasters while recovering their flow of information from the database applied to the system (source, peaks of greater intensity in relation to public health problems, etc). Describing the RFID of bodies used in the IMLC set for operation on December 2009, thus being a pioneer system in Spain.

**Methodology:** Disclosing in a clear and vivid way all the devices that allow the operation of RFID.

**Results and conclusions:** The SID implemented in the Forensic Pathology Service (IMLC) meets the needs required in these services.

**Keywords:** Radio Frequency Identification Device (RFID); System for Identifying Bodies

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# VIRTOPSY VERSUS AUTOPSY IN AN UNUSUAL CASE OF MECHANICAL VIOLENT ASPHYXIA: CASE REPORT

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**Abstract:** The mechanical asphyxia is characterized by violent asphyxiated components caused primarily by a mechanical impediment to the influx of air into the airways (as in suffocation). In this mechanism, sometimes, there are two additional components due to mechanical compression of nerves and vessels of the neck, followed by an inhibition of nervous origin and a vascular hypoperfusion. The three mechanical components of asphyxia, to varying degrees, are found in the strangulation, hanging, clogging (death by bolus) and death from aspiration of foreign bodies. Asphyxial death can be either suicidal, homicidal or accidental. In this study, the Authors illustrate the importance of Diagnostic Imaging in the evaluation of so-called "death by food blolus". In this form of accidental asphyxiation the foreign body (consisting of food) enters the larynx or bronchial branches occluding them completely. The victims are usually subjects in a state of acute intoxication by alchol or drugs, with partial or total edentulism and with neurological or psychiatric disorders. In this strange case of mechanical violent asphyxia, before the autopsy examination, we conducted a MDCT on the anatomical regions affected by the asphyxial/occlusive mechanism, aiming to the airways and lungs and involving acquisitions of the facial especially for the study of the masticatory. The CT scan was acquired through the use of 64-slice multidetector CT scanner (Acquilion CX 64, Toshiba Medical Systems, Tokyo, Japan) and supplemented with 3D reconstructions of the head and neck solid-facial. The results of X-ray were compared with data collected by post-mortem examination. The comparison showed that, in this case, the only radiological investigation was sufficient to identify the relevant anatomical occlusion. Therefore, this investigation would have allowed the determination of cause of death without autopsy examination. The authors emphasized that in asphyxial deaths by clogging of food, the virtual autopsy can be considered a gold standard in identifying anatomic obstruction and in determining the cause of death.

**Keywords:** Asphyxia; Death; Virtual Autopsy; 3D Reconstructions; Gold Standard; Autopsy Examination; Drugs

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# POSTER SESSION

## Session B2

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# FORENSIC APPLICATIONS OF AMBIENT MASS SPECTROMETRY - DIRECT SEARCHING OF EXPLOSIVES USE EVIDENCES

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**Abstract:** Analysis of explosives traces, directly and almost instantaneously from solid samples was a challenge for investigation of terrorist attacks. This is solved by the use of newly designed ambient ionization sources coupled with high resolution mass spectrometry. Since 2004, ambient mass spectrometry has experienced an incredibly rapid development, both in terms of ionization techniques and applications. Ambient ionization differs from already known atmospheric pressure ionization devices (ESI, APCI, APPI) in that ions are formed outside the mass spectrometer and not in an ionization chamber. Moreover, solids as well as liquids can be analyzed, which offers major advantages for forensic expertise. Cooks and al. were the first one to allow for the direct analysis of samples in ambient conditions and without sample preparation, thanks to desorption electrospray ionization (DESI). To date, more than 30 ambient ionization methods have been reported in the literature. The top two techniques in terms of the number of publications are DESI and DART (Direct Analysis in Real Time). They have been widely studied for pharmaceutics, metabolomics or quality control applications for example. Ambient ionization methods are also particularly suitable for forensic applications as they provide non-invasive analysis of samples (preservation of clues and incriminating evidences integrity). DESI and DART have previously been used for the investigation of counterfeit and illicit drugs; inks and document authenticity; fingerprints and skin; explosions . In the latter case, explosives can be retrieved from various surfaces such as glass, metal, skin, paper or clothes. Here we demonstrate the capabilities of new ionization sources for the analysis of explosives from synthetic samples. Elemental composition assignment of mass peaks (through exact mass measurements) permits a direct identification of explosives. This is achieved unequivocally thanks to high resolution mass spectrometry. This direct and simple method has been applied to real samples, which confirm the suitability of DESI and DART for forensic applications.

**Keywords:** Explosives; Mass Spectrometry; Ambient Ionization

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# THE COMBUSTION CHARACTERISTICS OF CELL PHONE IN THE MICROWAVE

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**Abstract:** A man has claimed in media reports that his two-month-old cellphone exploded while it was being charged at his home. For find out the truth, the police sent the cellphone combustion to NFS. It opposed to the common cellphone explosion during investigation. It is not explosion but fire and the battery does not seem to correlate. We did an experiment about cellphone in microwave. There are obvious similarity cellphone combustion in the microwave.

**Keywords:** Fire Investigation; Cellphone; Microwave

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# NEW APPROACH FOR ARSON DETECTION WITH A METROLOGICAL EVALUATION

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**Abstract:** The qualitative evaluation of the use of accelerants in arson by the ASTM E 1412-07 standard involves the concentration of the volatile fraction of debris into activated charcoal strips (ACS) at defined temperature and time, the solvent extraction of the concentrated compounds from ACS and the evaluation of extracts by GC-MS according to ASTM E 1618-10 standard. The variability of the performance of the analysis of some microliters of extract by GC demands the monitoring of measurement performance by the internal standard technique. Since the internal standard adsorption into ACS significantly varies with the amount of previously retained compounds, the standard has to be added after charcoal strips removing from the extracts. A strategy for the addition of internal standards to solvent extracts from debris, involving the gravimetric control of the volume of solvent mixtures with several composition using models of the volumic mass variation with composition was developed. The adequacy of the developed strategy for the control of the repeatability of GC-MS measurements was metrologically checked using the numerical Kragten method3 for uncertainty components combination. This numerical method successfully handled 21 input quantities since the linear assumption of the variation of the output quantity with the input quantities uncertainty is valid. The developed quality control strategy proved to be valid after performed adjustments in relevant analytical steps and further supported the control of the sample preparation performance and debris conservation by using two additional internal standards. This work illustrated how metrology can be used to develop and validate strategies for the control of qualitative forensic assessments supported by GC-MS determinations.

**Keywords:** Arson; Accelarants; ASTM E 1412-07 Metrology; GC-MS

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# DEVELOPMENT OF A STATISTICALLY SOUND STRATEGY FOR THE IDENTIFICATION OF EXPLOSIVE RESIDUES BY HPLC

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**Abstract:** The investigation of the origin of a potentially criminal explosion is frequently supported on results from the analysis of residues of explosive from samples collected in the explosion scenario. This task is extremely challenging due to the low concentration of explosives residues found in post-explosion scenario. Since the report from the analysis of samples from the explosion scenario is decisive for police investigation, their results must be reliable and objectively interpretable. The reliability of forensic analysis results depends on the detail of method validation and subsequent sample analysis quality control. An analytical strategy for the identification of explosive residues by HPLC-UV was developed having in mind the need to gather sound evidences of the presence of residues of some organic explosives. This analytical strategy was validated considering objective criteria for deciding its fitness for this purpose. The data collected during method validation was further used for establishing a quality control program for routine analysis.

**Keywords:** HPLC; Explosives; Residues

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# EXPERIMENTAL STUDY ON THE MORPHOLOGICAL CHARACTERISTICS AND SCENE DISTRIBUTION RULE OF EXPLOSIVE DEVICE FRAGMENTS

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**Abstract:** The fragments of Component parts of explosive devices being crushed and thrown out of the body due to explosion, which are the important evidence on the scene. We can infer the original form and structural features of explosive devices and then provide the basis for analyzing the conditions of producers of explosive devices by the extraction, tests and analysis of the traces of explosive fragments. The accuracy of the analysis of the original form and structural features of explosive devices depends on explosive fragments evidence obtained completely on the explosion scene. The formation of explosive device fragments morphology and their distribution on the scene subject to the type and amount of explosives, the structural characteristics of explosive device, location of the charge center, surrounding environment of the scene, and they are quite different on different explosion scene as well. Based on the survey of basic types of explosive devices appear in international explosion cases, this paper studies explosive fragments of typical explosive devices such as timing detonating explosive devices, remote control detonating explosive device, trigger detonating explosive devices, photoelectric control detonating explosive devices. The author carried out explosive experiments in field, experimental process is gradually completed according to the order of decomposing of important components of explosive devices, assembling, setting and detonating explosive, Dividing the range of experimental site, searching and extracting explosive fragments on the experimental scene, the laboratory examination of the extract explosive fragments from the experiment field, and then getting the experimental results of the morphological characteristics and distribution rule of explosive fragments in different explosive conditions. The extract explosive fragments obtained by experiments are the remote switch, the mobile phone, the toy car of remote control, the motorcycle remote lock; the quartz clock, the washing machine timer, the relay, the mechanical alarm clock; the photoelectric switch, the photoresistor, the infrared switch; the microswitch; the mercury switch; the toggle switch; the kinds of batteries, wires, packaging materials, etc.

**Keywords:** Explosive Device; Explosive Device Fragments; Morphological Characteristics; Distribution Rule

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# RESEARCH ON THE RECONSTRUCTION OF EXPLOSIVE DEVICE

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**Abstract:** Reconstruction of explosive device is a very important and complicated work in explosive scene investigation, if explosive device was reconstructed quickly and correctly, the criminal would be arrested soon. The basic principles of reconstruction of explosive device including objectivity, principle of relevance, scientific principle were introduced in this paper. The characteristics of fragments of explosive device, including appearance, shape and material quality, were summarized by explosion test, the results indicated that the fragments of explosive device can be distinguished with secondary fragments according to these characteristics. The steps of reconstruction of explosive device were researched in the paper. Firstly, the fragments were separated according to its material quality. Second, the fragments of same material were jointed together, the prototype of fragments can be presumed according to analysis to fragments. Finally whether the explosive device reconstructed is correct or not need explosion test . The method of reconstruction of explosive device were given, which can make complicated work of reconstruction of explosive device be simple.

**Keywords:** Reconstruction; Explosive Device; Fragments of Explosive Device

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# CAN WELDING PARTICLES BE MISTAKEN FOR GUNSHOT RESIDUE?

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**Introduction:** Gunshot residues (GSR) in the form of metallic particles originating from the primer of firearm ammunition reveal characteristic morphological and chemical properties. Examinations of GSR by means of scanning electron microscopy and energy dispersive X-ray spectrometry (SEM-EDX), can contribute to explaining various aspects of a shooting incidence, esp. relating an individual with the use of firearm. Recent developments in this field embrace efficient automatic programs for search of sub-micron particles as well as the artificial GSR standards consisting in a number of metallic particles placed on the surface of a silicon wafer. However, the interpretation of the analytical findings remains the key point of formulating an expert's opinion, since it requires, among other problems, consideration of alternative sources of particles similar to GSR. Whereas it has been found that environmental particles originating from lighter flint, fireworks and car break pads remain of low risk to be mistaken for GSR, there are not many works on welding, as a potential source of spherical particles containing metals, such as aluminium or titanium, i.e. components of primers in lead-free ammunition. Thus, a study of the chemical and morphological features of particles originating from welding of steel and aluminium was undertaken for their comparison with GSR.

**Materials and Methods:** The subject of the study were samples of the covering of 10 electrodes of rutile, rutile-cellulose, alloyed and alkaline types as well as samples of micro-traces collected from the welders' gloves after welding steel and aluminium (11 samples). The collected materials were examined by means of scanning electron microscopy and energy dispersive X-ray spectrometry (SEM-EDX)

**Results:** In the samples originating from both, steel and aluminium welding, there are present spherical particles of the metals being welded, the covering of the electrodes (titanium and other light elements) as well as particles with partially crystallised iron oxide on their surface. The effective circle diameters of the detected particles were in the range of tens of micrometres, while the diameter of the majority GSR is about 1 micrometer.

**Discussion and Conclusions:** A great number iron and iron oxide particles were found both, in the case of welding of steel and aluminium. The great amount of iron containing particles in the group of particles found in a sample makes it possible to differentiate them from GSR that contain only trace amounts of iron. Also, the morphology of particles originating from welding differs in that the sizes of particles are about 10 times greater than GSR. Thus, while comparing a group of particles originating from welding it can be easily differentiated from GSR. However, a care needs to be taken when evaluating single particles consisting from the electrode coverings containing, e.g. titanium, silicon, potassium and chlorine that may originate from modern ammunition brands primed with non-toxic compounds. Although, the forensic identification of particles as GSR is the primary step in the expert's opinion in a shooting incidence reconstruction, for a robust interpretation of the analytical findings also the knowledge on the prevalence of GSR in general population and the persistence of the particles on the shooting person have to be considered [1]. 1. Brozek-Mucha Z., Chemical and morphological study of gunshot residue persisting on the shooter by means of scanning electron microscopy and energy dispersive X-ray spectrometry, Microsc. Microanal., 2011, accepted.

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**Keywords:** Criminalistics; Gunshot Residue; X-Ray Microanalysis

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# A LOGICAL APPROACH FOR ASSESSING THE TIME SINCE DISCHARGE: AN EVALUATIVE PERSPECTIVE

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**Abstract:** Determination of the time since the last discharge of firearms or spent cartridges may be very informative in firearms investigation. In order to meet this objective, the decreasing of some volatile organic gunshot residues (such as naphthalene) remaining in a firearm muzzle or an empty shell after the shooting was generally followed using SPME/CG. However, current interpretative models suffer from several conceptual drawbacks which render them inadequate to assess the evidential value of a given measurement in practical cases. In order to approach these issues, a logical approach based on the assessment of likelihood ratios was evaluated. A simple probabilistic model was developed and applied to a scenario where alternative hypotheses about the discharge time of a spent cartridge found on a crime scene were forwarded. This model is based on continuous distributions for modeling the probabilities of measurements under the two given propositions. Presupposing the availability of reference material, the use of a heteroscedastic regression model was additionally suggested for estimating the distribution parameters requested for the implementation. The proposed approach proved to be a valuable method for interpreting aging-related data. A probabilistic perspective was moreover essential to integrate factors influencing the expected observations in a given case and further developments are thus promising.

**Keywords:** Firearms; Gunshot Residues; Organic; Aging; Dating; Time of Discharge; GC/MS; SPME; Interpretation

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# GUNSHOT RESIDUES ANALYSIS: A COMPARATIVE STUDY BETWEEN EGYPT AND ITALY

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**Abstract:** Gunshot residues (GSR) analysis and detection is a very challenging task as it includes the detection of minute traces after thermal and chemical destruction during the shooting process. Since the detection of organic GSR is difficult to guaranty, the present study is concerned with the analysis of characteristic inorganic GSR using SEM/EDX, atomic absorption and ion chromatography (IC). Samples were taken from cartridge cases. Comparative results were recorded between the inorganic residues left in Egyptian and Italian cartridge cases after shooting.

**Keywords:** GSR; SEM/EDX; Atomic Absorption; Ion Chromatography

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# CONTEMPORARY QUALIFICATION IN FORENSIC BALLISTICS AND GSR ANALYSIS AS A CONDITION FOR AN UNUSUAL TRIAL CASE SOLUTION

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**Introduction:** Looking at the drawings made on clothing worn by a person alleged to have committed the night before an attack with firearms against his nephew, it was observed that the particles found by searching the SEM / EDX with a composition compatible with the GSR however, showed a morphology completely incompatible with them. In addition, the particles were found and examined almost always contained, in addition to Pb, Sb, Ba, Fe peak amplitude over a GSR. These considerations imposed, prima facie, to doubt seriously that particulate matter collected on the clothing of the suspect could be attributable to fire a weapon and appeared much more likely against a rise in the consumption of friction disc brakes. An analysis of crime scenes, however, showed a series of objectively assessed as requiring careful consideration. On sites that were found in it five caliber 7.65 mm Browning FMJ bullets, which are fingerprints of the barrel abnormal interesting gaps between the grooves conductors. Direct examination is a valued evident phenomenon of slippage (line break), accompanied by equally evident traces of shaving (shaving). Also on the entire surface of the bullets were clearly visible traces of massive roasting and smoking.

**Materials and Methods:** By microscopic examination could determine whether the comparator knurls interesting crowns crimping of each projectile were matching each other perfectly, proving that all the exhibits had been produced by the same manufacture. The ballistic comparisons have shown, finally, that all the bullets found in it were fired from the same weapon. The number of bullets found in it and some facts collected in the course of inspection, as well as the total absence of shell casings near the epicenter of the fire, they did think that the bomber had used a revolver, it is entirely unlikely that the attacks may have gathered after the shooting the cartridge cases. Combining these estimates with ballistic data above we can reasonably deduce that it was used a revolver chambered for the .320 cartridge of Anglo European Union or the .32 S W. weapons of this type were widely used in the first third of last century, particularly of poor quality and cheap products made by manufacturers commonly referred to as semi-artisan Belgian velodog or bulldog. This assumption is perfectly harmonious with the characteristics identified based on the bullets. The 7.65 mm caliber Browning was born to be used in small semi-automatic pistols, however, delayed blow dimensional and morphological characteristics, in particular semi rimmed bottom of the cartridge case, which it can be used in revolvers. Firing cartridges cal. 7.65 mm Browning as a weapon than assumed, then generously super calibrated than the diameter of the ball of this caliber, of course, in addition to the occurrence of anomalies such as those found on the bullets found in it, there are implications of such abnormal times of internal ballistics extremely short barrel, lower than normal pressures of the cartridge, and probably a more rapid attainment of maximum temperatures at which follows a more rapid cooling. In addition, weapons are usually more economical and now very old, reasonably secular, are likely to have canes attacked by oxides. Based on these considerations resulting ballistic examination of the findings, it was decided to undertake a review of morphological and compositional GSR present on one of the bullets found in it. Obviously this additional investigation was necessary in order to compare the traces of gun ammunition exploded in the event issued by the particular crime with those which appeared abnormal, were found in samples taken on the clothing of the suspect. The GSR collected directly on ammunition seizure in court do not like the particles found in the clothing of the suspect taken from the stubs, the classic spherical morphology and are characterized by the most common compositions: Pb, Sb and Ba in the presence of very Fe peaks high, it is also frequently found in these basic elements are also added calcium, copper, zinc and iron levels ranging from easy to track values that are normally regarded as incompatible with true GSR. If the investigation had stopped only to the analysis of samples on the clothing would have to conclude with an overall negative for the presence of GSR: the ambiguity of all the particles have been found and examined, and no doubt, led to attribute the their origin to a massive pollution by residues of disc brakes. In this case, however, the availability of bullets, allowed to investigate further and then to understand and scientifically demonstrate why a singular anomaly that occurred as a result of internal ballistics of the particular coupling weapon - ammunition had an impact on the formation of GSR.

**Discussion and Conclusions:** In many years of occupation had never happened to hear a case similar to this that, at present, it must be considered quite "unusual" and unique. A case in which, he insists, they are so many particles containing the three characteristic features, but they are all morphologically and compositionally often ambiguous or even "not firing", and that there is almost no real definable with certainty GSR is unique for me. The highly detailed examination of individual particles shows how they are atypical. Their morphology recalls almost always that of a conglomerate (incongruous, therefore, with a gunshot residue). The rare occasions that this is not the look is powdered, in contrast to the "clean" of the typical particle gun, and, I repeat, singular that on many particles, all are highly abnormal or clearly inappropriate and not there has been no fully convincing. In this case, however, the firing of five shots cal. 7.65 mm Browning occurred in a weapon chambered for a caliber that is likely different from that, almost certainly the .320 Short Revolver CF, and then the bullets went through a super calibrated barrel. . The barrel in question, then, certainly was oxidized and further assumed that derives from the massive presence of iron found in the traces taken directly on the firing projectiles, this index certain that his soul was attacked by rust. Conversely if they are not, and may be procedurally consolidated with the results of the survey reflect faithfully the dynamics of the event.

**Keywords:** Forensic Ballistics Comparison; GSR Analysis

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# CALIBERS AND TYPES OF FIREARMS USED IN THE COMMISSION OF MURDER OF NDRANGHETA (ORGANIZED CRIME) OCCURRED IN THE PROVINCE OF CATANZARO (I)

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**Introduction:** The judicial district of Catanzaro is the operational area of our research group. This area is heavily influenced by the presence of numerous criminal activities carried out by organized crime associations (ndrangheta) that regulate and control their economic interests, often making use of intimidation and murder by violent means, ranging from the use of explosives, firearms. In this paper we review as well as to the types of weapons used also striking similarities in the modus operandi that are encountered in the bloody events that occurred even at a great distance in time between them, and, while not claiming to draw inspiration from investigating these similarities, we still worth noting as they may be indicative of criminal habits. As mentioned earlier were finally reviewed the murders attributed to the gangs operating in the area of Catanzaro detecting ballistic agents extracted from cadavers, those found at the crime scene, and when this occurred, even the finding of the weapons used. The results discussed in the body of the report were collected in summary form in the attached table.

**Materials and Methods:** The remains were found in the ballistic victims through the usual XRs and extracted in the course of autopsy. Cartridge cases, bullets and abandoned when the weapons were found in it during the inspection and examination and subsequently identified both external market which, when possible, by examination ballistic comparison. In some cases it has also been studied in depth the dynamics of the criminal event.

**Conclusions:** It highlights the recurring use of particular weapons and frequency of the gauges and the results discussed in the body of the report were collected in summary form in the attached table. The study provided only partial resaults on the choice of the same in relationship to violent crime. While identifying similar methodologies, there are currently no such items technical ballistic, forensic and reconstructive which can take a different strategy to detect weapons and ammunition choise different from one tied to the opportunity and availability.

**Keywords:** Ndrangheta; Firearms; Criminology; Criminalistics

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# EXAMINATION OF BALLISTIC HEAD MODELS USING COLOUR CONTRAST

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**Abstract:** The conventional analysis of ballistic gelatine is performed by transillumination and scanning of 1 cm thick slices. Previous research demonstrated the advantages of colour contrast in gelatine. The aim of this study was to determine if this method could be applied with head models in order to facilitate their examination. Four head models of about 14 cm diameter were prepared with two acryl hollow spheres (wall thickness of 2 mm) and two polypropylene hollow spheres (minimum wall thickness of 4 mm). 5 g acryl paint was sealed in a thin foil bag (5 cm x 5 cm x 0,2 cm) which was glued onto the sphere. After that, the spheres were covered with 230 ml of silicone and a coat of about 3 mm thickness resulted. A hole of 12 mm was drilled on the top of each sphere and 10 % standard gelatine solution was filled in. After at least 48 hours of storage at 4°C, the head models were shot using a SIG Sauer pistol P226 (calibre 9 mm x 19) loaded with 6,1 g Action-5 ammunition (RUAG) from 4 m distance. The gelatine core was removed from the sphere carefully. The bullet track was photographed and cut into consecutive slices of 1 cm thickness which were scanned optically. Images were analyzed on a personal computer by using the software AxioVision. The disruption of the gelatine within the head model was clearly marked by intensive paint filling up to the end of the finest cracks and along the whole bullet track. The evaluation of the gelatine cracks along the bullet track could be performed without any problem. The study proves that colour contrast allows accurate measurements even in ballistic head models. This was the precondition to start experiments in order to study the influence of different bone simulants.

**Keywords:** Wound Ballistics; Head Model; Image Analysis; Temporary Cavity

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# DISCRIMINATION BETWEEN HOLE PRODUCED BY BULLET COMPARED TO TEAR PRODUCED BY OTHER CAUSES BY SEM-EDX MICROSCOPY

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**Introduction:** The method described here has been adopted by us for the solution of a case in which the work was essential to provide proof that a garment on the hole was caused by passage of a bullet. The findings of the analysis were performed according to a precise work plan, which has followed the following steps later: 1. levy for the detection of GSR in the area around the hole identified; 2. morphological examination (electron microscopy and light microscopy at magnification to assess the condition of the heads of the damaged fibers) of the tissue around the hole in the jacket, focusing on the damaged fibers and yarns. 3. tests exploding on a piece of tissue integrity, bullets of the same caliber and type as those used for a criminal offense. The experiment allowed, together with previous research and surveys conducted by our group to assess the damage caused by the bullet and then make a comparison with the hole on the finding. Baseline studies on this type of damage has been done by the Department of Chemistry Department of Scientific and Industrial Research of Petone in New Zealand ("USE OF SCANNIG electron microscopy (SEM) CUTS TO IDENTIFY AND TEARS IN NYLON FABRIC). These studies consisted of a morphological analysis in scanning electron microscopy of the terminal part of the fibers forming a yarn, blended with various experimental tools such as scissors and knives, or forcibly uprooted.

**Materials and Methods:** As already stated, the area around the hole on the jacket has been subject to seizure by levy stub in order to identify any remaining rounds of gunfire. To see if the hole in the jacket was or was not compatible with a hole caused by a gunshot, it was decided, first, to examine carefully the damage this StereoZoom using a microscope at low magnification. Then, given the nature of the injury, the portion of the tissue affected by the hole has been cut out and analyzed in electron microscopy. The scanning electron microscopic observation allowed us to study the area of ??tissue around the hole, focusing on the heads of the fibers of the yarn. The fibers of a fabric show in the end, depending on the means by which have been damaged, a typical form and reproducible for determining whether the yarn in question was damaged by heat, tearing, cutting (with the possibility to trace the class of tool used) or a combination of these factors. Based on this previous empirical work has been carried out further experiments designed to observe and characterize the damage caused by a bullet to the tissue being examined. To this end they do the following: 1. was carried out for a bit of tissue from one area of ??the vest adjacent to the hole in question; 2. was prepared with a pistol bullets with the same caliber and type as those used in the murder; 3. Several bullets were fired against the fabric from a distance of 40 to 50 cm. 4. the damage produced was studied experimentally and compared with this one. The fabric with the experimental hole was photographed and then analyzed in electron microscopy.

**Results:** The comments S.E.M. allowed to characterize the end of the fibers of the fabric around the hole produced experimentally. The motion of a projectile is a complex type, consisting mainly of one component of uniform rectilinear motion (x axis), a component of a uniformly accelerated motion (y axis) and a gyroscopic effect. The damage caused by a moving body of this movement are complex in themselves are complex and diverse characteristics:

- curly fibers;
- head of the fibers with a broken bulb, more or less pronounced and deformed;
- fibers blended together;
- particles of gunshot residue (GSR), see pictures nr.19.

The wounds are then found typical jerk: curly fibers and deformed due to stress sustained dellelongazione and heads of the fibers with a broken bulb, more or less pronounced, but at the same time, there has been an aggregation and fusion of the fibers due to high

temperature (enough for a merger) generated by friction forces. Moreover, the presence of particles of gunshot residue (GSR) supports and maintains the view that an action of fire.

**Conclusions:** Morphological analysis on the fabric of the jacket found in it showed that the fibers around the hole are simultaneously several characteristics which may be as described below:

- presence of curly fibers and yarns;
- head of the fibers with a broken bulb, more or less pronounced and deformed;
- fused fibers and / or aggregated together.

The experimental sample of fabric upon which it had made a shot with a weapon of the same type and size were found to have the same basic objective on the jacket found in it, which confirms that the tests have perfectly reproduced the phenomenon suffered by the finding. On the basis of this comparison can be established that the hole in the jacket attachment has the same morphological characteristics of the hole made by a bullet of a firearm. This finding therefore rules that the hole has been produced for:

- effect of a cut (with a sharp tool);
- effect of tearing (no aggregate formation by fusion of fibers);
- effect of high temperatures (as is also the presence of fibers torn).

**Keywords:** Fibre; GSR; Fabrics

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# EXPERIMENTAL EFFECTS OF SHOT CAUSED BY PROJECTILES FIRED FROM PNEUMATIC WEAPON WITH KINETIC ENERGY BELOW 17 J

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**Abstract:** In Poland, according to the Act About Weapon and Ammunition, air weapon which has kinetic energy of fired projectiles below 17 J doesn't require permission and registration and can be bought even by Internet. Sport and recreation shooting with this weapon doesn't have to be performed on special embrasure, but can be carried out in a terrain „with particular caution". In this study we present experimental effects of shooting with pneumatic weapon (Norica Dragon air-rifle) which has kinetic energy of fired projectiles below 17 J. The first aim of this study was to estimate effects of shooting at the human soft tissues and at thin bones both of the temple region of human head and at human scapula to make empiric evaluation of danger scale for health and life, which such shot could produce. The second aim was to compare autopsy findings with the depth of missiles penetration in 20% gelatine blocks, which were the model of human soft tissues and with injuries of fresh calf scapulas which were the model of the temple bone of human cranium to check usefulness of this models. Before the experiment we evaluated the weight of projectiles and their initial velocity. Then we counted kinetic energy of fired missiles. After shooting at human corpses we measured the depth of projectile penetration in human tissues and we checked if they could injure important internal organs. After that we compared this findings with the depth of projectile penetration in gelatine blocks and with injuries to the calf scapulas. The results of experiment proved that the air weapon with kinetic energy below 17 J can be dangerous to human being. The shot from such a weapon can both injury soft tissues and bones.

**Keywords:** Pneumatic Weapon; Soft Tissues Injuries; Bones Injuries; Gelatine Blocks; Calf Scapulas

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# SURPRISING FINDINGS IN THE TWO VICTIM BODIES OF ONE GUNSHOT

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**Case Report:** The authors present a very uncommon case in which an elderly couple was found completely dressed, lying on the bed: the man had two gunshot wounds, the entrance hole on his chest and the exit hole on his back while his wife had only one gunshot wound on her bust. The police found a rifle over the bedside table near the man and several blood splashes on the walls. No other violence signs were found in the room and only one cartridge case was found. The autopsy revealed that the man had a gunshot wound track with a descendent trajectory. The woman had only an entrance hole, a semi-jacket .280 caliber bullet was extracted from her back and the wound trajectory was also descendent. The police suspect the man shot the gun and the same bullet, that passed through his body, re-entried in the woman´s body. All the wounds and clothes were studied at the laboratory and the results were consistent with a contact gunshot in the man, but an unexpected finding was seen, because several unburnt powder grains were on the edges of the clothe´s exit hole In addition, on the edges of entrance hole of the woman´s external garment several powder particles were also found. The gunshot residues analysis on their hands gave a positive result for the man´s hands and a negative result for the woman´s hands.

**Keywords:** Gunshot Wounds; Shooting Distance; Surprising Findings; GSR

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# EVIDENCE OF AN HEALED GUNSHOT WOUND: A STUDY CASE FROM THE BRAZILIAN AMAZON

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**Abstract:** The Brazilian Amazon is described as one of the most violent regions of the country. For instance, the homicide rates in the metropolitan area of Belém (the capital State of Pará, Brazil) almost doubled in the last 5 years. Deaths by firearm in violent crimes are frequent, but forensic cases are shadowy discussed in the literature. Consequently, there is a lack of comparative cases which may aid in the positive identification of the specific firearm used in the region, as well as peri, ante and post mortem firearm lesions found in skeletonized and mummified material discovered in remote areas of the state. The current case reports a lesion found in a cranium of the skeletal collection of the Anatomical Museum of the Federal University of Pará (UFPA), Belém. The cranium belongs to an adult individual, probably male. It has an orifice on the left parietal bone, on the posterior region. The opening in the outer table has a round shape, while in the inner table the shape is irregular and bigger. This type of cranial lesion is often seen in gunshot wounds, which is characterized as a high impact trauma. Those injuries can be categorized as penetrating, when only an entrance wound is observed, or perforating, when an entrance and an exit wound are present. In this particular cranium, the injury was the former one. No radial fractures were present. The remodeling of the bone makes it difficult to infer the direction and caliber of the bullet. The x-rays showed an absence of bullet residues in the inner table or inside the cranium. The sign of healing indicates that this individual lived long after the lesion. No signs of secondary infection, or other pathological lesions were found. Other cranium of the Museum exhibit traumatic lesions, but this case is the single one that can be attributed to gunfire. The provenance of the osteological material on the Anatomical Museum of the UFPA is currently unknown, although efforts are being made to ascertain the origin of this and the other cases. The present find is one of the first evidence of this type of lesion being reported as found in osteological material originated from material the Brazilian Amazon.

**Keywords:** Osteological Material; Cranium; Gunfire; Penetrate Wound

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# TRACING JOMON MAN AND YAYOI MAN USING THE DISTRIBUTION OF THE ALDH2 MUTATION GENOTYPE AND THE JC VIRUS GENOTYPE

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**Introduction:** It is believed that the history of the Japanese race is a mixture of the Jomon man who has existed since the new stone age, and the Yayoi man who immigrated to western Japan and who spread the rice growing culture. It has been shown that individuals believed to be Yayoi men had the mutation of Alcohol dehydrogenase gene and that they immigrated from China to western Japan during the Yayoi Era. The JC virus is one of polyomaviruses and a useful marker to trace human dispersal. In addition there are mainly two genotypes (CY and MY) in Japan. The genotype CY is more commonly distributed in western Japan. In addition, earlier studies advocated that Yayoi man brought the CY genotypes when he emigrated from China. Both the JCV genotype CY and the ALDH2 mutation might have been introduced to Japan by the Yayoi man. But there are no studies verifying the comparison between the JCV genotype and the ALDH2 mutation. As a result the aim of this study was to verify this comparison.

**Methods:** The ALDH2 genotype of samples collected in eastern and western Japan, using the RT-PCR method, was classified into the wild or mutated types. Following this, using the same samples it was established whether the JCV genotype was CY or MY using the RFLP method were classified.

**Results:** The CY genotype is commonly seen in the people who possess the ALDH2 genome mutation. However, the MY genotype is commonly seen in people who possess the wild type ALDH2 genome.

**Discussion:** Previous studies have showed that the CY genotype was introduced to Japan with Yayoi man when he emigrated from China. Furthermore, it is believed that Yayoi man also introduced the ALDH2 genome mutation. The current results are consistent with the hypothesis that Yayoi man introduced both the ALDH2 genome mutation and the CY genotype. However, the ALDH2 genome mutation is distributed mainly in the Kinki and Chugoku region in central Japan. In addition the CY genotype is mainly found in Eastern Japan and the MY genotype is mainly found in Western Japan. However, if both the JCV CY genotype and the ALDH2 genome mutation were introduced by Yayoi man, the distribution of both the JCV CY genotype and the ALDH2 genome mutation would be expected to be the same. As a result further research is necessary to trace the history of Yayoi man.

**Keywords:** ALDH2; JCV; Jomon; Yayoi

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# ESTIMATING STATURE FROM HUMAN SKELETAL REMAINS: DOES IT MATTER WHETHER WE ARE ESTIMATING LIVING OR CADAVER STATURE?

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**Abstract:** Stature data can provide valuable information in the forensic identification of human skeletal remains, by helping to reduce the pool of potential candidates. Most stature estimation methods rely on the linear relationship between long bone length measurements and stature. Several of these methods were developed from skeletal samples of known stature, but this rarely refers to actual living standing height. Because living stature is rarely available, cadaver length is a common surrogate available in the records of several anatomical collections, since skeletons in these collections where obtained from cadavers, where individuals were measured soon after death. In this study we examine the influence of stature estimation formulae based on femur length and cadaver length in estimating true living stature, using a skeletal sample of males of known age, and known cadaver and living stature (n=15). Since mean cadaver length is greater than mean living stature (2.9 cm) it comes as no surprise that stature estimation formulae based on cadaver length overestimated (1.7 cm) living stature in another skeletal sample of males of known age and living stature (n=20). In fact, not only do point estimates tend to be greater than actual living stature, but also around 25% of individuals lay outside the 95% confidence interval for estimates of stature. Consequently, methods using uncorrected formulae for estimating stature from cadaver length may provide inaccurate stature estimates, contribute to an incorrect exclusion, and impair the identification process. In addition, when the available source for the individuals stature is not true living stature, but rather reported stature or some other measure, then the chance of an incorrect exclusion may increase further.

**Keywords:** Stature Estimation; Cadaver Stature; Military Records; Accuracy

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# COMPUTER-BASED THREE-DIMENSIONAL FACIAL RECONSTRUCTION FROM CT SCANNED SKULLS USING SOFT TISSUE MEASUREMENTS OBTAINED FROM A BRAZILIAN POPULATION THROUGH MRI

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**Introduction:** Forensic facial reconstruction is a process by which an approximate ante mortem facial image can be generated from the skull. It is valuable in investigations involving post mortem human remains where no candidate identity is available. Typically, it is a sculptural process with a limited scientific basis. Computerization offers an alternative which, as well as permitting sculpture-based methods to be carried out in Virtual Reality (VR), has potential for improved quantification via volume data capture from medical imaging systems, and for partial or complete automation of the reconstruction process. Typically, Computed Tomography (CT) is suitable for volume data collection of hard tissue morphology post mortem, but is not suitable for collection of ante mortem tissue depth data, where Magnetic Resonance Imaging (MRI) offers an alternative. OBJECTIVE: To provisionally validate a practical method of forensic facial reconstruction in VR via application of soft tissue measurements obtained from MRI onto volume skull datasets obtained from CT.

**Materials and Methods:** Three skulls of known identity with accompanying ante mortem photographs were used as a provisional means of validation of a computerized facial approximation process conducted by a researcher who had no access to these images. Following an osteological assessment of age and ancestry, volume skull datasets were collected in DICOM format from CT (Philips Brilliance CT Big Bore, oncology configuration, pixel size 0.5 x 0.5 mm, slice thickness 0.8 mm, 120 Kvp and 125 mA) and reconstructed in inVesalius 3.0. A deformable 3D soft tissue model was applied to the skull datasets in Autodesk® 3ds Max 2011. A deformable 3D ante mortem tissue depth model collected from a Brazilian sample using MRI (Santos 2008) was applied to the skull to generate the face surface. Skin details were applied using ZBrush 3.5. The completed reconstructions were compared with the ante mortem photographs in order to provide a provisional assessment of resemblance.

**Discussion and Conclusions:** Computerized forensic facial approximations were completed on three different skulls using an approach relying only on pre-existing hospital infrastructure (CT) and on facial soft tissue measurements obtained from a Brazilian population through MRI. A comparison of the reconstructions with ante mortem photographs provisionally indicates that this method offers a practical and affordable approach to forensic facial reconstruction.

**Keywords:** Computerized Forensic Facial Reconstruction; CT; MRI; Skull; Facial Soft Tissue Measurements; Brazil

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# A PROTOCOL FOR SOFT TISSUE REMOVAL FROM DECOMPOSING BODIES ENCOUNTERED IN FORENSIC INVESTIGATIONS IN TROPICAL BRAZIL

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**Introduction:** Prior to 2004, unidentified putrefied and skeletonised human remains were not routinely investigated in Ribeirão Preto, Brazil. In 2005, an international partnership between Brazil and the United Kingdom--sponsored by the UK Foreign and Commonwealth Office--permitted the establishment of a program for the forensic analysis and identification of skeletonised and partially skeletonised human remains at CEMEL (Medical Legal Center, Faculty of Medicine of Ribeirão Preto-USP). The severe local climatic conditions of tropical Brazil meant that a range of degrees of putrification and friability of skeletal material were typically encountered. Standard protocols for soft tissue removal were found to affect the preservation of hard tissue features and to risk compromising subsequent osteological analysis. In particular, additives such as detergents or proteinases and the degree of heating recommended in standard protocols used in temperate environments were found to erode the remains. Defleshing is typically the rate limiting step in the forensic investigation of partially-skeletonised human remains, necessitating an optimised and effective protocol for soft tissue removal. OBJECTIVE: To establish a tailored protocol for soft tissue removal from partially-skeletonised human remains typically encountered in a tropical environment prior to forensic anthropological examination.

**Materials and Methods:** Prior to soft tissue removal, the remains--including any clothing or preserved soft tissue features such as peculiar marks, tattoos, piercings or evidence of pathology or trauma--were extensively photographed. A tooth or bone sample was collected for DNA analysis. The limbs and the head were disarticulated by anatomical dissection. The disarticulated parts were placed in a metallic basket and put into a maceration tank (Multifritas®) containing tap water with no other chemical additives and kept at a controlled temperature of 80-90 °C for 24-48h, regulated according to the amount and condition of the remaining soft tissues. Remaining soft tissues were removed carefully by hand and the skeletonised remains allowed to dry naturally in well ventilated conditions.

**Results:** From January 2005 to 2010, twenty-one unidentified putrified and partially skeletonised remains were processed using this protocol. Chemical additives to the water were dispensed with, as these had been observed to damage friable bone structure. Prolonged and excessive heating was also avoided. After maceration, the removal of the soft tissues was possible without the use of instruments that could produce artifacts on the bone surfaces. On average, an interval of 72-96 h was sufficent in total for soft tissue removal and forensic osteological analysis.

**Conclusions:** The method was effective for soft tissue removal from putrefied remains typically encounted in a tropical environment. The optimised defleshing procedure reduced the total time required for forensic anthropological analysis to be completed, and hence the overall efficiency of the process of investigation and identification.

**Keywords:** Defleshing; Soft Tissues; Decomposition; Bodies; Bones; Forensic Anthropology; Human Identification

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# IDENTIFICATION OF THREE CHARRED VICTIMS OF ROAD TRAFFIC ACCIDENT VIA ESTIMATION OF AGE FROM THE PELVIS

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**Introduction:** In February 2009 an automobile accident in Ribeirão Preto, Brazil, resulted in three victims in the vehicle being charred by fire. Witness and documentary evidence indicated the three victims were males aged 25, 34 and 54 years. The fire was so intense that damage to the head and limbs precluded identification from the fingerprints or dentition. The extent of heating and destruction, and miniscule amount (circa 3 ml.) of blood recovered and the extent of its carbonisation, indicated that the prospects for DNA identification were inauspicous. In order to permit rapid and cost effective repatriation of the bodies for burial, only a forensic osteological analysis was possible. The only well-preserved body segment in common, however, for all three victims was the pelvis. OBJECTIVE: To assign identity in a closed fatality incident using forensic osteological assessment of the pelvis.

**Methods:** Following dissection and manual removal of excess soft tissue, each pelvis was defleshed by immersion in hot water (80-90oC) for 24 h in the maceration tank of the Laboratory of Forensic Anthropology (LAF) of the Centre of Legal Medicine, Faculty of Medicine Ribeirão Preto - USP (CEMEL / FMRP-USP). The clean skeletal elements were allowed to dry naturally in warm well ventilated conditions. Age was estimated by evaluation of the pubic symphysis surface and auricular surface of the ilium following the methods of Suchey/Brooks and Lovejoy et al., respectively.

**Results:** For each pelvis, age estimations obtained from the pubic symphysis surface and auricular surface of the ilium were, repectively, 45,6?10,4 and 50-59 years; 35,2?9,4 and 40-44 years; and 28,7?6,5 and 20-24 years. Based on the average age estimation obtained in each case (54.5, 38 and 25 years) it was possible to assign each body to a known victim.

**Conclusions:** In cases of extreme destruction by fire, the pelvic bones may be preserved sufficiently for assessment when other methods of identification may be precluded. In this instance of a closed fatality incident, in which the identities of the victims were known, age estimation from the pubic symphysis surface and auricular surface of the ilium were sufficient for each body to be rapidly and cost-effectively assigned.

**Keywords:** Humam Identification; Charred Remains; Road Traffic Accident; Bones; Pelvis; Carbonization

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# STATISTICAL CORRELATION BETWEEN THE LENGTHS OF THE FIRST METACARPAL AND THE FEMUR OFFERS AN ALTERNATIVE METHOD FOR ESTIMATING STATURE

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**Introduction:** Standards for stature estimation in forensic anthropology use regression formulae based on the long bones, particularly the femur. Occasionally, however, the long bones may be damaged or absent. We sought to assess the utility of the first metcarpal in estimation of stature from the skeleton. OBJECTIVE: The aim was to investigate whether the length of the first metacarpal was correlated with femur length, and whether it could be used to estimate stature in Brazilian skeletons for forensic purposes.

**Materials and Methods:** Three independent measurements of the length of the left (LF) and right femur (RF), and first metacarpal were taken using an osteometric board by three researchers on three different days in thirteen skeletons of Brazilian Caucasian males.

**Results:** Calculation of St. Laurents correlation coefficient indicated the number of specimens in the sample was adequate. The intra-class correlation coefficient was also calculated showing the reproducibility of the method irrespective of repeat observation and observer. The proportionality ratio of RF, right first metacarpal (RFM), left first metacarpal (LFM) and LF was stable: RFM / RF (9.94±0.52), LFM / LF (9.81±0.26), LFM / RF (9.83±0.32), RFM / LF (9.98±0.52). These results lead us to observe that the length of the first metacarpal corresponds to about 1/10 of femur length and, by extrapolation, the length of the RFM represents 2.66±0.12 (%) of stature. The stature average obtained by Pearson's formula (165.9±4.57) using femur length and the stature average obtained (165.8±5.52) using first metacarpal length were almost identical.

**Conclusions:** There is a statistical correlation between the length of the first metacarpal and of the femur, offering an alternative method for estimation of stature in Brazilian skeletons. The proportional relationship between the lengths of these bones indicates that the length of the first metacarpal multiplied by 10 is a good approximation for the length of the femur.

**Keywords:** Stature; Regression Equations; Forensic Anthropology; Pearson´s Formulae; Femur; First Metacarpal

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# LIBS ANALYSIS OF HUMAN TISSUES IN FORENSIC SCIENCES

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**Abstract:** In this work, realized in collaboration with the recently instituted Italian Academy of Forensic Sciences, we present a study on the use of LIBS technique for the analysis of human tissues in the framework of forensic sciences. Results of LIBS analysis of hair tissue, nails, skin and bones are presented and compared with standard instrumental analytical chemistry approaches. The use of LIBS for identification of bones and other human remains is discussed in particular detail, in view of the existing know-how in LIBS analysis of archaeological findings. The availability of mobile and portable LIBS instrumentation suggests the possibility of extending the laboratory study to actual crime scene applications.

**Keywords:** Laser; LIBS; Spectroscopy; Forensic Anthropology

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# DOES FIRE SIGNIFICANTLY ALTER BLUNT FORCE INJURIES IN BONE?

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**Introduction:** Very little is known at the moment on how fire alters traumatic lesions on bone. Can the diameter of a circular or blunt force lesion on burnt bone still be a reliable indicator of the tool used? The aim of this study was to verify whether metric and morphological changes occur due to fire and to what extent in burnt and calcined bone. This investigation was conducted with a quantitative and qualitative analysis of the morphological and metric variation of blunt traumas and circular lesions on bony tissue after a controlled combustion process.

**Materials and Methods:** For the blunt wound injuries we used 22 bovine ribs; all the samples were divided into two portions using a handsaw so that we obtained 20 samples on which the lesions (one per sample) were inflicted with a hammer, organized in two groups of ten. We exposed one sample group to 400C and one to 800C of temperature. Casts of the lesions were made and dimensions measured. The morphological analyses were conducted by photographic superimposition using Microsoft Photoshop 7.0. For the circular lesions, 6 fresh bovine ribs were made using a drill, with a 10-mm tip for the former three ribs and a 12-mm tip for the latter three ones. Twenty holes were made on each rib, 10 in the middle of the rib and 10 both at the superior and inferior extremities. These last holes were subjected to a further treatment, by removing a portion of marginal bone in order to obtain open holes. In this way 120 holes in all were studied: in 60 the diameter was 10mm and in 60 was 12mm; among each group, 30 holes were closed and 30 open. Three measurements were made before burning the bone, when it became grey (at a temperature of 500C after 4 hours circa) and when it reached a stage of calcination (at 1200C after 10 hours circa). In both studies all metric data underwent a t of Student test to determine if the differences were statistically significant.

**Results:** In the first case, the statistical, qualitative and metric analysis conducted showed that all lesions maintained their morphological characteristics but metric characteristics changed significantly after calcination. The same results could be noticed in the study on the drilled lesions, although in this case fracture formation significantly hindered the measurement of calcined lesions.

**Conclusions:** These results have a substantial importance particularly in a forensic context where we frequently see cases where fire is used to destroy important evidence for the determination of cause and manner of death. Burnt lesions may change significantly from a metrical point of view and not be reliable markers of the dimensions of the tool which produced them.

**Keywords:** Forensic Anthropology; Blunt Force Trauma; Circular Lesions; Gunshot Wounds; Carbonization

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# THE CORRELATION BETWEEN THE SHOULDER HEIGHT AND STATURE AMONG THE INDONESIAN PEOPLE

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**Introduction:** In the case of unknown body, the police investigator can ask the forensic pathologist, medical doctor or other expert (such as dentist or forensic anthropologist) to help them to identify the body, part of the body or even skeleton. The doctor will collect the information as many as possible from the body and compare to ante-mortem information data from the family, medical record, dental record, etc. In the case of mutilation or death due to burn injury, sometime the head is missing. In this kind of cases the stature can be estimated by regression formula, ratio or proportion and multiplication factor (MF) that correlate between the length of a part of the body and the stature. In the case like this, the correlation between the shoulder height and the stature formula recovered from the same population can be used to estimate the stature.

**Methods:** As many as 753 Indonesian students, consisted of 356 males (aged 17-23 years old, X = 19.0 + 0.9) and 397 females (aged 17 - 28 years old, X = 18.8 + 0.8), were included in this study. On every person the stature and the shoulder height were measured and the correlation regression analysis was conducted.

**Results:** The males stature were 138.0 - 185.0 cm (x = 165.27 + 7.04), and the females were 132.50 - 180.0 cm (X = 153.50 + 6.38). The males shoulder height were 119.5 - 156.5 cm (x = 138.05 + 6.23), and the females were 115.0 - 177.50 cm (X = 127.73 + 5.69). The correlation between the stature and the shoulder height were as follows: Male: Stature = 0.9456 SH + 34.7221 SE = 3.8505 r= 0.8376. Female : Stature = 0.7299 SH + 60.2710 SE = 4.8478 r= 0.6513.

**Keywords:** Personal Identification; Stature; Shoulder Height; Indonesia

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# REGIONAL (DISTRICTS) PATTERNS OF DNA POLYMORPHISMS IN EAST TIMOR

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**Abstract:** East Timor (Democratic Republic of Timor-Leste) is located in Southeast Asia. The Democratic Republic, consists of 13 districts, includes the eastern half of the island of Timor, the Ataúro island and Jaco and Oecussi an enclave on the northwestern side of the island. Because of its localization and colonization, East Timor has a remarkable linguistic diversity (some authors referring to16 native languages) belonging to two different linguistic families: Austronesian, of Asian origin, and non-Austronesian (Trans-New Guinea), possibly of Melanesian origin. Considering East Timor's ethno linguistic diversity, analyzing the differences in the regional distribution of polymorphic genetic markers with medical-legal interest is of forensic relevance as micro-structuring of this population may occur. In this research, the distribution of polymorphisms of forensic application is presented in a regional-district basis perspective.

**Keywords:** East-Timor; Timor-Leste; Micro-Structuring

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# THE SECONDARY DNA TRANSFER: LOW COPY NUMBER (LCN) DNA PROFILING

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**Abstract:** DNA profiling is of great importance in the identification of perpetrators, particularly in violent actions such as strangulation, slap or punch. Primary and secondary DNA transfer which includes touching an item or an individual by skin, or handling them by hand, has been successfully utilized today in solving various forensic cases. Nevertheless the secondary transferred DNA has some limitations. The quantity and the quality of DNA in blood and other body fluids such as urine, saliva or semen found in the crime scene directly affects the analyses. However low DNA amount has been contemporarily coped with low copy number (LCN) methodology. This study aims to demonstrate that the secondary DNA transferred to the victims of physical violence can be analyzed and the perpetrators can be identified. A modelling experiment was designed and the necks of thirty volunteers were exposed to be touched as if there is strangulation. Swabs were obtained from their necks. DNA was isolated using QIAamp DNA Mini Kit, amplified using AmpFISTR SGM Plus PCR Amplification Kit and the samples were electrophoresed on ABI 310 Genetic Analyzer. DNA typing results revealed that touch DNA is valuable and can be analyzed if proper method is followed. The results of this preliminary research will also be evaluated in both aspects of the advantages and disadvantages of secondary DNA transfer.

**Keywords:** Secondary DNA Transfer; Low Copy Number (LCN); Touch Dna; Physical Violence; Turkey

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# INVESTIGATOR HEXAPLEX ESS KIT: EVALUATION AND VALIDATION TESTS

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**Introduction:** The Investigator Hexaplex ESS kit (Qiagen) is a PCR multiplex system for five miniSTRs recommended by the ENFSI and EDNAP groups as part of the new European Standard Set of loci, and also the TH01 and Amelogenin. In order to use new commercial kits, forensic laboratories must validate them in routine casework. The aim of this study was to compare results obtained with this kit and another validated kit already in use in our laboratory that includes the same miniSTRs.

**Materials and Methods:** Control included in some kits and secure samples were tested in duplicate analysis with the Investigator Hexaplex ESS kit (Qiagen) and the NGM kit (Applied Biosystems), and results compared. Sensibility, reproducibility and size precision tests were also performed. Some casework samples were also typed in duplicate and included in this study to evaluate the kit performance in real cases.

**Results:** This PCR amplification kit was capable of generating the same allelic calls when the same samples were run in duplicate. The system as the ability to yield correct, reproducible and complete profiles with a 0.5 ng/µl DNA input. Stochastic effects were observed in STR analysis where a sample contained very low amounts of DNA (i.e. forensic casework samples). In the case of STR analysis concordance questions are important. In this study we observed that control and known samples had the same DNA profile when examined using a different PCR amplification system (NGM).

**Conclusions:** The Investigator Hexaplex ESS kit gave similar results when compared with another kit (NGM) already in use in our laboratory. We could obtain a complete profile with a 0.5ng/ul of DNA input. This suggests that the use of this kit could be sufficient enough to solve some forensic cases involving degraded samples with low costs.

**Keywords:** Mini-STRs; Validation

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# APPLICATION OF INDELS (INVESTIGATOR DIPPLEX) IN MIXTURE SAMPLES

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**Introduction:** The insertion/deletion polymorphisms (indels) have considerable potential in the field of forensic casework, since they can combine the desirable characteristics of both STRs and SNPs. The multiplex amplification of 30 DIPs and Amelogenin (Investigator DIPplex), with the maximal amplicon length restricted to 150 bp, makes them a powerful tool in forensic field, mainly to improve the chances of successful amplification of highly degraded DNA. The 30 DIPs are distributed over 19 autosomes that are at least 10 Mbp away from any commercially available STR and SNP marker. Hence, in combination with standard markers, these polymorphisms improve discriminatory power and provide a potential supplementation for paternity analyzes. Furthermore, as they do not possess stutter products or microvariants, it could be a good option to solve forensic cases, mainly in the reliable mixture interpretation.

**Materials and Methods:** The main objective of this study was to evaluate the performance of the 30 indels included in the Investigator DIPplex Kit (Qiagen) to interpret mixtures linked with forensic cases involved in the analysis of sexual crime samples. In a preliminary study we used a mixture with 0,5ng/µl of the two controls, DNA XY5 (male) and DNA CCR 9947A (female). A mixture (male and female) with 0,3ng/µl (casework samples), related to which the genetic profile of the contributors was known. PCR was made according to the Investigator DIPplex Kit handbook. The amplified products were detected and separated in an ABI PRISM 3100, fragment sizes were determined automatically using the Genescan Analysis Software version 3.7 and allele designations were determined with the Genotyper Software version 3.7 (Applied Biosystems), by comparison with ladder included in the kit.

**Results:** It was observed that the controls mixture interpretation was straightforward. When the same allele was present in the mixture profile controls, the peaks heights were about two times of the correspondent single peak, as expected. Regarding to the casework samples, similar results were obtained. Furthermore it was possible the identification/interpretation of DNA mixtures, using peaks heights/areas information. In some casework mixtures it was possible to have full profiles of the male in the Indels analysis, whereas in the Y-STRs the profiles weren't complete. However, more experiences must be done using mixture samples, mostly connected with sexual crime cases. It will be compared the results from the two mixture type of samples (controls and casework samples) to evaluate the probable interferences in the last ones during the PCR and amplicon separation. Furthermore, the Investigator IDproof Mixture software, developed by Qiagen specifically for the evaluation of mixed samples, will also be use.

**Keywords:** Indels; Investigator Dipplex; Mixtures Samples

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# INDIVIDUALIZATION OF FETAL AND MATERNAL GENETIC PROFILES FROM A PLACENTA, IN THE RESOLUTION OF A CRIMINAL MATERNITY CASE

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**Introduction:** Placenta is composed of two parts, (1) the maternal section and (2) the fetal section. To the naked eye, both parts of the placenta appear as a single unit. Nevertheless with proper expertise it may be possible to identify tissues originate only from the mother, and tissues originate only from the fetus - chorionic villi. In cases of abandoned newborns, the recovery of maternal tissue from the placenta allows the direct comparison of genetic profiles between the suspected mother and the biological mother (placenta).

**Materials and Methods:** Earlier this year, we received a placenta found near a newborn, in a public highway, by the Portuguese Criminal Police. After macroscopic observation and manual placental tissue dissection, DNA extraction was carried out with enzymatic methods. DNA extraction from the reference biological samples (blood stains and oral swabs) was performed using the Chelex method. To define genetic profiles we performed the co-amplification of the loci D3S1358, TH01, D21S11, D18S51, Penta E, D5S818, D13S317, D7S820, D16S539, CSF1PO, Penta D, VWA, D8S1179, TPOX, FGA, D2S1338 and D19S433 using available commercial kits. The amplified products were detected and separated by capillary electrophoresis. The results were analyzed and allele designations were automatically determined with the GeneMapper® software.

**Results:** From the placenta, we individualize two genetic profiles, one from the male newborn and the other from the biological mother. From a blood stain of the suspected mother, a genetic individual profile was obtained, too.

**Discussion and Conclusions:** The genetic profile of the biological mother was resemblant to the genetic profile of the suspected mother. The kinship probability of the newborn relatively to the indicated suspected mother was 99.999980%, which corresponds to practically proven biological maternity. Not only we solve this criminal maternity case, but we also recommend that our protocols could be adopted and developed for use by forensic laboratories which deals with this kind of criminal cases in routine case work.

**Keywords:** Criminal Maternity Cases; Placental Samples; Genetic Profiles

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# EVALUATION OF IDPLEX STR KIT IN FORENSIC GENETICS LABORATORY´S ROUTINE

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**Introduction:** DNA profiling in forensic laboratories requires validated STR multiplex kits that fulfils all standard requirements established by International Forensic Organizations. The aim of this work was to compare results obtained with IDPlex Kit (Qiagen), including 15 STR loci and amelogenin, with other validated kits commonly used and perform validation tests in order to establish the usefulness of this kit in laboratory's routine.

**Methods:** Five secure samples with an approximate concentration of 2 ng/?l were tested in duplicate with IDPlex Kit and with Identifiler Kit (Applied Biosystems), and results of amplification compared. Kit's sensibility was also evaluated using the same samples in different DNA concentrations (5ng, 0,5ng, 0,2ng, 0,1ng and 0,05ng). Reproducibility was evaluated using three commercially available different controls (9947A, K562 and XY1) with already established profiles. Sizing precision test was performed calculating size mean and standard deviation for each possible allele at each locus analysed (through IDPlex allelic ladder). Amplification with criminal degraded samples was also considered, testing four different samples in duplicate that had previously shown difficulties in amplification with other kits used in our laboratory (like no amplification or incomplete profiling).

**Results:** Comparison of the two different kits shown concordance in allele typing although the mean peak height and mean peak area were higher in the case of Identifiler Kit, showing a better amplification power. The results remained the same when these parameters were evaluated considering each locus separately and compared according the amplicon size. The sensibility tests revealed good sample amplification for the higher concentrations used until 0,5ng of DNA, although at this concentration the percentage of complete profiles (20%) depended on sample's quality, since the controls amplified quite well at 0,5ng. For 0,2ng of DNA all samples revealed incomplete profiles and at 0,1ng only higher quality samples (that amplified completely at 0,5ng) revealed some markers amplification. For the same concentration used in Identifiler Kit amplification (2ng), IDPlex revealed more split peaks, with a +/-A pattern present more frequently. Test of three controls with IDPlex Kit revealed a perfect reproducibility of results. The kit sizing precision was perfectly acceptable with standard deviations for each allele at the 16 loci analysed, ranging between 0.036258pb (for amelogenin) and 0.090655pb (for D8S1179), never exceeding the 0,5 base binning window for allele calls. IDPlex amplification of degraded samples shown similar results to those obtained with other kits. Only in one case, a complete profile was obtained with IDPlex and not with the others.

**Conclusions:** IDPlex Kit revealed acceptable validation parameters for use in forensic genetics laboratory's routine but no advantageous features that could suggest actual kits replacement, unless the cost per sample.

**Keywords:** Strs Kits; Validation; Forensic Genetics

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# EVALUATION OF DIFFERENT STR TYPING KITS ON DNA EXTRACTED FROM FINGERNAILS OF UNIDENTIFIED DECOMPOSED CADAVERS

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**Introduction:** DNA extraction and genetic identification of decomposed and skeletonised cadavers can be performed from samples such as muscles, teeth or skeletal remains. Unfortunately some problems may arise with these samples: soft tissues suffer rapid degradation, while DNA extraction from bones and teeth is particularly difficult, longer and time consuming and results are not always satisfactory. Fingernails can be an alternative source of DNA because, differently to other complex samples, consist of keratinized epithelial cells that give robustness and good resistance to decay. Moreover keratin is easier to dissolve than calcified matrix of bones that is a barrier for access to DNA during the extraction process. In the last years new commercial kits including five non-CODIS additional autosomal STR (D1S1656, D2S441, D10S1248, D12S391 and D22S1045) were developed by different companies, in response to the ENFSI and EDNAP groups' recommendations for increasing the number of STR loci included in the European Standard Set (ESS). In this report we present a comparison between of the sensitivity of three new PCR amplification kits (PowerPlex® ESI 17 System (Promega), PowerPlex® ESX 17 System (Promega) and NGM PCR Amplification Kit (Applied Biosystems)) and one in widespread forensic use (AmpFlSTR® Identifiler™ PCR Amplification Kit (Applied Biosystems)) on DNA extracted from fingernails of decomposed cadavers.

**Materials and Methods:** Fingernails from 10 decomposed bodies found in different state of preservation were collected. Post mortem intervals were estimated between one month to more than 2 years. DNA was extracted using QIAamp DNA Investigator kit (Qiagen) and autosomal STR were amplified both by AmpFlSTR® Identifiler™ PCR Amplification Kit (Applied Biosystems) and by three new generation kits such as PowerPlex® ESI 17 System (Promega), PowerPlex® ESX 17 System (Promega) and NGM PCR Amplification Kit (Applied Biosystems). Amplification was performed from standard 28 to 34 PCR number cycles as recommended for low copy number (LCN) DNA samples. Amplification products were analyzed using ABI Prism® 3130 Genetic Analyzer (Applied Biosystems) and STRs fragments were automatically analyzed by GeneMapper ID-X v.1.1.

**Results:** It was possible to observe that at 28 PCR number cycles a complete genetic profile was obtained for each samples of DNA extracted from fingernails when the three new generation kits (ESI, ESX and NGM) were used. Differently, partial profiles of at least eight STR were provided using Identifiler kit, better results were achieved when PCR number cycles were increased to 34.

**Conclusions:** These results imply that the new generation kits have enhanced sensitivity, that combined with the robustness afforded by the five new amplicons has substantially improved the quantity of data obtained from degraded samples, and the improved chemistry confers exceptional tolerance to high levels of laboratory prepared inhibitors. Moreover the good quality of profiles achieved from all samples, as previously demonstrated in other studies, indicates that nails can be considered an alternative source of DNA for identification of decomposed samples.

**Keywords:** Fingernails; Genetic Identification; Short Tandem Repeats

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# ANALYSIS OF DNA EXTRACTION PROTOCOLS FROM HAIRS. LABORATORY PROCEDURES AND MOLECULAR ANALYSIS FOR HUMAN IDENTIFICATION

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**Introduction:** In the Brazilian Penal Code (art. 213) rape is considered one of the most violent crimes and is classified as a hideous crime. Sexual assaults, such as rapes followed or not by death, have increased considerably, especially in metropolitan areas, such as the city of São Paulo. The majority of cases are not even reported for many reasons - moral, social, and emotional aspects that involve the victim. Studies on such a subject in Brazil show that less than 10% of the cases are reported to police authorities. One of the limiting factors for clarifying rape crimes is the lack of spermatozoa collected from vaginal material, which makes the identification of genetic material from the perpetrator difficult. For other hand, considering such cases, the probability of male hair samples to be collected in crime scene is even greater. The aim of the study is to analyze and discuss the laboratory procedures and the DNA extraction protocols from pubic hairs, for molecular human identification using mitochondrial DNA HV1 and HV2 sequencing.

**Materials and Methods:** Blood, head and pubic hair (10 hairs from each individual) were obtained from 100 autopsy cases from the Serviço de Verificação de Obitos da Capital (SVOC). Sample collection was in accordance with the Research Ethics Committee 777/04 FMUSP HC and 0467/09, EPM/UNIFESP. DNA from blood samples were extracted using the Salting out method. Three pubic hairs from each individual were used for each sample as follow: a) root: the first segment 0.5 cm in length of the hair including the root; b) hairs without roots: the following 2 cm portion of the hairs. DNA extraction method were: a) Modified protocol using PCR reagents, b) QIAamp DNA Mini Kit (QIAGEN) and c) QIAamp Micro DNA Kit (QIAGEN). The commercial Kits were performed according to manufacturer's. d) Only one hair from each individual was used for samples, in duplicate, for DNA extraction using phenol/chloroform/isoamyl alcohol extraction, followed by Microcon (MilliPore). The DNA quantification was performed by spectrophotometry (NanoDrop®). An initial input was performed with PCR amplification of HV1. Amplified products were purified and sequenced using Big DyeTM Terminator v 3.1 Cycle Sequencing kit (Applied Biosystems). The sequenced products were precipitated, followed by electrophoresis in ABI 3130 Genetic Analyzer (Applied Biosystems), as well as the Identifiler kit for STR analysis.

**Results:** Considering that plucked pubic hairs were usually in anagenics and they have follicular material in its surface, the extraction using PCR reagents was practical and showed higher yield than the commercial kits. However the Micro Kit was more efficient for the mtDNA PCR amplification of pubic hair samples without root. Better results from the HV1 and HV2, using the micro kit, were obtained. Although the phenol/chloroform extraction is potentially toxic and laborious, when only one hair is available it should be used in addition to microcon purification.

**Discussion and Conclusions:** STR analyses were carried out for blood and pubic hair samples to check and to guarantee the same individual source. In order to trace potential contamination in our laboratory, all personal involved were typed and these were designated as control. The samples are subjected to sequencing in duplicate and in two different laboratories. Moreover, the results are interpreted by two independent analyzers (double blind). The heteroplasmy is a common phenomenon when it comes to the analysis of mtDNA and hairs tend to be more heteroplasmic than blood, possibly due to clonal nature of hair follicles and high energy required to occur keratinization of cells. The study of heteroplasmy in different tissues from the same individual and recognition of the frequency of this event becomes crucial in the analysis of maternal lineage.

*This study has its importance in handling this type of material for forensic cases and the control quality of our laboratory. FAPESP 2008/06369-8, Capes*

**Keywords:** Brazil; Hairs; Rape; Sexual Assault; Dna Analysis

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# MITOCHONDRIAL DNA HAPLOGROUPS IN AN AFRICAN ORIGIN POPULATION

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**Introduction:** Due to maternal inheritance of mitochondrial DNA (mtDNA), this genetic material has a very high potential for use in population genetics as well as in forensic studies. In the majority of Forensic Laboratories, DNA sequencing of the control region normally is performed trough HVI and HVII mtDNA studies. We have developed two sets of coding region SNPs, in order to determine major H and non-H mtDNA haplogroups for forensic purpose. These methodologies have been applied to an African origin population due to the highly genetic diversity generally associated to African populations.

**Materials and Methods:** From a set of 78 individuals from Cabo Verde population with African origin, we have selected 20 samples for mtSNP studies. All 78 samples have been previously sequenced using BigDye® Termination v3.1 Cycle Sequencing kit (AB) for HVI DNA sequencing. MtSNPs have been studied with SNaPshot methodology with two multiplex - one for typing H haplogroups using SNPs 4216, 4580, 7028, 10398, 10400, 12308, 12705, 1719, 8251, 3594 and the second one using SNPs 3010, 3915, 4769, 3992, 4793, 4336, 6776 for typing major non-H haplogroups.

**Results:** Haplogroups for the twenty Cabo Verde population samples using 10 H haplogroup loci (multiplex 1) and 7 non-H haplogroup loci (multiplex2) were determined and comparisons with DNA sequencing were obtained. Performing mtSNP haplogroups results were as follows: L1/L2 - 14 samples, J* - 1 sample, U* - 2 samples, R*/HV* - 1 sample, L3* - 1 sample and 1 sample in which haplogroup assignment was not possible. With DNA sequencing more detailed haplogroup specification were obtained as L1/L2 and L3 haplogroups could be subtyped as L2a, L2b, L2c, L1, L1b, L3b as well as J* and U* were subtyped as J2 and U6. However, in two samples there was no match using both methodologies - a L3 sample was typed as L1/L2 by SNaPshot as well as in a L3b sample was not possible to assign the haplogroup with single base extension methodology.

**Discussion and Conclusions:** All 20 studied samples belonged to non-H haplogroups as defined by DNA sequencing and SNP 7028T typing, the majority of samples belonging to African haplogroups L1/L2 or L3, although J, U and V haplogroups have also been encountered. A L3 haplogroup sample was detected trough DNA sequencing but the corresponding haplogroup was not assigned with SNaPshot methodology due to differences in 4216, 1719 and 3594 SNP positions. This is possibly a new variant not yet included in the mtSNP phylogenetic tree (PhyloTree). SNP studies should continue to address the mtDNA coding region emphasizing the need to improve phylogenetic studies.

**Keywords:** MtDNA Haplogroups; African Population; Sequencing; SNPs; New SNP Variant

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# X- STR MUTATIONS IN PATERNITY INVESTIGATION CASES

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**Introduction:** X-chromosomal markers have nowadays received special attention from Forensic Laboratories. X markers are particularly useful in complex paternity investigations when the child is a female and in investigation of relationships among individuals of different generations. Many X-chromosomal STRs are available but only few methods have been described for X-STRs and Amelogenin multiplex amplification. When performing X-STR studies in paternity investigations we have encountered several X-STR mutations, which are the aim of the present study, due to forensic interest in mutation rates for X-STRs.

**Materials and Methods:** Blood samples from 35 Portuguese Caucasian non-exclusion paternity casework including female children - 9 exclusion and 26 non-exclusion, previously typed with 17 routine autosomal STR markers, were studied with Mentype® Argus X-8, according to manufacturer's recommendations. DNA was extracted with Chelex® followed by Promega Wizard purification method. PCR products were analysed in an ABI PRISM® 3130 Genetic Analyzer. Mentype® Argus X-8 contains eight X-chromosomal STR markers which have to be handled as haplotypes: DXS10135/DXS8378, DXS7132/DXS10074, HPRTB/DXS10101 and DXS10134/DXS7423.

**Results:** Genetic profiles of twenty-six paternity investigation trios including female children were presented. We have detected three mutations in DXS10135 locus between the alleged father and the daughter in three of these paternity investigation trios - 2 deletions 26 to 25 and 1 insertion 32 to 33. In this last case there was also detected a two-step mutation - an insertion 15 to 17 in DXS7432 locus between mother and child. In exclusion casework, previously studied with routine STR markers for paternity investigation, more than four X-STR exclusions were observed between the alleged father and the female child in all exclusion situations.

**Discussion and Conclusions:** Although different mutations types can occur in X-STRs study such as the absence in the electropherogram of amelogenin allele X or the presence of a trisomy in some loci (also observed in our casework but not included here), the occurrence of insertions or deletions of repeated units was detected in this study. In DXS10135 locus a mutation rate of $\mu$= 0.038 was observed, and in DXS7423 locus a mutation rate of $\mu$ = 0.019 was determined, the last one referring to a two-step mutation.

**Final Comments:** Although this type of insertion/deletion mutations between alleged father-daughter or mother-daughter are usually detected in paternity investigation casework performed with autosomal STRs, with X-STR loci we have obtained mutation rates ten times higher,

**Keywords:** X-STRs; Argus X-8; Paternity Investigations; One-step Mutations; Two-step Mutation

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# NGM LOCI IN SOUTH PORTUGUESE POPULATION

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**Abstract:** Allele frequencies and other relevant forensic parameters of 15 loci studied with Applied Biosystems AmpFlSTRs NGM Kit were calculated in a population of individuals residing in the South of Portugal. Blood stain samples were obtained from a total of 350 unrelated individuals involved in paternity testing casework. This new kit has five loci not present in any other kit used in our laboratory (Promega Powerplex 16 System and Applied Biosystems Identifiler Plus): D10S1248, D22S1045, D2S441, D1S1656 and D12S391. The NGM multiplex kit is used in our forensic casework as an auxiliary screening tool to solve deficient casework such as fatherless paternity testing, and to help in paternity investigations with one genetic incompatibility after the routine seventeen loci typing. Furthermore, this five loci included in the European Standard Set are also recommended by the European Network of Forensic Science Institutes (ENFSI) and the European DNA Profiling group (EDNAP). These studies are necessary to calculate statistical forensic parameters such as power of discrimination, power of exclusion or minimum allele frequencies. Statistical parameters such as heterozigoty, homozigoty or allele frequencies were determined with Arlequim V3.5 and results compared with the ones reported in previous similar studies. As final remark, is important to remember that this kind of study is highly important for the Forensic Laboratories accreditation achievement.

**Keywords:** Paternity Investigation; Population Study; NGM Kit; Forensic Parameters

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# OPTIMIZATION OF DNA EXTRACTION AND TYPING FROM SKELETAL REMAINS

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**Introduction:** Extraction and successful PCR amplification of DNA from human remains has great importance in solving forensic cases. Unfortunately, at present there is not an infallible method to recover DNA from much degraded samples due to variations in DNA yield from larger bone fragments. In this study different types of human bones ranging in age from 1 month to 90 years and differently preserved were analyzed. We performed DNA extraction with three commercial kits based on the use of silica membrane or magnetic bead-based treatment, with minor modifications to standard protocols. Moreover we amplified DNA using four commercial kits and two homemade miniSTR quadruplexes which produced amplicons less than 120 bp. It was possible to achieve DNA profiles of at least 12 STRs from long bones (femurs) up to 90 years old.

**Materials and Methods:** Skeletal remains of 14 bodies were recovered in various state of preservation from very different geographical and environmental areas. 100-150 mg of bone powder were extracted using three different commercial kits: QIAamp® DNA Mini kit (Qiagen), DNA IQ™ System (Promega) and PrepFiler™ Forensic DNA Extraction Kit (Applied Biosystems), both following standard protocols and introducing a step with phenol-chloroform-isoamylalcohol after lysis step. DNA amplification of autosomal STR were performed using four commercial kits: AmpFlSTR Identifiler™, AmpFlSTR MiniFiler™ and NGM PCR Amplification Kit PCR (Applied Biosystems) and PowerPlex® ESX 17 System (Promega). Moreover two homemade mini-quadruplexes built with conventional STR markers (D8S1179, D3S1358, TPOX, TH01, D5S818, CSF1P0, D13S317, D16S539) redesigned and converted into mini-STRs (<120bp) were used. Amplification products were separated by capillary electrophoresis ABI PRISM 3130 Genetic Analyzer (Applied Biosystems) and analyzed with GeneMapper ID-X v. 1.1.

**Results:** The extraction methods (silica columns and magnetic beads treatment) not always provided reproducible results following standard DNA extraction procedure in all skeletal remains analyzed. The partial STR profiles obtained with standard protocols induced to modify the procedures to improve DNA purification and increase the amount of DNA that could be extracted from bones by introducing an intermediate step performed with phenol-chloroform. Only the modified QIAamp® DNA mini kit with gave better results on all femurs in terms of number of STR amplified and reproducibility of electopherograms than all other DNA extraction methods. The new protocol produced a variable number of 5-11 markers in all femurs analyzed when Identifiler was used. Better results were achieved with NGM PCR Amplification Kit PCR and PowerPlex® ESX 17 System, due to their higher PCR amplification efficiency. Moreover, the combined use of Minifiler and two homemade mini-quadruplexes allowed the amplification of at least 12 STR.

**Conclusions:** In our opinion DNA extraction method based on combining phenol-chloroform-isoamyl alcohol and QIAamp® DNA Mini kit can provide an alternative method to standard protocols. We have observed that this method allowed to remove as many inhibitors as possible and maximize the yield of DNA template. Moreover DNA template in low copy number (LCN) was successfully amplified with high sensitivity and good peak balance. Finally the high success rate for nuclear STR typing reported here further confirmed that mini-STRs could be considered a good method of choice when traditional marker fail to give a genetic profile of at least 12 STRs as recommended by ENFSI and ISFG Commission.

**Keywords:** Skeletal Remains; Short Tandem Repeats; Human Identification

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# DEVELOPMENT OF TWO QUINTET MINISTR MULTIPLEX FOR FORENSIC PURPOSE

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**Introduction:** MiniSTR typing has been proved a useful tool for degraded DNA sample due to the smaller amplicons. However, such shorter amplicons in similar length from different loci will easily overlap on electrophoresis and only be distinguished from one another by keeping one locus in each dye lane. This is particularly unfavorable for degraded DNA from a limited forensic specimen because more amplifications have to be required in order to get more MiniSTR loci typed. This research try to assemble more loci in a combination set by selecting different length of amplicons and labelling more different fluorescent dyes.

**Materials and Methods:** The candidate primers of MiniSTRs from references and the primers of amelogenion designed with premier3 were crosschecked against one another by software FastPCR6.0 for compatibility. Compatible nine MiniSTR markers less than 150 bp integrated a sex typing maker (91 and 97 bp) were finally selected to assemble two PCR multiplexes system: D12ATA63, D2S1776, D1GATA113, D4S2408, D17S974 and D20S482, D3S3053, amelogenin, D6S474, D9S1122. The overlapped loci were distinguished from each other by labeling four colour dye (FAM, HEX, TAMERA and ROX) on forward primers, respectively. The PCR parameters and primer concentrations were subsequently optimized. The electrophoresis was fulfilled under POP4 on 3100-Avant and the typing data was validated by standard DNA 9947A and 007. Fresh blood samples of unrelated Chinese individuals and kinds of degraded DNA samples from real cases were tested to evaluate the usefulness of the system for forensic purpose.

**Results:** All amplicons by two multiple amplification were less than 150bp in size. The optimal quantities of templet DNA input in 12.5μL PCR reaction were a range of 0.25-5ng. Primer concentrations in a range of 0.1-0.6uM together with 59? annealing temperature, 30 cycles made a balance peak heights within and between dye colours. Both allele frequencies of 144 unrelated Chinese individuals and pedigree studies showed no deviations from Hardy-Weinberg equilibrium and expected Mendelian inheritance patterns. For Chinese Han populations, the two MiniSTR multiplex system showed an accumulated power of discrimination and chance of paternity exclusion 0.999999983 and 0.9965, respectively. It also showed the higher efficiencies in detecting trace or degraded DNA such as formalin fixed tissues, decomposed tissues or abnormal blood from leukaemia patient, etc.

**Conclusions:** This MiniSTR multiplexes system integrated amelogenin could be solely used in personal identification cases or complementally used in paternity tests.

**Keywords:** MiniSTR; Multiplex PCR; Degraded DNA

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# ANALYSIS OF SOIL SAMPLE METAGENOME AS AN ADDITIONAL TOOL FOR FORENSICS

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**Introduction:** Soil analysis is a valuable resource in legal investigation potentially connecting victim or suspect to a particular crime scene because soil traces are easily transferred to persons and/or objects. Classical forensic soil analysis involves examination of its physical characteristics and chemical composition, such as soil type, colour, particle size, pH, elemental, mineral and organic content. However, the limited variability of these parameters does not always allow adequate discrimination between soil samples. Therefore, microbiological approaches have been proposed as technique that could fulfill the cap and provide complementary information. To date terminal restriction fragment length polymorphism (T-RFLP) analysis has been the most popular technique for microbial-based soil identification and differentiation. The aim of current study was evaluation of variability of bacterial and eukaryotic (including fungal) communities in different soil samples on metagenome level using the second generation sequencing technique for development an additional tool for linking persons to the crime scenes.

**Materials and Methods:** Soil samples were collected from different environments (forests, fields, grasslands, town park) with different flora. 9 soil samples per one sampling area (30m x 30m) spaced by 15m were subjected for analysis. DNA was extracted and parallel sequencing was performed on Roche/454 platform. For bacterial community analysis the 16S rRNA gene V2-V3 hypervariable region was used. For fungal community sequencing the 18S rRNA gene V2-V3 region and NS31-AML2 SSU rRNA region for arbuscular mycorrhizal fungi were analyzed. For data analysis two computational models based on statistical analysis were developed. The first model employs operational taxonomic unit (OTU) definition by clustering of sequences and the second one uses NCBI BLASTN. For both approaches 7 samples per one sampling area were used for building up a statistical model of the community, then the model was checked and validated by the two unused samples in that area. Unknown samples from two additional sampling areas (forest and field) were analysed to test the performance of our system.

**Discussion and Conclusions:** To overcome limitations related to T-RFLP analysis, concerning different sizing results obtainable from different instruments and analysis conditions, we implemented direct sequencing approach to get more precise taxonomic information on species/genus level. Thus, this parallel sequencing approach enables to obtain reliable and comparable information about existing microbial communities that could be shared very easily with other (forensic) laboratories. As the approach uses direct sequencing, it meets also quality criteria for accreditation, which is an important question for forensic purposes. Microbial community analysis of soil samples in the current study revealed that samples from different environment were significantly distinguishable, although more samples have to be analysed including samples taken from the same locations but at different times/seasons as well as from wider range of soil-types. Nevertheless, our proposed statistical modelling approach using logistic regression showed good performance for used dataset. Thus, the obtained results are clearly promising enabling exclude or include samples to particular site; however, foresee a need for more elaborative studies for statistical evaluation and criteria formation to be able to implement this approach into the routine forensic practice.

**Keywords:** Soil Sample; Metagenome Analysis; Microbial Community; Second Generation Sequencing

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# DEVELOPMENT OF A DNA EXTRACTION METHOD FROM BUCCAL-SWAB CARDS USING A H-PREP

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**Abstract:** Many Forensic labs face the similar situations to process many casework samples within a time limit. Forensic DNA typing has a crucial role in solving caseworks such as murder, sexual assault, burglary, theft and so on. Moreover, if DNA typing data were accumulated in a DNA database, they provide not only a valuable tool to solve crimes but prevent serial incidents. Many countries have National DNA database by the law. In Korea, crime scene evidences for DNA typing are steadily increasing. In addition, suspects and arrestees samples are increasing by enforcement of Law about using and protecting information of Human DNA identification since July 1, 2010. In order to reduce efforts and time, we developed a DNA extraction method using a H-prep from buccal-swab cards, produced in Korea. It showed reliable and reproducible DNA typing data to search DNA matches from National DNA database. Furthermore, it displayed a 60% cost reduction compared to other commercially available kits.

**Keywords:** H-Prep DNA Extraction Method; Buccal-swab Card; DNA Typing

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# GENES OF THE EXOCYTOTIC MACHINERY IN THE ETIOLOGY OF ALCOHOLISM AND SUICIDAL BEHAVIOUR: STX1A GENE

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**Introduction:** Several lines of evidences suggest that changes in exocytotic machinery might be involved in alcohol dependence and suicidal behaviour. Synaptic vesicle exocytosis requires several SNARE proteins, including vesicle-associated membrane protein (VAMP), synaptosomal-associated protein (SNAP) and syntaxin (STX). However, to date no genetic studies has been performed in order to investigate the relationship between exocytotic machinery genes and alcoholism as well as suicidal behaviour. The aim of this work was to investigate the role of the STX1A gene in the etiology of alcoholism and suicidal behaviour.

**Materials and Methods:** The sample of this study includes alcoholic patients, who attended the Alcohology Regional Centre of Coimbra. They all had been diagnosed as alcohol dependence syndrome, using structured questionnaires and following the ICD-10 Diagnostic Criteria for Research (I.C.D.-10 DRC) and DSM-IV TR (American Psychiatric Association) criteria. All subjects included were informed about the methodology and procedures of this study and gave their consent, signing a written form. Related to suicidal behavior, the blood samples from suicide victims and controls were collected during routine autopsy at National Institute of Legal Medicine. Genomic DNA was extracted from peripheral lymphocytes by using enzymatic method. Genotyping of the STX1A gene used conventional PCR-RFLP method.

**Conclusions:** We found no evidence of association between STX1A gene and alcoholism as well as suicidal behavior in the Portuguese population.

**Keywords:** Suicidal Behaviour; Alcoholism; Stx1a Gene; Genetics

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# CANDIDATE GENES OF THE DOPAMINERGIC AND SEROTONERGIC SYSTEMS IN THE ETIOLOGY OF DOMESTIC VIOLENCE: A PILOT STUDY

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**Introduction:** Domestic violence against women is a major public health problem worldwide, with tremendous social and financial costs. Alcohol abuse has been recognized as a common risk factor for such violent behaviour and the link between genetics and alcoholism was already clearly demonstrated. Despite the evidences that suggest a contribution of genetic factors, namely of dysfunctions in serotonergic and dopaminergic systems, for the development of violent behaviour, a possible relationship between genes from these systems and domestic violence perpetrated by alcoholics had never been explored.

**Methods:** This study examined the relationship between genetic polymorphisms in receptors and transporters of dopamine (SLC6A3 40bp VNTR, DRD4 48bp VNTR) and serotonin (SLC6A4 ins/del, HTR2A T102C) genes and domestic violence in a Portuguese sample of alcoholic males.

**Materials:** Blood samples were collected from male alcoholics who practiced acts of domestic violence (n= 48) and alcoholic patients without record of domestic violence (n=48) and genomic DNA was extracted by a standard enzymatic protocol. Genotyping of the SLC6A3, DRD4, SLC6A4 and HTR2A genes was performed by PCR and PCR-RFLP.

**Conclusions:** We found no evidence of association between SLC6A3 40bp VNTR, DRD4 48bp VNTR, SLC6A4 ins/del and HTR2A T102C gene polymorphisms and domestic violence. The results of this study seem to contradict the role of genetic variants of serotonin and dopaminergic receptors/transporters in the etiology of domestic violence in the Portuguese population.

**Keywords:** Domestic Violence; SLC6A3; DRD4; SLC6A4; HTR2a; Genetic Polymorphisms.

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# SUICIDAL BEHAVIOUR AND NEURONAL NITRIC OXIDE SYNTHASE GENE

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**Introduction:** Suicide is an important public health problem and in the last 45 years, suicide rates have increased by 60 % worldwide. Particularly, suicide is among the three leading causes of death among those aged 15-44. Neuronal nitric oxide synthase (nNOS) isoform has been implicated in suicidal behaviour. In particular, post-mortem brain study that revealed a decreased level of nNOS protein in the locus coeruleus of the subjects with depressive disorder, who had committed suicide, gave interesting data that point to a role of the nNOS gene in the etiology of suicide. Thus, in this study we explored the potential association between the polymorphism C276T of NOS1 gene and suicide.

**Materials and Methods:** From our population, we select a Portuguese population of suicide victims and Portuguese controls and the genotyping of the C276T of NOS1 gene was determined by polymerase chain reaction followed by digestion with the specific restriction enzyme Eco72I.

**Conclusions:** Related to genotypes significant differences were found when comparing suicide victims and controls ($P < 0.05$). These data suggest a possible link between the polymorphism C276T of the NOS1 gene and suicide in the Portuguese population.

**Keywords:** Suicide; NOS1 Gene; Association Study

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# THE WAY TOWARDS PERFECT FORENSIC LABORATORY

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**Abstract:** The aim of the paper is to present all those problems that prevent forensic laboratories from proper functioning and set forward the ways of their solution. The authors are far from the idea that there could be any "perfect" laboratory in the world which would be an example for any other laboratories and whose every unit will function on the highest level. It is a well-known fact that many forensic laboratories of developed countries have better financing and work more skillfully than those of developing countries. In spite of this, it should be taken into consideration that in order to work on the perfect level it is necessary to:

- Have modern facilities and equipment;
- Recruit highly qualified and experienced personnel who should be periodically trained.
- Have operability while investigating the criminal scene;
- Have scientific base and information availability;
- Establish efficient structure and management;
- Make conditions necessary for non-corruptible atmosphere;
- Have democratic legislation and law of the country which will ensure forensics' freedom from the pressure of higher organizations and management.
- Have national/international certification and accreditation
- Have the group of quality management. Based on the above mentioned, the authors consider that all kinds of reforms should be directed towards successfully solving the mentioned problems and accomplishing the programme of not cosmetic, not so important changes what can finally cause important problems and complicate normal functioning of forensic laboratories. In this case forensic academies and associations have a great role. They have to present the main scheme and direction what is necessary for making correct reforms, accreditation and certification in forensic laboratories in order all laboratories which make such reforms come close to the conditions of a perfect laboratory.

**Keywords:** Forensic; Laboratory; Perfect; Scientific; Establish; Equipment; Investigating; Certification; Crime

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# GENETIC POLYMORPHISMS OF 5-HT2A, 5-HT1D?, 5-HT1D? AND 5-HTT GENES IN SUICIDE COMPLETERS: A CASE CONTROL STUDY

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**Introduction:** Genetic factors confer susceptibility to suicide and the serotonergic system has been implied in its etiology. Indeed, a number of studies have reported that suicide is associated with dysfunction of 5-HT, but the genetic studies that have examined several candidate genes from serotonergic system are inconclusive. Therefore, this study aimed to investigate the relationship between the 5-HT2A, 5-HT1D?, 5-HT1D? and 5-HTT genes and suicide in the Portuguese population.

**Materials and Methods:** After consultation of RENNDA ("National Registry of Non Donors") blood samples were collected from suicide and accident victims during routine autopsies. Genomic DNA was extracted from peripheral blood leukocytes by using a standard enzymatic method. We genotyped 5-HT2A, 5-HT1D?, 5-HT1D? and 5-HTT gene polymorphisms by using RFLP-PCR. The digestion products were separated and visualized in an agarose gel electrophoresis stained with Ethidium Bromide under UV light.

**Conclusions:** Concerning allele frequencies or genotype distribution, there were no significant differences between the suicide completer and controls for 5-HT2A, 5-HT1D?, 5-HT1D? and 5-HTT genes. Overall our results suggest that the investigated 5-HT2A, 5-HT1D?, 5-HT1D? and 5-HTT gene polymorphisms are not involved in the genetic susceptibility to suicide in our population.

**Keywords:** Suicide; Serotonin System; Case Control Study

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# ALCOHOLISM AND DOMESTIC VIOLENCE: CYP2E1 GENE.

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**Introduction:** A large body of evidence suggests that enzymes from the cytochrome P450 system (CYP450) have an important role in the etiology of alcoholism, which is frequently related with domestic violence. CYP2E1 is responsible for 10 % of total alcohol metabolism. Therefore, the aim of this study was to investigate an association of CYP2E1 -1053C>T polymorphism with alcoholism and/or domestic violence in the Portuguese population.

**Materials and Methods:** Informed consent was obtained for alcoholics (331 patients) and controls (285 subjects) and blood DNA was isolated by an enzymatic method. Genotyping of the CYP2E1 gene was carried out by polymerase chain reaction (PCR) and restriction fragment length polymorphism.

**Discussion and Conclusions:** This study did not reveal an association between CYP2E1gene and alcoholism as well as any gender-specific association. Moreover it was not found an association between the CYP2E1-1053C>T polymorphism and domestic violence in a sample of male alcoholic patients with a record of domestic violence. The results from this study suggest that the CYP2E1-1053C>T polymorphism does not play a direct role in the etiology of alcoholism and/or domestic violence in the Portuguese population.

**Keywords:** Alcoholism; Domestic Violence; CYP2E1-1053C>T Polymorphism

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# SUICIDE AND NEUROTROPHINS: P75NTR GENE

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**Introduction:** Genetic polymorphisms of neurotrophins have recently been shown to affect susceptibility to suicidal behaviour. Therefore, the aim was to investigate the polymorphism S205L of the pan-75 neurotrophin receptor (p75NTR) gene in the etiology of the suicide.

**Materials and Methods:** Genomic DNA was extracted by enzymatic method and the genotypes of p75NTR were investigated by PCR-RFLP in 276 suicide victims and 281 controls.

**Results:** The results of this study for genotype revealed a tendency of association between the S205L polymorphism of the p75NTR gene and suicide in male subjects, but the differences were not statistically significant (?2=5,302; df=2; p=0,071). When comparing the allele distribution between male suicide victims and male controls an association was found (?2=5,269; df=1; p=0,022). In females subjects, the differences were not statistically significant between suicide victims and controls for genotypic and allelic frequencies (Genotype: ?2=0,516; df=2; p=0,773; Alleles: ?2=0,311; df=1; p=0,577). In global sample, no significant differences were found between suicide completer and controls (Genotype: ?2=2,323; df=2; p=0,313; Alleles: ?2=2,038; df=1; p=0,153). The results of this study suggest that the polymorphism S205L of the p75NTR gene may contribute to the risk of suicide in male subjects in our population.

**Keywords:** Suicide; P75ntr Gene; Polymorphism S205l

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# HIGH-RESOLUTION ANALYSIS OF Y-CHROMOSOME SNP AND STR GENETIC POOL OF CHRISTIAN, MUSLIM ARABS AND KURDISH JEWS FROM ISRAEL AND THE PALESTINIAN AUTHORITY AREA

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**Abstract:** A total of 253 individuals unrelated at the great-grandfather paternal level (46 Christian Arabs (CA) and 89 Kurdish Jews (KJ) from Israel, and 118 Muslim Arabs (MA) from Israel and the Palestinian Authority Area) were analysed for 61 binary polymorphisms and 17 Y-chromosomal STR loci. The investigation of the Y-chromosome variation among these communities revealed that CA, MA and KJ were indistinguishable from one another, whereas differed slightly. At the haplogroup level the Y chromosome distribution in Arabs and Jews was similar but not identical, driven by their proportion of J1-M267, T-M70 and E1b1b1c-M123. At the haplotype level, single-step microsatellite networks of Arab and Jewish haplotypes revealed a common pool for a large portion of Y chromosomes, suggesting a relatively recent common ancestry. When comparing our data with that available from other relevant populations in the region, these communities were found to be more closely related to groups of the Fertile Crescent than to their Arab neighbours. The present study contributes to the elucidation of the complex demographic history that shaped the present-day genetic landscape in Middle-Eastern and North African Arab and Jewish populations.

**Keywords:** Muslim Arabs; Christian Arabs; Kurdish Jews; Y-Chromosomal Strs; Y-Chromosomal SNPs; Israel

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# FORENSIC COMPARISON OF SOIL SAMPLES

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**Abstract:** Small-scale(<1m2) spatial variability in soil properties was investigated at three locations in Seoul Korea. At each location, ten samples were collected sequentially in a square grid pattern (5 sites). The samples were compared in terms of four properties: major and minor element composition of the <63um size fraction determined by X-ray fluorescence, stable carbon and nitrogen isotope ratios of the bulk <150um and >150um fractions determined by isotope ratio mass spectrometry(IRMS), colour of the <150um fractions determined by spectrophotometry. Results showed that analytical and within-location variations were much smaller than between-location variations, and that the two sampling localities could be readily distinguished using any of the four soil properties. Significant within-site variation in the elemental composition and nitrogen isotope ratio was found at both sites. Colour properties and carbon isotope ratios showed relatively low variability at four sites. Considering the data as a whole, the four sites could be readily differentiated on the basis of a singles sample from each site, using a minimum of three comparison criteria. However, in order to adequately assess the potential variability at this scale it is recommended that a minimum of three, and preferably five or more, samples should be taken to assess variation within a localized area of forensic interest. Additional samples should also be taken from the wider surrounding area for purpose of comparison.

**Keywords:** Soil; IRMS; Color; XRF

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# REFORM CHANGES IN HUNGARIAN FORENSIC SCIENCES

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**Introduction:** The political changes in the central-eastern European countries during the first half of the 1990s induced significant changes in the legal system especially in the field of criminal and civil procedure law. (The procedure laws of the countries of the Continent were always sensitive to the political environment.) Hereby we would like to demonstrate those changes of the law system which are relevant from the aspect of forensic sciences using the Hungarian model. Pursuant to the new requirements, new codes of civil procedure and criminal procedure were codified based on the rule of law and the principles deriving from the decisions of the European Court of Human Rights. Before 1990 forensic sciences and any activity related thereto were basically restricted to state institutes. The political changes of the nineties broadened the possibilities of individuals to take part in the forensic activities and from 2005 - pursuant to the new act on forensic activities - the prevalent role of the state became restricted mainly to the field of ex officio evidence procedure - a feature to be found mostly in continental criminal justice systems. The former institutional background still exists, however its function and field of activities changed. From a geographical aspect, the forensic institutes of the Ministry of Justice (Igazságügyi Szakértoi és Kutatóintézet, ISZKI ~ Institute for Forensic Sciences and Forensic Research) still perform their tasks evenly- as they did in the past as well - presenting an average of one-hundred-thousand expert opinions each year. (118 forensic experts: in the fields of medicine, toxicology, traffic technology and economy) Furthermore, the departments of forensic medicine of four universities are also engaged in forensic pathology and medical examination. The network of police physicians - with a background of almost a hundred year - used to have a significant role in this field. Within the above-mentioned network offices were established in each county on the basis of the organization of the police itself. The primary functions of the police physicians were the examination of extraordinary cases of death and fulfilling the tasks of coroners, besides other activities related to forensic sciences. However, due to the amendment of the criminal procedure code in 2006 and the enactment of the comprehensive act on forensic activities in 2005, such rules of incompatibility entered into force, which prohibited the members of the investigation authorities to perform forensic tasks. The goal that the legislator wished to reach was the absolute independence of forensic experts, therefore it is not allowed for the forensic expert to be an employee of the investigation authority. Thus the whole network of police physicians were abolished and forensic experts are not allowed to work on the crime scene investigation departments of the police - only crime scene investigators. The whole range of tasks of crime scene investigation is performed by the crime scene investigators. Several authors emphasized their critical opinions when scrutinizing the situation that developed after the above-mentioned amendments, while others even described it as the collapse of the system of forensics. Pursuant to the present situation, the forensic activities in connection with the criminal procedure are carried out by the Bunügyi Szakértoi és Kutatóintézet (Institute for Forensic Sciences) as the institute of the Ministry of Interior where experts in the fields of weaponry, documents, DNA, biology, physics and chemistry work. However, the employees of the institute do not take part in crime scene investigation. There is also an overlap in the activities of the two state institutions - including mainly the tasks with laboratory background -, which raised the question of contraction in this relatively small country (10 million inhabitants). We find it important to emphasize that at present the state-financed institutions only recei

**Keywords:** Criminalistics; Forensic Sciences; Institutes; Hungary; Evidence

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# MEDICO-LEGAL EXPERTISE FORM IN CASES OF SUSPICION OF CHILD PHYSICAL ABUSE: A PROPOSAL

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**Abstract:** When assessing a suspected child physical abuse case in the scope of forensic medicine one must take a complete history regarding circumstances of the child's injury, past medical conditions and birth history. The physical examination must be detailed and carefully performed in order to document clearly the presence of cutaneous injuries both in writing form and by proper use of photographic equipment and eventual necessity of ancillary studies must be decided. In order to organize and standardize these procedures the authors present a proposal of a form, check-list like, in order to streamline the realization of medical expertise in this specific kind of violence. This form includes the approach of the following items: A) recognize patient history that does not match findings; B) recognize medical evidence of possible physical abuse (cutaneous patterns suggestive of possible child maltreatment, skeletal injuries of possible child maltreatment and signs and symptoms of dentofacial trauma or even syndromes of possible child maltreatment); C) evaluate the child for possible abuse (obtain history from the child if applicable due to age, perform comprehensive physical examination, request ancillary studies if indicated - radiology, laboratory, consultative examinations); D) consider differential diagnosis. This form will also include a list of the laboratory testing and proper posed and exposed views for skeletal survey as well as a summary approach screen for developmental, behavioural and emotional problems in order to request more specific assessments.

**Keywords:** Child Physical Abuse; Medico-Legal Expertise; Ancillary Studies; Specific Assessments

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# POSTER SESSION

## Session C1

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# FORENSIC AGE ESTIMATION A REVIEW OF THREE CASES

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**Introduction:** The worldwide boost in cross-border migration verified in recent years has increased the need for forensic age estimation in undocumented migrants and asylum seekers. Recently, the North Branch of National Institute of Legal Medicine has adopted the recommendations of the Study Group on Forensic Age Diagnostics (AGFAD) on forensic age estimation, based on physical examination (including dental examination), analysis of the X-Ray left hand exams, orthopantomogram and, in certain cases, radiological study of the clavicles. These recommendations are now becoming the standard in age estimation.

**Materials and Methods:** The authors present three cases where the aforementioned methodology was used in an attempt to estimate the subjects age.

**Case Report:** The first two cases concern both a male and a female subjects, alleged relatives, detained during a theft in an automated teller machine. The two individuals claimed to be Romanian and have 14 years of age. Both subjects were physically examined and left hand X-Rays were performed; orthopantomograms were scheduled. However, the Police made a positive identification on the subjects before those exams were performed and the hand X-Ray results were available. The third case concerns a male individual who alleged to be 15 years old and claimed to be Moroccan, detained while driving without a licence. In this case, besides the physical examination, X-Ray exam of the left hand and orthopantomogram were performed. The combined methods established the individuals age was comprised between 15.7 and 23.6 years. The expert considered unlikely that the subject was younger than 16 years old, although that possibility could not be excluded.

**Discussion and Conclusions:** These cases represent the first uses of the AGFAD recommendations by the authors; they also illustrate some of the difficulties found in age estimation, especially concerning the 16 years threshold and the short period of time provided to complete this kind of expertise (48 hours). Contrary to some other EU countries, in Portugal the relevant age thresholds in criminal proceedings are 16 and 18 years, thus posing some difficulties in age estimation, as most age estimation studies are oriented to the 14, 18 and 21 years thresholds. In order to overcome these difficulties, further studies are needed, with relevance to the 16 year threshold.

**Keywords:** Age Estimation; Criminal Age; Forensic Evaluation

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# MULTIPLE ABRASIONS ON THE NECK: IS IT PHYSICAL CHILD ABUSE? AN ANALYSIS OF THREE CASES

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**Introduction:** Background: Physical child abuse (PCA) is a leading legal and paediatric health problem. Correct diagnosis is vital, since children exposed to physical abuse can experience a variety of adverse effects like development delay, failure to thrive, behavioral disorders and risk of development of adult depression. Wrong diagnosis is catastrophic as it will lead to many unnecessary investigations, separation from the family and psychological trauma. An abrasion represents the one of the commonest and most informative injuries seen in forensic medicine. The author presents three cases with abrasions of the neck that initially appeared as PCA. But correct diagnosis was made by comprehensive investigation including repeated reviews and multidisciplinary approach. Objective: Emphasis the difficulty and importance of interpretation of multiple abrasions of the neck in respect to alleged cases of PCA.

**Materials and Methods:** Settings: Two children suspected of PCA, aged 2 years and 1 year and 5 months respectively, both male, were produced by the police for clinical forensic examination. Another child, a girl aged 1 years and 9 months, was referred from the out patient department suspected of PCA. They were admitted to the ward to ensure safety and for further investigation including close monitoring to observe the bond and interaction between family members and the child and other specialist opinion. On examination, all three children had multiple linear abrasions with different stages of healing placed obliquely and vertically on the frontolateral aspect of the neck and few on the back aspect. There were no soft tissue injuries to other areas of the body. Findings of skeletal survey and blood investigations were normal. The opinion of other specialties including dermatology, psychiatry, ENT surgeon and radiology were unremarkable. Subsequently repeated reviews and case conference were done to reach the injuries were innocent.

**Discussion and Conclusions:** Discussion and conclusion: Multiple injuries with different stages of healing on occult/ hidden or non accidental areas are highly suggestive of PCA. Since it is unable to take a history from all three children, conclusions are mainly based on clinical examination, laboratory and other investigations, repeated reviews and opinions of other specialties. The direction of the injuries being vertical and non compressible; an accessible site; a healthy bond between family members and the child and compliance for management and follow up are factors that are unlikely of PCA and more in favor of self inflicted nature. Clinical examination, investigations, repeated reviews and a multidisciplinary approach should not be underestimated in the interpretation and arrival of the final conclusion of a child presenting with multiple abrasions of the neck.

**Keywords:** Physical Child Abuse; Multiple Abrasions on the Neck; Multi Disciplinary Approach

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# "GRANNY RAPE": A STUDY OF ELDER SEXUAL ABUSE

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**Abstract:** The concept of elder abuse is, by itself, particularly hard to define. The notion of sexual abuse perpetrated against an elderly person is even harder to conceptualize, due to a number of difficulties the researcher must overcome. The very definition of who should be considered elderly in this context of abuse, the offender/victim relationship, very frequently close in these cases, are examples of such difficulties. For the purposes of this study, and similarly to other studies in this area (e.g., Burgess, 2006), sexual elder abuse was defined as integrating criminal behavior and nonconsensual sexual contacts perpetrated on individuals aged 60 years or older. This is an exploratory, descriptive study, based on document analysis using content analysis on a corpus comprised of the court proceedings of eleven rape cases where the victim was older than 59 years of age. The aim of the study was the capture of a constellation of characteristics that would allow for the design of an intelligibility scheme regarding the phenomenon of elder sexual abuse. Thus, through the document analysis, information underwent a categorization procedure so as to characterize crimes according to the circumstances surrounding them, the time and location of the occurrence, the offender/victim relationship, the presence of psychoactive substances, the offender's hunting style and attack method, the victim's resistance, the sexual acts perpetrated by the offender, and the consequences of the crime for the victim (e.g., in terms of physical injury).

**Keywords:** Elder Sexual Abuse; Criminal Event; Court Proceedings; Content Analysis

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# VIOLENCE IN INTIMATE RELATIONSHIPS: A COMPARISON OF MARRIED AND DATING COUPLES

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**Abstract:** The objective of this study was to compare the prevalence of physical and emotional abuse in Portuguese married and dating couples and to investigate attitudes about these forms of violence. A sample of 3,716 participants, aged 15 to 67 years, filled in two questionnaires, one behavioral and one attitudinal. At least one act of abuse perpetrated by the partner during the previous year was reported by 24.9% of participants. Conversely, abuse of a partner was reported by 29.1% of participants. The attitudinal data revealed, however, a general disapproval of violence use. Violence support was higher among males and married participants.

**Keywords:** Violence; Attitudes; Dating; Married; Comparison

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# MULTIPLE LEVELS ABUSE OF A 1 AND ½ YEAR-OLD INFANT FEMALE CASE REPORT

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**Case Report:** Case Report: We present a lethal case of 1 and 1/2 year old Roma girl who found dead by the mother some hours later. The incidence took place in their home, in front of the three older children. The victim was hardly physically and sexually abused: Multiple bruises were found (head / upper abdomen / buttocks / arms / legs). Sexual abuse with swollen, bruised labia major, vaginal and anal penetration injuries was present. The child died from severe craniocereberal injury with cranial fractures and brain injury.

**Introduction:** Introduction/Objectives: The incident referred to domestic abuse and thus to lethal physical and sexual child abuse by the father of the minor, a 24 years old Roma heroin abuser. The child's mother is a heroin abuser as well.

**Discussion and Conclusions:** This incident relates to the molesting of an infant on multiple levels, where: (1) a serious form of sexual molesting exists (natural and unnatural intercourse) together with severe physical abuse; (2) the victim is in early infancy, which is very vulnerable to physical abuse, where there is indeed no involvement in the crime; (3) the victim's death occurred as a result of the abuse (severe traumatic brain injury); (4) the perpetrator is the victim's father (domestic violence); (5) the victim belongs to the socially marginalised and lowly accepted (low socio-economic status) Roma social group. It is argued that approximately 68 % of traumatic brain injuries to children under two years-old in Greece and most deaths in this age group are due to abuse by the parents. The actual figure may in fact be higher because of the inadequate recording of incidents. In response to the specific incident, this report inter alia discusses: the troubled parental-child relationship; the more general dysfunction of the family and the existence of the predisposition factors for child abuse; the influence of the socio-economic factors; the specific social group's culture; its relation and conflict with the wider community; a thorough study of the psychological profile and the psychological memories of the father-abuser; his capacity for competence; the modus operandi of his criminal action; his endangerment; the attitude by the other family members (e.g. the mother), etc. The perpetrator is responsible for murder by intent from a criminal perspective (since there was malice, albeit potential), which we however believe has distinguished the nature of the particularly heinous homicide. We consider that the thorough study of such severe incidents of child abuse will greatly facilitate the proper organisation of methods to detect, prevent (at a primary and secondary level) and address the exceptionally significant issue of child abuse.

**Keywords:** Physically Abused; Sexually Abused

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# MEDICO-LEGAL AND CRIMINAL STUDY OF GENDER VIOLENCE IN GALICIA (NW SPAIN)

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**Introduction:** Violence against women is a problem of big dimensions and severe consequences. The purpose of this work is to contribute to its knowledge from the medical-legal and criminal fields. Objectives: - Determine the prevalence of gender violence and analyse the socio-demographic characteristics of victims and aggressors. - Identify the features of the assault taking into account diverse medical-legal parameters: mechanisms and type of injuries, time of recovery and consequences. - Study the diverse mechanisms through which these facts can arrive to the legal system (victim complaint, police report, injury report, etc). - Determine the percentage of guilty / not guilty verdicts and their rationale, as well as the different crimes and offences. - Identify the situations and elements that support the qualification of maltreatment as usual and lead to application of aggravating circumstances of criminal responsibility.

**Materials and Methods:** Files classified as Gender Violence from the prosecutor office of Santiago de Compostela (Galicia, NW Spain) have been examined and analysed. A descriptive statistical analysis, testing the possible association of variables has been carried out. The statistical treatment was conducted with the statistical package SPSS.

**Results:** Most victims are young adult woman, of Spanish origin, married or divorced, with children and living in an urban population, belonging to a middle-low socioeconomic level. The aggressor is a Spanish young adult, who lives in an urban population, and belongs to a middle socioeconomic level. Usually, he has a component of violent personality with some type of drug addiction. Regarding the peculiarities of the relationship, the majority of victims live with their abuser at the time of the assault, sharing the house with children. The women that needed medical assistance were attended, mainly, at the Point of Continued Attention and attach report of first assistance. The presence of injury reports is very low. Assaults usually occur at night, during the weekends, and mainly take place at home. The majority of injuries are superficial (alone or associated to another type of injury, physical or psychological), needing scarce days for recovery and no hospitalisation, which indicate that most of the assaults are minor. The study shows the hegemonic role that victims play in the legal process and the remarkable higher incidence of minor offences. Even though the majority of the examined cases end in conviction, the number of those that end with a not guilty verdict is considerable. Victim right to not testify seems to be a relevant factor in order to explain the rationale of these verdicts.

**Keywords:** Gender Violence; Forensic Evaluation; Criminal Analysis

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# HOMICIDE-SUICIDE IN NORTH TUNISIA

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**Abstract:** Homicide(s) followed by the perpetrators suicide is a rare but tragic event that often shocks the whole community. Annual rates in the industrialized nations have been reported to vary between 0.07 and 0.6/100,000. No previous study has been conducted in Tunisia to estimate the incidence of homicide-suicide. The Forensic Department in Tunis is responsible for the investigation and determination of the cause of death in cases of violent, unexpected or sudden death occurring in North Tunisia. The files of the Forensic Department in Tunis were retrospectively reviewed for cases of homicide(s) followed by the perpetrators suicide that occurred during a nine-year period. Fifteen cases of homicide-suicide were identified, one of which was subsequently excluded because the victims body hasnt been found, and hence the cause of death couldnt be ascertained. Among the 14 remaining cases, one resulted in 3 victims which accounted for a total of 16 victims. The perpetrator was male in all but one case. The victims were predominantly females (13/16), and family members (11/16). Four perpetrators were found to be suffering from a psychiatric disorder (2 schizophrenics, 1 with a bipolar disorder and 1 with major depression). Stabbing was the commonest method of homicide (11 cases) and hanging the commonest method of suicide (8 cases). The classical homicide-suicide scheme of a male perpetrator killing a spouse/lover/intimate partner during or shortly after a separation process was not the dominant figure in our material which seems rather heterogeneous. In only two cases, the event could have been prevented since the perpetrators had threatened of committing homicide or homicide-suicide. Hence, homicide-suicide seems to be extremely difficult to prevent on the individual level.

**Keywords:** Homicide; Suicide; Homicide-suicide; Murder-Suicide; Extended Suicide

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# FORENSIS MOLECULAR BOTANY: A PRELIMINARY STUDY IN A NORTH OF PORTUGAL SPECIMENS

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**Abstract:** Forensic Botany is the application of scientific plant knowledge and techniques in a legal context. The classic methods of identification of plant material is not always possible, due to the often degradation of this kind of proofs. Forensic Molecular Botany becomes the only answer in these cases. In this study we present methods and results from DNA sequencing of considerable number of plants that inhabit the North of Portugal. Samples of plants that grow in our region were collected and the DNA was extracted using DNeasy® Tissue Kit (Qiagen) and Robot® EZ1 (Qiagen) from 100 to 500 mg of different tissue (mainly leaves, in dried form), according to the manufacture instructions. DNA amplification was performed in 20 µL reactions containing 1µL of template DNA, 10 µL of HotStarTaq Plus Master Mix Kit (Qiagen) and 0.5 µM of each primer. The primers used were the recommended by the CBOL (Consortium for the Barcode of Life's), matk (3F_KIM and 1R_KIM) and rbcL-a (forward and reverse). PCR conditions were according to Bruni et al (2010) protocol with a small variation considering the same temperature of annealing for all primers. PCR products were visualized on 2% agarose gels stained with ethidium bromide. All amplification that products occurred at the correct fragment size were cleaned using EXOSAP (exonuclease I and shrimp-alkaline phosphotase, USB Corporation) and sequenced in both forward and reverse directions by cycle sequencing with BigDye Terminator v1.1 Cycle Sequencing Kit (Applied Biosystems). The determined sequences were screened using BLASTn algorithm to assess identification matches with the available GenBank sequences.

**Keywords:** Forensic Molecular Botany; Chloroplastidial DNA; MATK; RBCL

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# USE PLANTS AS PROBATIVE VALUE IN SOLVING A CASE: AN EXAMPLE OF APPLIED FORENSIC BOTANY

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**Abstract:** Forensic botany, defined as the use of plant evidence in court, encompasses many sub-disciplines. In fact, it can be subdivided into several botanical subspecialties, including plant anatomy (the study of cellular features), plant systematics (taxonomy and species identification), palynology (the study of pollen), plant ecology (plant succession patterns), and limnology (the study of freshwater ecology). Forensic botany can provide significant supporting evidences during criminal investigations. The ubiquitous presence of plant species can be very useful in forensics; however, the absence of an accurate method of identification remains a major obstacle due to our present inability to correctly identify traces of botanical evidence. Many plant components cannot be identified and classified by traditional morphological characteristics when botanical specimens are either degraded or lack physical features. The aim of our study is to demonstrate the importance of forensic botany in the crime scenes. Here, we describe a crime scene in which botany is important for the determination of both modality and causes of death.

**Keywords:** Botany; Crime Scenes; Death; Plant; Finding AT Autopsy; Multidisciplinary Investigations

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# FORENSIC BOTANY IN COLOMBIA: PLANT MATERIAL ANALYSIS IN FORENSIC SCIENCES

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**Abstract:** Forensic botany joins together the formal knowledge of the biological characteristics of plants from a forensic point of view. The taxonomic identification of plant species from fragments adhered to the clothing or found in gastric content has been useful for reconstructing events related to intoxications or physical damage in different forensic procedures. It can also be an important piece of evidence in a criminal investigation by relating a person to a scene or providing information about a geographical location, toxic and other biological properties of the identified species. In Colombia, the study of toxic and hallucinogen plants has been significant from a medical, pharmacological and ethnobotanical point of view, but not so much from the forensic sciences perspective. Its development has been poor and mainly related to the ingestion of magical-religious beverages and unintended consumption of toxic plants. Since the 70's, trends in Colombia changed and have been quite different from other countries due to the impact of illicit crops, strongly related to the current socio-political situation. Until 2005, the most common request was identification of chemical compounds as Tetrahydrocannabinol in seized samples of "marihuana", followed by cocaine in "coca plants" and morphine in "opium poppies". Due to its relevance and the scarce information about the actual status of coca plants, the taxonomical review of Erythroxylum P. Browne cultivated species on a recent sample of these was carried out at the National Institute for Legal Medicine and Forensic Sciences (INMLCF, spanish acronym) in conjunction with the National University of Colombia. Hybridization between both species was suggested, important changes in the geographic distribution of all taxa were described and the commercial use of wild species was observed (see poster). Compared to previous years, an arising fraction of the forensic botany services of the INMLCF in relation with sexual assault, homicide and kidnapping has been seen. The most representative cases are: Case type 1: The detection of pepper seeds (Capsicum anuum L.) in the victim's vagina was an important finding to corroborate the victim's testimony and to rebut the suspect's testimony in one case. In a different case, calyx fragments of Plumbago scandens L. were found on the body of an abused child and the same fragments were also found in the suspect's pants, which links the suspect with the victim and with the scene of crime. Case type 2: Non vascular plants provided important information to forensic medicine; some clothes were found in a kidnapping-homicide crime scene near Bogotá. The garments were covered by two kinds of moss identified as Rhynchostegium scariosum (Taylor) A. Jaeger and Leptodontium luteum (Taylor) Mitt. This identification allowed the specialist to calculate the plant population growth, thus providing an independent and parallel clock to the postmortem interval estimation. Case type 3: The search for unicellular aquatic diatoms provided information in a case where a drowning was presumed. After botanical analysis, diatoms were not observed in five internal organs or bone marrow, which was consistent with the findings of the medical examiner and useful as an alternative line of thought to support the medical hypothesis regarding the cause of the death of other origin. Case type 4: The dead body of a man was found on his bed, as well as a pot with a vegetal infusion. The plant fragments contained in it were identified as hemlock (Conium maculatum L.), commonly used in suicide cases due to its high toxic properties and because it is a weed growing anywhere. In this case plant evidence found on the scene of crime, provided useful information to establish the cause of the death. Nowadays scientific investigation at the INMLCF is being carried out by exploring micro-characters to provide stronger tools for plant evidence identification.

**Keywords:** Forensic Botany; Colombia; Psycotropic Plants; Coca Plants; Opium Poppy; Marihuana; Kidnapping

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# COLOMBIAN COCA PLANTS. A CRITICAL DISCUSSION ON TAXONOMY OF CULTIVATED ERYTHROXYLUM P.BROWNE SPECIES (ERYTHROXYLACEAE)

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**Abstract:** Forensic botany joins together the formal and detailed knowledge of the biological characteristics of plants, providing useful information as evidence in criminal investigations. Trends in Colombia, compared with other countries, show that the highest demand for analysis is related to the study of coca plants as the main subject of study. This is due to the great impact illicit crops have on the current socio-political situation of the country. Coca plants belongs to Erythroxylum, a pantropical genus with approximately 230 species, 190 of them in the neotropics and almost 40 species in Colombia. Only two species of the genus have been largely cultivated since prehispanic era: Eythroxylum coca Lam. and E. novogranatense (Morris)., and the following taxonomical varieties have been formally accepted: Erythroxylum coca var. coca, Erythroxylum coca var. ipadu Plowman, Erythroxylum novogranatense var. novogranatense and Erythroxylum novogranatense var. truxillense (Rusby) Plowman. These plants have been of great interest for botanists, horticulturists and pharmacists since the early nineteenth century, resulting in a complex history and a long debate about the proper taxonomical identity. Its history today is heavily loaded with a strong social conflict related to illicit crops in Latin-America and specially in Colombia. A taxonomical review of E. coca and E. novogranatense, as well as the varieties, was performed on a recent sample of Colombian plants from illicit crops, mainly due to the fact that almost in 30 years no study had been carried out about the current state of the art on these species in the country and also because the varied and diverse sources of information on this respect, sometimes lead to erroneous conclusions about botanical identity and/or biological properties of these species in the Colombian legal context. Hybridization between E. coca and E. novogranatense and between the two varieties of E. coca is suggested; moreover, important changes in geographic distribution of those taxa are described. There seems to be a lack of delimitation between the varieties of E. coca: var. coca and var. ipadu. On the other hand, it was seen that E. novogranatense is currently used in illicit crops despite previous reports showing the exclusion of this species from commercial trades due to its difficult cocaine extraction. Species distribution patterns in Colombia have changed because of anthropic intervention, probably due to the effect of high population dynamics on illicit crops and the constant plant artificial-selection in the last decades.

**Keywords:** Forensic Botany; Illicit Crops; Coca Plants; Erythroxylum; Colombia

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# ATTRACTIVENESS TO BAITED TRAPS BY DIPTERA IN FORENSIC SCENARIO: PRELIMINARY STUDY

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**Abstract:** Forensic entomology, the science that studies insects and other arthropods as evidence in medical-legal investigations, is becoming increasingly important in Portugal. The creation of a national catalogue of forensically important Diptera is crucial to cover the gap in applied forensic entomology research in Portugal, providing, this way, valuable tools to crime scene technicians, homicide investigators, and medical examiners involved in the death investigation process. The aim of this study was to identify the first Diptera colonizers of carrion using bait traps. For this purpose, four identical traps were set out during early spring time in an urban environment in Lisbon. One trap was baited with pork beef, another with pork liver and a third one was baited with cat food, in order to study the effectiveness of each in attracting sarcosaprophagous Diptera. A fourth, unbaited, trap was used as a control. Each trap was rotated through four positions randomly selected. Four trials were made each lasting 48 hours after which the insects were collected and the baits replaced. Insects were identified according to morphological characters resorting to molecular identification whenever necessary. The differences in the quantity of specimens, in species diversity and the temperature between baits were analyzed statistically. The control trap did not pick up a single specimen. All other traps caught flies of forensic interest. The "pork beef" bait was, in all trials, the one that showed a higher number of specimens as well as a greater diversity of species collected. Calliphora vicina was the predominant species in all trials and baits. There is a positive relationship between temperature increase and a high number of specimens and species collected. In conclusion, the lure of pork beef, showed a greater attractiveness efficiency of forensic interest Diptera. This study expands the catalogue of sarcosaprophagous dipteran species in Portugal.

**Keywords:** Forensic Entomology; *Diptera*; Bait Trap; Portugal

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# OUTDOOR FORENSIC ENTOMOLOGY: COLONIZATION OF HUMAN REMAINS IN COLD ENVIRONMENTS

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**Abstract:** Necrophagous insects are useful tools for several forensic purposes. Insects age determination can allow post-mortem interval (PMI) estimations, while cause of death or even the identity of a death person can be revealed by toxicological and molecular investigations on entomological samples (Smith, 1986; Introna et al., 2001). Different insects species may be used to calculate the minimum PMI (mPMI), according to stage of cadaver decomposition, body exposure, geographic region and season. The temperature is the most important factor in insect colonization. Temperature is related with season and altitude, with a decrease in temperature, in stable conditions, of 7 °C per 1000 m. Temperature have an effect not only on the insect development but also on the fauna composition, with species adapted to the colder seasons (eg.: Calliphora sp.) and also species exclusive of the winter (eg.: Trichoceridae). Few data are published about entomological cases occurred in outdoor cold environment. Here we discuss entomological and tanatological aspects of two bodies exposed for several month in cold conditions in the region of Valle d'Aosta (North of the Italy). The first one, recovered in January from an abandoned house in a wild area whereas at 740 m asl, was found in skeletonised stage of decomposition; the second one, recovered in late October in an urban area at 650 m asl, was found partially skeletonised, with residual desiccated human tissues. In the first case empty puparia of Protophormia terranovae and of Phormia regina were the most important part of the insect remains collected on the body and on the recovery area, however in the second case two different morphotypes of maggots (Calliphoridae) have been collected. The two different morphotypes indicate two different oviposition occurred in two "warmer" days. Both entomological and tanatological evaluations were consistent with the time of disappearing of the two individuals lately identified.

**Keywords:** Forensic Entomology; Time Since Death; Cold Environments

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# OBSERVATION OF DECOMPOSITION ON NATURAL DEATH AND HANGING DEATH EXPERIMENT USING PIG IN REPUBLIC OF KOREA(WONJU CITY, (GANGWON-DO)

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**Results:** Forensic entomology is the application and study of insect and other arthropod biology to criminal matters. Some advanced countries use forensic entomology to investigate real matters in recognition of its practicality, while there are few basic researches and studies in Republic of Korea. Fauna succession experiment was conducted using pigs [Case1 General corpse, Case2 hanged corpse (03.06. 2010.29.07)] in the hills Wonju-City, Gangwon-Do, Republic of Korea. A total of 7 orders, 24 families, 71 species belong to arthropod was collected. Compare with Case1 General corpse, the hanged corpse (Case2), approach of ground insects were limited in initial days, but the population of insects were increased as visceral organs exposed.

**Keywords:** Forensic Entomology; Medicolegal Entomology; Succession

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# THE USE OF INSECTS TO ELUCIDATE TIME OF DEATH AND SUSPECTS ASSOCIATION TO THE CRIME: CASE REPORT IN A RURAL AREA OF SOUTHERN BRAZIL

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**Introduction:** One of the mainly applications of Forensic Entomology is the use of developmental and ecological data of necrophagous insects to estimate the post-mortem interval (PMI) in criminal investigations. The knowledge about the time of death is important because it can allow the police officers to include or exclude probable suspects to a homicide case. In Brazil, entomological evidence is still neglected, so cases involving the use of insects to estimate the PMI are rare.

**Case Report:** In an occurrence of encounter of cadaver analyzed by a unit of the Institute of Criminalistic, specimens of dipterans that were colonizing the corpses were collected using forceps, put in containers with 70% ethanol and taken to the Laboratory of Biology and Biochemistry of the Criminalistic Institute to proceed the identification of the material, aiming to aid in the investigation of a double murder case of the city of Cosmópolis, São Paulo State, Brazil. The bodies of the male victims, without any identification and in the ages between 20 and 30 years old were found in the middle of a sugar cane plantation. They were in decay process of decomposition. The larvae of corpse 1 were identified as belonging to the species Chrysomya putoria (Calliphoridae) while the larvae of corpse 2 were identified as being Chrysomya megacephala and Chrysomya albiceps (Calliphoridae). The estimative of PMI was done by considering the larval weight, environment temperature data (obtained from the nearest weather station of the area where the corpses were found) and laboratorial data on developmental rate studies of the mentioned species. The age, in hours, estimated to each species was: 95 hours to C. putoria, 94 hours to C. megacephala and 77 hours to C. albiceps. Later, this case was related to a missing person occurrence of two male individuals, uncle (28 years old) and nephew (24 years old), reported about four days before the encounter of the cadavers.

**Discussion and Conclusions:** Considering the age of the larvae of C. putoria and C. megacephala and their behavior of nocturnal oviposition we can conclude that the time of death was near the time they had disappeared. Based on this information, the people who were last seen with the victims were included as the main suspects of the crime.

**Keywords:** *Calliphoridae*; PMI; Forensic Entomology

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# THE IDENTIFICATION OF OPHYRA CALCOGASTER IN A HUMAN CADAVER FOUND IN SICILY

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**Abstract:** Forensic entomology provides a very useful method of investigation in particular for the determination of "post mortem interval" (PMI). For this reason, the species identification becomes necessary, and usually it requires a careful morphological examination, supported in some dubious cases by the molecular examination. The case we present concerns the sampling of an insect (adults, maggots and pupae) belonging to the genus Ophyra, on a corpse in advanced state of decomposition, found in the south of Sicily, in winter months. The genus Ophyra generally cosmopolitan, belongs to the family of Muscidae and it has been described for the first time by Rombineau-Desvoidy. There are more than 20 species, including: the O. Chalcogaster, the Nigra, the Leucomastoma and the Aenescens. This insect, generally, is very important in forensic and clinical medicine, being the carrier of pathogens, and it prefers to colonize the corpse in advanced stages of putrefaction, as in our case also confirmed. For a correct species identification, several authors have published dichotomic keys of reference; in our case, the insect has been identified belonging to the species O. Chalcogaster, but even if it had some features of that species, according to what is described in the literature, it showed also some characteristics typical of other species. To confirm the identification of species, we extracted DNA from larvae and adult insects. The extracted sequence did not correspond significantly with any sequence present in the international barcode; showing only a match of 92% with the DNA sequence of Ophyra Chalcogaster, in the international barcode. This indicates intraspecific modification of species related to the geographical area, demonstrating a certain utility of molecular identification for flies of forensic interest.

**Keywords:** Forensic Entomology; Species Identification; Genus Ophyra

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# ANALYSIS OF THE FORMATION OF THE CRIMINAL EXPERTS IN THE POLICE ACADEMY NORTH BRAZIL

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**Abstract:** The evaluation of training process of Criminal Experts in the Police Academy is something indispensable for the improvement of criminalistic in Brazil and consequently of Public Security in general. This study evaluated the education system and training of Criminal Experts from the north region of the country, specifically those who are active in the states of Pará and Amapá. Questionnaires were administered addressing a broad spectrum of the expert activities, encompassing issues related to basic education, postgraduate course, continuous training of human resources, encouraging research, and also the place of residence in relation to the workplace, among other topics. Interviews with the directors of Institutes and chairmen of Criminalistics Associations were also carried out and the curriculum grids of training academies of the two states were analyzed, presenting the scholarly approach to the actual need of the daily life of each state studied, as well as the problems of public safety in Northern Brazil. It was concluded that the trainig process of academic experts do not drastically differ between the states, as they pose the same deficit in their characteristics regarding the subjects presented in their curriculum, training for small workload, lack of continuous training and research encouragement as well as the non-use of technical skills intrinsic to each expert, especially in the allocation of those experts who will develop their activities in areas that do not require specific academic training, such as: crime scene, ballistics and documents examination.

**Keywords:** Education; Criminalistic; Police Academy

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# THE SWISS MANUAL (SPI) FOR THE "PROTECTION AND COLLECTION OF EVIDENCES"

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**Abstract:** The Swiss Confederation is a federal republic consisting of 26 cantons located in linguistic and cultural regions. Each canton has a high degree of independence with its own constitution, parliament, government and courts. These political and cultural differences is also mirrored in Forensic approaches and methods established in the cantons. The Swiss Manual for the "Protection and collection of evidences" is a guidelines collection with the principal objective to harmonize the Forensic departments to national level, through unified procedures in the field of activities related to Forensic Science. Published by the Swiss Police Institute (SPI), it presents in a pocket size format (11 x 15 cm) and in a resistant and laminated material. It consists of 110 pages and is user friendly. The manual, realised by a group of specialists in the field of Forensic Science in Switzerland, is based on various experiences matured in different sectors (Forensic Police organizations, Forensic Medicine, School of Forensic Sciences of the Lausanne University, etc.). It constitutes a firm point in politics of standardization of the procedures with respect to the conservation and the sampling of traces in Switzerland and Liechtenstein. Regarding its contents, it can be schematically presented as follows: - Material index - Introduction : safeguarding of traces, behavioural procedures at the sites, type of trace, material evidences, fixation of the sites / documentation, indicative tests, identification of individuals - Material traces - Morphological traces - Traces / objects - Various traces - Index of key words This manual is available in three national languages: German, French and Italian.

**Keywords:** Crime Scene Investigation; Guidelines; Evidence

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# IS FORENSIC SCIENCE A PROFESSION? A SOCIAL INQUIRY INTO FORENSIC SCIENCE PRACTICE

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**Introduction:** Forensic science is a relatively new "profession" which has been experiencing rapid developments since 1990. Debates in journals, seminars, and conferences have emerged about the identity of forensic science: whether or not forensics is a real science and a true profession. This paper shifts the focus of these debates by conducting a social inquiry into the nature of forensic science practice and the specialisations operating under the umbrella of forensic science.

**Methods:** The inquiry was part of a larger project investigating the complexity of forensic science education and the factors which contribute in such complexity. This study is conducted through semi-structured interviews with 14 participants distributed over three categories: forensic science educators, forensic science practitioners, and members of professions associated with the field.

**Discussion:** Data generated from these interviews created insights into the ontological nature of forensic science practice. Data analysis identified 3 significant mindsets and cultures underpinning forensic science practice: the scientific, quasi-military, and legal. This study examined how these mindsets and cultures impact forensic science everyday practice and shape the profession.

**Conclusions:** This examination extends our understanding of forensic science practice- beyond current debates- through demonstrating it as a complex muli-faced profession operating through multi-discourses and involving mulit-discourse communities.

**Keywords:** Social Inquiry; Forensic Practice; Profession; Multi-Discourse Communities

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# A NOVEL METHOD FOR FOOTPRINT EXAMINATION

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**Abstract:** In 1969, DARPA, a U.S. defense organization, developed a way for all their computers to "talk" to each other through the telephone. They created a network of computers called DARPANET. For fifteen years, only the U.S. army could use this system of communication. Then in 1984, the U.S. National Science Foundation (NSF) started the NSFNET network. It then became possible for universities to use the system as well. NSFNET became known as the Inter-Network, or "Internet".

**Keywords:** Computer Footprint Communication

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# INTERNATIONAL DRUG TRAFFICKING: REPORT OF TWO ORIGINAL CASES OF "HUMAN MULES" USING ALUMINUM PAPER AS WRAPS OF SWALLOWED COCAINE CAPSULES

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**Introduction:** The international trafficking of cocaine (base paste) is a serious legal and social problem of increasing proportions every day. Mato Grosso State, Brazil, is one of the known main routes (currently with 17 "tracks" documented) that is used by drug traffickers, with the implementation and use of "human mules", people who are tricked by drug dealers and shipped mainly through the borders of the western region of the state. In the manufacture of capsules containing cocaine swallowed for transportation, the traffickers' use resistant materials to wrap the capsules and to prevent the action of digestive juices and the risk of leakage of the drug. This measure also has the intention of cheating and or confusing the finding of these capsules inside the gut of these carriers, through the use of equipment for diagnostic imaging (plain x-ray and CT). The apprehensions made since 2005 show that the capsules are typically coated with carbon paper (as in very many countries), "fingers" of surgical gloves, rubber "bladder" (used in parties), food film-type, PVC films and automotive insulfilm. A couple of human mules of Bolivia were diagnosed with the presence of swallowed capsules (90 in his case and 80 capsules in hers) which, after expelled aroused great interest in the authors, because it is a new type of material used by the regional drug trade, such as envelope capsules (aluminum foil). The objective is to bring to the attention of the medical community the imaging appearance of ingested capsules of cocaine swallowed by drug traffickers and the novelty of using the aluminum foil wrap through x-ray.

**Methods:** The study was carried out only by evaluation of radiographs of the abdomen, obtained in the sector of drug dependencies (8th floor) of the Federal Police building in Cuiaba, in July 2009.

**Results:** Conventional radiographs of the abdomen showed cylindrical image with soft parts and defined borders, best seen in the region where the bowel columns are highlighted by contrast with the adjacent gas. It is not possible to characterize or individualize their wraps

**Conclusions:** The radiologic patterns present are defined and repeatable patterns of the capsules of cocaine ingested by the known "human mules" in drug trafficking between the border regions of western Mato Grosso and Bolivia. Such features should be considered in the evaluation of suspected or even in patients with abdominal complications especially in the context of normal traffic or receiving the drug, to allow their identification and prosecution of trafficking, in addition to detecting abdominal complications that may occur due to ingestion. In other regions such images may hinder or delay a conclusive medical diagnosis due to lack of familiarity of radiologists, clinicians and other medical professionals. As outcome of our research, we present an illustrative image of two recent cases, confirming presence of the novelty of using aluminum foil as the swallowed capsule shells, with nothing to modify the characteristics of these images, in relation to scientific studies previously performed by the authors. The imaging method for Computed Tomography (CT) is the most reliable and accurate technique for the diagnosis of detection of cocaine capsules inside the gastrointestinal tract of so-called "Human mules," independently of the type of material used as a wrapper.

**Keywords:** International Drug Trafficking; Cocaine; Capsules; "Human Mules"; Aluminum Paper; "tracks"

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# IRMS ANALYSIS OF CANNABIS SEIZURES IN SINGAPORE

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**Abstract:** Cannabis, or also known as marijuana, is a common drug of abuse in Singapore. Most of these cannabis seizures were encountered in the form of dried vegetable matter compressed into blocks and they were believed to be smuggled into the country. Like other forensic laboratories, our laboratory has often been asked by the drug enforcement agencies to determine if a cannabis sample is from a particular geographical origin or if two separate seizures of cannabis sample come from the same source. Hence, there is a need for our laboratory to develop a methodology for characterizing and profiling the cannabis seizures. In this study, a method for studying the stable carbon and nitrogen isotopes compositions in the cannabis seizures will be presented. A total of 25 cannabis samples were collected over a six months period and these were seizures submitted to the laboratory for analysis. These samples were pre-washed, dried and ground into a powdery substance using a ball mill. The powdered material was then analysed using the continuous flow isotopic ratio mass spectrometry (CF-IRMS). The samples were converted into N2 and CO2 by full combustion and the gases were carried by helium gas to the mass spectrometer. The 15N/14N and 13C/12C isotope ratios were evaluated and corrected to an internal reference material calibrated to the international standards reference: N2Atm and Vienna Pee Bee Belemnite respectively. Results are expressed in relative deviations of the isotope ratios as compared to the standards. The samples were then grouped according to their isotopic signatures. The linkages between the different seizures within the group would be evaluated. Although the origins of the cannabis seizures remained uncertain due to the lack of samples of recognized origin, the results obtained had enabled us to establish possible linkages between different seizures.

**Keywords:** Stable Isotopes Mass Spectrometry; Cannabis; Marijuana; Isotope Signature

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# IN VITRO EXPERIMENTAL STUDIES ON THE RECENT USE OF ALUMINUM AS A MANTLE OF COCAINE CAPSULES SWALLOWED BY "HUMAN MULES"

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**Introduction:** The international trafficking of cocaine is a serious legal and social problem increasing every day. In our country, the Mato Grosso state is one of the known main routes (currently with 17 "tracks" documented) that is used by drug traffickers, with the implementation and use of "human mules", people who are tricked by drug dealers and sent mainly through the western borders of the state. In the manufacture of capsules containing cocaine swallowed for transportation, the manufacturers use specific ways to involve the capsule with more resistant materials to prevent the action of digestive juices and the risk of leakage of the drug and also with the intention of cheating and or confusing the finding of these capsules inside the gut of the carriers, through the use of equipment for diagnostic imaging (radiology and CT). The capsules are typically coated with carbon paper (also widely used as a packing of the capsules of cocaine in countries around the world, "fingers" of surgical gloves, rubber bladder (used in parties), food -type, PVC films and automotive insulfilm. Recently, in the Marechal Rondon International Airport, located in Varzea Grande - Mato Grosso, two "human mules" coming from Bolivia that stopped at the metal detector of that airport, showing great nervousness, were arrested by Federal Police officers. They were then brought to an emergency room, where they were x-rayed and diagnosed with the presence of capsules swallowed. After they were expelled they aroused great interest in authors due a new type of material used to wrap the drug. To investigate experimentally the ability to change the density of radiation in conventional radiography and computed tomography, we tested various types of wraps, considering its potential to hinder the detection of capsules "swallowed" on drug dealers ("human mules").

**Methods:** The test tubes were filled with saline solution (saline 0.9%) and sealed with plastic corks. The tubes were then engaged by the wrappers for the same materials used by traffickers. The tubes were numbered and radiographed with X-ray equipment (TFX 15, GE, USA) with automated technique for use with the ends of the ionization chamber, manipulated images on a digital (CR Kodak, USA) and printed on special equipment (printer Laser Dry-view 8900, Kodak) radiographic film and documented in a digital file. Later they were scanned in a multislice CT scanner (model Brightspeed, GE), with slice thickness / reconstruction of 3.75 mm, manipulated with various adjustments of contrast ("windows") and printed on special equipment (Dry-view Laser Printer 8900, Kodak) documented on film radiology (Figures 1 and 2). The images were analyzed by experienced radiologists and CT analyzed quantitatively by the specific device (ROI - Region of Interest).

**Results:** In conventional radiography of tubes with various wraps it was not possible to identify or differentiate them, nor detectable difference was observed in the radiological density of its contents. In the CT images it was not possible to identify or distinguish between the type of wraps. The subjective analysis of the density of content also did not identify any significant difference or that could be attributed to the different wraps. The density measured according to the Hounsfield scale showed little difference according to the attached table, which cannot be imputed to the wraps, but the technical feature in relation to different positions within the object field of view, so that the tube with fewer layers of wrap, located at one end, shows the number of Hounsfield units less negative, as the tube 5 located at the other end, while the more central tubes present higher negative results.

**Conclusions:** The different enclosures including aluminum foil are not able to significantly alter the radiological density of the object involved in the form in which they were tested, whether in conventional X-ray (radiographs) or in Computed Tomography (CT).

**Keywords:** In Vitro; Experimental Studies; Cocaine; "Human Mules"; Swallowed; International Trafficking; Drug

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# ARRANGEMENTS FOR TRAFFIC PASTA BASE (COCAINE) IN THE WEST BORDER OF MATO GROSSO STATE (BRAZIL - BOLIVIA)

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**Introduction:** Information in the Act 2005 show that Brazil is the largest consumer market for cocaine in Latin America and the 2nd largest supplier of cocaine to Germany, not being a producer, but serving as a corridor and route for the manufacturers of drugs such as Peru, Bolivia and Colombia. The importance of involvement of teenagers linked to cocaine trafficking between the towns of San Matias (Bolivia) and Caceres (Western Region-MT-Brazil) is an alarming fact. Traffickers apply creativity in various forms of transportation, such as drugs attached to the body, the use of "human mules" in the form of capsules of cocaine swallowed or introduced in the human body's natural orifices or the drugs hidden or disguised (the so-called "mocós"), being placed on various objects such as bottles, bags or in larger volumes and in various parts of automotive vehicles. The objective is to show, in partnership with the Federal Police of Caceres - the Gefron (Special Frontier) and the Federal Highway Police, the creativity and sophistication in ways of transport of drugs that are used in drug trafficking in the Brazil - Bolivia Border.

**Methods:** Research was made in the period between January 2005 and June 2008. We used pre-structured interviews with police officers team Gefron (Special Frontier) who accompanied us on field work, also carried out with arrested drug traffickers. In the field research the author repeatedly visited the town of San Matias using GPS equipment, marking the main satellite coordinates and photographing some of the most used areas for trafficking, which resulted in that a letter geo-referenced. We also documented the settlements of "landless" individuals, with the installation of culturally, socially and economically dysfunctional families, which facilitates the recruitment of drug trafficking cheap labor and rising every day the number people involved in trade and drug use.

**Conclusions:** During the day the traffickers use small aircraft and entering Brazilian airspace near the border. With the help of GPS they locate the places without police enforcement and make the boundaries. When night falls, they return and launch the drug already packed and ready for transport, on land that will be assembled by "mules vagrants." So they continue the mission which is to transport drugs to Cáceres by Jauru River. The "trails" are difficult to access, the territorial extension is immense, and there is a lot of creativity for creating new methods of transportation used by "mules". On the other hand, there are no effective and modern equipment or sophisticated weaponry, as well as adequate structures due the lack of investment to modernize surveillance and to increase the numbers of agents. In our point of view, in some forms of "mocós" and "human mules" we only discover drugs and arrest the trafficker if there is previous and anonymous complaints. It is becoming each time more difficult to combat international drug trafficking, requiring larger investments by the World Governments to suppress the distribution and transport of "pasta base".

**Keywords:** Traffic; Cocaine; "Human Mules"; "Mocós"; "Trails"; Drugs

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# STUDY OF OPIATES BY HYPHENATED TECHNOLOGY OF CE-MS

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**Introduction:** Capillary electrophoresis (CE) is a separation method based on differences of motilities as well as partition characters of different components. It has many advantages such as high efficiency of separation, high analysis speed, low running expenditure and environmental friendliness. Mass spectrometry (MS) is a detection technology based on detection of fragment ions and their intensities for a pure compound after ionization. It has higher sensitivity and capability to differentiate overlapping peaks with distinct mass-to-charge ratios (m/z). MS furnishes molecular weight and/or structural information to identify the compound. Coupling of CE with MS has become a powerful tool in chemical and biological assays.

**Methods:** The paper investigated some factors affected opiates analysis in the hyphenated CE-MS technology, which includes category, pH, concentration, organic adjuster of buffer in CE analysis, as well as rate of sheath-flow and its proportion in MS part. The analysis conditions for opiates were optimized and established. Buffer at pH 5 containing 80mmol/L ammonium acetate and 15% methanol was used through the analysis; electrospray (ESI) was used for ionization in which the ions were monitored in positive mode and scanned in the range of 100~500m/z. The quantitive analysis were carried out at the selective ions with m/z 286.14m/z for morphine, 328.15m/z for monoacetyl morphine, 300.16m/z for codeine and 370.16m/z for heroin. The voltage of capillary was set at 3.5KV, 10psi for spry gas (N2). The temperature of drying gas (N2) was 325?;sheath-flow was composed of 15mmol/L ammonium of acetate and 0.25% acetic acid with 60% methanol, the rate of it was 4μL/min.

**Conclusions:** The real seized heroin sample was analyzed using the method, illustrating that the method was practicable in drug analysis.

**Keywords:** Capillary Electrophoresis; Hyphenated CE/MS; Opiates

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# MULTI-CLASS DIFFERENTIATION OF CANNABIS SEEDLINGS IN A FORENSIC CONTEXT

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**Introduction:** This article presents an experimental study about the classification ability of several classifiers for multi-class classification of cannabis seedlings. As the cultivation of drug type is forbidden in Switzerland law enforcement authorities regularly ask forensic laboratories to determinate the chemo-type of a seized cannabis plant and then to conclude if the plantation is legal or not. This classification is mainly performed when the plant is mature as required by the EU official protocol and then the classification of cannabis seedlings is a time consuming and costly procedure.

**Methods:** This study investigated the discrimination of fiber type from drug type Cannabis as well as the differentiation of drug type Cannabis varieties by analyzing the compounds found in seedlings leaves and using chemometric tools. Seven classifiers for differentiating between cannabis seedlings are evaluated in this paper, namely Linear Discriminant Analysis (LDA), Partial Least Squares Discriminant Analysis (PLS-DA), Nearest Neighbour Classification (NNC), Learning Vector Quantization (LVQ), Radial Basis Function Support Vector Machines (RBF SVMs), Random Forest (RF) and Artificial Neural Networks (ANN). The performance of each method was assessed using the same analytical dataset that consists of 861 samples split into drug- and fiber type cannabis with drug type cannabis being made up of 12 varieties (i.e. 12 classes).

**Results:** The results show that linear classifiers are not able to manage the distribution of classes in which some overlap areas exist for both classification problems. Unlike linear classifiers, NNC and RBF SVMs best differentiate cannabis samples both for 2-class and 12-class classifications with average classification results up to 99% and 98%, respectively.

**Discussion:** In forensic case work this study shows that it is not necessary to wait plants' maturity and that the discrimination between cannabis samples at an early stage of growth is possible with fairly high classification performance for discriminating between cannabis chemo-types or between drug type cannabis varieties.

**Keywords:** Cannabis; Classification; Supervised Learning

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# RAPID ANALYSIS TECHNIQUE FOR ILLICIT TABLETS WITHOUT SAMPLE PREPARATION: DESORPTION-ELECTROSPRAY-IONIZATION-MASS SPECTROMETRY (DESI-MS)

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**Introduction:** Direct and rapid analysis techniques are important for the screening of seized items of evidence in forensic toxicological laboratories and as well at crime scenes. Samples range from illicit drugs, counterfeit pharmaceuticals and plant materials to wipe or suction samples of contaminated surfaces. Because of its identification power and the possibility to analyze solid samples like tablets directly the novel technique Desorption-Electrospray-Ionization-Mass Spectrometry (DESI-MSn) is especially helpful in this respect. Additionally, the fast information provided by DESI-MS screening greatly facilitates the direction of the follow-up analysis strategy.

**Methods:** Experiments were performed using a Bruker HCTplus ion trap mass spectrometer, equipped with a Prosolia OmniSpray DESI source. The desorbing solvent (acetonitrile/water (75:25)) was supplied at a flow rate of 3µL/min by a syringe pump. Different spray impact and collection angles and tip-to-surface distances of 2-4 mm were applied. DESI-MS spectra were obtained in positive and negative ion mode with a scan speed of 26000m/z per second (mass range 50-500m/z). Auto-MSn experiments were performed for unambiguous analyte identification.

**Results:** Different Ecstasy tablets were directly analyzed by DESI-MS in positive ion mode. As main active substances 3,4-methylenedioxy-N-methamphetamine (MDMA), amphetamine, meta-chlorophenylpiperazine (m-CPP) and 4-bromo-2,5-dimethoxyphenylethylamine (2C-B) were identified by MS/MS experiments. Similar looking Ecstasy tablets were easily distinguishable within seconds by DESI-MS screening. Different illicit pharmaceuticals from current case work were directly analyzed by DESI-MS in positive and negative mode. In white seized tablets without further information about the active ingredients Clenbuterol and Metandienone were identified. In a small red tablet, labeled as contraceptive, MDMA was detected. Lifestyle products like "Viagra" and "Cialis" were directly analyzed by DESI-MS and the main ingredients were identified by MS/MS. The coating of the tablets was removed in a small spot by application of the DESI-solvent jet for approximately one minute before analysis.

**Keywords:** DESI-MS; Illicit Drugs; Lifestyle Drugs; Forensic Toxicology; Counterfeit Pharmaceuticals

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# OXI: FROM ANONYMITY TO THE FAME AS THE MOST DANGEROUS DRUG ON THE BRAZIL

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**Abstract:** For the past few months, a "new drug" called "oxi" or oxidized has shown up on the Brazilian and international press. It has been known in the state of Acre, Brazil, since the 1980s. Apparently it was restricted to the north of the country until 2011. Since then, it has been apprehended in several other states. After that it gained the status of one of the most potent and dangerous drugs known so far, or maybe, being more potent and deadly than crack itself. Every day, news about its power of addiction, effects on the body and mortality are reported in the media. Kerosene or petrol, lime, potassium permanganate, sulfuric acid, among others, have been cited as materials used in its preparation, all of them easily found in local markets. Authorities from several parts of Brazil have questioned whether oxi is really a new drug, as reported by the press, or just a new form of cocaine use, because its morphology is similar to cocaine base paste. This work discusses the chemical analysis of the drugs seized by the Brazilian police as oxi. The drugs were analyzed using traditional techniques and instruments such as the Modified Scott test, thin layer chromatography (TLC) and gas chromatography coupled with mass spectrometry (GC-MS). The results indicate that the oxi samples present alkaloid cocaine and do not show traces of other organic narcotics.

**Keywords:** Oxi; Drugs; GC-MS

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# CONFLICTS OF INTEREST IN FORENSIC MEDICINE

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**Introduction:** This study refers to actual and necessary discussion about the issue "Conflicts of Interest in Forensic Medicine". The conflict of interest is present when a number of situations which a professional judgment about a primary interest may be influenced by a secondary interest.

**Methods:** Broad literature revision involving article research between 1991 and 2011 on the research sites (PubMed, LILACS and SciELO) correlating the medicolegal uniterms with bioethics. A critical reflection on the subject.

**Results:** Several hidden interests peculiar to the professionals, when analyzed carefully, can reveal harmful conflicts to the expert, especially when in a guarded condition. The medical condition of safety public sever, specially as police, can result in interest conflicts. Although violence is an increasing concern for national health, after an extensive previous literature review about the subject, it was shown that compared to the international literature, this issue is not enough explored in Brazil.

**Conclusions:** How to deal with the interest conflict in forensic medicine that is not enough discussed issue and there is evidence of controversy. However, in conflicts of interest the diagnosis is a good start.

**Keywords:** Conflict OF Interest; Forensic Medicine; Bioethics; Medical Ethics; Violence

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# REVIEW OF ALL MEDICAL ERRORS REFERRED TO THE DEPARTMENT OF FARS PROVINCE LEGAL MEDICINE CENTER IN SOUTH OF IRAN DURING THE 2007 TO 2010

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**Introduction:** Today, despite efforts of medical society and medical and health care technology, and despite progress, dissatisfied patients is increasing that, although the one hand it could be due to medical errors, but on the other hand, many rooted in other causes such as lack of physician communication with patients, increase patient awareness of their rights and are in many cases. In this study, the frequency of medical imagery referred to the General Department of Fars Legal Medicine Center during 2007 to 2010.

**Materials and Methods:** In a study of all cases of failure of medical referrals to the Fars Department of Legal Medicine center in south of Iran during 2007to 2010 and due to the inclusion and exclusion criteria of the study separately demographic, site remedial action, the outcome of treatment, theres failure, type of specialty physicians. Finally all dates analysis with spss version 16 and Q-Square test.

**Results:** In total 320 cases were investigated the sex of 60/3 percent was men and 39/7 percent was women and both sex with average age was  years old. The highest age group complained of 20 to 29 years and 30 to 39 years, 62/2 percent of the study population was married, most jobs people was self-employed with 27/3 percent. Most complaints related to staff specialist with 78/6 percent and in total 170 people sentenced to pay blood money and 200 people were acquitted.

**Discussion:** Based on results from this study and due to negligence, there most be accepted in plastic surgery, general surgery, orthopedics and women, promote education of this group of physicians and using credit education programs, related Company units and legal sciences.

**Keywords:** Medical Malpractice; Medical Errors; Legal Medicine; Fars; Iran

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# LEGAL REGULATION OF GENETICALLY MODIFIED FOOD PRODUCTS TURNOVER IN NATIONAL LAWS OF CIS COUNTRIES

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**Abstract:** Gen engineering is a fast moving research field producing lots of achievements, including genetically modified organisms used during production of food products. Last decades show that scientists, policy makers and general public could not come to the same opinion about benefits and hazards of genetically modified food products. Opinions are so different and both-side well-grounded that it is not easy to define attitude to this scientific achievement. Nevertheless, food security is one of the main objectives of the state, which is responsible for providing in the markets safe food products to own citizens. This is why states are interested in reviewing the scientific achievements in terms of the state's national interests and security of its citizens. In this article 1/ main advantages and disadvantages of genetically modified products, 2/role of national legislation on control of food security, 3/attitude of CIS countries national legislations to genetically modified products are given. Taking into account these points authors come to conclusion that actual Azerbaijan law is not-responding to changes of world market development and technological conditions of food products production, having place in last decades. This gives the basis to conclude that in actual conditions rights of Azerbaijan citizens for safety of food products are not well-protected. In the end of study authors come to recommendation about necessity of amendments to own legislation towards increasing control on turnover of such products in Azerbaijan.

**Keywords:** Genetically Modified Organisms; Genetically Modified Products; Food Products; Food Security

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# TRENDS OF ORGAN DONATION IN AZERBAIJAN AND OTHER COUNTRIES

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**Introduction:** Transplantology and organ donation are developing from year to year worldwide, including Republic of Azerbaijan. It should be noted that this issue should be considered on the point of intersection of three formats - medicine, law and ethics. However, first of all, we would like to make an analytical excursion and uncover the dynamics of the transplantology and to show medical and legal aspects of this problem in various countries.

**Materials:** Situation and legislative acts of Azerbaijan, Russia other CIS countries, Turkey, USA, UK, Austria, Belgium, Spain, Iran and Pakistan as well as international treaties and documents were analyzed.

**Results:** The most acute problem today in allotransplantation is a shortage of donor material. To a large extent this is the reason why many doctors perform transplantations of such organs as kidney, heart, liver only in those cases where traditional medical and surgical treatment has completely exhausted itself and the patient is doomed to a near death. There are several theories of fair distribution of such deficiency resources. According to one of them, the priority should be given to those whose social significance is higher than the average person's and, consequently, the recovery of their vital activity will bring benefits to society. Thus, an American H. Risher wrote that the society "invests" a limited resource in a given individual and not in another one because waits for a large return of its investments. In this case, the principles of fairness and equality are violated. Objuring the Hippocratic Oath, a physician agrees to render aid regardless of a person's social or financial status. In most countries the distribution of donor resources carries out on the principle of equality. Nevertheless, there are criteria that limit this principle. Primarily, there is a criterion of "lottery": in obtaining a cadaveric organ the recipient is selected by the highest number of compatible antigenic systems. This recipient can be on the waiting list during a week or for several years. It should also be noted that with equal status of other criteria, the preference will be given to the recipient with the best predicted effect after transplantation (first of all transplants are performed on young people without severe concomitant pathology). There are a number of ethical issues. Should received organs be "given" to people with antisocial behavior (e.g. people suffering from drug addiction)? It is known that an addict dies at average within 5 years after the first injection. Is it right to treat these individuals while there are hundreds of children and young capable of working people on the waiting list? In Russia the distribution of donors is guided by three principles: compatibility of the pair "donor-recipient" urgency of the situation and the time the patient is on the waiting list. Another limiting factor is the price of a donor organ.

**Discussion:** The development of modern medical science opens up tremendous prospects for people in solving issues and problems that only recently seemed to be unresolved. Research and progress in the area of biomedical technologies put humanity on a completely different level of development. However, the reality clearly shows that a person becomes extremely vulnerable to the application of methods of diagnosis and treatment, and in some cases of interference with one's health it is possible to see the lack of guarantees of human safety. The society and law were not ready for such a rapid development of biomedical technologies and such high level of intervention in human nature. Moreover, it is not only moral and ethical aspects of manipulations with the human body that are touched upon, but also legal issues that are expressed in the lack of legal consolidation both of the relationship between the recipient and donor and legal mechanisms of regulation, implementation and protection.

**Comments:** Despite the existence of a law in our republic there is still a lack of mechanisms for its action.

**Keywords:** Organ Donation; Transplantology; Legal and Ethical Aspects of Transplantology

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# BIOETHICS EDUCATION IN THE SYSTEM OF MEDICAL EDUCATION IN CIS COUNTRY

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**Abstract:** Medical ethics has been developing throughout millenniums. Medical ethics began to form when being a physician had become a separate profession. As any branch of knowledge, it could not have existed if medical practice had not proved its necessity, expedience and usefulness, and if physicians of many generations had not developed its laws, principles and rules that everyone who has chosen medicine as his/her profession ought to know. Nowadays, as ages ago, special demands are made on medical professionals with regard to their moral qualities and professional behaviour, which is the subject matter of medical ethics. Thus, many ethical norms that were compulsory for physicians of early civilizations of Egypt, India, China and Greece have not lost their significance up to the present day. Many moral demands for physicians in the time of Hippocrates formed a core of modern ethics codes, oaths and declarations. Although the ethical component was present in the Soviet system of medical education, it was isolated from the world trend. By the beginning of the 1990s it became obvious that without an appropriate and adequate approach to ethical issues in medicine it is impossible to integrate the USSR into the world medical community. Global scientific and ethical changes coincided with political and economical processes that took place in the USSR in the end of the 1980-s - the beginning of the 1900s. The changes were marked by a rapid development of a new political thinking all over the Soviet Union space, which resulted in economic and political grounds for changing the political system of the State. New States restoring their history, national psychology and state interests began to emerge in the post-Soviet space. In December 1991 Agreement Establishing the Commonwealth of Independent States was signed. Changes in social and political life in the countries of the post-Soviet space and setback from socialist principles revealed the necessity of building up a system of education and healthcare in new conditions. The most complicated task was to work out new approaches retaining, at the same time, everything that was obviously positive in the preceding experience of the development of education and healthcare in the USSR based on common ideological, social, economic, cultural and historical heritage. One of strategic trends of the development became the integration of the CIS member countries into the world community attracting attention of international structures and their assistance for changes in the CIS political and economic life as a guarantee of irreversibility of reforms, guarantee of national security, maintenance of peace and stability in the Region. From this point, our presentation will inform audience about: history of medical ethics education in USSR, changes of content and form of medical ethics and bioethics education in different CIS member countries, present situation of bioethics education in the medical system of CIS countries, perspectives and common recommendations validated with UNESCO.

**Keywords:** Bioethics Education; Medical Education

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# A STUDY FOR DENTAL MALPRACTICE CLAIMS IN SOUTH OF IRAN (SHIRAZ CITY), IRAN, 2006-2010

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**Introduction:** All of medical staff such as dentists, may have some errors and malpractices during their treatment procedures. These errors can lead to not only the patient's dissatisfactory but also the patient's claim. In this study, we have examined the prevalence of dentistry claims and their details in Shiraz, Iran.

**Materials and Methods:** We performed a retrospective study with 85 malpractice cases occurred during 2006-2010. In this study 30 cases had been decided by the LMO (Legal Medicine Organization) and 55 remained cases had been decided by the IRIMC (Iran Republic of Irans Medical Council).

**Results:** According to the questionnaires, the majority of malpractice claims were related to the oral surgery and fixed prosthodontics specialty. Most of the complaints had occurred in a private sector. In most of the cases, the dentist was found guilty.

**Conclusions:** Dental malpractice claims have increased because the patient's awareness about the medical laws and legal and punitive consequences of suits presented to the legal organizations, has improved. Therefore, the dental education should follow the aim of improved quality of treatment and decreased malpractice claims.

**Keywords:** Dental Malpractice; Dentistry; Patient Complaint; Legal Medicine; Shiraz; Iran

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# MALFUNCTION OF HEART PROSTHETIC VALVES AND CRIMINAL LIABILITY: ANALYSIS OF 105 CASES

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**Introduction:** Introduction Replacement heart valves using mechanical prosthesis is a viable option in the treatment of heart valve diseases. The ideal prosthesis should have the following characteristics: not being obstructive or incontinent, be biologically inert, not producing haemolysis, not being thrombogenic and having long life. This requires structural requirements, whose absence can lead to serious health risks for patients. We present a case study on subjects implanted mechanical prosthetic valves: some died and others for which it was required a second surgery to replace the implants, and the Prosecutor hypothesized a structural inadequacy of the implanted prostheses.

**Methods:** 105 patients were considered undergoing heart valve replacement with mechanical prostheses (mitral, aortic, tricuspid, aortic + mitral) produced by two different companies, of which 49 of the company called "A" and 56 of the company called "B". All cases underwent surgery at the same hospital and by the same surgeon team. The 49 cases with prostheses of the company "A" were distributed as follows: 15 dead and 34 living already undergone a second operation to replace the prosthesis in the suspicion of a malfunction. The 56 cases with prostheses of the company "B" were distributed as follows: 50 living and 6 dead already undergone a second operation to replace the prosthesis in the suspicion of a malfunction. For each case it was taken into consideration: clinical data (with particular reference to indications and executions of surgery and to the management of post-operative period), the final results of necropsy (if performed), and the data provided by engineering consultancy on the characteristics of the valves taken from exhumations.

**Results:** Through a comprehensive assessment of all available data, in light of the classical forensic criteriology, we proceeded, in each case, to the evaluation of the possible existence of a valvular defect and, if present, the possible causal link towards the death or towards the need for reoperation replacement. In particular, in patients undergoing valve replacement with a prosthesis of the company "A" a causal dependence between the death (or injuries suffered by patients who underwent a reoperation replacement) and the inadequacy of the prosthesis was proven in 37 out of 49 cases. For patients with prosthetic valve replacement of the company "B" any defect in the valve was ruled out, which could have played a role in contributing to the death or to injuries suffered by patients.

**Keywords:** Heart Prosthetic Valves; Criminal Liability

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# THE ROLE OF INFORMED CONSENT IN LAWSUITS AGAINST MEDICAL DOCTORS: ANALYSIS OF FIRST STAGES PROCEEDING VERDICTS OF THE CIVIL COURT OF ROME.

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**Introduction:** In principle, informed consent is the building block of every sanitary intervention: in its absence medical actions would results in abuses even if carried out in the interest of patients. Profiles of medical professional responsibility for failure or incomplete information are various and, over the last decade, it became one of the most frequent causes of lawsuits against medical doctors. In this study, we evaluated the first stage of proceeding verdicts, from 2001 to 2009, issued in by the Civil Court of Rome concerning medical professional liability cases where the only violation was the duty of information omission.

**Materials and Methods:** In the analysis of the documentation provided by the Observatory on Medical Liability (O.R.Me), we considered several different parameters: kind of damage covered by compensation, specialist areas and worker categories most involved in litigation, timing of proceedings, informed consent with special attention to principle of law and economic compensation.

**Results:** Among 2700 complaints, 21 matched our inclusion criteria (i.e. where the duty of information was the only violation). Within this group, defective informed consent was reported in 47,6% of cases, whereas in 52,4 % the informed consent was completely omitted. In 33,3 % of cases only medical doctors were sued, more frequently the first/single operator; in 19,05 % only the hospital/private structure was involved and in 47,6 % both of them. The categories most susceptible to claims resulted plastic and cosmetic surgeries (7 cases) followed by oncological and radiotherapic interventions (4 cases). Importantly, on average, the time required for the first degree of civil proceedings was 5 years and, in addition to procedural expenses, 1.402.037,82 Euros were spent for patient compensations.

**Conclusions:** The results of this Italian research are important because they show the central role of informed consent in the lawsuit against medical doctors. It is necessary an extended analysis of the whole national and international scenario, in order to improve our ability in the comprehension of this problem , and, more importantly, in developing effective strategies for prevention.

**Final Comments:** In synthesis, lack of informed consent is a separate and distinct legal reason for a lawsuit. A patient can sue for lack of informed consent even when there has been no malpractice but there has been an unwanted result. Thus, medical doctors are in the di

**Keywords:** Informed Consent; Malpractice; Medical Professional Liability

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# THE QUESTION OF MEDICAL LIABILITY FOR PRESCRIPTION DRUGS OUTSIDE THE MARKETING AUTHORIZATION INDICATIONS IN EUROPEAN COUNTRIES: ABOUT AN ACCIDENTAL CASE OF BACLOFEN OVERDOSE IN LYON, FRANCE

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**Introduction:** Prescription outside the marketing authorisation indications can potentially expose patients to serious life-threatening adverse events. Here, a case of an accidental intoxication to baclofen has been reported to discuss the question of liability in case of such prescriptions in European countries.

**Case Report:** A 74 year old man, with a past history of alcoholism, oral cancer and depression, was prescribed baclofen 90mg daily for maintenance of alcohol abstinence . On the second day of treatment, he presented acute agitated confusion and was admitted to Edouard Herriot Hospital emergency care unit in Lyon (France). On arrival, his Glasgow Coma Scale score was 10. Vital signs were within the reference range except for blood pressures, which were 170 mm Hg systolic and 95 mm Hg diastolic. Neurological examination revealed muscle stiffness without any sign of localization. Cranial tomodensitometry was normal. Electroencephalogram showed a diffusely slow background with intermittent generalized sharp wave discharges. Toxicological analysis of blood samples confirmed a baclofen overdose with a serum level of 1 µg/mL (reference serum level for treatment of spasticity is 0.08-0.4 µg/mL). Fortunately, complete recovery was obtained in two weeks.

**Discussion and Conclusions:** Baclofen is a muscle relaxant that acts on the central nervous system, indicated for the management of severe spasticity. Its recent use in the prevention of alcohol relapse has raised controversy since the publication of Dr Ameisen's best seller Le dernier Verre, in 2008, as baclofen therapeutic efficacy in alcohol dependence has not yet been established in any clinical trials. Though acute baclofen intoxications are quite rare in the literature, some lethal cases have already been reported. If some medications may be prescribed outside the marketing authorization and considered as perfectly lawful and beneficial for patients when no alternative product with marketing authorization or authorization of temporary use exists, they should be used very prudently in other cases. It is clear that the burden of medical liability is growing in many parts of Europe, which underlines the greater knowledge among citizens of the possibility of obtaining redress. Health care practitioners should keep in mind that every act of prescription engages their civil, criminal and disciplinary liability and must be in accordance with professional consensus guidelines.

**Keywords:** Medical Liability; Prescription Outside Marketing Authorization; Acute Baclofen Intoxication

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# HOW TO AVOID MALPRACTICE IN FORENSIC ENT MEDICINE?

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**Introduction:** Problem Addressed: Because of Many cases of Medical Malpractice , trauma and Pathology, referred from the different points of police and courts, in KUWAIT or from the medico-legal doctors for consultation. Also from Persons Lawyers that need Medico legal Consultation Report from ASCC about their Criminal or Civil Cases , it was much important to pay attention for this to prepare a scientific CORRICULUM or GUIDE in this field to know What is Malpractice How to avoid it?

**Methods:** Forensic ENT. Specialist examines more than 9830 cases along 10years in G.D.C.E, ASCC in KUWAIT, records his notes using the most recent procedures Apparatuses with total quality means for accurate exam. of ENT. Cases clinically focus on medico-legal point of view, presence of trauma, or pathology its type the way it was inflicted its clinical picture.

**Results:** Forensic Otorhinolaryngology is the science that studies the clinical aspects medical rules related to ENT. Practice from the medico-legal points of view preparing to be ready for law application in the service of medicine justice. Differentiation between real or fabricated ,recent or old, traumatic or pathological or malingering reporting about affection, type or nature, cause, used tools, date relation to the accident, time needed for cure its fate or prognosis, with disability its percentage, if permanent infirmity is present .in the form of full , accurate ,sharp fair forensic ENT. medico-legal report. Clear much new facts in this new specialty practice, with new recommendations e.g.: in CASES of Cosmetic Rhinoplasty.

**Conclusions:** Clinical Significance of Study is to: Record the results of this experience in a recent book: " FORENSIC ENT MEDICINE" to be the 1st textbook in the world, as a GUIDE, to clear much new facts in this new specialty practice, ideal guide for doctors how can AVOID MALPRACTICE IN OTO-RHINO-LARYNGOLOGY, ALSO prepare forensic report as a scientific curriculum, for the service of science justice, FOR PATIENT DOCTOR's SAFETY.

**Keywords:** Forensic Medicine; Malpractice; Forensic Otorhinolaryngology

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# SURVEY ABOUT THE QUALITY OF THE HEALTH CARE INFORMATION: DOCTOR´S OPINION

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**INTRODUCTION:** To analyse doctor´s opinion regarding with the information provided within office hours, with the analysis of the information management according with the current legislation as well as how doctors internalize "the autonomy's patient principle". Likewise, to determinate the relation among information provided and the quality perceived by the physicians.

**Methods:** The study was developed in the Virgen Del Castillo de Yecla Regional Hospital, within the Autonomous Community of the Region of Murcia (Spain), first level Hospital, which encompasses a population of 61000 inhabitants. In order to carry it out, an information's quality survey was designed and handed out to all doctors working in the Hospital, referring to the information provided within the Outpatient Services, finding out their opinion.

**Results:** 100% of the physicians answered the survey, being 80 doctors (70% men, 30% women), with an average age of 44.64. The 68% do inform to the patient and relatives, 8% never or almost never and 9% do not inform relatives; 58% usually explain the diagnostic and treatment options, 10% do it a few times and 15% do it depending the patient; only 26% inform systematically whereas 45% assess the kind of patient before do it (medical specialities);27% of those who use the informed consent form do not allow to read it, worrying matter specially with the surgical specialities, which reach the 50%; 51% do not consider enough the time addressed to inform; 30% do consider the information they provide as unsatisfactory; doctors from non surgical specialities address more time to inform patients (82%,more than two minutes), than those from surgical ones.

**Conclusions:** The results obtained make us thinking about significant shortages regarding so transcendental aspects within the management of the information as the knowledge of the current legislation as well as generalization and proper application of the autonomy's patient principle. From the point of view of the education in Medical Forensics and Deontology, undergraduate and Continuing Education, we do consider that training in legal and deontological matters regarding with the information transmission and its efficacy, is a key aspect for the improvement of the physician-patient relationship, and may represent a qualitative difference for the improvement of the quality of the healthcare assistance.

**Keywords:** Information Consent; Medical Information; Quality Of Information

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# SURVEY ABOUT THE QUALITY OF THE HEALTH CARE INFORMATION:PATIENT´S OPINION.

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**Introduction:** To establish the relation between the information provided to the patient and relatives and quality perceived, identifying those basics aspects regarding with the transmission efficacy.

**Methods:** The study has been developed in the Virgen Del Castillo de Yecla Hospital, first level centre belonging to the healthcare network of the Murcia Region (Spain). A survey about quality of the information was made and handed out to all those patients seen at the Outpatient Services of the Hospital, asking about the information received and weighing up the satisfaction level.

**Results:** 528 patients answered the survey (64% women, 36% men), with an average age of 45.04; only the 56% were in active labour situation and, regarding cultural level, 71% studied elementary education and professional courses, and solely 12% took college studies. 71% considered good or very good the information received, 33% stated that time addressed for inform was poor, 82% could read the informed consent form but the 18% signed for it without the possibility of read it and 12% had not understood it. Everything related with his disease was not explained to the 20% and 27% could not ask for enquiries; youngest people were the most critical regarding with the information received and time addressed for it.

**Conclusions:** Even overall the results obtained show a proper satisfaction by the users, it can be notice a kind of deficiencies at different level of the information management which make thinking about serious shortages either from a legal view, the quality management as well as the efficacy of the information transmission. An essential goal from a medical and healthcare training perspective should be to encourage the development and improvement of an efficient culture of the healthcare information as an unavoidable part of a more human assistance

**Keywords:** Informed Consent; Medical Information; Quality of Information

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# OBSTETRICS AND GINECOLOGY AT HIGH-RISK OF LITIGATION

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**Introduction:** Increasing malpractice litigation risk and medical liability insurance premiums have caused widespread concerns regarding their effects on medical care in general and obstetric and gynecological care in particular (Hale, 2006). Obstetrics and Gynecology (OG) is among the specialties in high-risk for malpractice claims and obstetrics accounts for most of the claims (Chervenak JL, 2007). Findings from this study will help illuminate the specific areas at high risk for malpractice claims and help maintain patient safety associated with obstetric and gynecologic care.

**Materials and Methods:** We aimed to identify the most important safety and liability areas at high risk in obstetrics and gynecology. A total of 7324 malpractice claims handled by the Praxis Area of Barcelona's Official College of Physicians between 1986 and 2010 were analyzed. The subgroup of 913 claims concerning Obstetrics and Gynecology (OG) were reviewed and analyzed.

**Results:** Obstetrics and Ginecology-related claims accounted for a 12% of the total amount of claims during the study-period, mostly in obstetrics. Only a 17% of sued doctors were convicted (another 17% ended up in agreement). Most allegations related in some manner to the management of labor and delivery. Most frequently reported basis of allegation in obstetrics related to fetus death during labor or delivery and fetus severe neurological impairment. In Gynecology most claims involved problems related to hysterectomy or breast cancer. Percentage of compensation cases was remarkably high in "forgotten foreign objects".

**Final Comments:** Understanding these specific basic elements of medical malpractice in Obstetrics and Gynecology may help the physicians to better manage the impact of malpractice concerns on their practice decisions and to improve patients safety in Obstetrical-Gynecological care.

**Keywords:** Obstetrics; Ginecology; Malpractice; Litigation

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# PREDOMINANCE OF THE CAUSES OF DEATH FOR ASPHYXIA IN THE NECROPSY FULFILL IN THE PERIOD FROM 2009 TO 2010 IN THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL

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**Abstract:** The data of the Brazilian Health Organization in the analysis of the period from 1996 to 2006 showed that in the national territory it took place 69.731 deaths for drown, when the most frequent mechanism of dead in children in the age group from zero to 14 years. When the climatic characteristics of our country were given, in the summer period there takes place an increase of this type of accident due to the biggest access of the population to the beaches, bathing resorts and swimming pools. This work had since the most frequent mechanism valued objective which at the deaths characterized how of cause asphyxia at the state of São Paulo. For this diagnoses were analysed necropsies carried out in the period of January of 2009 to December of 2010. The total of necropsies when 61.928 (100%) was carried out, 7.529 had drown like cause of the death, corresponding to 12,16% of the total, 1.528 took the hanging as a mechanism of death, strangulation which corresponded to 2,47 % of the total of necropsies. The drown in our country follows the world-wide standard for this type of accident, being in some towns the biggest cause of death for external mechanisms in the childlike population in the age group from zero to fourteen years.

**Keywords:** Death; Asphyxia; Hanging; Strangulation; Necropsy; Human Rights

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# PREDOMINANCE OF SUICIDE IN NECROPSIES, ANALYSES AT THE PERIOD FROM 2009 TO 2010 IN LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL

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**Abstract:** In accordance with the System of Information of Mortality of the Ministry of Health, 9090 persons reached the suicide in Brazil in the year of 2008, corresponding to 25 daily deaths. It is appreciated what for each accomplished suicide exist twenty attempts attended in the system of health. In accordance with the results published in several international studies, in 97 % of the cases, the suicide it is a marker of psychological suffering or of psychiatric upsets. The Brazil presents fewer 6,5 suicides for each 100 thousand inhabitants, which leaves it between the countries with the least taxes of incidence for this mechanism of death. In the analysis of the statistical data of the necropsies carried out in the Legal Medicine Institute of the State of São Paulo in the period from 2009 to 2010 they revealed the incidence of suicide what took place 2.710 cases of suicide being that 1.146 (42,29 %) took place for hanging, 337 (12,44 %) for haste of buildings, 231 (8,52 %) produced by firearm, 199 (7,34 %) for poisoning and 797 (29,41 %) for other ways. The study multicenter of intervention in the suicidal behaviour (Supre-Miss Study), of the World-wide Organization of the Health (WHO) carried out between 2003 and 2005 with support FAPESP showed that the untimely intervention near population with suicidal conception reduces significantly the suicide.

**Keywords:** Suicide; Hanging; Haste; Firearm; Poisoning; Supre-Miss; Organization; World Championship

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# EVALUATION OF THE NECROPSY IN MURDER AND THE MECHANISMS OF DEATH IN THE PERIOD FROM 2004 TO 2009, AT THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SAO PAULO - BRAZIL

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**Abstract:** In accordance with the publications "Map of the Violence 2010 - Anatomy of the Murders in Brazil", based on the data supplied by the Ministry of Health - S.I.M. and DATASUS, UNESCO, Institute Ayrton Senna and World-wide Organization of the Health, the incidence of murders showed alarming numbers in our country, but fortunately with decreasing rate in his incidence from the year of 2003. In the State of São Paulo where the current population disposes of more than 41 million inhabitants (IBGE - 2010), representing 21, 63 % of the population of the country, the deaths for murder occupy the 24th position inside the national classification. In the last years the state of São Paulo saw the rates of murder lessening significantly, having the analysis of the period from 1997 to 2007 revealed descent of 50,3 %, consequent of the improvement of the social conditions in the state, politics turned to improvement of the basic teaching, improvement of the police ostensible pomp, when the modernization of the judicial and penal system was associated. The evaluation of the necropsies carried out in the Legal Medicine Institute of the State of São Paulo in the period from 2004 to 2009 showed that there was in this period a total of 49.340 necropsies in the State. In this analysis, there was observed the absolute predominance of the use of firearm to produce the death, and the second place the use of cold steel (knife).

**Keywords:** Murder; Firearm; Cold Steel; S.I.M.; Datasus; Unesco; Institute; Ayrton Senna; Human Rights

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# THE MECHANISMS OF BODILY HARM IN CHILDLIKE POPULATION IN THE AGE GROUP FROM ZERO TO TWELVE YEARS. IS NECESSARY TO CREATE A SPECIFIC SERVICE TO THE CHILDLIKE POPULATION IN THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL?

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**Abstract:** In Brazil the official numbers of violence are known through registers of morbidity and mortality what allow classification for age. The cases not communicated the area of health or of public security are out of the official statistics. The objective of this study was of valuing the incidence of bodily harms and the mechanisms of injury, in the expert examinations carried out by the Forensic Team of Skills in a Unit of Legal Medicine Institute in the period of February of 2008 to January of 2009, in the childlike attended population, valuing if there was the need of the creation of a service post for the specific service of the childlike population. There was carried out the historical analysis of the examinations of bodily harm in the childlike population with age group between zero and twelve years old, of both sexes, in the period of February of 2008 to January of 2009. The total of decisions of expert evaluated examinations added 1326 examinations up. The most frequent mechanism of trauma went to physical aggression corresponding 52,10% of the total, being a 57,2 % of the masculine sex and 42,8 % of the feminine sex, the most attacked age group wrapped children from six to twelve years being a 52% of the total and 53,10% received some type of medical service. The penal framing, on basis of the Article 129 of the Penal Brazilian Code, of the evaluated victims, showed that 65,2 % of the injuries corresponded to injury of light nature, 5,35 % of serious nature and 1,28 % of severe implication. On basis of this study we end what up to the present moment does not exist the necessity of the creation of one unity of the Legal Medicine Institute to the specific service of the childlike population in the city of São Paulo.

**Keywords:** Mechanism; Injury; Physical; Childlike; Human Rights

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# THE BODY DAMAGE ANALYSED AT THE EXAMINATIONS AD CAUTELAM, FOR THE GUARANTEE OF THE INDIVIDUAL RIGHTS IN THE PERIOD FROM 2004 TO 2010, EVALUATED AT THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO - BRAZIL

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**Abstract:** The examinations carried out by the Legal Medicine Institute of the State of Sao Paulo (IML/SP), in the criminal population, have since objective guarantees the fulfilment of the Constitutional Rights predicted in the Fundamental Law of State of our country, valuing the physical and moral entirety of this population that is in transit of the institutions that shelter them for courts of judgement, or in order that several correctional institutions carry out medical treatments and transfers between. Whenever the detainees enter or go out from the jail this examination will be carried out. The examinations Ad Cautelam had beginning in our country, paying attention to the fulfilment of the legislation. In our study we analyse the growing increase of the number of examinations in the period from 2004 to 2010. The incidence of observed bodily harms was not much frequent, what it speaks on easy terms, to offered dealings to which they are under the protection of the justice. In the studied period, they were carried out in the State of Sao Paulo 649.682, being a 52,17% in the city of Sao Paulo and 47,83% in the remainder of the State. The realization of the examinations was distributed in eleven Centres of Skills Forensic in the interior, three in the capital and 14 in Great city of São Paulo. In the second semester of the year of 2010 these examinations were concentrated in the only unity among the posts located in the city of São Paulo, taking as a justification the necessity of safeguarding the human dignity of prisoners by examination without contention. Another important point is special kind of activity is the security of the expert team who carries out the examination in this people and to reduce the means of incidents in the removal of the prisoner. Therefore, the Safety Bureau of the State of São Paulo modify the logistics transportation to the criminal population.

**Keywords:** *Ad Cautelam*; Bodily Harm; Physical; Moral; Entirety; Human Rights

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# DRUG ABUSE VIOLATIONS IN UPPER EGYPT THROUGH 2003-2009

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**Introduction:** Drugs of abuse are predisposing factors of many crimes, homicide, suicide, traffic accidents, domestic violence, and decrease learning abilities of students and workers production in the community. The objective of this work was the analysis and reporting of the pattern of drug abuse violations in Upper Egypt governorates through a retrospectively study of positive cases of drug abuse seizures analyzed at the Assiut Medicolegal Laboratory of Ministry of Justice of the seven governorates of Upper Egypt through the period (2003-2009).

**Methods:** The data obtained are analyzed according to the numbers, types of drug involved, region, season, gender distribution and offenders in the prison.

**Results:** The results demonstrated that the highest percentage of seizures was found in EL-menia and Assiut governorates and the lowest was found in the New valley. Most of the offenders are males. There was increase in percentage of seizures from 2005-2009. Cannabis is the most widely seized drug followed by opium and its synthetic and semisynthetic derivatives then sedative. As regard the season of arrest the highest seizures was in September and October. The seized cases with prisoners represents 0.11%, 0.20%, 0.32%, 0.11%, 0.17%,0.24%,0.15% of total case from 2003-2009 respectively mostly trihexyphenidyl (parkinol) and benzodiazepines.

**Conclusions:** Prevention of drug abuse violation needs social education programs and increase effort of law enforcement agencies in prohibition of cultivation, synthesis, trading and transportation of these drugs.

**Keywords:** Pattern; Drugs; Abuse; Violations; Upper Egypt; Years

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# POSSIBLE FACTORS PREDICTING POST TRAUMATIC SYMPTOMS IN JAPANESE BEREAVED FAMILY MEMBERS: INVESTIGATION OF FORENSIC AUTOPSY CASES

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**Introduction:** Bereavement is a traumatic event, particularly in unnatural deaths by suicide or homicide, or in various accidents, which are mostly involved in forensic autopsy practice; forensic casework is closely involved with victims dying such unusual deaths as well as bereaved family members who have experienced a traumatic loss of their relatives. Our preliminary investigation of forensic autopsy cases suggested tragic events, bereavement of a child or close relative, living alone, and poor information to be possible factors related to posttraumatic symptoms (Ogata et al., 2003). The present study further extended the investigation of forensic autopsy cases to detect possible factors predicting posttraumatic symptoms due to psychological distress in Japanese bereaved family members.

**Materials and Methods:** We investigated surviving Japanese family members of fatal criminal and accidental events between 1999 and 2010, who consulted our institute to receive a certificate of postmortem examination. The participants (n=414) were surveyed after informed consent by means of a questionnaire designed to measure posttraumatic symptoms based on four symptoms, reexperience, avoidance behavior, hyperarousal, and maladaptation, according to the DSM-IV-TR criterion of posttraumatic stress disorder (PTSD). We analyzed the variables, including sex (female or male), age, relationship with the deceased (parent, child, spouse, sibling, relative, or others), and cause of death (natural death, traffic accident, fall, drowning, smoke and fire, asphyxiation, intoxication, other accidents, suicide, homicide, or undeterminable) with regard to PTSD symptoms. The data were statistically analyzed using Excel and SPSS software.

**Results:** Participants (n=414) were classified into high- and low-risk groups for PTSD (n=98, 23.7% and n=316, 76.3%, respectively). Significant absolute values of standardized discriminant coefficients for predicting a high- (positive values) or low- (negative values) risk status (>0.30) (Tabachnick and Fidell, 2000) were detected for parents (0.50) and spouses (0.45) in family relationships, female (0.43) against male, suffocation (-0.32), and undeterminable cause/manner of death (0.30). The discriminant function could accurately classify 76.3% of the samples, having a significant predictive power for Wilks' lambda was 0.93, $p<0.05$, and canonical correlations of 0.27, while the previous function did not reach significant predictive power. Reliability and stability appeared to be improved with an increased sample size, suggesting bereaved females, parents and spouses, and undeterminable cause/manner of death of the deceased to be additional risk factors for PTSD symptoms. Further investigation is needed for other bereaved family members, and the individual cause/manner of death of the deceased as risk factors. Some participants (n=65, 15.7%) responded to an additional question asking for a free description of requests or complaints about their respective forensic autopsy. The results were mainly about understanding the forensic autopsy, involving police and forensic medical procedures, and even appreciation, while there were few negative responses; however, their comments suggested that adequate information about the cause and process of death of the deceased is needed to reduce and improve the psychological stress responses of the bereaved. Well-coordinated forensic activity involving accurate determination and appropriate interpretation of the accurate cause and process of death appears primarily important.

**Conclusions:** The present study suggested that parents and spouses as family relationships, female gender, and an undeterminable cause/manner of death to be significant risk factors for PTSD symptoms. Adequate information about the cause and process of death of the deceased is important to reduce and improve psychological stress responses of the bereaved.

**Keywords:** Post Traumatic Stress Disorder; Risk Factor; Forensic Autopsy

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# FUNERARY CUSTOMS IN GREECE- A COURSE IN TIME AND THE SYSTEM IN EFFECT

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**Abstract:** Handling the body of the deceased is a social event which is almost solidly connected with the Orthodox Christian tradition in modern Greek society. In the last few years handling the body of the deceased was mainly constricted to the Orthodox funeral and burial until recently and that collides with the practical commands which reinforced the issue of cremation/ burning of the body of the deceased. The term "funeral" generally addresses the ensemble of the care and the ceremonies that are organized after a person's death by his family and his community. The word "funeral" derives from the Greek verb "??d?µa?" (kedomai) and it generally means attending to and caring. Even since Homer's times, the funeral for ancient Greeks included the prothesis (the laying out of the body), the ekphora (the funeral procession), the burial and the funeral supper. The funeral is ruled by the religious beliefs of the population much more in ancient times than modern times in Greece because there was no division between the political state and the official church in ancient times unlike today. In most cases this procedure is diligently followed in Greece until today with some differentiating tensions however. Nowadays, in Greece the practice of a plain burial is embraced and it takes place 24 hours after the actual death to avoid cases of apparent death. The present study presents the funerary customs that are applied nowadays as they are dictated by the religious, political and legal framework in Greece. The study also emphasizes the unbreakable connection with the past and the peculiarities that were dictated in each case by the prevalent circumstances.

**Keywords:** Funerary Customs in Greece; Nowadays and in the Past

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# CREMATION IN GREECE NOWADAYS - REFERENCES TO THE PAST

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**Abstract:** Burning the dead is the procedure of cremating the body of the deceased person. In order to understand the origin of the custom of cremation from ancient times in Greece, it is worth mentioning that at least in Greece the custom of cremation and deposition of the ashes in cinerary vases with the appropriate funeral offerings, which help archaeologists in the process of dating, is testified during prehistoric times; however, it is manifested much more at the beginning of historic times and then it coexists with the custom of burial. Through centuries the custom of cremation gradually gives ground to the custom of burial and from the middle of the Roman times it ceases to exist. The custom of burial is applied in Greece ever since the country embraced the Orthodox Christian doctrine. New conditions set by the accumulation of the population in big cities which demand more or larger burial places, the cost of religious ceremonies, the problems concerning the hygiene related to the burial and of course the beliefs of the people who compose the population of Greece today have changed the approach to the issue of cremation. Greece is also home for populations whose religion allows or even demands cremation, according to the chairman of the Greek Cremation Committee. Even if there were not many Orthodox Christian people who wanted to be cremated after death in the past, nowadays there is a great number of people who wish to do so. This paper records basic data of the history of the research and these data signal the presence of the custom and the respective legislation for the application of this procedure nowadays by means of scouting the past of a nation which is indigenous and native in the beginning and it integrates elements and procedures of a more generic "becoming" through the course of time.

**Keywords:** Cremation in Greece; Burning; Nowadays and in the Past

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# EPIDEMIOLOGICAL STUDY ON SUICIDE IN RELATION WITH BACKGROUNDS OF ACT IN JAPANESE LARGE CITY AND SMALL TOWNS

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**Abstract:** In Japan, death rates by suicide are quite high. The number of suicide was extremely increased after 1998. To clarify the mechanism of a suicidal act, we investigated ages, sex, causes and backgrounds of suicide in Tokyo metropolitan area,a large city, and Yamagata prefecture, a small towns. The most popular motive of suicidal act was social or economic problems such as unemployment or debts followed by mental disorder. The rate of suicidal cases due to mental disorder in Tokyo was higher than that in Yamagata prefecture. And the number of suicide due to social or economic problems was increased after 1998. That means "social or economic problems" is one of the most important factors of the increased number of suicide. The majority of suicide with mental disorder suffered from depression (mood disorder) and this tendency was especially seen in suicides more than 40 years old. We supposed that radical changes in economic situations and social structures lead to peoples' depression mood and the management of depression should be the effective strategy for suicide prevention.

**Keywords:** Suicide; Social or Economic Problems; Mental Disorder; Tokyo Metropolitan Area; Yamagata Prefect

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# POSTER SESSION

## Session C2

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# IMPLEMENTATION OF ICD-10 DIAGNOSIS OF THE CAUSE OF DEATH

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**Abstract:** Forensic medicine in Spain does not have a standardized system for diagnosing the cause of death. Having a regulated system of classification is fundamental for epidemiological studies of mortality and to compare the data obtained in our field with those from public health. The existing legal regulation establishes the obligation of coding the underlying cause of death by ICD-10. However, as stated in its classification, its application may involve the necessary adaptation to the needs and characteristics of a particular area. The aim of this study is to identify the limitations involved in the classification of the causes of death established in ICD-10 and adapted to the field of forensic pathology. We reviewed the root causes of death for all autopsies performed at the Centre of Forensic Pathology IMLC Collserola during the year 2010 (481 autopsies). The results show the need to limit the number of diagnoses and to group certain entities. In this regard, we propose the use of some broader categories as the ones set out in Schedule PAHO 6/67 for tabulation of mortality data (ICD-10). We also proposes the adjustment to a closed list of diagnoses relating to the immediate cause of death, considering only heart failure, renal, respiratory, liver, different types of shock, neurological damage, disruption of the internal environment, and multiorgan failure. The resulting standardization has rendered a proper forensic approach to the analysis of mortality.

**Keywords:** Mortality; Public Health; ICD-10; Cause of Death

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# ANALYSIS OF 56 DEATHS IN PRISON

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**Introduction:** Deaths in custody are always high-impact events because of the situation of deprivation of liberty of the deceased. The forensic study of these deaths is essential for research. OBJECTIVE Describe the epidemiology of deaths occurring in prison in our area (Martorell, Barcelona, Spain) with greater attention to the deaths caused by adverse drug reaction (ADR).

**Material and Methods:** Retrospective descriptive study. Information sources: Records of the Center for Forensic Pathology (Collserola) of IMLC and IMLC Laboratory Service databases. The study period lasts from 10/09/2003 until 31/07/2010. In all cases there was a complete forensic study (autopsy and toxicological analysis). The variables were: sex, age, cause of death and toxicology results. Analytical methods used were enzyme immunoassay and/or GC-MS. The data were processed using SPSS Version 16.0.1.

**Results:** All deaths in custody during the study period were included in the sample. 56 cases of the sample corresponded to 47 men (84%) and 9 women (16%). The average age of the sample was 37.27 years (std. dev.s 10.42). As for the cause of death, 29 cases (51.78%) were identified once the complete study (autopsy and/or toxicological analysis) as ADR, 10 cases (17.85%) as suicide (all of them by hanging) and 17 (30.35%) due to natural causes. Toxicological analysis was performed in 54 cases (96.43%). In deaths due to ADR, opiates were present in 72% of cases, methadone in 28%, cocaine in a 10%, cannabis in a 10% and 3% alcohol and benzodiazepines in 55% cases. Significant differences were identified as the cause of death according to age groups. DISCUSSION We compare our results with those obtained in similar international studies.

**Conclusions:** Highlighted in our series the high incidence of deaths from ADR and the absence of homicidal deaths. Forensic sources are the gold standard for this type of deaths from external causes.

**Keywords:** Prison; Deaths in Custody; Adverse Drug Reaction

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# LEAN TOOLS IN A FORENSIC PATHOLOGY SERVICE

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**Abstract:** The Lean approach is a philosophy, a proved toolset and a management system that can change the way our services are organized and managed. We present three simple Lean tools tested in our Forensic Pathology Service. The first of them improved delivery of medicolegal reports from the Pathology Service to different Courts. Lean tool number two was used to manage our refrigerators while the third was used to arrange samples in histopathology. All these Lean tools improved the efficiency of our Pathology Service. The way they were implemented led to the desired cultural change in the service and can be extrapolated to other Services.

**Keywords:** Lean; Lean Tools; Management

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# LIVER INFARCT IN THE CONTEXT OF A TRAFFIC ACCIDENT

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**Abstract:** A 28 years old male person has a traffic accident falling from a lorry and being trapped under its cabin for 6 hours with maximum compression at the level of both the right inferior extremity and right hemiabdomen. Conveyed to the reference hospital, the absence of pulse at the left inferior extremity highlights; after treatment pulse recovers. Evolution towards rabdomiolosis, liver failure. The abdominal computerized axial tomography rendered suggestive images of intestinal ischemia, exploratory laparotomia which objectivised celiac trunk and mesenteric thrombosis, liver ischemia, of the small intestine, spleen and stomach. Bad evolution towards a severe metabolic acidosis, hyperkalemia by rabdomiolsis and compartmental syndrome, being thus tributary of haemodialysis and fasciotomies in all compartments. Multiorganic irreparable failure.

NECROSCOPIC STUDY: Inferior extremities incisions of surgical kind (fasciotomies). At the right liver lobule a well delimited necrosis area highlights, compatible with liver infarct versus liver contusion. Minor cardiac hypertrophy of concentric type.

HISTOPATHOLOGICAL STUDY : The existence of a sub capsular liver infarct is confirmed. Cardiac hypertrophy of concentric type, with findings of calcified myocites presenting an irregular distribution. Both macroscopic and microscopic images of the case are presented.

**Keywords:** Traffic Accident; Rabdomiolisis; Multiorganic Failure; Necrosis; Liver Infarct

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# PHEOCHROMOCYTOMA: TWO CASES DIAGNOSED BY FORENSIC AUTOPSY

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**Abstract:** Pheochromocytomas are known to be rare causes of sudden death. The authors present two non-diagnosed cases from forensic autopsies performed in the North of Portugal during 2010. The first case was a 68-year-old woman with a medical history of diabetes mellitus and unknown history of arterial hypertension. The second case was a 31-year-old woman healthy and without symptoms or medical claims. Both cases were victims of sudden unexpected death and the diagnosis was not suspected until the postmortem examination. Autopsy revealed a large tumour of the right adrenal gland in both cases. The strong suspicion of pheochromocytoma was confirmed by histology and immunohistochemistry investigations. In both cases were founded histological findings of acute myocardial ischemia, probably associated to an acute hypertensive crisis, caused by the hitherto unknown pheochromocytoma, wich was ascertained as the cause of death. The morphological findings are presented, the difficulty to diagnose pheochromocytoma and the medico-legal implications are discussed.

**Keywords:** Pheochromocytoma; Sudden Death; Forensic Pathology

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# AORTIC INJURY FOLLOWING FOREIGN BODY PERFORATION OF THE THORACIC ESOPHAGUS. REVIEW OF THE LITERATURE AND REPORT OF A CASE

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**Abstract:** Foreign bodies in the esophagus are uncommon causes of esophageal perforation. Paraesophageal and retroesophageal abscess, mediastinitis, pericarditis, pneumothorax, pyopneumothorax and pneumomediatinum are the most recognized and documented complications associated with esophageal perforation. Vascular injuries following foreign body perforation of the esophagus are rarer and less-known complications. Some isolated case-reports can be found in the literature. However, major vascular trauma resulting from an esophageal foreign body is associated with a significantly higher morbidity and mortality. This report describes a case of esophageal perforation caused by an ingested bone that resulted subsequently in aortic injury and death. The literature on vascular trauma following foreign body perforation of the esophagus is reviewed. The pathophysiology of vascular injury, its diagnosis and treatment are reviewed and emphasis is made on the necessity for an early diagnosis and timely surgical treatment of these deadly complications.

**Keywords:** Foreign Body; Esophageal Perforation; Aortoesophageal Fistula

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# YEARS OF POTENTIAL LIFE LOST AND VIOLENT DEATH: A FIVE-YEAR RETROSPECTIVE ANALYSIS

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**Introduction:** Analyses of the importance of different manner and causes of death are usually based on their relative frequencies. However, in order to better appreciate the magnitude of their influence in the society, it is important to evaluate another parameter already used in epidemiological studies - the Years of Potential Life Lost (YPLL). The authors focused on determining and analyzing this parameter in cases of violent death.

**Materials and Methods:** A digital file from 1628 forensic autopsies performed in the Department of Forensic Pathology (Coimbra) of the Portuguese National Institute of Legal Medicine, from January 2005 to December 2009 was examined for all cases listed as violent death (68,5%). Data collected was used to determine the YPPLL according to manner, cause of death and gender distribution. YPLL was determined subtracting the age at death from the appropriate life expectancy at that age, which was based in what the Portuguese Institute of Statistics established for the triennium 2006-2008: male and female life expectancy being 75,49 and 81,74 years respectively. The authors considered the legal ruling retirement age (65 years) in order to calculate the "potential of working life lost" due to violent death.

**Results:** The cases of violent death had a male/female ratio of 3,83:1. Total YPPL summed 27387.14 years, 20972.06 being accidental, 5578.10 suicidal and 836.98 homicides. Within accidental deaths, traumatic mechanisms were responsible for a loss of 18934.08 years, the great majority due to traffic accidents (12679,00). Asphyxia was the preferred mechanism of suicidal deaths (YPPL 2096,69 years). In homicidal deaths, gunshot wounds were responsible by loss of 300.07 years. The average YPPL for female individuals across different manner and cause of death was slightly higher than the male counterparts, except for suicides in which there was a difference of 7.31 years (28.41 average female YPLL against 21.10). As for the "potential of working life lost", it followed a similar relative trend to the YPLL, adding up to 17547,93 years.

**Discussion and Conclusions:** Analysis of manner and causes of violent death using the YPLL provided an insight to the social impact of violent death. According to the results obtained, clearly preventive measures toward traffic accidents and suicide (especially in younger female) should be areas of further enhancement.

**Keywords:** Violent Death; Years of Potential Life Lost; Cause of Death

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# IMMUNOHISTOCHEMICAL DIAGNOSIS OF MYOCARDITIS ON AUTOPSY MATERIAL - DOES IT IMPROVE THE DIAGNOSIS?

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**Introduction:** The diagnosis of myocarditis was for a long time based on the DALLAS criteria. The clinical diagnosis of myocarditis in symptomatic patients was replaced by an immunohistochemical approach (qualification and quantification of interstitial leukocytes, T-lymphocytes and macrophages on endomyocardial biopsies.) There are recommended cut-off values of cell counts for the positive diagnosis of myocarditis. However, it remains unclear if these cut-off values can also be used for the postmortem diagnosis of myocarditis, especially in SIDS cases.

**Materials and Methods:** A reference sample of 92 SIDS cases and 15 control cases was investigated. Conventional staining of myocardial tissue (haematoxylin-eosin) and immunohistochemical stainings of leukocytes, macrophages, T-lymphocytes and apoptosis were carried out (LCA, CD68, CD45 R0). Criteria for the diagnosis of myocarditis on conventional stained tissue were myocytolysis, necrosis and lymphomonocytic infiltrates. The immunohistological stainings were quantified as follows. For each section 20 High Power Fields (HPF) were counted. Furthermore 10 loci at 100x magnification were counted for each section (1 locus corresponds to 1mm2).

**Results:** In the whole reference sample the diagnosis of a myocarditis based on the DALLAS criteria was possible inonly two cases . The quantification of leukocytes and T-lymphocytes revealed in the reference sample slightly elevated cell counts compared to the control sample. However, the cell counts are in the same range as reported by Krous et al. If different sampling areas and cell counts within one slide are compared cell counts differ widely. The rate of apoptotic cells was not increased in the SIDS sample. Statistical results were more or less equivalent between both groups.

**Conclusions:** At autopsy the diagnosis of fatal myocarditis should still be based on the DALLAS criteria. The immunohistochemical qualification and quantification of interstitial leukocytes and macrophages can not replace the classical diagnosis of myocarditis. Furthermore in the literature recommended cut-off values for an immunohistological diagnosis of myocarditis are for different reasons not valid.

**Keywords:** Myocarditis; Sids; Immunohistochemistry; Dallas Criteria

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# DETECTION OF ENDOTHELIAL PROGENITOR CELLS IN HUMAN SKIN WOUNDS AND ITS APPLICATION FOR WOUND AGE DETERMINATION

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**Abstract:** Endothelial progenitor cells (EPCs), a newly identified cell type, are bone marrow-derived precursors that coexpress stem cell markers and vascular endothelial growth factor receptor 2 (VEGFR2/Flk-1). In this study, a double-color immunofluorescence analysis was carried out using anti-CD34 and anti-VEGFR2 antibodies to examine the time-dependent appearance of EPCs, using 53 human skin wounds with different wound ages (group I, 0-1 days; group II, 2-5 days; group III, 7-14 days; and group IV, 17-21 days). In wound specimens with an age of less than 1 day, CD34+/VEGFR2+ EPCs were not detected. The EPCs were initially observed in wounds aged 2 days, and their number increased in leasions with advances in wound age. In a semiquantitative morphometrical analysis, the average number of EPCs was highest in the wounds of group III. These findings imply that human skin wounds containing EPCs are at least 2 days old. Based on the average number of EPCs in each group, an EPC number of over 25 more strongly suggests a wound age of 9 to 11 days. Together, our observations indicate the participation of EPCs in wound healing of human skin inducing vasculogenesis and therefore, detection of EPCs could be a useful marker for wound age determination.

**Keywords:** Wound Healing; Wound Age Determination; Endothelial Progenitor Cell

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# IMMUNOHISTOCHEMICAL DETECTIO OF HARMONIZATION OF OF UPA, TPA AND PAI-1 WITHIN EXPERIMENTAL THROMBI AND ITS APPLICATION TO THROMBUS AGE DETERMINATION

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**Introduction:** Deep vein thrombus (DVT) is one of the major causes in pulmonary thromboembolism (PTE) from both clinical and forensic aspects. When forensic pathologists encounter cases of DVT-related PTE, they are always required to estimate how old the venous thrombi are. Urokinase-type plasminogen activator (uPA) and tissue-type plasminogen activator (tPA) are serine proteases that are the members of the trypsin family, and they are essential to the intrinsic coagulation and fibrinolytic system. On the other hand, plasminogen activator-inhibitor type-1 (PAI-1) is a member of the serine protease inhibitor family. And it has been shown to regulate uPA and tPA, resulting in the inhibition of proteolytic activity. In this study, we clarified the appearance of uPA, tPA and PAI-1 on the thrombus formation and resolution immunohistochemically using mice model with deep vein thrombosis.

**Materials and Methods:** Eight-week-old male BALB/c mice were anesthetized by intraperitoneal injection of pentobarbital (50 mg/kg). A 2-cm incision was made along the abdominal midline, and the inferior vena cava (IVC) was ligated with 3-0 silk suture. Then, the bowel was returned to the abdominal cavity, and 1 ml of PBS was injected subcutaneously. At 1, 3, 5, 7, 10, 14 and 21 days after the IVC ligation, mice were euthanized by an overdose of diethyl ether, and thrombi with vessel walls were harvested, and subjected to further analyses (n=5 per group). After making paraffin-embedded sections, we immunohistochemically examined the expression of uPA, tPA and PAI-1. After uPA-, tPA or PAI-1-positive cells were enumerated in five high power fields (x 1,000) within the thrombus, total numbers in the five fields were combined. In a separate set of experiments, at 5, 10, and 14 days after IVC-ligation, we obtained the patency rates of thrombosed IVC blood flow using the laser tissue blood flow meter (FLO-C1, Omegawave, Inc., Tokyo, Japan) and measured the intravenous thrombi by weight (n=5 per group).

**Results:** Immunohistochemically, PAI-1-positive cells could be detected 3 days after IVC ligation. And uPA- and tPA-positive cells were not detected until 3 days after IVC ligation and thereafter gradually increased after 7 days. The number of PAI-1-positive cells was significantly higher than that of uPA- and tPA-positive cells after 7 days. The average ratio of uPA to PAI-1 (uPA/PAI-1 ratio) was less than 0.15 until 7 days. After 10 days, the uPA/PAI-1 ratio was greater than 0.15. The average ratio of tPA to PAI-1 (tPA/PAI-1 ratio) was less than 0.2 until 7 days. At more than 10 days, the tPA/PAI-1 ratio was greater than 0.2. These observations implied that an uPA/PAI-1 ratio and tPA/PAI-1 ratio, markedly exceeding 0.3, strongly indicates an age of 14 days and above. Furthermore, the uPA/PAI-1 ratio and tPA/PAI-1 ratio of 0.1 or less probably indicated an age of 5 days or less. On the other hand, the thrombosed IVC blood flow was recovered according to the time after IVC-ligation by the thrombus resolution and the recanalization within thrombi.

**Conclusions:** The harmonization of uPA-, tPA- and PAI-1-positive cells within experimental thrombi changed along with time after IVC ligation. The present study demonstrated that the immunohistochemical detection of intrathrombotic uPA, tPA and PAI-1 was useful for estimation of venous thrombus age.

**Keywords:** Deep Vein Thrombosis; uPA; tPA; PAI-1

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# POST MORTEM COMPUTED TOMOGRAPHY AS AN IMPORTANT TOOL IN ESTABLISHING A CAUSE OF DEATH IN FIRE FATALITIES

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**Introduction:** In the forensic assessment of a burned body, the question whether the victim was still alive when exposed to the fire, is essential, as well as establishing the cause of death. As the external findings in burned bodies are often inconclusive due to postmortem consumption by the fire, the internal findings are all more important. The most important internal signs of vitality are soot deposits in the respiratory tract, the esophagus and the stomach as well as elevated CO-Hb values in the blood. In toxicologic investigations of cause of death, CO-Hb concentration above 50 % are considered lethal. For practical reasons, blood for CO-Hb analysis is usually taken from the right atrium. In some cases where the bodies are severely charred, it can be difficult to obtain a suitable specimen for CO-Hb testing. This is inconvenient as the significance of the vital parameters alone is limited (1). Post Mortem Computed Tomography is a valuable tool facilitating conventional autopsy (2). In fire fatalities PMCT is often used for identification purposes (3). We present a case of a fire death where PMCT was a significant contribution in establishing the cause of death.

**Case Report:** In a completely burned out car an unidentified, charred body was found on the driver's seat. The body was later identified by the forensic odontologist as the owner of the car, a 45-year-old woman. There was information, that she had been mentally unstable lately. She had taken her daughter to school in the morning, and nobody had seen her since. The autopsy revealed a severely burned and charred woman's body with loss of soft tissue, thermal amputation of the distal extremities and partial thermal destruction of the cranium. All internal organs were affected by the heat with shrinking and charring. Small remnants of blood was found in the heart and aorta, but it had changed into a thick, modeling wax- like texture, and was not suitable for CO-Hb testing. In the pharynx, in the respiratory tract and in the esophagus there were great amounts of soot deposits Before the autopsy, a PMCT was performed. Artefacts due to charring and shrinking challenged the evaluation of the CT images. However, it was possible to localize an area in the large blood vessels just above the heart, still containing blood. No blood was clearly visible in the heart chambers. This information was given to the forensic pathologist before the autopsy, thereby enabling her to optimize the anatomical location for aspiration of blood. Before the exvisceration, and guided by the CT images, the syringe was placed in a large vessel (probably the superior vena cava). An ample amount of liquid blood was aspirated, and analyzed to establish the CO-Hb level as well as the blood was used for alcohol and drug analyses. Toxicology revealed that her carbon monoxide level was 57 % saturation. The cause of death was established to be carbon monoxide poisoning. Histological examination revealed soot deposits in the lower respiratory tract, thus confirming the diagnosis. The manner of death was believed to be suicide.

**Conclusions:** PMCT can be a valuable tool complementing conventional autopsy in fire fatalities when the bodies are extensively burned and the physical autopsies limited. The PMCT images can act as a guide for selecting an anatomical location for aspiration of blood suitable for analysis.

**Keywords:** *Post Mortem*; Computed Tomography; Cause of Death

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# HOMICIDE AGAINST CHILDREN BEFORE SCHOOL AGE IN TARRANT COUNTY, TEXAS

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**Introduction:** Child homicide, although proportionately unusual, represents social and medico-legal problems which attract public attention worldwide. Such cases are also among the most difficult and challenging for forensic pathologists. The prevalence and other characteristics of child homicide may be closely related to social and economic changes within a particular society, and may vary significantly year to year. There was no previous in-depth analysis of child homicide in Tarrant County, Texas. The target of this study was to clarify the occurrences and demonstrate epidemiological and medico-legal characteristics of such cases.

**Materials and Methods:** This study included all the homicide cases younger than 7 years of age in Tarrant County, Texas, from 2005 to 2009. Data were collected from the Tarrant County Medical Examiner Office records. Every case files included scene investigative reports, police reports, and medico-legal autopsy reports prepared by forensic pathologists. Analysis of toxicology and microbiology was also included if necessary. The data were analyzed according to the age, gender, race, cases per year, evidence of prior abuse, body region of injury, cause of death, and suspect profile.

**Results:** There were 38 eligible child homicide cases (22 males, 16 females). 13 victims were younger than 1 year of age and they were predominantly male and Hispanic. A history of abuse or neglect was noted for over half of the cases. Blunt trauma was the most common cause of death with two-third of all the cases involving the head. Most of the suspects knew the victim.

**Conclusions:** This study focused on homicide against children before school age because they are the most vulnerable in pediatric population. The majority of deaths in the study occurred among children younger than 4 years of age, with a high proportion of fatalities among Hispanic, a finding dissimilar to other studies. A larger Hispanic population in Tarrant County, Texas, compared to other geographic locations may be a contributing factor. As in other studies, the victims were slightly more likely to be male, and the suspects in many cases knew the victim with half of the homicides involving a parent. The most common scenario was the parent or caretaker finding the child unresponsive.

**Keywords:** Homicide; Children

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# UNUSUAL CASE OF FATAL CARBON MONOXIDE POISONING DUE TO FAULTY CHIMNEY DUCT

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**Abstract:** Carbon monoxide(CO)is a colorless, odorless, tasteless, and non-irritating gas whose relative density is a little less than that of air. The most common sources of CO in deaths are fires, automobile exhaust, defective heaters, and incomplete combustion of burning products, such as charcoal briquets. CO is produced whenever organic materials are burned with inadequate supply of oxygen necessary to produce complete combustion. The CO posoning is one of the most common causes of death in developing and underdeveloped countries. Almost fatal CO poisoning cases, mostly accidental or suicidal deaths occur in very unusual place away from the heating appliances . However , this case occurred in very unusual place away from the heating applaances due to faulty chimney duct. Because of a peculiar place, it is difficult to imagine the cause of death as a CO poisoning. Deaths from CO inhalation can occur if the individual is in proximity to a rich sources of CO for a prolonged time. Therefore, even though men dies away from the heating appliance, it is nessary to bear in mind the possibility of CO poisoning.

**Keywords:** Co Intoxication; Faulty Chimney Duct

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# POSTMORTEM BIOCHEMISTRY OF PERICARDIAL FLUID IN DEATH INVESTIGATIONS

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**Introduction:** Pericardial fluid (PCF) is a well-preserved postmortem material in cases without structural damage due to injury or medical intervention, containing various biochemical substances. The present study investigated a spectrum of pericardial biochemical markers, including total proteins (TP), albumin (Alb), urea nitrogen (UN), creatinine (Cr), uric acid (UA), sodium (Na), potassium (K), chloride (Cl), magnesium (Mg), calcium (Ca), glucose (Glu), with regard to the postmortem interval, survival period and cause of death in serial forensic autopsy cases.

**Materials and Methods:** Medicolegal autopsy cases having intact pericardial and cardiac structures (n=296) within 48 h postmortem (median, 19.5 h) at our institute were examined, consisting of 218 males and 78 females between 0-80 (median, 32.9) years of age with survival time of 0.1 h-1 year (median, 2.5 h). The causes of death were: blunt injury (n=84: head injury, n=53; others, n=31), gunshot wound (n=3), sharp instrument injury (n=3), mechanical asphyxiation (n=31), intoxication (n=24: methamphetamine, n=5; psychotropic drugs, n=7; others, n=12), freshwater drowning (n=7), fire fatality (n=70), hypothermia (cold exposure, n=7), hyperthermia (heat stroke, n=6), other traumas (n=5), acute cardiac death (ACD, n=21) including myocardial infarction without hemopericardium (n=7), cerebrovascular disease (CVD, n=9), and other diseases (n=26). For this study, clearly identifiable cases were collected. PCF in the pericardial cavity was collected using sterile syringes at autopsy. The specimens were stored at -20 ? until use and centrifuged before analysis. Biochemical markers were measured using qualified automated analyzers.

**Results:** The amount of PCF was 0-200 ml with a median of 10.0 ml and a mean of 15.0 ml (90th percentile, 5.0-24.7 ml), showing no survival or postmortem time dependency, or difference between the causes of death. Concentrations of most biochemical markers were independent of the amount of PCF, except for slight negative correlations for K ($R=0.217$, $p<0.001$,), Ca ($R=0.183$, $p<0.01$,) and Mg ($R=0.206$, $p<0.001$). For all cases, there were moderate postmortem time-dependent decreases of Na ($R=0.470$, $P<0.0001$) and Cl ($R=0.490$, $p<0.0001$), and increases of K ($R=0.390$, $p<0.0001$) and Mg ($R=0.382$, $p<0.0001$); however, the findings were different among the causes of death: blunt injury, mechanical asphyxiation and intoxication showed moderate decreases of Na and Cl ($R=0.419$-$0.771$, $p<0.05$-$0.0001$) and increases of K and Mg ($R=0.453$-$0.700$, $p<0.01$-$0.0001$), while the relationships were insignificant for drowning, hyperthermia, hypothermia and ACD ($p>0.05$). The changes in other markers were slight or insignificant within 48 h postmortem. Under these conditions, characteristic findings with regard to the cause of death were detected: lower TP and Alb levels for blunt injury; lower TP and Alb, and higher UN, Cr, UA, Na and Cl levels for blunt head injury; a higher Glu level for sharp instrument injury; higher Ca and Glu levels for mechanical asphyxiation; lower Na and Cl levels for freshwater drowning; lower Na, Cl and Ca, and higher Alb, Cr, UA, K, Mg and Glu levels for intoxication; lower TP, Alb, Cr and K, and higher Na levels for hypothermia; lower Ca, and higher Alb, Cr and UA and Mg levels for hyperthermia; higher UA and Glu levels for ACD; higher UN, Cr, K, Mg and Glu levels for CVD. Significant survival time-dependent increases were detected for UN in blunt injury, fire fatality, mechanical asphyxiation, intoxication and ACD cases, and for Cr in the latter four groups, while a tendency toward a decrease was seen for TP and Alb (insignificant).

**Discussion and Conclusions:** These observations suggest the usefulness of pericardial biochemical markers for investigating the cause, process and pathophysiology of death as well as preexisting disorders to enforce pathological and toxicological findings.

**Keywords:** Forensic Biochemistry

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# VARIATION OF POSTMORTEM PULMONARY CT HIGH-DENSITY AREAS IN SERIAL AUTOPSY CASES OF SUDDEN CARDIAC DEATH

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**Introduction:** Application of diagnostic imaging procedures is widespread in postmortem investigation; postmortem CT (PM-CT) is especially popular worldwide, providing a spectrum of whole body morphology before autopsy. Evident variations are detected in PM-CT morphology of the lung, involving increased transparency or opacity due to congestion and edema in death process and changes after death. Previous studies were mostly intent on demonstrating or eliminating postmortem interference with pulmonary CT findings, stressing an evident increase of hypostatic high-density areas; however, pulmonary PM-CT morphology largely depends on the status of aeration and water contents at the time of death, which are characteristic of the cause of death. The present study investigated postmortem changes in pulmonary CT morphology of sudden cardiac death (SCD), which often presents with marked congestion and edema.

**Materials and Methods:** PM-CT data of serial autopsy cases of SCD (n=22, 0-91 years of age) without apparent putrefactive changes (within 2 days postmortem) were examined with regard to the pulmonary morphology, including hypostatic opacification. PM-CT was routinely taken before autopsy using a scanner (ECLOS; Hitachi Medical Co., Tokyo) with 5-10-mm slice thickness. Causes of SCD included acute/recurrent myocardial infarction (n=8), possible fatal arrhythmia without ischemic myocardial lesions (n=9), and others (n=5: congestive heart failure, n=3; acute myocarditis, n=1; congenital heart disease, n=1). These cases included deaths without recovery despite critical medical intervention involving fluid infusion of <500ml in hospital emergency units (n=17).

**Results:** Most cases of myocardial infarction (7 out of 8 cases) and possible fatal arrhythmia (7 out of 9 cases) had increased pulmonary vascularity and ground glass opacification with/without partial consolidation (n=6/8). Hypostatic opacification in the posterior lung areas was not evident in some cases (n=6 and n=5, respectively), although the livor was apparent on the back. In the other cases (n=5), congestive heart failure (n=3) showed predominant ground glass opacification, while consolidation was predominant in acute myocarditis (n=1) and congenital heart disease (n=1). Hypostatic opacification in the posterior lung areas was not evident in these cases (n=5), despite apparent livor on the back. Hypostatic opacification was not evident in 16 cases (72.7%), independent of cardiac pathology, as mentioned above. In witnessed deaths (n=5), a SCD case (possible fatal arrhythmia) during a struggle in a prone position showed anterior consolidation without significant hypostatic opacification about 18 h later, which indicated gravity-dependent congestion in the agony period. Similar findings were partly seen about 26 and 32 h later in two cases of death sitting facedown and lying laterally, showing anterior and hemilateral ground glass opacity, respectively. Among unwitnessed deaths (n=17), 9 cases of death in a prone position and sitting facedown had possible gravity-dependent ground glass opacity and/or enhanced vascularity in anterior lung areas about 14-37 h postmortem, independent of the cause of death; one had livor on both sides of the front and back. Opacification in CT morphology was independent of fluid infusion (<500 ml) during critical medical care without recovery (n=17). Histology of the lung areas corresponding to hypostatic opacity was congestion with intraalveolar edema, and other parts predominantly showed congestion with partial hemorrhages.

**Discussion and Conclusions:** CT morphology of pulmonary vascular congestion in SCD may remain without serious postmortem interference in cases without recovery from cardiac arrest, showing varied high-density areas, partly related to the posture at the time of death. These observations suggest that plain PM-CT findings are useful for evaluating pulmonary congestion and edema in the death process.

**Keywords:** *Post mortem* Computed Tomography (PM-CT); Pulmonary CT; Sudden Cardiac Death

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# FORENSIC EXAMINATION OF POSTMORTEM DISMEMBREMENT

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**Abstract:** Postmortem dismemberment and mutilation are unusual in forensic cases. We report a case of postmortem dismemberment and present the analysis of toolmarks on bone and cartilage produced as a result of sharp force trauma. In winter 2010, a human head, a torso, a foot and a hand were found dispersed along the highway, being the two most distant fragments about 120 kilometers away from each other. The remains were positively identified through fingerprints as those of a 45-year-old female. It was learned that her death had occurred two days after a domestic dispute. The aggressor worked as a slaughterer and disarticulated the body in order to make identification more difficult. As a cause of death, the autopsy showed a sharp-force trauma at the back. Additionally, associated blunt-force trauma was found at the head and upper extremities. After conventional autopsy, we removed muscle tissue, and the remains were macerated in hot water with an enzymatic detergent, ensuring that no additional toolmarks were made as a result of processing. Forensic analysis of the bone and cartilage at articular surfaces allowed us to recognize numerous superficial incised marks from different directions, suggesting rotation of either the blade or the remains. The pattern of the cuts was indicative that a sharp non-serrated instrument was used for disarticulation. In spite of the fact that the analysis of the bone toolmarks are generally considered of little value forensically, inferences about weapon identification and criminal behaviour, gave us invaluable data which are admissible in a court of law.

**Keywords:** *Post mortem* Dismemberment; Mutilation; Toolmarks; Anthropology

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# PATTERN OF UNNATURAL DEATH DURING A 13-YEAR PERIOD IN THE REGION OF EPIRUS, GREECE

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**Introduction:** The evaluation of the epidemiological characteristics and pattern of unnatural deaths in the region of Epirus, north-west Greece, during the period 1998-2010, so that possible preventive measures can be proposed. Cases were classified according to the manner and cause of death and the gender and age of the deceased.

**Methods:** A retrospective review of the archives of the Department of Forensic Medicine and Toxicology, Medical School, University of Ioannina, was performed and the cases that concerned the unnatural deaths were collected for evaluation. The archives included data of all autopsy cases performed in the region of Epirus during the study period. The study population included all residents of Epirus. The region comprises of four prefectures and its total population in 2001 was 352,421 inhabitants, according to The National Statistical Service Bureau. The Epirus's population represented approximately 3.3% of the total population of Greece. For each case, medical records, circumstances of death and autopsy data were recorded.

**Results:** During the 13-year period, among 3,206 autopsies performed, 1,681 unnatural deaths (52.4%) were examined. The mortality rate was 36.7/100,000 inhabitants per year. Death frequencies were much higher for males (1,295) than for females (386), with a male/female ratio of 3.35/1. The mean age was 49.8 years (SD=21.77). Regarding the manner of death, most autopsy cases were classified as accidents (1,236/1,681; 73.5%), followed by suicides (257/1,681; 15.3%) and homicides (64/1,681; 3.8%). A percentage of 7.4% (124/1,681) of deaths were characterized as undetermined. The leading cause of death between the accidental deaths was traffic injuries in 67.3% (832/1,236: 520 drivers, 159 occupants and 153 pedestrians), with people in the second decade of age being more prone to such deaths, and falls from height (127/1,236; 10.3%). Among homicides, the majority of cases were committed by firearm (38/64; 59.4%) and blunt object (12/64; 18.8%). Regarding suicides, hanging (84/257; 32.7%) and shooting (69/257; 26.8%) were most frequently encountered.

**Conclusions:** Our results show mainly that in the study population: (i) the majority of unnatural deaths were accidental in nature, (ii) road traffic accidents are tied as the leading cause of death and (iii) suicides are recorded as the second manner of death. As a general conclusion, many of the accidental deaths could be preventable. This should raise a concern for public health authorities to improve, develop and evaluate programs and policies to avert violent deaths in Epirus, Greece.

**Keywords:** Autopsy; Unnatural Death; Accidents; Suicide; Homicides; Undetermined

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# OVERESTIMATION OF POST MORTEM INTERVAL RELATED TO EXTRACTION OF SAMPLES FROM VITREOUS HUMOUR?

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**Abstract:** Due to its possible criminal and civil repercussions, the correct determination of the time of death is absolutely crucial in legal medicine, and in recent years this has been the recurring object of research into maximizing the precision and reliability of its estimation. Given that most homicide victims are discovered soon after death, it is therefore of utmost importance to have recourse to a method which can provide this information quickly and accurately. The best results for estimating time of death derive from the biochemistry of the vitreous humour and are based on examining the relationship between PMI and increases in K+ and hypoxanthine (Hx) levels by means of novel mathematical models such as AM and SVM. Latest reports in the literature suggest that the manner of death can also modify this relationship. Also, contamination can occur during the extraction of the sample, leading to overestimation of the PMI. We compare the differences between the real PMI with that obtained by the PMICALC program [Muñoz-Barús et al., Doi:10.1016/j.forsciint.2009.10.006] using different degrees of blood contamination semi-quantified microscopically. Contamination by causes not readily apparent, such as blood from the accidental puncture of blood vessels can cause an increase in the concentrations of Hx in the vitreous humour independently of direct diffusion related to PMI. This noticeably affects the result, and thus emphasises the importance of careful sample extraction

**Keywords:** Time of Death; Vitreous Humour; HX

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# RECORDING OF DEATHS RELATED TO ALCOHOL CONSUMPTION IN THE RIBEIRÃO PRETO REGION, SÃO PAULO, BRAZIL, FROM 1996-2007

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**Introduction:** There is evidence that alcohol is a risk factor in disease and death, in addition to other negative social consequences. Alcohol consumption is recognised worldwide as an important public health concern. Health statistics may only take into account the cause of death. We chose to investigate the potential further influence of alcohol consumption. Ribeirão Preto, State of São Paulo, Brazil, was chosen as the location for the study. It has one of the highest rates of consumption of alcoholic beverages in Brazil. OBJECTIVES: To examine multiple cause of death potentially related to alcohol consumption in the Ribeirão Preto region, São Paulo, Brazil, from 1996-2007, and to consider their implications for public health statistics.

**Methods:** The study relied on data from the Mortality Information System of the Ministry of Health (SIM/MS), Brazil. All 324 files containing declaration of death (DD) documents held on SIM/MS (available at DATASUS: www.datasus.gov.br) for between 1996 and 2007 were downloaded. APPENDA was used to filter the data, yielding 1,800 DD documents which refer to alcohol as a basic or related cause of death (F10 at International Classification of Diseases - ICD, 10th edition, WHO, 1990).

**Results:** In the 1,800 DD documents refering to alcohol, there was predominance of males (90.1%), between 40-59 years old (56.9%), and of Caucasian ancestry (White, 65.7% ). Analysis of educational level attained was confounded due to the high number where this parameter was classed as unknown (78.8%). Post mortem examinations had been undertaken in 43.7% of cases and in 56.3% of these no laboratory tests were requested. The ICD-10 Chapters: IX- Diseases of the circulatory system, X- Diseases of the respiratory system and XI- Diseases of the digestive system were the three most frequently assigned causes of death, totalling 56.2% of basic causes and 48.7% of all recorded diagnoses. Among the main causes of death diseases of the liver, pneumonias, pancreatitis and other pancreatic diseases, hypertension, and mental and behavioural disorders associated with psychoactive substances were common. Only 1% of the deaths refering to alcohol could be attributed to Chapter XX- External causes of morbidity and mortality of ICD-10. This indicated inadequate recording of alcohol consumption in deaths related to transport accidents and violence, implying lack of information sharing between Medical Legal Institutes (IML) - which are resposible for post mortem investigations - and the SIM/MS. Consultation with the IML established that death certification occurred prior to receipt of results of laboratory analyses, which hence were not included in the DD documents. Certification could not be delayed until laboratory results were obtained, because of the delay this would cause to the burial of the deceased.

**Conclusions:** Our results indicate that the influence of alchohol consumption in deaths recorded in SIM/MS DD documents can be reliable investigated when the deaths are related to disease. This is not possible, however, for external causes of death, including those related to road traffic accidents and violence, because of inadequete information sharing between the IML and SIM/MS. Legistative or adminstrative changes may be necessary in Brazil to correct this situation.

**Keywords:** Multiple Causes of Death; Diseases; Alcohol; SIM/MS; ICD-10; External Causes of Death; Brazil

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# PREVALENCE AND CHARACTERISTICS OF PHYSICAL ABUSE IN CHILDREN: A RETROSPECTIVE STUDY IN GREATER CAIRO (2008-2009)

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**Introduction:** There is clear evidence that child abuse is a global problem. It occurs in many forms; physical or mental injury, sexual abuse or negligent treatment. Child abuse is deeply rooted in cultural, economic and social practices. This study aimed at illustrating the pattern of physical child abuse either fatal or non-fatal one inflicted in Greater Cairo, Egypt through the year 2008-2009, via studying all cases of child abuse referred to medicolegal authority - Ministry of Justice.

**Methods:** Demographic data, characters of both victims and perpetrators, injuries sustained and their frequencies have been recorded.

**Results:** Our results yielded that, the total number of cases was 193; most of them were in primary school age (n=71) . Percentages of non-fatal child abuse exceeded that of the fatal. head injuries and cerebral hemorrhage were the commonest cause of death ( 53%) and males are more prone to be victims of child abuse (61.7 %) .The commonest perpetrator was the mother (77.3%) in the infancy age group of victims. The commonest non- accidental injury to soft tissues was bruises which considered as warning sign for physical child abuse.

**Keywords:** Physical Child Abuse; Greater Cairo-Egypt

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# PHYSICAL AND SEXUAL ABUSE OF CHILDREN IN REPUBLIC OF MACEDONIA

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**Abstract:** Only recently has the abuse of children come to be seen as a major social problem in Macedonia. The non governmental organization played the pivotal role in recognizing and the extend of the problem. Physical abuse is the deliberate application of force to any part of child's body bay a parent or caregiver, witch results or may result in non accidental injury. It may involve hitting a child a single time or it may involve a pattern of incidents. Child physical abuse is usually connected to physical punishment or is confused with child discipline. ("The stick comes form the haven" -the sentence repeated by our grandparents). That is why physical abuse in previous years comes extremely rare to attention of the public. Also, the alertness of the doctors is on a low scale. We had only few calls from the pediatrics for help as a forensic expert to take part in cases of child abuse. In the past few years much more attention are given to child abuse and pattern of injury in education of the medical and postgraduate students. During a 5 year period, among 53 reported child abuses , 11 were sexual and physical injuries acquired inside the family. Only the fatal outcome of such injuries had proper attention and even, publicity. Such cases raise the awareness for child abuse. At our Institute of forensic medicine in 12 autopsies are done on the children from 2 months to 17 years, where the cause of death was in direct connection with the injuries contracted in a close family circle.

**Keywords:** Child Abuse; Sexual Abuse; Family; Child Homicide

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# PERSONAL IDENTIFICATION FROM HUMAN REMAINS BY DNA TYPING

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**Case Report:** Personal identification of human remains by DNA typing is made by comparing DNA profiles from human remains to DNA profiles from supposed biological relatives of the tested person, using different methods, for DNA profiling, such as short tandem repeat (STR) typing of autosomal and Y chromosome and sequencing of mitochondrial DNA (mtDNA) if tested human remains are very old or if the maternal lineage of the deceased is followed. In the last 5 years in our laboratory successfully were solved ten cases of identification using DNA profiling methods, including eight cases of identification of body remains from missing persons, found in changed or decomposed form and two cases of left babies with unknown identity. In nine cases, the identification was positive with accuracy more that 99,9 %, so the identity of the unknown person was proved, only in one case of unknown baby, there was mismatching between baby's DNA profile and DNA profile of the supposed mother, so the identification was negative. DNA technology is supreme technology in human identification, especially when, other methods used in identification such as facial recognition or recognition of special features of the body such as scars, or tattoos, or dentition are insufficient for positive identification.

**Keywords:** Personal Identification; STR Typing; MtDNA Sequencing

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# EVALUATION OF MOBILE ULTRASSOUND DEVICE AT THE SITE OF A BODY FIDING

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**Introduction:** At the site of a body finding forensic pathologists are forced to rely exclusively on the findings from external postmortem examination to advise the public prosecutor whether to request a forensic autopsy or not. The great advances that were made in forensic radiology, notably by computed tomography (CT) and magnetic resonance imaging (MRI) are of no use in the field due to the immobility of the equipment. However, mobile imaging devices would be useful for the postmortem examination on-site and might assist with the decision regarding the necessitiy of forensic autopsy. It was the goal of this study to test the utility of the new, palm-sized, mobile ultrasound devices for external postmortem examination and to assess the added value provided by on-site imaging regarding the forensic decision making process.

**Methods:** We elaborated a dedicated, FAST(Focused Assessment with Sonography for Trauma)-based protocol for forensic sonography and prospectively examined 20 human cadavers that were admitted to our institute for forensic evaluation using a GE Healthcare VscanTM and a Siemens Acuson P10TM prior to postmortem computed tomography (CT) and traditional autopsy. Sonographic findings were then compared to CT and autopsy findings.

**Results:** We will present our experiences and results with both mobile ultrasound devices and discuss their usefulness, benefits and limitations regarding forensic examination of a corpse.

**Keywords:** Pprtable; Ultrasound Device; Forensic Imaging; Virtopsy

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# RESEARCH ON IMPROVISED EXPLOSIVE DEVICES

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**Abstract:** Improvised explosive devices are usually used by terrorist. Improvised explosive devices are diversified, intelligent in china, hundreds of explosion cases were collected in recent years, The typical improvised explosive devices were summarized according to these explosion cases. The principles of preparation, the methods of operation of the typical improvised explosive devices including the timing device, the remote control device, triggering control device, the multi-control device and so on were introduced in the paper. The model of the typical improvised explosive devices were made in laboratory. the parts of the typical improvised explosive devices were purchased in market and assembled according to the principles of preparation of the typical improvised explosive devices, the electric detonator was substituted by buzzer in the model. when the model of the devices worked , buzzer would alarm. The feasibility and reliability of the typical improvised explosive devices were tested . About two hundred models were made. The principles of improvised explosive devices were demonstrated by the models. The method to dispose such explosive devices were given according to the principles in the paper, which be helpful to counter terrorism.

**Keywords:** Improvised Explosive Devices; Terrorism

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# MANAGEMENT OF DEAD IN MASS DISASTERS -RECENT ADVANCES IN SOUTH ASIA

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**Abstract:** Management of dead in mass disasters has not received much attention until recent times compared to management of trauma victims of multiple casualty incidents in clinical settings though the mortality data of mass disasters were rapidly increasing throughout past decades. Management of dead in mass disasters was first conceptualized by the Pan American Health Association (PAHO) in 2004. Its a multidisciplinary multistage cohesive process which should be implemented by a central coordinated body. Most of its integrated effects were not grasped by the mechanisms established for identification of deceased in the Asian tsunami affected countries in early 2005. Hurricane Katrina and many other disasters also had the same fate. In broader context, the management of dead in disaster situations is comprised of three main spheres. * Physical management of dead * Information management of dead * Specific support to bereaved families and communities Management of dead is an interactive, integrated and continuing process extending into the late post disaster period. It is essential to put the affected community back to its near normal state as much as possible within a minimal time period. The most urgent task to be dealt is the physical management of dead which should be commenced in the immediate post disaster period. The main objectives of appropriate management of dead in disasters are: * Respect the dignity of the dead * Respect the bereaved, including their right to know the fate and whereabouts of their missing loved ones * Positive Identification of all deceased * Determination of Cause(s) of death * Dignified disposal and mourn the remains of dead in accordance to religious and cultural needs of the affected community * Resolve other medico-legal issues pertaining to the disaster eg. cause of the disaster esp. in man made disasters Physical management of dead in disasters is a stepwise procedure operated via a coordination mechanism. This procedure could be usually divided into five distinct phases. In standard practice, it consists of: Recovery, Transportation, Storage, Identification Disposal of dead. Each step is related to subsequent step and the whole procedure needs to be pre planned to achieve best results. The final achievement mainly depends on the strength of the coordination mechanism established within the affected region to facilitate smooth flow of events related to physical management of dead. The core of this coordination mechanism is the establishment of a central command post during the immediate post disaster period. However since 2005 many tsunami affected countries attempted to evaluate the methods adopted at the local level to manage casualties and dead during the aftermath of tsunami disaster. It was possible in many south Asian countries to convince policy makers to a reasonable degree that both living and deceased should receive equal attention in mass disasters when states were creating centrally governed multifaceted disaster management authorities during the post tsunami period. The spontaneous participation of survivors of the affected community and concerned public of neighboring communities for rescue and relief operations during the immediate aftermath of a disaster has been a significant feature in many recent disasters experienced specially in south and east Asia. The role of these first responders in managing dead was inco-operated into disaster management policies of many south Asian countries during last five years. The International Committee of the Red Cross (ICRC) has taken the lead in this effort by publishing the ground level experience to be used globally through local Red Cross societies and related government counterparts. Management of dead in mass disasters is a forensic emergency. This paper intends to explore the necessity of managing dead as a main pillar of post disaster response in mass disasters, together with rescue and care

**Keywords:** Mass Disaster; Management of Dead; First Responders; South Asia

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# IMPLEMENTATION OF ISTANBUL PROTOCOL - GEORGIAN EXPERIENCE

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**Abstract:** Implementation of the Istanbul Protocol (IP) as the UN guidelines for effective documentation and prevention of Torture was initiated by the International Rehabilitation Council for Torture Victims (IRCT) in 2004 in Georgia when the first Training of Users was held. 50 medical and 25 legal professionals from public, private, civil society organisations and NGOs participated. Two distinct features of the status of general documentation practice and knowledge were revealed: a. a lack of coordination in routine documentation practice of alleged torture cases and b. the necessity for a multidisciplinary approach for effective investigation of torture. Nationally adapted medical and legal guidelines were developed in close collaboration with national trainers for wider dissemination. Notably, support from the Georgian Medical Association and Public Defenders Office in Georgia contributed significantly toward improving practitioners' daily work with alleged torture cases.

The next step of the IRCT project was a Training of Trainers seminar in 2007 for 24 medical and legal professionals. The RCT/EMPATHY took leading role in practical activities for medical rehabilitation of torture victims in the country. Several cases were documented and reported to international courts according to IP. The Caucasian Regional Training-Workshop for Georgian, Armenian and Azerbaijan professionals was held.

To further institutionalise the knowledge of the IP, an undergraduate medical curriculum was developed with the support of the IRCT. The syllabus was elaborated for Tbilisi State Medical University and admitted to the Faculties of Medicine, Dentistry, Pharmacy, Public Health and Rehabilitation as an elective course for inclusion to the final undergraduate semester. The chapter of torture forensic documentation was included into the Textbook of Forensic Medicine for professionals and students of medical and legal faculties.

Details and a closer view of the Georgian experience in implementing the Istanbul Protocol are presented.

**Keywords:** Torture; Documentation; Istanbul Protocol; Implementation; Georgia

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# A CASE OF ANTI-REGIME - A FIREARM INJURY

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**Abstract:** Many non-citizens were injured during the incidents that occurred in Syria. To draw attention to the drama an interesting case, occurred in the anti regime events, presented in this case report. Our case, a 27 year old male, wanted to escape to Turkey because of the rebellion launched against the regime in Syria. Firearms by security forces injured his right eye while attempting to cross the border. Although wounded, fled to a shelter in Turkey. In his physical examination 300 degree full-thickness laceration of the. right sclera, choroid and retinal detachment, vitreous was detected outside the right periorbital ecchymosis, edema, nasal lower lid incision and tissue loss have been identified fully. Radiographs of the posterior fossa, right orbital wall and the right orbital globda apexinde lead perforation detected by hyperdense metallic appearance. Tomography of the brain have not been identified pathological feature. The right eye underwent surgery and was repaired primarily. However, the right eye is completely lost function.He was discharged 7 days after treatment. Bullet firearms was limited to only the eye globe and the orbital bone Although the bullet stuck in the back wall of orbit, it was interesting not to damage brain tissue. In addition, unmerciful shooting to an innocent citizen who is unarmed and escaping from violence, show that the life is so difficult for the people against the regime in Syria

**Keywords:** Gunshot Wounds; Human Rights Violations

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# FIREARM INJURIES DOCUMENTED AMONG SYRIAN REFUGEES IN ANTAKYATURKEY

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**Abstract:** The Arab Spring the revolutionary wave of demonstrations and protests that has been taking place in the Arab world since 18 December 2010 also affected Syria. After the massacres and excessive us e of force in several cities of Syria huge number of people started to leave their country. Antakya was among the first cities that the Syrians looked for shelter and emergency medical care after these military attacks. Some of the injured were treated in Antakya Mustafa Kemal University Medical Faculty Hospital The information of the wounded will be discussed based on existing literature. Medical records of 31 refugees who applied to Antakya University Medical Faculty between the dates 05.31.2011 -06.06.2011 were examined. The age variance was between 4 years to 54 years . And th e mean age was 30.54 ± 10.22. All the cases were male. 29% of the injuries, lower extremity, 22.6% percent of upper extremity, 19.4% were localized to eye zone. All of the shootings were found to be long-distance shooting. In two patients four, in three patients three and in five patients two gunshot wounds were present. Two of the patients had died due to gunshot injury. One of the cases was a 30 year old man. Injured after the helicopter opened fire, gunshot wound to his body had 4 pieces. The cause of death were found to be internal organs and major vascular injury. The other case is 80 years old female, was killed in the head because of gunshot wound. The results of excessive use of force by Syrian Security forces to their citizens during peaceful demonstrations will be analyzed by taking into consideration the gender, age, injury regions, and number of the patients By this situation violating human rights.

**Keywords:** Firearm Injuries; Human Rights; Excessive Use of Force; High Velocity Gun Shot Wounds

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# DEATH BY AN ATTACK OF "AFRICANIZED" BEES: REPORT OF A CASE IN CACERES - MT - BRAZIL

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**Introduction:** Bees and wasps belong to the order Hymenoptera, as the ants. These insects are responsible for human deaths through stings located in the abdomen, which inject venom and induce severe allergic or toxic reactions. European bees (Apis mellifera mellifera) were introduced in Brazil in 1839. In 1957, African bees (Apis mellifera adamson) have fled of areas of research in Brazil and since then there are hundreds of reports of serious and fatal accidents, because of the hybridization of European and African bees (Apis mellifera scutelata) that resulted in good production of honey, but high volume of aggression linked to the African bees. Bees have a serrated barb attached to venom-producing glands and muscles to release and provoke protrusion of the sting and ejection of the venom. When a bee stings, these structures are detached with part of the insect gut, causing the death of the bee. The sting penetrates about 2 to 3 mm into the skin and keeps pumping venom due the muscle movements, until about a minute. After this time the withdrawal of the stingers not alter the prognosis of the accident. A bee can kill a human by two mechanisms: hypersensitivity reaction, which occur in predisposed individuals as a result of one or a few bites and are not related to the toxicity of the venom or poisoning due to a potent venom phospholipids where FA2 and melting action is predominant, causing nausea, vomiting, generalized weakness, hypotension, pulmonary edema, tachycardia, loss of consciousness and shock. In cases of an extreme number of bites, death occurs quickly because of the cardio toxicity of the venom. Late manifestations include hematuria, rhabdomyolysis and acute renal failure. About 500 stings, is life-threatening to a human. In five men attacked by African bees, receiving approximately 200 to 1000 bites each, the clinical signs were observed intravascular hemolysis, acute respiratory deficiency syndrome, liver dysfunction, rhabdomyolysis (with myoglobin and myoglobinuria), hypertension and myocardial injury (probably due to endogenous catecholamine release by phospholipase A2 and melittin from the venom), shock, coma, acute renal failure and bleeding.

**Case Report:** Male, 81 years-old, hometown, Cáceres-MT, with 1.68 m in height and obese. On the morning of June 7, 2010, the victim suffered a massive attack by Africanized bees that caused his death. The victim had countless bee stings, with presence of stingers and glandular structures visible on the skin (Figures). The highest concentration of bites occurred on the face, neck, ears and the proximal portions of the corpses chest, sparing areas covered by clothing (photos). A large number of stings around showed the presence of bruises.

**Discussion and Conclusions:** The countless injuries (stingers) that the victim suffered death warrant in a manner so acute. We can also consider that the victim had a death almost instantly (not a common fact) due to the large number of stings and the excessive amount of venom inoculated. The causes may be multiple, but is necessary to reminder of the direct cardiotoxicity in the accidents with multiple bees and hypotension and shock caused by the venom directly as a major cause of death. The glottis, in direct examination, had no swelling that would justify the death of allergic phenomena. Hemolysis and rhabdomyolysis are delayed effects that would not manifest itself as an in acute envenomation, but the venom appears to cause local bleeding, seen through the bruising and bleeding around the stings. The cause of death of the victim expertise was determined by mass envenomation (exogenous envenomation) caused by Africanized bee attack.

**Keywords:** Bees; Africanized; Death by an Attack; *Apis*; *Mellifera; Adamson; Scutelata*

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# ATTACKS BY JAGUARS (PANTHERA ONCA) ON HUMANS IN CENTRAL BRAZIL: REPORT OF THREE CASES, WITH OBSERVATION OF A DEATH. SHORT TITLE: ATTACKS BY JAGUARS ON HUMANS IN BRAZIL

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**Introduction:** The records of conflicts between humans and big cats have been known for centuries throughout the world, but this kind of interaction has intensified in recent decades. Recently, attacks by P. onca on humans in Brazil have come to the fore by disclosure in the press, lack of publications, and severity of the attacks.

**Case Report:** We report three cases of patients attacked by jaguars in provoked and predatory situations. Two patients survived the attacks and one died.

**Discussion:** Attack mechanisms and lesions in victims are discussed.

**Conclusions:** The attacks demonstrate a real risk of accidents from jaguars in certain regions of South America.

**Keywords:** Jaguars; Panthera Onca; Attacks; Death; Humans

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# INJURY CAUSED BY A TAPIR (TAPIRUS TERRESTRIS): A CASE REPORT IN CÁCERES - MT - BRAZIL

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**Introduction:** Tapirs are large mammals that present shy behavior and live in areas of forests and near rivers, which often invade plantations when approaching places inhabited by humans. Accidents are rare but can happen when the animal is attacked or cornered.

**Case Report:** AS, male, 65 years-old, victim of unprovoked attack caused by a tapir (Tapirus terrestris) on August 13, 2010. The patient was treated in the Department of Trauma and Emergency Hospital Regional de Cáceres - MT. He said: "around 1:00 pm, I was working in a plantation at Santa Ediviges farm in Cáceres-MT, when passing the sickle at the base of a clump of grass, I was attacked by an adult tapir, which left the bush and bit my right wrist". The patient started scream for help, and the animal dropped his arm, chased by dogs on the farm, being rescued and taken to the Hospital by his own boss. DESCRIPTION OF INJURIES: The victim was admitted on August 13, 2010 at 5:30 pm and was observed by an orthopedist. After x-ray was immediately taken to Surgical Center and operated in an emergency. Radiographs (photo) showed comminuted fracture of the distal 1 / 3 of the right forearm, associated with bone exposure and at external examination there were multiple soft tissue injuries (lacerations of skin, subcutaneous tissue and muscles). FINAL PRE-SURGICAL DIAGNOSIS: FRACTURE comminuted exposed (Grade III) of the distal third of right forearm, with exposed bone, caused by a tapir´s bite (Medical Records 25449). SURGICAL REPORT: ANESTHESIA: Brachial Plexus Block associated with auxiliary block. Asepsis, removal of devitalized tissue, hemostasis, alignment and reduction of fractured bone fragments, percutaneous fixation with Steimann wires (steel), sutures by planes, occlusive dressings and splint sleeve type. Hospitalization for antibiotic therapy. Administration of anti-tetanus serum and observation of the operated area (due to the high degree of contamination).

**Discussion and Conclusions:** Injuries caused by tapirs are not common. This large ungulate (largest mammal in Brazil) are solitary and shy animals that never attack humans when unprovoked, fleeing into the woods. When cornered, however, can defend themselves with violent bites inflicted by powerful jaws and teeth (photo). Encounters like this can happen, depending on tapirs damaged crops, especially maize, and even one death has been reported in conditions similar to those reported here (for the defensive attitude of the animal). Docile animals in the wild can defend themselves with force and violence and never reported accidents may become more common.

**Keywords:** Tapir; Comminuted Fracture; *Tapirus Terrestris*

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# FINDINGS CHARACTERISTIC OF ATTACKS BY FISH THE CORPSES OF DROWNING VICTIMS.

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**Introduction:** Many animals act as decomposers of drowned corpses of animals, including humans. How can there be confusion with other causes of death and even attacks on live individuals by some species of fish, it is important to know if there is a characteristic pattern of injuries in corpses devoured by fish. Additionally, it is not unusual to observe small specimens of various species of crabs in internal cavities of bodies submerged (personal communication from authors)1.2. Among the main fish decomposers are the freshwater and marine catfish (families Pimelodidae, Cetopsidae and Ariidae). Piranhas have a very important role in these attacks, perhaps more active than the folkloric attacks in living humans through shoals. The aim of this work is a research of an attack pattern to human bodies by small fish, which will be able to identify the bodies' victim of secondary attacks where the cause of death was not the action of the fish.

**Methods:** We performed postmortem examinations on two bodies of humans who had proven attack action by fish and was dead by other causes than the attack. Morphological aspects were highlighted in the common search for a pattern of action of fish.

**Results:** The main cause of death was mechanical asphyxia slowly in liquid medium (freshwater). In one case, the victim was tortured and after his death, he was tied to a weight and thrown into the Paraguay River. After a few days, the water level lowered and the body part was exposed when it was removed by firefighters. The common aspects to all bodies were the tissue destruction of the face and cartilaginous areas of the head

**Discussion:** The victims died of other causes than the attack of the fish. The cheeks and the rest of the face are the points of initial preference of the attacks of small carnivorous fish and crustaceans decomposers, as well as areas of cartilage. We could still find these animals in the cavities of corpses. Lesions with these characteristics should alert the forensic medicine expert to the possibility of attacks post-mortem by fish.

**Keywords:** Piranhas; Attacks By Fish; Drowning; Pimelodidae; Cetopsidae; Ariidae; Paraguay River

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# DEATH BY DROWNING ASSOCIATED WITH AN ATTACK BY PIRANHAS OCCURRED IN CÁCERES (MATO GROSSO STATE) - BRAZIL

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**Introduction:** Piranhas are carnivorous fish of the Characidae Family that are popularly blamed for fatal attacks on humans, though the statement did not provide scientific proof, contrary to what is observed in corpses1,2. Most injuries occur in fishermen and in defense of eggs in underwater vegetation in riversides1.

**Case Report:** The human body was a male, 25 years old, 1.74 m in height and good physique. The victim and a friend drowned while diving in the evening in the Padre Inácio River. After the bodies were recovered (almost immediately), it was found that a body showed no external injuries, while the victim showed deep lacerations on his face with the destruction of tissue and bone exposure, characteristics of attacks by piranhas, including showing teeth marks typical of fish. The autopsy reports showed the typical lacerations on the face (injuries by pullout) and the presence of foreign bodies in the lungs alveoli, favoring the drowning as the leading cause-of death There are extensive lacerations and teeth marks with avulsion of tissues in the face of the victim and circular lesions in frontal region with tissue destruction in the submandibular region, affection and section of important branches of the carotid artery. There was also muscle wasting in the temporal region. The face is a preferred site for attack by small carnivorous fish cadavers.

**Discussion:** Piranhas attacks are common in bodies of drowned and occurs after long time of immersion of victim 1, 2. This case, exceptional, probably shows an attack from several fish on a person still alive, stressed with the risk of drowning. Besides contributing decisively to the death, the bites caused extensive and intensive tissue destruction and lesions in high caliber vessels, especially in the submandibular region that can justify the death, without description in the medical literature. We also observed that the other drowned did not have any injury of importance, which reinforces the possibility of an attack on the victim in vivo.

**Keywords:** Death by Drowning; Piranhas; Mato Grosso State; Humans; *Characidae* Family

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# GENETIC CHARACTERIZATION OF EGYPTIAN MONGOOSE (HERPESTES ICHNEUMON) POPULATION IN PORTUGAL: A WILDLIFE SPECIES WITH POTENTIAL FORENSIC INTEREST

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**Abstract:** The Egyptian mongoose (Herpestes ichneumon) is one of the most abundant carnivores in Portugal. Its presence in the Iberian Peninsula is reported since historical times. In Portugal, this species, while previously restricted to southern boundaries, is now in a recognized process of rapid expansion until north. Although protected in several countries, such as Spain, in Portugal the Egyptian mongoose is part of hunting lists. At an international level, mongooses have been studied in a forensic wildlife perspective due to its protective status and the over poaching with the main purpose of exploitation of mongoose hairs for painting and shaving brushes. In the context of a broad scientific research of this species we present mitochondrial (control region) data as well as preliminary attempts for Y chromosome genotyping of Egyptian mongoose. The present polymorphisms may be of forensic value in the near future according to the ongoing expansion of Herpestes ichneumon.

**Keywords:** Egyptian Mongoose; Wildlife

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# CASEWORK ICPMS/IRMS EXAMPLES IN THE NETHERLANDS

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**Abstract:** In this poster a number of forensic IRMS/(LA-)ICPMS applications are discussed demonstrating the strong discriminating power of this technique combinaton. We use these techniques for a wide variety of forensic material casework investigations (various tape types, glass, XTC, drug precursors, paper, sawdust, ink, bullets, brass and other metals, rope materials, cables, polymeric jerrycan remains in arson residues, human materials for tracing geographic origin unidentified human victims). For a selected number of general casework investigations experiences are shared below and general trends and aspects discussed. LA-ICPMS and IRMS casework investigations mostly center on material comparisons, eg do this piece of material as found at the crime scene and a similar material as found with the suspect originate from one source. As one hypothesis the materials are therefore considered to originate from one source (eg roll of tape).

Most of the investigated materials are industrially produced in production batches. As alternative hypotheses we will typically consider that materials are from the same production batch; from another production batch but the same producer or from other random producers. Weighing of the evidence is based on scientific literature results and NFI investigations on limited numbers of samples to test literature information applicability for the Dutch situation. An interactive process is used in reporting. Mostly (fast, softer) forensic intelligence is generated for the police investigation phase. For the court evidence phase in first instance we will report the findings as of that moment and mention possible follow-up studies. Dependant on the court response some aspects of the first investigation may be further substantiated in a follow-up study. In one example a series of police cars were torched near police stations throughout the Netherlands.

The MO often consisted of placing a jerrycan filled with petrol on top of a police car and torching it. At two crime scenes (A+B) almost completely burnt jerrycan remnants were recovered and offered for a comparison to see if there was a link. Burnt jerrycan remnant samples were cut to gain access to visually appearently unchanged core material. Visual, FTIR and μ-XRF investigations could not discriminate materials from both crime scenes A and B. Both jerry can remnants contained poly ethylene. Samples were therefore investigated with IRMS and LA-ICPMS and from the results could be discriminated. In a second example explosives and other materials were found in various Dutch cities and believed to be in preparation for a terrorist attack. Forensic investigations were made on possible links between materials from different sites. Compared were a device consisting of two packages of pentrite (PETN) explosives next to a metal frame with two magnets and grey duct tape (figure 3) with a roll of grey duct tape from another location.

The focus of the comparisons with visual, FT-IR, LA-ICPMS and IRMS was on these tapes and results were also combined with results from physical fit investigations. Interesting was also the unexplained presence of small orange foil particles in the glue layer of both these tape materials. In a third example two murdered males were found walled in an empty building. In one forensic investigation red polypropylene ropes as bound around a crime scene carpet and as found at a location controlled by a suspect is compared using IRMS.

The crime scene rope samples were heavily contaminated with human decomposition products and were cleaned ultrasonically before analysis. FTIR was applied but results were insufficient for discrimination. IRMS results for the three rope samples vary more than expected from repeatability experiments but still offer potential for discrimination. One of the reference ropes was easily discriminated but another rope was closer to the crime scene samples.

**Keywords:** IRMS; ICPMS; Jerrycan; IED; Tape; Rope

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# DISCRIMINATION OF FORENSIC GLASS SAMPLES WITH LA-ICP-MS

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**Abstract:** Glass is frequently encountered as types of materials that are submitted to forensic science laboratories as a result of trace evidence transfers. There are many kinds of source of glass debris such as car windshields, house window, bottles, cups, and so on. What the glass debris is from can sometimes be a critical clue to solve a crime case. Therefore, the discrimination power of trace element analysis was examined for glasses with LA-ICP-MS. The 111 glass fragments from car windshield were collected and analyzed to identify the source. The Canonical discriminant analysis was performed with PASW 18. The canonical discrimination function was made based on 18 elements such as Li7, Mg25, Al27, K30, Ca44, Mn55, Fe57, Rb85, Sr88, Zr90, Ba137, LA139, Nd146, Hf178 and Pb208. Mg25 is the most powerful element to discriminate source of glass. Eigenvalues and group centroids are evaluated and 98.6% of original groups are correctly classified with the canonical discriminant functions.

**Keywords:** Glass; LA-ICP-MS; Origin; Discrimination

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# A MODERN METHOD OF INVESTIGATING A FRACTURE PLANE IN FORENSIC MEDICINE

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**Introduction:** Long bone fractures of the lower extremities are usually accompanied with a high rate of disability, considerable expenses on their treatment, relatively high case fatality rate and permanent attention on the part of inquest organs, executing investigative measures. The number of road accidents, as a result of which the bulk of fractures of the long bones of the lower extremity takes place, is on the rise annually by 7-10%. A skeletal injury diagnosed in over a third of victims is placed second after neurological injuries within the pattern of a severe mechanical injury. The share of fractures, for example, of the crural bones reaches 36,6%. Therefore, fractures of the long bones of the lower extremities have a leading place in the practical activity of medical experts and are the object of investigative actions. Forensic medical experts should answer important questions of the inquest bodies based on a detailed familiarizing themselves with the circumstances of the case, postmortem findings, a study of the roentgenological picture or an investigation of the plane of a fracture. The goal of this work is to design a mode of fixation and research of objects of forensic-medical examinations which would permit to obtain a complete information about an object under study as a whole and while studying its individual details.

**Methods:** A modern method of fixation and research of forensic-medical objects is implemented via photographing by means of a digital camera, which is fixed on a tripod in the most advantageous spot of space in relation to the object of research that is situated on a rotary platform with a possibility of rotating round its axis at 360°. A composite picture of an object is achieved in the form of a series of 36 photographs in every 10° with a subsequent transfer into a 2D and 3D format by means of computer programs.

**Results:** Fixing the research findings of expertise objects is of great significance in forensic-medical practice. Owing to the introduction of a new method of fixation of objects into the forensic-medical practice new possibilities and advantages have arisen in the process of their research. Thus, there exists a new possibility of obtaining both an integral image of an object under study and its individual details, a selection of an optimal relative position of an object and a camera and a thorough examination of an object in any optimally chosen plane. A study of the fracture plane of the long bones of the lower extremity has been carried out and two-dimensional (three-dimensional) images have been obtained, enabling to examine the entire region of a fracture around the circumference tubular bone. Thus, the authors have established true distinctions among different zones of the fracture plane of the tibia, which have made it possible to draw a conclusion as to the type of deformity, the spread of a split, the point of force application and the main direction of its destruction.

**Discussion and Conclusions:** A modern method allows for a possibility of a more clear-cut fixation, a study and an expert assessment of the morphological characteristics of a fracture area that considerable facilitates singling out objective diagnostic signs, which help to reveal the mechanisms of a fracture formation of the bones under study and furnish expert reports to the investigating bodies.

**Keywords:** Method; Investigation; Forensic Medicine; Fracture Plane

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# THE FREQUENCY OF DEATHS DUE TO AORTIC ANEURYSM AND ITS DETACHMENT AMONG THE POPULATION OF CITY OF YEREVAN

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**Comments:** By the decree of the Government of Republic of Armenia autopsies of sudden death should be carried out by the forensic experts of the Center of Forensic Medicine Republic of Armenia. The number of scientific publications that focus on aneurysms of the aorta, ?ortoclasia and rapture of the aorta, in our republic is small, and there is no data or statistics regarding this issue. Following similar works of several authors, including studies of British and American scientists in the period from 1992 to 2007, among 100 000 people aortic aneurysm occurs in 5-10 cases. The study shows that about 60% of pathology of the aneurysm revealed aneurysm of the ascending aorta and aneurysms of the cerebrum. Conclusions of the forensic experts of City of Moscow shows that among 11279 autopsies only 172 cases connected with aortic aneurysm and in 137 cases the immediate death caused by the aneurysm. However, among these 137 cases, only 11% had been diagnosed aneurysm during lifetime. In the Center of Forensic Medicine of RA among the population of City of Yerevan in the period from 2006 to 2010, were investigated 3456 cases of non-violent deaths and in 187 cases the cause of immediate death was aneurysm, which is 5.41% of total. Among this group 60.96% were males and 39.04% were females. Out of this 187 death 118 cases revealed aneurysm of the ascending aorta, which is 63.1% of total. It should be noted that amongst this 187autopsies forensic experts did not state aneurysm caused by traumatic injuries. It is characteristic that the cause of immediate death is detachment of the ascending aorta, cerebral blood vessels and detachment of the thoracic and abdominal aorta. Recovered medical records of dead people shows that only 0.03% of patients was assumed an aorta aneurysm, but for different circumstances patients were not able pass examination by modern methods of diagnostics. Most of them did not consult a doctor for several years during the lifetime. It is a fact that only forensic experts are being able to state the diagnose aneurysm. Research studies undertaken by Republican Scientific- Practical Center of Forensic Medicine and scientific publications regarding this issue shows that the percentage of sudden death due to aortic aneurysm disease and it's detachments is fairly high in City of Yerevan were are living more than 1/3 of the population of the RA. Out of 100 examined cases 5.4 had aortic aneurysm and its detachment, most of which falls to the ascending part of aorta and cerebral vessels, and it was determined as a cause of immediate death and death occurs immediately.

**Keywords:** Aneurysma; Aorta; Detachment; Population

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# APPLICATION OF TYRE IMPRESSION EXAMINATION IN ROAD TRAFFIC ESCAPE ACCIDENT INVESTIGATION

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**Case Report:** Moving vehicles often leave marks on the ground or other objects vehicle which reflects the characteristic configuration of tyre surface, which is called tyre impression. They are classified as tyre crown impression (especially often found), tyre sounder impression and tyre sidewall impression. When identification of tyre and tyre impression is needed, we can compared the configuration characteristic of tyre surface and tyre impression by use of characteristic comparison method. In road traffic escape accident investigation, tyre impression is often left. Suspected vehicle can be ascertained or excluded by comparison examination between a tyre and tyre impression. This paper discusses successful application of tyre impression examination in some escape accident investigation.

**Keywords:** Tyre Impression; Examination; Escape Accident; Investigation; Application

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# ANALYSIS ON FREEWAY TRAFFIC ACCIDENTS AND THEIR COUNTERMEASURES

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**Abstract:** At present, China is coming into a rapid development moment of freeway. Freeway provides good driving condition to vehicles improves our country's traffic transportation and promotes the national economic greatly, which has smooth alignment, expanse roadway, and different kinds of efficient traffic safety infrastructure. However, with the rapid increase traffic volume, traffic accident becomes more and more serious and brings graveness consequences to human life and wealth. Traffic safety problem catch high attention from governments of many counties. We do not have regularities cognition of traffic accident because of relatively late construction of freeway. Therefore, discussing traffic accidents has importance significance to prevent traffic accident and improve freeway safety situation. Based on the traffic accident data from Shenyang-Dalian freeway and other freeway of domestic and abroad, freeway safety problems are researched and analyzed. Through the analysis of the great deal of traffic accidents data, the paper studies the distribution regularities of road traffic accident by applying the statistical analysis methods, including time and space distribution, accident form distribution, climate distribution and so on, the distribution regularities of serious accidents in different forms are obtained. The strongpoint and shortcoming of methods used to identify accident-prone locations in domestic and abroad are researched. The accident accumulation frequency method (AAMF) is presented to identify accident-prone locations, Furthermore, it is applied in the examples. The accident-prone locations on the Shenyang-Dalian freeway are distinguished and the main causes of accidents are analyzed. The influencing factors of freeway traffic accident are studied by researching the relationship between traffic accident and human, vehicle, road environment, the influence levels of the three factors to the occurring of accident are obtained. The relations among traffic accidents, road-alignment, pavement conditions, traffic volume and atrocious weather are studied, the relationship between the traffic accidents and these external factors are gained. The study suggested that road deficiencies are a much greater contributing accident factor than human or vehicle factors. This study suggests that the road administration should carry out road audits of existing roads. According to the cause and mechanism of freeway accident, the whole countermeasures to improve traffic safety from the angle of human, vehicle, road and environment aspects are presented, also the framework of Shenyang-Dalian freeway emergency rescue system is instructed.

**Keywords:** Freeway; Traffic Accident; Influencing Factors; Accident-Prone Locations; Countermeasures

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# MAP ANALYSIS OF EMERGENCY SURVIVAL RATES AFTER TRAFFIC ACCIDENTS USING GEOGRAPHIC INFORMATION SYSTEMS - A COMPARISON OF ANALYSIS BY AGE INCLUDING CHILDREN IN FUKUOKA PREFECTURE AND THE TOKYO METROPOLITAN AREA

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**Abstract:** (Purpose) There are disparities between urban areas and other regions in emergency medical systems after traffic accidents. At the same time, it is clear that there has been an increase in the number of traffic accidents involving children and the elderly in Japan recently. Consequently, we compared map analysis results of the Tokyo Metropolitan Area and Fukuoka Prefecture by age using emergency survival rates after traffic accidents as our indicator. (Method) We used the Geographic Information System (GID) and SPSSver12.0 for our analysis and took the following steps for both the Tokyo Metropolitan Area and Fukuoka Prefecture: (1) We calculated the emergency rate and casualty rate after traffic accidents after extracting the number of traffic accident fatalities by age, the total number of casualties, the total number of accidents and the total number of fatal accidents from the Institute for Traffic Accident Research and Data Analysis webpage. (2) We extracted data relating to the accessibility to emergency medical services (3) We calculated the data from each secondary medical service area and examined significant differences (4) We tested the hypothesis that "emergency survival rates after traffic accidents increase according to the accessibility of emergency medical centers from the scene of the accident" (5) We visualized the emergency survival rates by age for each municipality with map analysis using GIS MarketPlanner (Results and discussion) Our hypothesis was valid in Fukuoka Prefecture, but not in the Tokyo Metropolitan Area. A significant difference in the number of fatalities by age after traffic accidents by secondary medical service area was seen in adults in Fukuoka Prefecture but not in any age group in the Tokyo Metropolitan Area. Almost no significant difference in the accessibility of emergency medical centers between secondary medical service areas was seen in the Tokyo Metropolitan area but a clear difference was seen in Fukuoka Prefecture. According to the results of the map analysis, the lowest emergency survival rates of children after traffic accidents in the Tokyo Metropolitan Area were in Ebara-mura, Hachioji City and Higashimurayama City. In Fukuoka Prefecture, the survival rate of children was zero in 20 towns, eight cities and three villages. The lowest emergency survival rates after traffic accidents across all age groups in the Tokyo Metropolitan Area and Fukuoka Prefecture were seen in Haramura and Aka respectively. Tangible disparities in emergency survival rates after traffic accidents and emergency medical systems between urban areas and non-urban areas were confirmed in the above analysis.

**Keywords:** Geographic Information System; Map Analysis; Traffic Accidents; Children; Emergency Survival Rate

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# VEHICLE SPEED ESTIMATION BY USING VIDEO SURVEILLANCE

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**Abstract:** The widely useof video surveillance equipment provides important clues for traffic accident investigation and reconstruction, and techniques using clear video images for close-range photogrammetry, moving object recognition and tracking have become quite mature, but the techniques of using wide-angle, low-pixel video surveillance for the description of vehicle speed have not yet been developped. According to general calculation methods of speed and the basic principles of photogrammetry, this paper proposed an approximate calculation of traveling speed and location speed, of which target vehicle passing the monitoring range, by using general video surveillance videotape which is being used widely. This method not only relies on the fixed spatial reference, but also use the feature points on the vehicle for distance calibration. Finally, the operability and reliability had been proofed by comparison with the results from the optical diffraction velocimeter.

**Keywords:** Traffic Accident Investigation And Reconstruction; Vehicle Speed Estimation; Video Surveillance

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# SEVERAL TRACES OF TRAFFIC ACCIDENTS WHICH TYPE OF TESTING POINT

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**Abstract:** On the road traffic accident which happened in the traffic is a form of identification and vehicle collision of two major types, testing, which were out of the way to pedestrians, including the type of stance ( and walking, or lay down on the parties concerned, cycling ) the traffic manner ( riding a motor vehicle or ), the parties to the traffic manner ( driving a vehicle, etc. or ride ) The road traffic accidents on the development of the appraisal time, so its not the national standards for unified guidance, and testing institutions adopt different methods for verification and it would be a mistake. the effect of the five years of relevant cases more than 2,000 example for statistical analysis, filtering out of a typical case, has identified specific points that such testing forms a normative documents and in this sector and the relevant verification mechanism for trial application.

**Materials and Methods:** Application of the way to trace the vehicle and other objects of the inspection mark in analyzing.

**Results:** Summary of the road traffic accidents on the identity of the specific points.

**Conclusions:** Road traffic accident which could trace the car and train, car with men, and other objects of the judge. the relationship between.

**Keywords:** Traffic Accident; Vehicle Collision; Testing Point; Vehicle Collsion

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# PREVALENCE OF FATAL CHILDHOOD INJURIES IN HIMACHAL PRADESH IN INDIA

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**Introduction:** Globally, around 950 000 children under the age of 18 years die due to injury and violence each year. Injury is a major cause of death in children over one year of age in the South-East Asia (SEA) Region. In 2004, the Region had the second highest rate of unintentional child injuries (49/100 000 children per year) globally, following the African Region. In the South-East Asia Region road traffic injuries, drowning, burns and self-inflicted injuries are the leading causes of death among children. Injuries disproportionately affect the poor. About 95% of all global child deaths from injury occur in low- and middle-income countries. Children over one year are most vulnerable to injuries. In general, boys are far more likely to get injured than girls. However, burns are the only type of fatal injury that occur more frequently among girls than boys in South-East Asia and in low- and middle-income countries in the Eastern Mediterranean and Western Pacific Regions. In India, injuries are the second leading cause of death in 5-14 year-old children and fourth leading cause of death in children under 15 years old. Childhood injuries have been a neglected issue so far even though injury and violence are a major killer of children who are the asses to the society throughout the world. Due to paucity of data on child hood injuries from our country it becomes difficult to establish a baseline of such injuries so that preventive interventions can be instituted at the right time and the right place. Availability of such data can therefore significantly play an important in reducing mortality and morbidity of children due to fatal and non fatal childhood injuries. Research Question: What is the prevalence of fatal childhood injuries in Himachal Pradesh in India during the year 2006-2010 in children aged 0-19 years. Aims and objectives: 1) To ascertain the prevalence of fatal childhood injuries in Himachal Pradesh in India during the year 2006-2010 in children aged 0-19 years. 2) To study various aspects of unnatural deaths in children aged 0-19 years.

**Materials and Methods:** The present retrospective cross sectional observational study was carried out in the Department of Forensic Medicine, IGMC Shimla in India. Records of all the autopsies conducted in the Department of Forensic Medicine from the year 2006 to 2010 were procured and closely scrutinised. Records of autopsies conducted on children aged 0-19 years were segregated and tabulated .Percentages and proportions were calculated for various variables. Chi square test, and Fischer exact test was used for statistical analysis using SPSS version 16.0.

**Results:** In this Five years study there were 107(7.11%) cases out of the total 1505 autopies done in the Department. Out of these 107cases 42 female cases between age group 0_19 years and 65 males cases between age group 0_19 years were present. The mean age of the males was 12.53±6.50 and the mean age of females was 12.86± 6.81. There was no statistical difference between the ages of the genders(t value =0.61,p=0.8).There were 31 children in the age group of 0-9 years (mean age 3.25±2.83) and 76 children in the age group of 10-19 years(16.50 ±2.60).There was no statistical association between area of residence(urban and rural) and gender of the children died of fatal injuries during the study period(Fischer's exact test value less than 0.1).Road traffic accident was found to be the most common cause followed by poisoning(17.75%)further followed by blunt trauma due to fall(14.95%) and burns (9.34%).

**Keywords:** Fatal Childhood Injuries; Homicide; Suicide; Violence

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# INFLUENCE EVALUATION AND DEVELOPMENT OF INTELLIGENCE TRANSPORTATION SYSTEM

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**Abstract:** The application of modern intelligence traffic system marks that the intelligence of traffic management turns, modern and technological, along with the high-speed development of international economy, the traffic management style falling behind has already canned not satisfy the quick development of modern traffic and result in from here traffic management of difficult and not good enough to the prevention of traffic accident handle slowness to wait many problems on the scene with trouble. This text mainly said domestic and international intelligence traffic the influence of the system upon the traffic evaluation and development direction, the traffic condition, public security official traffic combining an our country manages and the prevention and processing of road traffic accident, adoption elaborate intelligence traffics system from the method that many angles analyze the traffic manages to the public security official of influence evaluation and evaluated intelligence traffic system from the multilayer, introduce an intelligence traffic on this foundation system new technique how apply a modern traffic management and road traffic accident processing in, then simplified traffic management and the trouble handling. This text put forward in the future the development direction of new intelligence traffic system, concentrating on highway, railroad and sea mail and aviation that the establishment has Chinese special feature were the traffic intelligences of integral whole to manage system and raise our country of the traffic management and road traffic accident of prevention and processing work have important meaning.

**Keywords:** ITS; Influence; Evaluation; Traffic Managements

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# PEDESTRIAN DRAGGED BY A TRUCK

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**Case Report:** Cases in which a pedestrian is dragged under a vehicle along the roadway are rare. Such incidents most frequently involve dragging of a victim under a passenger car. Cases in which a pedestrian was dragged by a truck are sporadic. The cars which dragged pedestrians not always manifested damage in the front of the car or chassis. However, in every case criminalistic evidence material could be detected on the car chassis and the road. This makes the described case even more interesting. A traffic accident is described, involving a pedestrian who was at first hit and, then, hooked up by his clothing by a suspension element on a low-floor truck trailer and dragged on a road along the distance of 3500 m. Autopsy demonstrated that the pedestrian died of cerebro-cranial injuries, experienced due to hitting of his body. Moreover, frontal surface of his body demonstrated outer injuries typical for dragging of the body along the roadway. Before dragging the pedestrian was hit by front of the vehicle, when he was in a sitting, rising position or when he was in a recumbent position with elevated head and trunk. 1. The pedestrian died due to cranio-cerebral injuries experienced when he was hit by the vehicle into his head and trunk. Lacerated wounds in his head, trunk and lower extremities developed as the result of dragging him along the roadway. 2. Spread of lacerated wounds within a single body side, developed due to roadway friction, depends on the distance of dragging along the roadway. 3. The untypical position in which the pedestrian was hit by the vehicle front, absence of alcohol or psychotropic agents in blood may indicate that the accident represented a suicidal act. 4. Road accidents with involvement of pedestrians develop most frequently in conditions of restricted visibility. Such cases confirm that a pedestrian lying on the roadway can be difficult to discern by the driver of a vehicle.

**Keywords:** Traffic Accident; Dragging; Pedestrian

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# FORENSIC EXAMINATION AND HUMAN RIGHTS (UNDER THE LEGISLATION OF REPUBLIC OF UZBEKISTAN)

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**Introduction:** Forensic examination is the important means of reception of legal authority. In crime cases committed under unobvious circumstances, without witnesses forensic experts conclusion often represents itself as the basic proof. According to the procedural legislation of Republic of Uzbekistan appointment of forensic examination is the right of the body of investigation or a court. Quite often examination is appointed at early stages of investigation, when the person of criminal suspect is unknown. Therefore maintenance of human rights (including suspected, accused, defendant) during the appointment and execution of forensic examination is one of the important problems of legal practice. Human rights are fixed in the laws defining the order and conditions for carrying out forensic examinations. Observance of the rights and freedom of the person is defined by Law «About forensic examination» (article 6) of the Republic of Uzbekistan as one of main principles of forensic-expert activity. The Law «About forensic examination» and procedural codes (Code of Criminal Procedure, Code of Civil Procedure, Code of Economic Procedure) of Republic of Uzbekistan provide protection of human rights at all stages of execution of the examination: from the appointment of forensic examination to an experts conclusion estimation. Participants of the process can request an examination and (under their requirement - with presence of a lawyer) should be presented with the decision of the inspector (court) on the appointment of examination. Before presentation of materials for examination the petition for challenge of the expert and appointment of the expert from among other specified persons, and also statement for the expert of additional questions can be declared. The presentation by the lawyer of additional materials, concerning a subject of examination, is possible at any stage of forensic research. But, it is necessary to supply the procedural order for familiarizing with these materials to the case. The end of examination is not the reason for refusal for familiarize with additional materials on examination to the criminal case and their study by the inspector (the judge). The presence of persons, interested in criminal case (the suspect accused, the defendant, the claimant, the respondent), at carrying out forensic examination is supposed only under the sanction of the body, which has nominated examination. The participation of the persons, interested in case, in manufacture of examination, realization of any operations, actions is not supposed. Presence of interested people at discussion of expert's research results and conclusion drawing up is forbidden. Each person believing, that in connection with manufacturing of examination by actions of the expert his rights has been broken, have the right to appeal against actions of the expert in order, established by the law. Suspected, accused, defendant, claimant, respondent and their lawful representatives have right to get acquainted with the experts conclusion and to declare petition for appointment of additional or repeated examination, which the body, appointed examination, should be considered. Protection of the rights, freedom and legitimate interests of citizens substantially depends on business and moral qualities of the expert. Reception of the objective and impartial experts conclusion is impossible without high professional standard of the expert and observance his professional etiquette. The professional etiquette of the expert's behavior assumes presence such qualities as fidelity, honesty, decency, modesty. It should define behavior of the expert not only during the manufacture of examination, but also in a society out of the office activity.

**Keywords:** Forensic Examination; Human Rights; Expert; Procedural Legislation

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# ROLE OF FORENSIC SCIENCES IN HUMAN RIGHTS PRESERVATION

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**Abstract:** Human rights are rights inherent to all human beings, whatever our nationality, place of residence, sex, national or ethnic origin, colour, religion, language, or any other status. We are all equally entitled to our human rights without discrimination. These rights are all interrelated, interdependent and indivisible. Universal human rights are often expressed and guaranteed by law, in the forms of treaties, customary international law , general principles and other sources of international law. International human rights law lays down obligations of Governments to act in certain ways or to refrain from certain acts, in order to promote and protect human rights and fundamental freedoms of individuals or groups. International human rights law undertakes various programs, projects and services utilizing forensic medicine in the prevention of human rights violation and criminality. Forensic science is the application of a broad spectrum of sciences to answer questions of interest to human rights. In this paper we discuss the current issues and problems that facing who working in forensic sciences to detection and declaration of human rights violations.

**Keywords:** Human Rights Violations; Forensic Sciences

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# MULTIDISCIPLINARY APPROACH FOR EVALUATION OF SEXUAL ASSAULTS

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**Abstract:** Documentation of physical findings is a priority of medicolegal evaluation, however psychological findings should accompany physical findings in order to consider a medicolegal documentation as a complete process. Medicolegal evaluation of sexual assaults has particular limitations hence many of such cases do not have any phisical evidence which increases the significance of psychological evaluation. This study has been planned to describe the collaboration between Psyciatry and forensic Medicine, and to reveal the characteristics of alleged sexual assault cases that had been evaluated at the Department of Forensic Medicine outpatient clinic from 2005 to 2011. Ninety nine alleged sexual assault cases have been analyzed as for age, gender, type of assault, relationship with the assaillant, physical and psychological findings, while results of collaborative approach have been compared with former medicolegal evaluations. Slightly more than half of these cases had applied to the outpatient clinic of the department on their own (57,6%), and 42.4% of them had been referred by either public prosecutor's office regarding the requirement of the official forensic specialist or by the court. Only 13.7% of the cases could be examined in the first week while a considerable amount of the cases were long term cases. Female-male ratio was 3:1, and 9.1% of the assaillants were fathers. All of the cases had been subjected to at least two medical examinations, but no former psychological examinations. The Department of Forensic Medicine of Istanbul University Istanbul Faculty of Medicine outpatient clinic works in collaboration with the Department of Forensic Medicine Psychosocial Trauma Programme for several years, and a clinical and forensic psychologist who is specialized on trauma works in Forensic Department for the last year. All interviews are performed together, and interviews are recorded given informed consent. All preventive measures are taken not to retraumatize victims however ordinary procedures with police, prosecutors office and courts are still far from being adequate. A recognized trauma centre with multidisciplinary approach should be established particularly for sexual assaults.

**Keywords:** Sexual Assault; Medicolegal Evaluation; Psychological Evaluation

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# RAPE CASES DURING 33 YEARS IN EASTERN CROATIA: SELDOM REPORTED AND WITH LEGAL OUTCOME BIASED BY ASSAILANTS' CHARACTERISTICS

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**Abstract:** The aim of this study was to establish which case characteristics are associated with delayed report of an sexual assault and does assailant's educational achievement and employment status influence legal outcome severity. Study is based on review of District court data from 178 cases of rape and attempted rape during 33 years (1973-2006) in Eastern Croatia. All 178 victims were females (median 26 y, 25th percentile - 18 y, 75th percentile - 52 y) and 48 (27%) of them were postmenopausal. Report time (interval between an assault and reporting to authorities) was shorter if attacked at public place, during day, or by stranger (p=0.016, p=0.004, p=0.009, respectively). Shorter delay of the report and completed sexual assaults (p=0.006, p<0.001, respectively) were associated with higher imprisonment rate. In the cases with report within 24, the risk of prison sentence for assailant increased almost three times compared to assault cases reported after 24 h (OR 2.7, 95% CI: 1.3-5.4). More educated assailants (with 11 or more years of formal education - completed secondary school) were more likely to attack at own or public place (p=0.001), to complete an assault (p=0.011) and to attack younger victims (p=0.004).

Assailant's and employed status was associated with lower imprisonment rate (p=0.002, p=0.032, respectively) and higher educational achievement with milder punishments (p=0.013). The risk for prison sentence for assailants with poorer educational background was three times increased compared to better educated (OR 3.0, 95% CI: 1.5-6.0), while risk for unemployed assailant had increased 2.5 times, compared to employed assailants (OR 2.5, 95% CI: 1.1-5.4) When compared to previous studies, our sample has excess of older women as rape victims and we assume that is due to low reporting rate of assaults on younger victims, more often raped by family members and in relationships or the assault on younger victims has been recognized as different type of sexual violence.

We have established that assailants' educational background and employment status are influential factor for legal closure of a rape case. Authorities should be aware of potential bias based on socioeconomic status of an assailant.

**Keywords:** Sexual Violence; Legal Aspects; Socioeconomic Factors; Postmenopausal; Violence Perpetrators

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# SEX OFFENDER REGISTRY: KEEPING SOCIETY SAFE?

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**Abstract:** The Sex Offender Registry, a system currently implemented in the United States of America, Canada and the United Kingdom, was originally designed for the purpose of allowing government authorities to keep track of the residences and activities of convicted sex offenders after they are released back to the community. However, in several jurisdictions, especially in the United States, the information contained in the Registry is made available to the general public via a website (e.g., FBI website and the US Department of Justice) or by other means. A number of additional restrictions are imposed on registered sex offenders, including housing.

Those on parole or probation may be subject to restrictions that dont apply to other parolees or probationers, such as restrictions on being in the presence of minors, living in proximity to a school or day care center, owning toys or other items of interest to minors, or using the Internet. Sex offenders who have completed probation or parole may also be subject to restrictions above and beyond those of most felons. In some jurisdictions they cannot live within a certain distance of places children or families gather (e.g., schools, worship centers, and parks), public venues (stadiums), airports, apartments, malls, stores, shopping centers, and certain neighborhoods. Some states have Civil Commitment laws, which allow very-high-risk sex offenders to be placed in psychiatric hospitals or forced to live under very heavy supervision after the end of their normal sentences.

The State of Missouri, for example, now restricts the activities of registered sex offenders on Halloween, requiring them to avoid Halloween-related contact with children and remain at their registered home address from 5PM to 10:30PM, unless they are required to work that evening. Regardless of whether they are at work, offenders must extinguish all outside residential lighting and post a sign stating, "No candy or treats at this residence." Despite the public awareness of the whereabouts of convicted sex offenders, there has been no evidence that mandatory registration has actually made society safer. In fact, although Sex Offender Registries are designed to protect and alert the public about the dangers of sex offenders, in at least two instances, convicted sex offenders were murdered after their information was made available over the Internet.

This unfortunate consequence of the Registry is in reality just one extreme manifestation of the unease and destabilization caused by the availability of this sort of information to the general public. This study analyses the perceptions and attitudes of a sample of Portuguese citizens, regarding the usefulness, the implications and consequences of a hypothetical implementation of the sexual offender registry in Portugal.

Perceptions pertaining to the different types of sex offenders, the viability of their reintegration in the community and their associated risk are also analyzed, for the purpose of understanding whether this preventive and control measure contributes to public safety or, on the contrary, has a destabilizing effect on the community.

**Keywords:** Sex Offender Registry; Sex Offenders; Community Reintegration; Public Safety

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# ETHICAL ISSUES IN MEDICO-LEGAL RESPONSES TO SEXUAL ABUSE AMONG MOROCCAN ADOLESCENT FEMALES

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**Introduction:** Examination of sexual offences against women, especially among adolescents, cannot be separated from the socio-cultural and religious contexts in the Arab world. Victims need not only to deal with the psychological and physical effects of the abuse, but also need to cope with the reaction of the community at large which is reflected by medico-legal practices. PURPOSE : This study aims to understand the socio-cultural factors within which disclosure of sexual abuse take place and to emphasize how some current medical and legal practices are used as tools of pervasive gender oppression.

**Methods:** The data of this study were extracted from records available on 52 cases of sexually abused adolescents examined in our medico-legal institute during 2008.

**Results:** Among these 52 cases, 31 were conducted upon police request. Prompting disclosure of the abuse took place in situations where it was publically apparent and the victim "absolved of blame". Delayed disclosure was motivated by either pregnancy, loss of virginity or the attempt to force the rapist to marry the victim and therefore, nullify the abuse. In most cases, the only preoccupation of the police and/or the victim was to ascertain the condition of the hymen. Thus, the victim run the risk of being forced to undergo an imposing virginity test (IVT) which has a little impact, if any, as forensic evidence on the prosecution, especially in delayed disclosure. In fact, the IVT would result in dramatic consequences for the victims allowing their families and the community to nullify the abuse.

**Conclusions:** Given the socio-cultural context, health care providers in Arab countries should, when dealing with sexual abuse among teenagers, always put the victim's interest on the paramount consideration so that the disclosure of the abuse will not end in negative way.

**Keywords:** Sexual Abuse; Ethical Issues; Virginity

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# LAW ENFORCEMENT OFFICERS' PERCEPTIONS REGARDING THE SEX OFFENDER REGISTRY AND ITS IMPACT ON SOCIETY

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**Abstract:** Sex Offender Registry, designed to allow government authorities to keep track of the residence and activities of convicted sex offenders, is currently implemented in the United States of America, Canada and the United Kingdom. Information in the Registry is made available to the general public via a website (e.g., FBI website and the US Department of Justice) or other means. Additional restrictions are imposed on registered sex offenders, namely not being in the presence of minors, keeping a mandatory distance between their residence and public places attended by minors and/or families (e. g., schools, churches, public parks, stadiums, shopping malls), owning toys and other objects of interest to minors, or using the Internet. Contrary to media depictions of stranger assaults, or child molesters who kidnap children unknown to them, the vast majority of sexual offense victims are known to the offender, who is generally either related, or intimate to the victim. Thus, despite the public awareness of the whereabouts of convicted sex offenders, there has been no evidence that mandatory registration has actually made society safer. In fact, although Sex Offender Registries are designed to protect and alert the public about the dangers of sex offenders, in at least two instances, convicted sex offenders were murdered after their information was made available over the Internet. Furthermore, many believe that sex offender registration has become a self-defeating process. In an effort to register as many people as possible for sex-related crimes, the Sex Offender Registry has grown exponentially with too many people for law enforcement to effectively manage. This study analyses the perceptions and attitudes of a sample of Portuguese law enforcement officers, regarding the usefulness, the implications and consequences of a hypothetical implementation of the sexual offender registry in Portugal, namely on the type and number of crime occurrences and on its impact on society. Perceptions pertaining to the different types of sex offenders, the viability of their reintegration in the community and their associated risk are also analyzed, for the purpose of understanding whether this preventive and control measure contributes to public safety or, on the contrary, has a destabilizing effect on the community.

**Keywords:** Sex Offender Registry; Sex Offenders; Law Enforcement Officers; Public Safety

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# TWO MALPRACTICE CASES IN MEDICAL EXAMINATION OF SEXUAL ASSAULTATION

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**Abstract:** Forensic medicine assists in clarification of cases of violent injury and death by the assessment of bodily damage and forensic evidence. Medical decisions often require reconsideration of information, reanalysis and possible change. First case was a 68 years old female. She had been examined by a gynecologist a few hours after she had been sexually assaulted. She didn't have any traumatic finding except e few hyperemia at her wrist and elbow. Also, sample from her genital examination didn't include any sperm. So, she was sent to the forensic department of the university for re-examination one day after her assaultation. She was re-evaluated by forensic medical specialists. A positive sperm sample could be detected by detailed anamnesis and examination of her. Second case was a 17 years old female. She had been sexually assaulted a few months ago. She had been examined by six doctors including one forensic medical specialists. The reports of her genital examination had different conclusions leading confusion at court decision. So, She was sent to the forensic medicine department of the university by the court. A scarr concealed in the folded border of hymen was revealed by her genital examination. By presenting two sexual assault cases, the characters of these cases and the cause of medical malpractice was discussed. The authors also provide a comprehensive and detailed summary of steps to be followed in the physical examination of a sexual assault victim, emphasizing the importance of a strict, thorough procedure for protecting the interests of the patient, the physician and society.

**Keywords:** Sexual Assault; Genital Examination; Malpractice; Forensic Medicine

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# EVENT RELATED POTENTIAL BASED ASSESSMENT OF SEXUAL INTEREST IN SEX OFFENDERS

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**Abstract:** The assessment of sex offenders' sexual interest is considered of paramount importance for the intervention and therapeutic process. This is usually achieved through the somewhat invasive method of penile plethysmography. New methods have recently been proposed, some of which are based on the assumption of a higher allocation of attentional resources to sexually preferred targets. These methods rely on measuring the viewing time of sexually interesting pictures or the interference of sexual stimuli on the performance of cognitive tasks, such as choice reaction times or snake in the grass protocols. The attentional modulation of Event Related Potentials (ERP) by motivationally relevant stimuli constitutes a robust finding in the ERP literature. In the present study, the use of the ERP technology will be tested as an assessment tool for sexual interest in criminal offenders. Sex offenders will be stimulated with virtual pictures of different sexual targets, some of which will match their sexual interest. We hypothesize that preferential allocation to preferred sexual targets, as indexed by enhanced amplitude of the P1, N1 and Late Positive Potential (LPP), will be shown, according to the type of index sexual offense and self-reported sexual interest. The interference of visual stimuli on the auditory P300 will be studied. Visual stimuli that match the sexual preference of the participants are hypothesized to cause more interference, resulting in reduced an auditory P300. Bayesian and bootstrapping analysis of individual ERP records will be conducted for the classification of participants according to their sexual interest. The assessment of sexual preferences through this inexpensive, robust and non-invasive technique will improve the efficiency of forensic assessments (pre-trial and post-sentencing), as means of diagnosis and treatment efficacy follow-up.

**Keywords:** Event Related Potentials; Sexual Interest; Sex Offenders; Forensic Assessment

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# POSTER SESSION

## Session D1

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# ANALYTICAL APPROACH FOR THE DETERMINATION OF PIPERAZINES IN URINE USING MICROEXTRACTION BY PACKED SORBENT

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**Abstract:** A new method using microextraction by packed sorbent (MEPS) and ultra high performance liquid chromatography-diode array detection (UPLC-DAD) is described for the determination of piperazine-type stimulants in human urine. The studied compounds were 1-benzylpiperazine (BZP), 1-(3-trifluoromethylphenyl) piperazine (TFMPP), 1-(3-chlorophenyl) piperazine (mCPP) and 1-(4-methoxyphenyl) piperazine (MeOPP); 1-(2-chlorophenyl)-piperazine (oCPP) was used as internal standard (IS). The method was comprehensively optimized using the fractional factorial design approach, and the evaluated parameters were sample dilution (1:2), strokes (8), cathion exchange mechanism enhancement (1% acetic acid), amount of methanol on the washing solvent (10%), and elution of the analytes (5% ammonia in methanol). The procedure was linear from concentrations ranging from 0.1 (lower limit of quantitation - LLOQ) to 5 µg/mL, with determination coefficients (R2) higher than 0.99 for all analytes in all runs. The limits of detection were 0.1 µg/mL for BZP and TFMPP, while for MeOPP and mCPP 0.05 µg/mL was obtained. Intra- and interday precision ranged from 1 to 14%, while accuracy was within a ±15% interval for all analytes, fulfilling the criteria normally accepted in bioanalytical method validation. Under the optimized conditions, extraction efficiency was higher than 80% for all analytes, except for BZP (50%). This is the first time that MEPS was used for the determination of those compounds in biological fluids, and the technique has shown to be rapid and robust for the determination of piperazine-type stimulants in human urine, allowing reducing the handling time and costs usually associated to these analyses. Furthermore, the fact that only 0.1 mL of sample is required to accomplish the analysis make this method a valuable and powerful tool for drug monitoring in human urine in situations where the compounds are involved, for instance in forensic scenarios.

**Keywords:** Microextraction by Packed Sorbent; Piperazines; UPLC-DAD; Urine

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# EFFECTS OF LOW BLOOD ALCOHOL CONCENTRATION ON VISUAL EXPLORATION

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**Introduction:** Visual function is highly influenced by alcohol consumption in many different ways, spanning from visual field to stereoscopic vision. In a previous study we investigated the effects of low alcohol concentrations on visual search function using an automatic and non-invasive tool (Tobii 1750). The aim of the present study was to investigate visual ability by a Slide Show task in an "ecological environment". In the same time attentive function, concentration, and memory were explored. These are cognitive and psychomotor functions highly related to drive ability.

**Materials and Methods:** Twenty-four healthy volunteers (aged 18-65 years) were recruited as subjects. A single dose of alcohol (0.5 g/Kg) or placebo were administered according to a double-blind, cross-over design. Volunteers received the treatment randomly and performed the test 0, 30, 90 and 150 min after beverage administration. A Tobii 1750 automatic eye-tracker equipped with a proprietary management software was used. The following measures were considered in this study: "number of point of fixation", "pupil diameter", "position of the first fixation point", "coincidence between the first fixation and the longer duration point", and "extention of explorated area". A double task (memory recall of words) was applied in the final part of each session.

**Results:** In the alcohol group at 30 min (T1) from drinking the alcoholic beverage we observed a reduction of number of points of fixation. Also the extension of visual area explored was limited at T1, with an increase of coincidence between the prolonged observation point and the area with greatest visual impact. Even the coincidence between time of first fixation and point of longer fixation was greater under the influence of alcohol. At 150 min (T3) from drinking the alcoholic beverage we observed a tendency to direct gaze in the central part of the visual field, particularly this happened for the first fixation point. Furthermore, at 150 min we registered a more pronounced miosis in the alcohol group, in according to our previous study.

**Discussion and Conclusions:** Results confirm that low alcohol levels impair some visual functions; this occurs during the absorption phase and in the elimination phase of alcohol metabolism. In particular, versus control group, alcohol causes a visual pattern characterized by reduced search ability, and static gaze with a clear accommodative effort in last phase. These effects are more evident when the subject is required to perform an adjunctive task with partial distraction of attention from elaborative and cognitive resources. This is a kind of situation quite normal during driving.

**Keywords:** Alcohol; Visual Function; Performance

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# VALIDATED METHOD FOR THE SIMULTANEOUS DETERMINATION OF 12 ANTIEPILEPTIC DRUGS BY ULTRA PERFORMANCE LIQUID CHROMATOGRAPHY - TANDEM MASS SPECTROMETRY

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**Introduction:** Antiepileptic Drugs (AED's) are primarily intended to prevent epileptic seizures. They are also used in many non-epileptic conditions such as: migraine headache, neuropathic pain and bipolar affective disorder, among others. An analytical method was developed and validated for the simultaneous determination of 12 AED's commercialized in Portugal (Carbamazepine, Felbamate, Phenobarbital, Phenytoin, Gabapentin, Lamotrigine, Levetiracetam, Oxcarbazepine, Primidone, Rufinamide, Topiramate and Zonisamide).

**Methods:** The developed analytical method consisted of spiking 0.1 mL blood samples with internal standard (Promazine), pre-concentration and clean-up by solid phase extraction (Oasis HLB 3cc, WatersTM) followed by ultra performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS), using electrospray ionization (ESI). The separation was carried out on a Waters ACQUITY UPLC® HSS T3 column (2.1 x 100 mm I.D., 1.8 µm), with a mobile phase containing acetonitrile and formic acid 0.1% in gradient, at a flow rate of 0.5 mL/min, with a run time of 10 minutes. The samples were quantified by internal standard method detecting the ion transitions by a multiple reaction monitoring (MRM), for each AED. The described method was developed under the guidelines of Forensic Toxicology Laboratory (INML, I.P. - Centre Branch).

**Results:** Using weighed regression to calculate the calibration curves, the assay was validated in terms of linearity, accuracy and precision, achieving a sensitive (limit of quantification ranges from 45 ng/mL to 233 ng/mL) and selective method for quantification of the 12 AED's. Calibration curves for all AED's were linear from 50 to 5000 ng/mL and showed correlation coefficients (r2) better than 0.9925. No detectable carry-over and no relevant cross-talk and matrix effect occurred.

**Discussion and Conclusions:** The present study describes a simple and validated method for the determination of 12 different AED's in blood samples. Based on the analytical results and short run time, the method is suitable to support routine analysis of Antiepileptic Drugs in a forensic toxicology laboratory. The method can also be useful in Clinical Toxicology for therapeutic drug monitoring of epileptic patients.

**Keywords:** Antiepileptic Drugs; UPLC-MS/MS

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# FORENSIC AND SOCIAL EVALUATION OF DRUG FACILITATED CRIMES

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**Abstract:** Drug abuse refers to the hazardous or harmful use of illicit drugs like marijuana or cocaine, morphine, etc. and also prescription or nonprescription (over-the-counter) drugs. The most commonly abused drugs may be classified in 5 or 6 groups such as hallucinogens (cannabinoids, LSD, magicmushroom-psilocybin, etc.), depressants (benzodiazepines, barbiturates, GHB etc.), dissociative anesthetics (ketamine, phencyclidine, etc.), opiates (morphine, heroin, fentanyl, etc.), stimulants (amphetamine derivatives-MDMA-methamphetamine-methylphenidate, cocaine, etc.), inhalants (solvents-paint thinners, propane, etc.). Some of them are widely controlled, illicit or prescribed for therapeutic indications. The long-term and repeated substance usage can lead to psychological and/or physical dependences which cause a public health problem. Drug abuse and dependence plays a role in many major social problems and crimes. Especially in metropolises and touristic zones; rates of crimes offended under the influence of drugs are higher than others. Some of its reasons may be: the ease of providing cheaper drugs, the large number of the sellers, quite a number of people who recognize the drugs in advance and the vast population of the metropolitan areas. When a person abuses any drug or alcohol with drug, he/she may be subjected to a criminal act through the incapacitating effects of these substances; it is termed a drug-facilitated crime (DFC). Consuming psychoactive substances and the biological processes affect all human behaviors. As a result, the individual becomes the offender or the victim. The most common DFCs are sexual assaults, robberies, homicides and also drug smuggling has been committed by drug users. Drugs and drug usage have become important problems in recent years for the world. There are also increases in drug-related crimes, in the number of suspects taken into custody and in the amount of drugs seized over the years. In light of all this information about crimes caused by drugs, forensic and social evaluation will be presented in this poster session.

**Keywords:** Drug Facilitated Crimes; Drug Abuse; Psychoactive Drugs; Forensic Toxicology

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# DRUGS IN FINNISH DRIVERS: A COMPARISON OF HOSPITALISED AND KILLED DRIVERS

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**Introduction:** Use of alcohol and psychoactive drugs or medicines is a known cause of driver impairment with a considerable impact on road safety. The aims of this study were to compare the prevalence of substances commonly encountered in driving under the influence (DUI) cases.

**Materials and Methods:** As a part of the DRUID project two epidemiological studies were carried out within the Helsinki region, Finland. The studies were a study of hospitalised accident involved drivers and a retrospective study of autopsy findings from killed drivers. At the hospital blood was collected from injured drivers and data for killed drivers was from autopsy blood samples. Blood alcohol concentrations (BAC) from routine police roadside controls were also retrieved. A comparison of drug prevalence in blood was made between hospitalised and killed drivers. BACs from both populations were compared to those detected in drivers by the police in routine controls. Results are unweighted for traffic flow.

**Results:** For the comparison of hospitalised and killed drivers substances were grouped: alcohol, benzodiazepines, Z-drugs, illicit drugs (amphetamines, cannabis and cocaine) and opioids. For each category prevalence was similar in both study populations. Alcohol prevalence was clearly highest: more than one in five of the studied drivers in both groups were positive. Benzodiazepines were next most prevalent, above 10% in both populations. Opioids, illicit drugs and Z-drugs were less prevalent at 6% (for opioids in killed drivers) or less; no Z-drugs were detected in killed drivers. The overall BAC prevalence was similar for hospitalised and killed drivers, at approximately one in four drivers, compared to one in one hundred in the police controls. The prevalence of alcohol below the legal limit (0.5‰) in injured or killed drivers was multiple times that found in the police controls. Hospitalised and killed drivers were over 100 times more likely to be above the legal limit (0.5‰) and more than 300 times more likely above the aggravated drunk driving limit (1.2‰) than those at the police controls.

**Conclusions:** All of the studied substance groups for hospitalised and killed drivers were prevalent at 5% or more, except for Z-drugs. Benzodiazepines and especially alcohol are of particular concern. Overall prevalence of alcohol is much higher in accident involved drivers and the likelihood of a BAC level above 0.5‰, and particularly above 1.2‰, is dramatically increased in these drivers compared to normal traffic.

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**Keywords:** Hospitalised and Killed Drivers; Alcohol; Benzodiazepines; Opioids; Z-drugs; Illicit Drugs

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# APPLICATION OF THE MATHEMATICAL MODELS FOR MICROBIAL ETHANOL PRODUCTION IN POST-MORTEM CASES

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**Introduction:** The objective of this study is to test the applicability of the mathematical models we have developed in a previous study to approximate the microbially produced ethanol in correlation with other alcohols for C. perfrigens, C. sporogenes and E. coli, in real post-mortem cases.

**Materials and Methods:** Our chromatograms archives of the last six years were reviewed retrospectively and 40 chromatograms, from postmortem cases, having presence of other alcohols during the original blood forensic ethanol analysis were selected. The concentrations of the higher alcohols (1-propanol, isobutanol, 2-methyl-3-butanol and 2-methyl-1-butanol) and 1-butanol were calculated for each case. The six models developed previously [Boumba et al., 2011; doi:10.1016/j.forsciint.2011.03.003] were applied to calculate ethanol concentrations for each case. Standard errors produced for each case after comparing the original ethanol concentrations measured for each case and the calculated concentrations after applying each model were used to evaluate the applicability of the models. Microciological studies were performed for some postmortem cases to identify the microbe species present in the respective postmortem blood.

**Results:** The models corresponding to C. perfrigens estimated the microbially produced ethanol with a standard error <40% for 27 out of the 40 cases (68%), 26 of them with marked putrefaction (96%). Additionally, 21 of these cases (78%) had ethanol lower than 0.7 g/L. The models corresponding to E. coli estimated the microbial produced ethanol with a standard error <40% for 25 out of the 40 cases (63%), 24 of them with marked putrefaction (96%). Moreover, 18 of these cases (72%) had ethanol lower than 0.7 g/L. The models corresponding to C. sporogenes estimated the microbial produced ethanol with an error <40% for 18 out of the 40 cases (45%) all presented with putrefaction at autopsy, while 12 of these cases (67%) had ethanol lower than 0.7 g/L. It is worth mentioning that 28 out of the 29 cases (97%) having original ethanol concentration lower than 0.7 g/L succeeded a standard error <40% in predicting the microbially produced ethanol by at least one of the models. Limitations in the application of the models are identified in cases of ante mortem origin of part or all of the post-mortem detected ethanol, making the proper interpretation of postmortem ethanol analysis difficult. Moreover, other microbes might generate different alcohols patterns which might result to different models, explaining this way the major discrepancies observed in some cases.

**Conclusions:** The models of C. perfrigens show better applicability than these of E. coli and than those by C. sporogenes in postmortem cases while they apply more effectively in the presence of marked putrefaction and when blood ethanol concentrations measured are lower than 0.7 g/L.

**Keywords:** *Post mortem* Blood; Microbial Ethanol; Model

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# DETERMINATION OF TETRODOTOXIN IN BIOLOGICAL SAMPLES USING SOLID-PHASE EXTRACTION AND LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY: A FATAL CASE REPORT

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**Abstract:** Tetrodotoxin(TTX) is one of the most potent neurotoxins and is known to block voltage-gated sodium channels. TTX is found in various marine organisms including the puffer fish. In China, many food poisoning cases due to ingestion of wild puffer fish have occurred. There are some cases caused by the mistaken ingestion of muscles of a puffer fish species with toxic muscle, or by ingesting a dried dressed fish fillet produced from toxic puffer fish by a food processing company. In this paper, a rapid, simple and sensitive method was developed for the determination of TTX in biological fluids and tissues, using solid-phase extraction and liquid chromatography-tandem mass spectrometry. After precipitation of protein, the samples were cleaned up using solid-phase extraction with Oasis® MCX cartridges. The extracts were analyzed on a API 4000 LC-MS/MS system with multiple reaction monitoring (MRM), using positive mode electrospray ionization. Chromatographic separation was performed on a PC HILIC analytical column (100 mm×2.0 mm i.d., 5 mm particle size) with a programmed mobile phase consisting of 0.1% formic acid solution and acetonitrile at a flow rate of 0.2mL/min. The limits of detection were 2 ng/mL in blood and urine and 4 ng/g in liver for TTX, respectively. Here a fatal case was reported. A 45 year-old man developed numbness and tingling of the mouth, weakness and paralysis after ingestion of a cooked puffer fish. He was admitted to hospital and subsequently died about 2h later. No abnormal external findings were noted during the postmortem examination. Autopsy was performed and biological samples were collected. The method was applied to determination of TTX in biological samples collected from the autopsy with TTX poisoning. Simultaneously, distribution of TTX in the autopsy was reported. TTX concentrations were as follows: 34.3 μg/L in heart blood, 592.0 μg/L in urine, 38.8 μg/kg in the liver, 61.5 μg/kg in the lung, 86.4 μg/kg in the spleen, 6.1 μg/kg in the brain, 41.1 μg/kg in the stomach, and 434.5 μg/kg in gastric contents. TTX were not detected in kidney and pancreas. These results were in agreement with the quick death of the decedent. The cause of death was attributed to be "acute TTX poisoning", and the manner of death was accidental.

**Keywords:** Forensic Toxicology; Tetrodotoxin(TTX); Solid Phase Extraction; LC/MS/MS; Biological Sample

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# A SIMPLE METHOD FOR DETERMINATION OF BENZOYL-ECGONINE FROM ORAL FLUID, BLOOD AND URINE BY GC-MS FOLLOWING LIQUID/LIQUID EXTRACTION

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**Abstract:** Liquid-liquid extraction (LLE) of the most frequent illicit drugs and benzodiazepines by butyl-acetate (BuAc) at alkaline pH before GC-MS analysis is a good alternative of solid phase extraction. Its only disadvantage is that benzoyl-ecgonine (BZE, one of the main metabolites of cocaine) cannot be extracted under these conditions. The aim of this study was to work out the extraction of BZE from the same sample that was used for LLE of the other compounds, and to develop a GC-MS SIM method for its qualitative and quantitative determination. According to the protocol for extraction of illicit drugs and benzodiazepines, 1 ml oral fluid, blood, or urine sample is mixed with 0.05 ml phosphate buffer and 5 ml butyl-acetate and extracted. After centrifuge 4.50 ml BuAc is transferred to clean tubes, evaporated, derivatized with MSTFA and analyzed. For extraction of BZE, 4 ml methylen-chloride was added to the lower phase (which still contains 0.50 ml BuAc), and re-extracted. The mixture was centrifuged and 3.50 ml from the lower phase was transferred to a clean tube, evaporated, resolved in acetonitrile containing MSTFA and analyzed by GC-MS. The method has been validated and all parameters (linearity, intra- and inter day precision, selectivity, stability) fulfilled the validation criteria. The cut off values were: 10 ng/ml for oral fluid and blood, and 25 ng/ml for urine. The extraction recovery was 39.7 % for oral fluid, 14.9 % for blood, and 26.7% for urine. In spite of low recovery, the method proved to be accurate in four proficiency tests for oral fluid and blood during the DRUID (Driving Under the Influence of Drugs, Alcohol, and Medicines) EU-6 project. It was also successfully applied for determination of BZE from approximately 2800 oral fluid, 500 blood, and 1400 urine samples.

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**Keywords:** Benzoyl-Ecgonine; Liquid-Liquid Extraction; GC-MS

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# COCAINE POSTMORTEM REDISTRIBUTION IN BLOOD, BRAIN AND VITREOUS HUMOR

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**Abstract:** In intoxication cases, the interpretation of analytical results to assess the cause and process of death requires knowledge about toxicokinetics, toxicodynamic, postmortem redistribution and autopsy elements. Cocaine-related deaths occur mainly after prolonged drug use, the presence of cocaine in fluids or tissues does not prove that death was due to drug consumption and the interpretation of postmortem concentrations is even more complicated than attempts at making such correlations in the living. The objectives of this study were to investigate the postmortem redistribution of cocaine and its metabolite benzoylecgonine in blood, brain and vitreous humor. The analytes levels were quantified by High Performance Liquid Chromatography with diode array detection. Cocaine concentrations in blood show moderate correlation with vitreous humor and brain and strong correlation was found between vitreous humor and brain. Additionally, benzoylecgonine concentrations in blood show strong correlation with vitreous humor and weak correlation was found between blood and brain and vitreous humor and brain. These findings suggest that the studies of postmortem redistribution may be useful to assess the process of death.

**Keywords:** Cocaine; *Post mortem* Redistribution; Brain; Vitreous Humor; Blood.

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# POSTMORTEM DISTRIBUTION OF DRUGS AND OTHER CHEMICALS IN PERICARDIAL FLUID AND BONE MARROW ASPIRATE

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**Introduction:** In postmortem toxicology, an alternative material may be needed when adequate blood specimens are not available. In addition, multiple sampling of blood and other body fluids may be useful to investigate ante-mortem distribution and postmortem redistribution. Pericardial fluid (PCF) and bone marrow aspirate (BMA) are well-preserved postmortem materials in cases without structural damage due to injury or medical intervention. A previous study suggested that these materials are useful for postmortem analysis of ethanol, showing good correlations to blood level. However, there appears to have been insufficient data for other drugs and poisons. The present study compared toxicological data of blood, PCF and BMA in forensic autopsy cases to investigate the distribution of drugs and other chemicals.

**Materials and Methods:** Serial forensic autopsy cases (n=2,546) during the past 15.2 years (January 1996-March 2011) were reviewed and those with positive toxicological findings were collected to compare the data among right heart blood, PCF and BMA. Beside blood, urine and stomach contents, PCF and BMA from the lower thoracic vertebrae were routinely drawn using syringes after opening the body cavity at autopsy. Toxicological analyses were performed using an automated head-space gas chromatography/mass spectrometry (HS-GC/MS) for gaseous and volatile substances and solid/liquid phase extraction followed by an automated GC/MS for other substances. These sample collections and analyses were performed within the framework of our routine medicolegal casework following the autopsy guidelines (2009) and ethics guidelines (1997 and 2003) of the Japanese Society of Legal Medicine, approved by the institutional ethics committee.

**Results:** Toxicological analysis using HS-GC/MS was positive for 7 substances, including alcohol (>0.1 mg/ml), acetone, toluene, cyanide, liquefied petroleum gas (LPG), cresol and trichloroethylene (TCE), in blood, and PCF and/or BMA in 1,128 cases. GC/MS screening detected 37 drugs and other chemicals in these specimens of 150 cases, including amphetamines, codeines, sedatives/hypnotics (incl. phenothiazines, benzodiazepines, zolpidem and barbiturates), antidepressants (incl. amitriptyline, imipramine, dosulepin, olanzapine and sertraline), analgesics (acetoaminophen), anesthetics (incl. lidocaine, propofol and thiamylal), other drugs (incl. chlorpheniramine, carbamazipine, clopidogrel, methylephedrine, mexiletine, promethazine and ticlopidine), and hydrogen sulfide. Among these substances, propofol and thiamylal (intravenous anesthetics) as well as cyanide in acute fire fatalities and hydrogen sulfide in suicides (inhaled gaseous substances) were detected at a substantially lower concentration in PCF than in blood or BMA. However, ingested cyanide showed a higher level in PCF. LPG and TCE levels were higher in BMA than in blood. Distribution of toluene varied by case. Most other substances that were taken orally and acetone showed similar distribution in blood, PCF and BMA, as previously reported for alcohol; however, an evident topographic difference was sporadically seen for several drugs, including barbiturates, phenothiazines, promethazine, mexiletine and lidocaine. The distribution varied by case as well as by drug; drug concentrations in individual specimens were different even when taken simultaneously in a mixture. Lidocaine used in critical medical care was detected in blood, BMA and PCF as well as urine and stomach contents, and the level was often higher in heart blood and/or PCF than in BMA.

**Discussion and Conclusions:** The present study suggested that PCF and BMA are useful alternative materials for toxicological analysis of most drugs and other chemicals, except for concentrations of intravenous anesthetics and inhaled gaseous substances, which were often substantially low in PCF. Inclusion of these materials in routine analysis may be also helpful to investigate pharmaco- and toxicokinetics.

**Keywords:** Toxicological Analysis; Pericardial Fluid; Bone Marrow Aspirate

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# MUENCHAUSEN SYNDROME BY PROXY: A WARFARIN CASE

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**Abstract:** Muenchausen syndrome by proxy is an artificial disease or physical damage exaggerated or created by the parents to their own child. It has been described sometimes as a form of extended child abuse. Inconsistency among clinical symptoms, laboratory findings, physical examination and medical history should bring the Muenchausen syndrome by proxy to mind. Conditions or symptoms that may be faked by parents include failure to thrive, allergies, asthma, vomiting, diarrhea, seizures and infections By this study, we aimed to emphasize the possibility of Muenchausen syndrome by proxy with complex and repetitive hospital admissions. A 16 months old male patient was admitted to Cerrahpasa Medical Faculty Department of Pediatrics with unexplained menorrhagia and hematuria. Clinician had suspected to Muenchausen syndrome by proxy after a series of treatment. In this study toxicological results of biological samples and feeding bottle of the patient will be presented.

**Keywords:** Munchausen Syndrome by Proxy; Warfarin; Toxicology

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# WHEN IS BLOOD ALCOHOL CONCENTRATION LETHAL? TWO DICHOTOMIC CASES STUDY

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**Abstract:** In forensic toxicology, the severity or lethality of a given intoxication is generally appreciated in the light of the blood concentration of the toxic compound (or "xenobiotic") involved, for which reference values such as therapeutic, toxic, or lethal levels often exist. Correlation with laboratory data and any available antemortem or perimortem clinical information is necessary to render an appropriate opinion on the cause of death. Often no antemortem or perimortem drug blood is available for analysis, and clinical information about the deceased at the time of death may not exist if no medical attention was provided. Although the interpretation of blood alcohol concentration (BAC) may be facilitated by the relative amount of scientific data available, it is still difficult to interpret some levels of BAC as lethal if there isn't enough information available. There are some relevant factors that may affect BAC results, like the time elapsed after death, post-mortem redistribution phenomena and blood sampling quality. A less confident BAC result can make it more difficult to accomplish a correct interpretation of the influence of ethanol in a certain death. As a paradigmatic example of how difficult it is to consider ethanol a lethal toxic agent, we present two practical cases of deaths related with alcohol which were collected from the 2010 casuistic data of the North Branch of the INML, I.P... The first death was directly caused by acute ethanol intoxication, and the other was due to traumatic injuries resultant of a traffic accident. In the first case, the victim ingested a large quantity of alcohol beverages, namely half a bottle of pure ethanol, resulting in an ethanol analysis of 3,86 g/L. In the second case, the BAC obtained was 4,49 g/L , a level considered lethal according to the main reference toxic tables. However, the victim not only was conscious around the time of death, but was driving a vehicle. It is known that antecedents as chronic alcohol abuse and associated diseases, or the use of other toxic substances with additive neurodepressive action may influence lethal BAC. The toxicokinetics mechanisms that could be involved in both cases will be characterized and the death circumstances, the social and medical history, autopsy findings, blood sampling procedures, degree of putrefaction and other toxicological results will be compared. When interpreting toxicological results, the forensic expert must be aware of most of the circumstances involved, and never take quantitative toxicological results as an absolute decisive parameter in the evaluation of toxic lethality.

This communication shows that, in some particular cases, a higher BAC level does not necessarily cause death directly as it would on most individuals in similar circumstances.

**Keywords:** Blood Alcohol Concentration (BAC); Case Study; Lethal Case

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# EXTERNAL QUALITY CONTROL: THE CRUCIAL EVIDENCE OF QUALITY

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**Introduction:** The ability to demonstrate the existence of the triangle accreditation, validation and external quality control allows a good connection between the laboratory and the outside world. Then, the evidence of technical quality depends on each of these acts. The Analytical Method Validation should demonstrate by objective evidence, that the method is fit for is intended purpose. Thus, a laboratory like the forensic toxicology service shall validate non-standard methods, methods created or developed by the laboratory while, contemporarily, the laboratory should project the Quality Control design. The Quality Control is an essential laboratory tool and is divided in internal and external actions. In accredited laboratories the External Quality Control should be based in proficiency test participation. The greater the requirement for external quality control, better the demonstration of fitness for purpose.

**Materials and Methods:** The participation in the External Quality Control CONTROL 2/10 organized by Instituto Nacional de Toxicología y Ciencias Forenses (INTCF) referred to Blood Ethanol Determination acts as an example of using the results of participation to highlight the advantages of the test procedure. Results: The analytical method for ethanol determination by GC/FID/Head-Space is divided into two analytical runs with three parameters monitored for compliance verification of results. In the first run, two samples are injected after verifying compliance with relative retention time and the repeatability limit in two different chromatographic columns. In the second sequence are re-injected, with an aliquot, the samples with positive results in the first sequence. If the result respects 2 limit of repeatability, it is considered as the result of the first phase. The internal quality control is implemented through two levels of control charts with control limits associated with compliance (-/+) 3s, together with the analysis of a reagent blank. The method's ability to differentiate the ethanol from other volatile compounds proves to be as important as the quantitative aspect. Thus, it is shown through the sample M3 of external quality assurance that the system of internal quality control, selection of columns and chromatographic parameters can ensure the correct identification and quantification of ethanol, acetone and 2-propanol. Quantitatively the results of participation in the proficiency test were satisfactory for the three samples, with a |Z-score |<2 for ethanol, 2-propanol and acetone.

**Discussion:** With the conclusions obtained through the participation in the CONTROL 2/10 the STF-N has shown that the method used for determination of ethanol in blood has good performance for accuracy and for qualitative parameters (selectivity and specificity). This statement gives evidence of a consistent suitability of the analytical method over time, helping to ensure the accreditation of the laboratory.

**Keywords:** External Quality Control; Validation; Accreditation

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# WHAT ABOUT ACETALDEHYDE?

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**Abstract:** Although the toxicological basis of alcohol consumption has been extensively studied in the past decades, some of the primary mechanisms of acute and chronic alcohol intoxication remain controversial, being one of the major issues of controversy and intense debate the role of acetaldehyde, the first product of ethanol metabolism, as a major contributor for the symptoms and reactions of acute alcoholic intoxication and as an important factor associated with alcohol abuse and alcoholism. Acetaldehyde is a biologically active molecule produced from the metabolization of ethanol by three major enzymatic pathways based on three main enzymes - alcohol dehydrogenase (ADH), cytochrome P4502E1 (CYP2E1) and catalase - and subsequently metabolized into acetate mainly by a pathway dependent on acetaldehyde dehydrogenase (ALDH). Ethanol metabolism has high individual variability, with differences in alcohol elimination rates of three- to four-fold from person to person. Such individual variability is mainly due to genetic variations in the above mentioned pathways (e.g.: multiple molecular forms of ADH and ALDH). These genetic polymorphisms determine the level of acetaldehyde accumulation after alcohol consumption and therefore have an impact on individual susceptibilities to both alcohol toxic effects and alcoholism. Acetaldehyde is highly toxic, with a 50% lethal dose (LD50) concentration approximately 10 times lower than ethanol in rats, and the rise on its concentration is known to be acutely associated with several signs and symptoms, such as cardiac arrhythmias, nausea, anxiety, and facial flushing. Several authors have suggested a possible role of acetaldehyde as a marker of chronic alcoholism and as a major factor explaining chronic effects of alcohol consumption. Considering all blood alcohol determinations from January of 2010 through May of 2011 at the North Branch of the Legal Medicine National Institute, requested either in the forensic context, or in the driving offences scope, it was observed that in nearly one quarter of them a positive acetaldehyde determination was present, and this finding was four times more frequent in positive blood alcohol samples than in negatives. Considering the possible key role of acetaldehyde in acute alcohol intoxication and in alcohol addiction, it is of critical importance to discuss and clarify the relevance and interpretation that should be given to a positive blood acetaldehyde determination, particularly in negative blood alcohol samples.

**Keywords:** Acetaldehyde; Ethanol

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# OXAZEPAM FATAL INTOXICATION: A CASE REPORT

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**Introduction:** Benzodiazepines are among the most widely prescribed drugs and have replaced barbiturates as the major class of central nervous system depressant drugs. They are used for the treatment of anxiety and sleep disorders, stress, seizures, muscle spasm, and alcohol withdrawal. Regrettably, they are often subject to overdose and are frequently involved in fatal cases of drug intoxication often in combination with other compounds, but sometimes even alone.The authors report a fatal case of a 44 year-old homeless alcoholic woman involving oxazepam concentrations in an extremely high value in the analysed postmortem blood sample.

**Materials and Methods:** After autopsy, toxicological analysis of ethanol and drugs were requested. The determination of benzodiazepines involved a screening analysis by immunoassay and a LC/MS method for confirmation and quantitation of the detected benzodiazepines. Analysis of other drugs was performed by GC/MS and ethanol was analysed by GC/FID.

**Results:** Toxicological results from cardiac blood have confirmed the presence of oxazepam (25 ug/mL) ethanol (0.14g/L), methadone (931 ng/mL) and nordiazepam (285 ng/mL).

**Discussion and Conclusions:** In fatal cases due to oxazepam administration, concentrations of this benzodiazepine usually are between 3-6 ug/mL. The authors conclude that, in this case, the detected oxazepam concentration was much higher (25 ug/mL) than the letal concentration described in the specialized literature. In addition, other substances with similar action (depression of the central nervous system) were also present (nordiazepam, methadone and ethanol), which can lead to a fatal respiratory depression. It is important to note that the victim was super obese (IMC 49 Kg/m2) which may had also contribute to the respiratory depression associated with the factors described above. The remaining autoptic findings were non-specific and no other information raised the suspicion of fatal intoxication.

**Keywords:** Oxazepam; Intoxication; *Post mortem* Toxicology

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# DEVELOPMENT AND VALIDATION OF AN ANALYTICAL METHODOLOGY BY GC/MS/MS FOR ANTIDEPRESSANTS DETECTION IN WHOLE BLOOD

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**Introduction:** Depression is one of the most prevalent psychiatric disorders in our society. Solid epidemiological evidence suggests a substantial incidence of the disease in recent years. Treatment of depression can be accomplished through the use of pharmacotherapy, psychotherapy or both. By this way, consumption of antidepressants has been increasing exponentially and alarmingly over the past years. In this study an analytical methodology was developed, in whole blood samples, for the analysis of the following Antidepressants: Amitryptiline, Citalopram, Clomipramine, N-Desmethylclomipramine, O-Desmethylvenlafaxine, Dothiepin, Fluoxetine, Imipramine, Maprotiline, Mianserin, Mirtazapine, Nortryptiline, Paroxetine, Sertraline, Trazodone, Trimipramine and Venlafaxine.

**Materials and Methods:** The developed methodology included a solid phase extraction (SPE) procedure with Oasis HLB® 3cc columns (WATERS) and an analytical technique using a gas chromatograph GC-450, coupled to a mass spectrometer MS-300 with a triple quadrupole detector (VARIAN).

**Results and discussion:** This analytical methodology validation was accomplished with the assessment of some parameters. In the specificity/selectivity and identification capacity, 0% false positive and false negative results were achieved, whereby confirming the specificity and the selectivity of this method. The limits of detection and quantification were, respectively: Amitryptiline (3,98ng/mL and 12,06ng/mL), Citalopram (5,03ng/mL and 15,24ng/mL), Clomipramine (7,10ng/mL and 21,50ng/mL), N-Desmethylclomipramine (6,82ng/mL and 20,68ng/mL), O-Desmethylvenlafaxine (8,35ng/mL and 25,31ng/mL), Dothiepin (5,23ng/mL and 15,85ng/mL), Fluoxetine (7,13ng/mL and 21,60ng/mL), Imipramine (3,27ng/mL and 9,92ng/mL), Maprotiline (6,80ng/mL and 20,61ng/mL), Mianserin (3,88ng/mL and 11,74ng/mL), Mirtazapine (3,29ng/mL and 9,98ng/mL), Nortryptiline (5,15ng/mL and 15,61ng/mL), Paroxetine (9,31ng/mL and 28,21ng/mL), Sertraline (9,65ng/mL and 29,26ng/mL), Trazodone (10,03ng/mL and 30,39ng/mL), Trimipramine (3,10ng/mL and 9,40ng/mL) and Venlafaxine (9,34ng/mL and 28,30ng/mL). All these values were lower than therapeutic values described on literature. In the linearity study it was obtained a correlation coefficient higher than 0,99, which shows a good linearity in the chosen work range.

**Conclusions:** The combination of GC with a triple quadrupole detector (GC/MS/MS) make it one of the most powerful analytical techniques that provides a method for detecting target compounds in complex matrices. MS/MS is a highly selective mass spectrometric technique, whereby target analytes are detected regardless of the sample matrix or coeluting interferences and is a technique that permits to achieve ultra-low detection limits and sensitive analyses in this type of samples. Validation has an important paper at the routine analytical methods whether in the context of quality management or accreditation. The following validation parameters were evaluated for qualitative and quantitative purposes: specificity/selectivity and identification capacity, limits of detection and quantitation, linearity, carry-over, extraction recovery, among others. The method applies into the laboratory routine, given that the achieved results cover all therapeutic and letal range with high sensitivity. As such, this procedure may confirm the existence of these antidepressants group, including their quantitation, in whole blood samples.

**Keywords:** Antidepressants; GC/MS/MS; Forensic Toxicology

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# IS THE PSYCHOACTIVE DRUGS CONSUMPTION AFFECTED BY THE ECONOMIC CRISIS?

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**Introduction:** During the years, the Forensic Toxicology Laboratory of the National Institute of Legal Medicine - North Branch has given particular attention to psichoactive drugs detection increasing rates. Thus, the authors intended to evaluate and compare these substances consumption during equal periods of time by analysing the cases performed in this Laboratory.

**Methods:** A retrospective study was performed, between November 2009 and April 2010 and between November 2010 and April 2011, concerning the positive cases achieved for antidepressants, antipsychotics and benzodiazepines, considering the most diverse causes of death, gender and age.

**Results:** Between November 2009 and April 2010, 307 positive cases were detected and confirmed. In the analogous period (November 2010 to April 2011), one year later, 437 cases were found, corresponding to a 42% increase. Considering all the studied cases, 41% of them corresponded to the first analyzed period and 59% to the second. Comparing the total number of prescription drugs detection requests by the pathologists along the two time-periods, an increase of the absolute value was observed from the first to the second period of time (586 to 658 requests). Nevertheless, the increase in terms of positive cases is still noted, as the relative number of positive results compared with the total ones is still higher in the second period of time (52,4% of positive cases in the 2009-2010 period to 66,4% of positive cases in the 2010-2011 period, related to the total number of requests

**Discussion and Conclusions:** It is known that the consumption of these substances groups, isolated or combined, is mostly associated with the monitoring and treatment of depressive states. Actually, in our country, depression is a very common illness of the psychiatric forum and these numbers indicates that this problem is rising with all the related and already known consequences. The current economic crisis and the consequent financial pressure among families are factors that can propitiate the increase of depression cases. In hard times, as the ones that we are currently living, the number of suicides tends to increase and this is one of the serious consequences of this problem. Nevertheless, this study just intends to discuss the compounds positive numbers, whatever the entire death context parameters (cause of death, age and gender, among others). According to specialists, one in five persons can potentially suffer from mental illness and it becomes recommendable a prompt search of specialized medical support as soon as the individual may experience the first signals of insanity, namely depression, which is the pathology with the most growing rate nowadays.

**Keywords:** Psicoactive Drugs; Economic Crisis; Forensic Toxicology

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# VALIDATION OF AN IMMUNOASSAY SCREENING METHOD FOR PHENCYCLIDINE (PCP) IN WHOLE BLOOD FOR FORENSIC PURPOSES

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**Introduction:** Although Phencyclidine was originally developed for anaesthetic purposes, its clinical use was abandoned afterwards, due to its hallucinogenic properties. However, these side effects led PCP to the illicit market, also known as "Angel's dust". The use of screening imunoassays methods is a major advantage in a toxicological laboratory, due to their ease of use, automation degree and fast results, allowing predictive results which will help the toxicologist in further steps and samples analysis. The aim of this work involved the analytical validation of an immunoassay screening method for Phencyclidine in whole blood samples in terms of specificity, selectivity, sensibility and cross-reactivity for some affiliated compounds.

**Materials and Methods:** The assays were performed on a Bio-Rad CODA® Automated EIA Analyzer. The PCP assay kit, OTI PCP Intercept® MICRO-PLATE EIA kit, was obtained through Bio-Rad Laboratories. For all the validation steps, whole blood samples were fortified with PCP in different concentrations (5, 10, 25, 50, 100, 200 ng/mL). Different samples were fortified with Ketamine (0,75; 1,5; 3 and 6 mg/L), with venlafaxine (100, 200, 500, 1000 ng/mL) and desmethylvenlafaxine (100, 200, 500, 1000 ng/mL), for cross-reactivity study purposes. Positive confirmation of the samples was obtained by GC-MS.

**Results and Discussion:** The chosen cut-off value for PCP was 25 ng/mL. The method has shown good selectivity and specificity, with 0% False Negatives and 0% False Positives (n =20). The method has also shown good results in terms of cross-reactivity, with 0% False Positives for all the three referred compounds. As so, this method validation results, associated with its advantages in terms of ease of use, automation levels and time of analysis, avoiding an unnecessary confirmation procedure by hyphenated techniques, more expensive and much more time-consuming, whenever the sample analysis result is negative. In conclusion, the OTI PCP Intercept® MICRO-PLATE EIA was found to be a reliable method for rapid screening of PCP in whole blood samples, being able to be used in routine laboratory analysis.

**Keywords:** EIA; GC-MS; PCP

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# ANALYSIS OF COUNTERFEIT DRUGS AND PHARMACEUTICAL PREPARATIONS SEIZED IN THE ILLEGAL MARKET AMONG BODYBUILDERS

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**Introduction:** Although illegal without prescription, bodybuilders purchase preparations to enhance muscle size and strength and to alleviate advers effects associated with steroids use or to mask steroid abuse. The aim of this study was to identify active compounds present in counterfeit drugs and pharmaceutical preparations seized in the black market among bodybuilders in Belgium. Closed or sealed packagings with different labels and three preparations without label were included in the study.

**Materials and Methods:** The identification scheme was based on reverse-phase liquid chromatography with a photodiode array UV detector and gas chromatography-mass spectrometry. Methanolic sample extracts of tablets (n=24), capsules (n=2), oral gels (n=4) and water-based injectables (n=1) were chromatographed on a ChromSpher 5 C18 column using a gradient program of triehylammoniumphosphate buffer and acetonitrile as mobile phases and were monitored at wavelengths 220 nm and 254 nm. Oil-based injectables (n=36) were extracted with hexane and methanol. The diluted supernatant layers and the methanolic sample extracts were injected into a Agilent 6890 N gas chromatograph with fused silica CPSIL 8CB low bleed capillary column and Agilent 5973 inert mass selective detector operated in full-scan mode. The identified compound(s) were checked against the active ingredient(s) declared on the label.

**Results:** In tablets, capsules, orals gels and water-based injectables one of the following compounds were identified: sildenafil, yohimbine (vasodilators), anastrozole (aromatase inhibitor), tamoxifen or clomiphene (estrogen receptor antagonists), clenbuterol (beta-2 agonist), methyltestosterone, methandrostenolone, oxandrolone, stanozolol or dehydroepiandrosterone (anabolic steroids) or liothyronine (thyroid hormone). With exception of one preparation in which only tocopherol was identified, all oil-based injectables contained one or a combination of anabolic steroids (esters). Propionate, enanthate, decanoate, acetate, fenylpropionate, isocaproate, and undecylenate esters of a variety of anabolic steroids were detected.

**Conclusions:** Counterfeits can not be differentiatied from original pharmaceutical preparations base on their physical appearance. The seized preparations often did not contain the active ingredient(s) declared on the label (n=21), they either contain other of more active ingredients. Anabolic steroids (esters) and products used as an alternative to anabolic steroids such as clenbuterol, are commonly found in the black market among bodybuilders.

**Keywords:** Anabolic Steroids; Black Market; Bodybuilding; Liquid Chromatography; Gaschromatography-Mass Spectrometry

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# CYP3A4 AND CYP2C19 GENOTYPES AND ZOLPIDEM METABOLITE RATIOS IN CHINESE HAN POPULATION: A PILOT STUDY

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**Abstract:** It can be difficult to interpret forensic toxicology results due to the inter-individual variability in the response to drugs. CYP2D6, CYP2C19, CYP2C9, CYP3A4 and CYP1A2 were found to be involved in the majority of hepatically cleared drugs. Zolpidem(ZPD) is an imidazopyridine derivative used as a new kind of hypnotic. ZPD was chosen as the substrate of interest because it is mainly metabolized by these enzymes, and it is usually used in drug facilitated crimes. Otherwise, little was known about the pharmacogenetics of ZPD. As a preparatory step for a pharmacokinetic and metabolism study of ZPD in Chinese Han population, a genotyping method for 50 single nucleotide polymorphisms(SNPs) of CYP2D6, CYP2C19, CYP2C9, CYP3A4 and CYP1A2 was developed. Our objective was to evaluate genetically determined inter-individual variation in conjunction with metabolite ratios of ZPD found in toxicological analysis in a pilot study.

**Methods:** Health individuals (n=300) were genotyped for CYP2D6, CYP2C19, CYP2C9, CYP3A4 and CYP1A2 by allele-specific primer extension followed by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF MS). According to the genotyping results, twenty four Chinese volunteers were chosen and divided into the following four groups(n=6/group). Group 1: CYP3A4*18(wild-type, W), CYP2C19*2(W); Group 2: CYP3A4*18(mutant, M), CYP2C19*2(W); Group 3: CYP3A4*18(W), CYP2C19*2(M); Group 1: CYP3A4*18(M), CYP2C19*2(M). After oral administration of 10mg ZPD, blood and urine samples were collected from each subject over 24h. ZPD and its major metabolites zolpidem 6-carboxylic acid(ZCA) and zolpidem phenyl-4-carboxylic acid(ZPCA) were separated using 20mmol/L ammonium acetate (pH4.0) and acetonitrile based on an UPLC-MS/MS method which was validated previously. Data acquisition was performed on a QTrap 4000(Applied Biosystems) in MRM mode with positive electrospray ionization.

**Results:** Positive correlations between CYP3A4 and CYP2C19 alleles and the ratio of ZPD to ZPCA and ZCA were found. The main pharmacokinetic parameters of ZPD and its metabolites in Group 2 were not significantly different from those in Group 1 except that the oral clearance is higher than Group 1. In Group 3, t1/2, AUC and Cmax of ZPD were significantly higher than those in Group 1, while t1/2 of ZPCA was 31.2% longer than that in Group 1 and AUC was 43.7% lower than that in Group 1($p<0.05$). In Group 4, AUC and Cmax of ZPD were significantly higher than those in Group 1 and Group 3, respectively($p<0.05$). The oral clearance and renal clearance in Group 3 and Group 4 were significantly lower than those in Group 1($p<0.05$). The metabolic ratios in Group 3 and Group 4 were 1.67 and 2.86 times than that in Group 1, respectively. This was confirmed that the oxidative metabolism via CYP3A4 and CYP2C19 was the main pathway of ZPD metabolism.

**Conclusions:** The findings in this study show that CYP3A4*18 increases CYP3A4 activity while CYP2C19*2 reduces CYP2C19 activity which leads to the poor metabolism of ZPD in Chinese Han population. The results also suggest that genetic factors play, in general, a dominant role over other factors in the metabolism of individual drugs not only in forensic science but also in clinical pharmacogenetics.

**Keywords:** CYP3A4; CYP2C19; Genotype; Zolpidem; Metabolite Ratios

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# DETERMINATION OF COCAINE AND COCAINE METABOLITES IN SINGLE HAIRS BY MALDI MASS SPECTROMETRY IMAGING

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**Introduction:** Normally hair testing procedures involve several steps including washing, extraction, clean-up and last but not least analysis by chromatographic techniques. Matrix-assisted laser desporption/ionization (MALDI) mass spectrometry imaging (MSI) could be used as an easy-to-perform complementary technique for drug detection in such complex biomatrices.

**Materials and Methods:** In a preliminary test 4 single hairs were analyzed for the presence of cocaine and cocaine metabolites by use of the MALDI LTQ Orbitrap XL instrument (ThermoFisher Scientific). Hair strains were fixed on a sample plate and an a-cyano-4-hydroxycinnamic acid (CHCA) matrix was manually spotted onto the hair strains. Fourier transform mass spectrometric full scans were obtained moving from the hair root region towards the hair tip.

**Results:** In hair 1 cocaine (exact mass 304.15433) was identified mostly from the root of the hair and then towards the hair tip. This was confirmed by analysis of hair number 2. Drug concentrations determined by conventional LC-MS/MS approach were as follows: cocaine 3.33 ng/mg, benzoylecgonine 0.70 ng/mg. Using this technique we got time-related information (like a calendar) concerning the behavioural pattern of the consumer with high resolution. Cocaine was not administered during the whole period of time but there were two particular periods where cocaine was used, one of them 3 months prior to sampling and the other one 6 ½ to 9 months before. In addition to cocaine we were able to detect cocaine metabolites for plausibility control with the masses 290.13868 (benzoylecgonine/norcocaine), and 318.16998 (cocaethylene). In two hairs of the same subject which were analyzed under the same conditions we obtained negative results.

**Results:** Our preliminary results confirm the applicability of MALDI-MSI in principle for the determination of drugs and pharmaceuticals in hair samples. The high chronological resolution allows enhanced interpretation concerning the periods of drug administration. However, the results with 2 negative hairs have also demonstrated that hair analysis of single hairs can lead to misinterpretation. Different growth rates have to be considered as well as the phenomenon of different stages (anagen, catagen, telogen).

**Keywords:** Hair Analysis; Cocaine; Cocaine Metabolites; Maldi Mass Spectrometry

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# ETHLY GLUCURONIDE CONCENTRATIONS IN PULVERIZED AND CUT HAIR SAMPLES

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**Introduction:** The determination of ethyl glucuronide (EtG) in hair is a powerful tool to prove alcohol abstinence and to distinguish between social and heavy drinkers. Last year, the number of analyzed hair samples in our laboratory increased significantly. Sample preparation, especially cutting the hair with scissors, is a very time-consuming process. Grinding the hair samples with a mill would not only save an enormous amount of time but would also lead to more homogenous matrices. However, studies have shown that analyzing pulverized hair samples can have a negative influence on analytical measurements due to higher concentrations of matrix compounds in the hair extract. A comparative analysis of hair samples tested positive for EtG should show if grinding hair with scissors or with a mill leads to convergent results.

**Materials and Methods:** 40 positively tested hair samples originating from driving ability diagnostics have been included in this study. After washing the hair samples, one half was cut with scissors and the other half was pulverized. If there was only little hair available, the whole hair segment was pulverized and the measured EtG concentration was compared with the previously determined result. A FastPrep Automated Homogenizer (MP Biomedicals) was used, operated with steel balls (ø 3 mm). The following extraction procedure was identical. EtG concentrations were determined using a fully validated LC-MS/MS method.

**Results:** Both preparation procedures were performed without any problems. Concentrations between 11 and 140 pg/mg (mean: 43 pg/mg, median: 29 pg/mg) were determined in hair samples cut with scissors. In pulverized hair samples EtG concentrations between 13 and 175 pg/mg (mean: 59 pg/mg, median: 45 pg/mg) were measured.

**Conclusions:** In pulverized hair samples the determined EtG concentrations differ from the concentrations measured in cut hair samples by 5-177% (mean: 47 pg/mg, median: 38 pg/mg). A Wilcoxon-Test (95% confidence interval) showed a highly significant increase of the EtG concentrations in pulverized hair samples. This indicates a better extraction yield as a result of the more homogenous and finely ground hair matrix. Formation of EtG during the pulverization process can be excluded. Higher background noise or a larger number of matrix caused signals have not been observed when analyzing pulverized hair samples. It becomes obvious that determined EtG concentration varied significantly depending on how the hair matrix is cut. In our opinion, grinding the hair with a mill is to be recommended.

**Keywords:** Ethyl Glucuronide; Hair; Pulverizing Versus Cutting

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# DRIVING UNDER INFLUENCE OF DRUGS: RELEVANCE OF URINE CANNABINOIDS TESTS AND EFFECTIVE POSSIBILITY OF USE AS JUDICIAL EVIDENCE

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**Abstract:** The Italian Traffic Code (Article 187) establishes it is a criminal offense to drive a vehicle under the influence of drugs. The above mentioned Article also establishes that the driver can be brought by Police Officers to a Public Hospital to detect the presence of psychotropic substances such as illicit drugs. In many cases it is only possible to get urine test, as the blood test requires the permission and consent of the driver. Nevertheless, a positive urine test provides no evidence of present intoxication as it cannot determine when a drug was used, but only the presence of the carboxylic form of THC, which is an inactive metabolite. Starting from a case study, the purpose of this work is to enhance a debate in order to modify the substance abuse protocol and improve the analytical methods in order to detect the presence of active metabolites which confirm the effective psychophysical disorder from THC.

**Keywords:** Drugs; Driving; Urine Cannabinoids Tests

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# INDEL POLYMORPHISMS APPLIED TO CADAVERIC GENETIC IDENTIFICATION

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**Introduction:** The current forensic genetics, including the identification of bodies, paternity and criminal investigation is based on the study of the STRs (short tandem repeats). Mini-STRs strategies advances enable better results in difficult samples, such as forensic criminal mixtures or corpses identification. However, the problems still exist when we have to interpret the results from such samples. The new SNPs (single nucleotide polymorphisms) approaches, as INDEL (insertion /deletion) multiplexes may help to achieve this goal. Here we present our first results, applying a deletion/insertion polymorphism multiplex to body identification. A body buried about 35 or 70 years was played by two families. The lab received bones and teeth from the body and reference material from the putative grandson and his mother. The results are compared between STRs, mini-STRs and INDEL.

**Materials and Methods:** Samples of bone and teeth from a male body who was buried 35 years ago, said one family or 70 years ago said another family, came to our laboratory. After cleaning with bleach and water, the teeth were scraped with a drill and pulverized in a cryogenic mill. The DNA in teeth powder was initially extracted by DNA Isolation Kit, Tissue Kit, Puregene-Gentra Systems. PowerPlex 16 and Identifiler STRs approaches were made. Later, extraction using PrepFilerTM Express Forensic DNA Extraction Kit (Applied Biosystem), QIAamp® DNA Investigator (QIAGEN) and DNA IQTM System" (PROMEGA) was done. After quantification in real time PCR (ABI Prism 7000 Sequence Detection System) using Quantifiler Human® DNA Quantification Kit. Minifiler, NGM and PowerPlex ESI17 approaches (which includes mini-STRs) and also an INDEL multiplex, the Investigator DIPplex Kit (QIAGEN) was applied. Fragments were separated using POP6 conditions in a 3130 ABIPrism Genetic Analyzer (Applied Biosystem).

**Results:** The quantification results ranging between 0.00034 ng/µL and 0,0322 ng/µL. Better results were obtained with PrepFilerTM Express Forensic DNA Extraction Kit. With the new DNA extraction and amplification kits we obtained a better but a still incomplete autosomic genetic profile (12/17) and Y- genetic profile (11/16). Applying the Investigator DIPplex Kit to same samples it was produced a full profile of 30 DIP markers. When using the STRs profile information of forensic and reference material in Familias software we obtained a LR of 33.3 (97,1%) argued in favor of those teeth have belonged in fact to grandfather of the man presented to examination. But when we took the results from DIP and launched in Familias software the results showed a LR of 0,18. When combined the STRs and DIP information resulted in a LR of 5,89 (85,5%).

**Discussion and Conclusions:** Samples with small quantity and degraded DNA content shall be constantly a challenge to forensic study. New tools to help obtaining full information and consistent genetic profiles are always welcome. Those new DNA extraction kits, used in this work, allow obtaining an increased quality and quantity DNA, enough to obtain a nearly full genetic profile of mini-STRs (also a tremendous new tool) and Y-STRs kits. Careful must be taken in concern with the DIP approach. The studied thirty DIP markers seem to produce insufficient information, especially in family investigation cases. Also, the kit requires 0,2 ng/µL to give full profile, as was confirmed by our previous studies (results not showed). This is in range of the new generation STRs kits requirements, with superior power of discrimination. The use of technology and software worldwide spread in forensic labs is in favor of DIP approach. Also, the lack of stutter bands is another argument in favor, especially in mixtures criminal cases. DIP kits more sensitivity and with more markers are necessary, in future.

**Keywords:** Cadaveric Genetic Identification; Deletion/insertion Polymorphisms; Mini-STRs

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# Y-CHROMOSOMAL STR DATA FOR THE 16-AMPFISTR®YFILER™ LOCI UN FOUR ETHNIC GROUPS LIVING IN ANGOLA

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**Abstract:** Located in the south-central Africa, Angola is characterized by a diversity of ethnic linguistic groups, within the Bantu-speakers — main responsible for the inhabitation of Angola until the arrival of the Portuguese, in the 16th century. Occupying the South and East Angola, the Nyaneca-Nkhumbe, Chokwe (Lunda-Chokwe), Nganguela and Kwanhamas (Ovambo-kwanhamas) represent a minority within the Bantu community. The Y chromosome short tandem repeats (Y-STR) have become a crucial tool in forensic casework and paternity studies. Thus, population genetic studies and databases have gained a central role in the forensic society. In the present study, Y-STR data was determined for the four Angolan ethnic groups (Nyaneca-Nkhumbe, Chokwe, Nganguela and Kwanhamas) and was compared to other populations data. A total of 86 samples from healthy unrelated males of Nyaneka-Nkhumb (N=7), Chokwe (N=23), Nganguela (N=12) and Kwanhamas (N=44) had its DNA extracted from blood stains using Chelex® 100 method. The DNA amplification of 16 Y-STR loci (DYS456, DYS389I, DYS390, DYS389II, DYS458, DYS19, DYS385 a/b, DYS393, DYS391, DYS439, DYS635, DYS392, Y GATA H4, DYS437, DYS438, DYS448) was performed according to AmpFlSTR® Yfiler™ kit protocol (Applied Biosystems), using the thermo cycler GeneAmp® PCR System 2700 (Applied Biosystems). The separation and detection of the amplified product was carried out by capillary electrophoresis using the ABI Prism® 3130 Genetic Analyzer (Applied Biosystems). The analysis of the results was performed with the 3130 Genetic Analyzer Data Collection Software and GeneMapper® ID Software. GeneScanTM-500 LIZ® Size Standard was previously added to the samples as an internal standard, the sample's fragments size were obtained by comparison and subsequently typed with an allelic ladder. Statistical analysis was performed, haplotype frequencies were determined and a phylogenetic tree was elaborated from the comparative analysis with other population data.

**Keywords:** Y Chromosome Short Tandem Repeat; Y Filer; Ethnic Groups Of Angola; Population Data

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# CHARACTERIZATION OF BIOLOGICAL TRACES OF SEMEN AND SALIVA BY MRNA PROFILING

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**Introduction:** Sexual assault cases are part of common casework in forensic genetic routine. For determining the nature of the biological material there are some presumptive and confirmatory tests for both semen and saliva. These tests, especially for semen, are laborious since they depend mostly of microscopic observation of sperm cells. Therefore, mRNA profiling can be an alternative method for confirmatory testing of semen and also for saliva since it is specific for each kind of biological material. Our laboratory was been participating in an EDNAP (European DNA Profiling Group) collaborative exercise regarding mRNA profiling in different biological materials. The aim of this paper is to show our results and the potential of this technique.

**Methods:** 10 samples were tested: 4 semen samples, 4 saliva samples and 2 unknown samples. It was also tested two dilution series for saliva and semen (5, 1, 0.1, 0.01 and 0.001µl). Samples were extracted simultaneously for RNA and DNA using AllPrep DNA/RNA Mini kit (Qiagen). Reverse transcription to obtain cDNA was performed using SuperScript III kit (Invitrogen) and two multiplexs were amplified (saliva 3-plex: HTN3, STATF and MUC7; semen 5-plex: PSA, PRM2, SEMG1, TGM4 and PRM1). Capillary electrophoresis was performed with an ABI Prism 3130 Genetic Analyzer (AB). DNA samples were amplified using AmpFlSTR NGM PCR Amplification kit (AB) according to the manufacturer's recommendations. Fragments were detected by capillary electrophoresis in an ABI 3130 Genetic Analyzer (AB) and analyzed using GeneMapper1 ID V3.2 software (AB).

**Results:** It was possible to determine the nature of all samples except one, probably because it was a low quantity of saliva in fabric. For the two unknown samples no results were obtained. Those samples were a blood stain and a non-human swab so results were consistent with the expectations. In the dilution series the semen 5-plex performed better than the saliva 3-plex giving results in every sample from 5µl to 0.01µ although only with 5µl a full profile was present. With the saliva 3-plex a full profile was achieved with 5 µl and partial profiles with 1 and 0.5µl. Regarding DNA amplification a full profile was obtained for all samples except for one. That particular sample was a non-human sample so the negative result was the expected one. In dilution series, full profiles were always achieved in semen samples but in saliva dilutions only the first two dilutions (5 and 1µl) provided full profiles.

**Conclusions:** mRNA profiling for semen and saliva detection showed to be a sensitive method although time expensive. For forensic samples it can be of great utility when the co-extraction is used since it proved to enable good DNA recovery and full DNA profiles. With mRNA profiling of semen it is possible to identify the nature of the sample even if the donor is azoospermic and one can overcome the disadvantage of the microscopic observation. This technique provides a confirmatory test of saliva and surmounts the false positive results that can arise with the current presumptive test available.

**Keywords:** mRNA; Confirmatory Tests; DNA Co-extraction

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# EXTRACTION OF HAIR SAMPLES WITH PREPFILER EXPRESSTM FORENSIC DNA EXTRACTION KIT IN AUTOMATE EXPRESS DNA EXTRACTION SYSTEM AND TWO OTHER EXTRACTION KITS

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**Introduction:** A variety of challenging biological samples, including blood stains, saliva, semen, hair, bones, finger nails, among others, are often a part of our casework investigation. In this study, hair samples were extracted by three different methods, quantified by real-time PCR and the obtained genetic profiles compared to each other. The extraction methods used were based in silica membranes, silica-coated magnetic beads and paramagnetic resine. Optimize and validate Prepfiler ExpressTM Forensic DNA Extraction kit (silica-coated magnetic beads) in the AutoMate Express DNA Extraction System for the extraction of hair samples, were the prime objectives of this study.

**Materials and Methods:** A set of 20 samples (10 hair follicles, 10 hair shafts) were extracted with DNA IQ™ System kit (Promega), QIAamp®DNA Investigator (Qiagen) and Prepfiler ExpressTM Extraction kit (Applied Biosystems). The samples were quantified with Human QuantifilerTM kit (Applied Biosystems), according to manufacturer's instructions using and ABI Prism® 7000 (Applied Biosystems). The DNA extracts with proper amount of DNA were amplified with the AmpFlSTR® Identifiler® Direct PCR Amplification kit. The samples without enough material to enable an STR profile were amplified and sequenced for mtDNA. The amplified products were analyzed on a 3130 Genetic Analyzer: for STRs was used the GeneMapper® ID v.3.2, for mtDNA it was used the Sequencing Analysis v.5.2 and samples compared with Cambridge sequence with Seqscape v.2.5., Software, as described in the User Guides (Applied Biosystems).

**Results:** Comparing the various extraction methods, the AutoMateTM Express DNA Extraction System allows reducing time consuming; reducing the risk of contamination; reducing labor and man-hours within the laboratory; improve the quality of extracted DNA and increases efficiency.

**Conclusions:** In a preliminary study we were able to conclude that the robot enables to provide, in most of the samples, a quantity of amplifiable DNA to obtain a complete genetic STR profile.

**Keywords:** DNA Extraction; Automated DNA Extraction; Hair Samples

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# SELECTIVE CULTURING AND GENUS-SPECIFIC PCR DETECTION FOR THE IDENTIFICATION OF AEROMONAS IN TISSUE SAMPLES TO ASSIST THE MEDICO-LEGAL DIAGNOSIS OF DEATH BY WET DROWNING

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**Introduction:** The detection of autochthonous aquatic bacterial genes in tissue samples from drowning cases can assist the medico-legal diagnosis of death by wet drowning. The bacterial genus Aeromonas comprises gram-negative bacteria that are ubiquitous in freshwater, brackish and marine environments. In literature, the species Aeromonas sobria, Aeromonas hydrophila and Aeromonas caviae have been proposed as potential bacterial markers for drowning. The research aims were (i) to develop a sensitive, specific and rapid screening and confirmation method for Aeromonas species in tissue samples and (ii) to evaluate aseptic sternum punction as a post-mortem sample technique and bone marrow as an alternative matrix for the identification of bacterial genes to provide evidence of death by drowning.

**Methods:** Tissue samples of drowned bodies and of negative controls (clinical cases without bacteremia) were investigated. Lung swabs, blood and bone marrow of the sternum were taken in an aseptic manner. The presence of Aeromonas was verified by cultivation using the selective media Ampicilline Dextrin Agar (ADA) and Ryans Aeromonas Medium. Positive culture plates were confirmed by harvesting all colonies for DNA extraction and subsequent PCR amplification using Aeromonas genus-specific primers and agarose gel electrophoresis.

**Results:** The different analytical steps including aseptic sampling, bacterial enrichment, choice of selective media, DNA extraction procedure and PCR method were optimized. The use of ADA medium formed the basis of a sensitive, inexpensive and quick screening procedure for the detection of aeromonads in human tissue samples. The PCR-based confirmation procedure is specific and allows the identification of Aeromonas species to the genus level. Aeromonads were detected in lung swab, blood and bone marrow samples of drowned bodies, but were negative in these three matrices for the negative controls tested.

**Conclusions:** The study confirms previous indications that the presence of aeromonads in tissue samples can be used as a marker for drowning. Due to the potential presence of aeromonads on outer skin surfaces and the sensitivity of the methods, aseptic sampling remains the most critical step. To our knowledge, this study is the first to report the use of bone marrow of the sternum and aseptic sternum punction respectively, as alternative matrix and sampling technique for the genus-specific detection of Aeromonas as non-commensal indicator of death by wet drowning. Given the fact that the number of immersed bodies (drowned and non-drowned) investigated is statistically not significant, more tissue samples of will be investigated in the near future.

**Keywords:** Drowning; Aeromonas; Culture Media; PCR; Sternum

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# SKELETAL MUSCLE PROTEIN DEGRADATION PATTERNS IN TWO MODEL ORGANISMS: A NOVEL APPROACH TO DELIMITATE THE TIME OF DEATH?

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**Introduction:** The structure and function of skeletal muscle is well-known in a true-to life state but little is known about its postmortem (pm) characteristics. Information about protein degradation processes were gained mainly through meat science studies performed on dissected muscle parts in cool environments. To our knowledge little is known about the influences of whole body degradation processes on the patterns of protein degradation with respect to the determination of the time of death in forensic sciences. Therefore a study is performed analysing protein-based degradation processes of limb skeletal muscle at 21°C (rat, pig) and 4°C (pig) over a maximum of 21 days pm.

**Methods:** Samples were taken at pre-defined points of time of the superficial area of the M. biceps femoris (rat, pig), M. vastus lateralis (rat) and snap frozen in liquid nitrogen for protein analysis. With respect to the points of time western blot analyses were carried out to obtain information about patterns of fragmentation of contractile, regulatory and cytoskeletal proteins as well as the pattern of appearance of calpains.

**Results:** Protein profiles show an overall decrease in size with the occurrence of fragmentation products. Several cytoskeletal proteins degraded rather rapidly within several days while others, mainly contractile proteins, seem to be stable over a long period of time postmortem.

**Conclusions:** Taken together all results indicate that skeletal muscle proteins show a wide range of protein degradation patterns and offers the possibility to draw a sound and reproducible protein based postmortem time map and therefore provides an ideal approach for the delimitation of the time of death.

**Keywords:** Skeletal Muscle; Protein; Rat; Pig; Western Blot; Time of Death

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# THE APPLICABILITY OF HISTOCHEMICAL AND IMMUNOCYTOCHEMICAL METHODS IN MATTERS OF DELIMITATING THE TIME SINCE DEATH - A PILOT STUDY ON RAT SKELETAL MUSCLE

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**Abstract:** One of the major problems forensic science is dealing with is the reliable delimitation of the time of death. To date many different methods, as for example the measurement of body core temperature, the analysis of rigor mortis and livores progression or forensic entomology, can be used to delimitate the time since death. Unfortunately, the thereby analyzed parameters vary depending on a multitude of factors such as temperature, way of death, age and body composition. Therefore new methods should be established which could contribute to a more precise delimitation of the time of death. Since skeletal muscle is the largest homogenous body compartment, easy accessible and well studied, it lends itself as an adequate sample material for post mortal analysis. Information exists about the degradation processes of skeletal muscle in farm animals with respect to meat quality, thus analysing just a small postmortem period of time. The aim of the present study is to analyse a longer postmortem period of time including rigor mortis. Muscle samples of M. biceps femoris and M. vastus lateralis were taken from three adult, male Fisher 344 rats at pre-defined postmortem points of time, namely the rigor state down to the late postmortem phase (8 days). The dissected probes were frozen in isopentane (2-methylbutane) cooled and stored until further use in liquid nitrogen. Serial cross-sections of 12 µm were cut on a cryostat at -20°C and mounted on glass slides. Histochemical (SDH, LDH, AChE, mATPase) and immunocytochemical (MHC isoforms, Laminin, Dystrophin) staining procedures were carried out on consecutive sections. Fibre type specific degradation patterns of the above mentioned enzymes and proteins were analyzed according to the chosen postmortem points of time and discussed in matters of their applicability for forensic science.

**Keywords:** Skeletal Muscle; Rat; Postmortem; SDH; LDH; Matpase; MHC; Histochemistry; Immunocytochemistry

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# EVALUATION OF SWAB TYPES FOR TRACE DNA COLLECTION

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**Abstract:** Technological advances have increased our ability to glean information from trace DNA samples. However, if these samples are not efficiently collected in the first instance, the advantages of improving the technology and interpretation techniques will be somewhat diminished. Choice of the most appropriate sampling device to maximize efficiency for trace DNA collection is in part based on conjecture, and in this study we test a set of commercially available swabs to draw conclusions relating to their efficiency in collecting trace samples from crime scene related surfaces. Comprehensive comparisons are made among a wide range of swab types, including those frequently used by forensic scientists, as well as others which are less used but potentially relevant. Assessments are made based on three criteria: how efficiently the swab collects trace amounts of various types of biological material from a range of substrates; how well DNA is extracted from the swab during automated DNA IQ extraction; and the impact of any design features on the packaging, storage and/or practicality of use which may have a bearing on the quality, quantity and/or usefulness of the swab. Cost implications relating the swab choice are also noted. The comparative data identifies the most appropriate sampling device to be used for the collection of trace DNA from a wide range of specific case work related sample presentations. These findings will assist in maximizing the ability to collect trace DNA samples thus improve the ability to acquire a profile from such samples.

**Keywords:** DNA Sampling; Trace DNA; Swabbing; DNA Transfer

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# PRESSURE OVERLOAD-INDUCED CARDIAC HYPERTROPHY AFFECTS OSCILLATION AMPLITUDE OF CLOCK GENES EXPRESSION BUT NOT THEIR CIRCADIAN RHYTHM

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**Introduction:** In forensic practice, estimating the time of death is one of the most important procedures but is often extremely difficult. Recently, we reported a novel method for estimating the time of death based on the biological clock that might stop in the tissues of cadaver at the time of death. Our method for estimating the time of death is a concurrence method and quite different from conventional methods based on postmortem changes. Therefore, our method will contribute to increasing the accuracy of estimating the time of death in forensic practices. However, recent advance of studies on biological clock shows that disease conditions might affect circadian clock gene expression, which suggests that our method should be applied carefully to cadaver with disease in practice. In this study, we examined the effect of pressure overload-induced cardiac hypertrophy on circadian clock gene expression in mouse heart.

**Materials and Methods:** Transverse aortic banding (TAB). Balb/c mice (male 8W) were anesthetized with intraperitoneal administration of pentobarbital (50 μg/g weight). After induction of anesthesia, the mice were intubated and artificially ventilated. After sternotomy, the aorta and carotid arteries were exposed, and the transverse aorta was ligated by tying a 6-0 silk suture against a 27-gauge needle. Sham animals underwent an identical surgical procedure without placement of the suture. Animals recovered from anesthesia under warming conditions and normal ventilation. Three weeks after TAC or sham surgery, mice were sacrificed at 10:00, 17:00 and 20:00. Extraction of total RNA and real-time RT-PCR. Total RNA was extracted from mouse hearts (100 μg) using ISOGENE (Nippon Gene, Toyama, Japan), and 5 μg of total RNA was reverse-transcribed into cDNA at 42°C for 1 h in 20 μl reaction mixture containing mouse Moloney leukemia virus reverse transcriptase (PrimeScript, TAKARA BIO INC., Otsu, Japan) with 6 random primers (TAKARA BIO INC.). Thereafter, generated cDNA was subjected to real-time PCR analysis using SYBR® Premix Ex Taq™ II kit (TAKARA BIO INC.) with specific primer sets. The relative quantity of target gene expression to beta-actin gene was measured by a comparative Ct method.

**Results:** The ratio of heart weight and body weight was significantly increased with substantial fibrosis in mice at 3 weeks after TAB, indicating that TAB induced cardiac remodeling. Since we used mPer2/mBmal1 ratio as a parameter for estimating the time of death in mouse model, real-time RT-PCR analyses of clock gene expression for mPer2 and mBmal1 in the heart of mice subjected to TAB were performed. Gene expression levels of both mPer2 and mBmal1 were significantly reduced in the heart of mice at the indicated time points after TAB, compared with sham operated mice. However, circadian oscillation of gene expression for mPer2 and mBmal1, and circadian rhythm of mPer2/mBmal1 ratio were still observed.

**Discussion:** In this study, we found significantly attenuated expression of clock genes in hypertrophic hearts, suggesting that other diseases also affect clock gene expression in heart and other tissues. From a contrary point of view, an aberrant gene expression level of clock gene might be a sign of disease. Therefore, we should carefully estimate the time of death based on clock gene expression levels in the case of the cadaver with disease. In our method, we estimate the time of death of cadaver based on mean value of clock gene expression in three tissues (kidney, liver and heart), which might reduce the effects of altered gene expression level in the diseased tissue on estimating the time of death.

**Keywords:** Estimating the Time of Death; Biological Clock; Hypertrophic Heart

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# DO FIXATION TIME PERIOD AND DECREASING POSTMORTEM PH-VALUES INFLUENCE THE PATTERN OF POSTMORTEM DEGRADATION OF SKELETAL MUSCLE - A HISTOLOGICAL AND FINE STRUCTURAL PILOT STUDY ON RATS USING DIFFERENT PH-VALUES AND TIMES FOR FIXATION

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**Abstract:** The delimitation of the time since death is one of the central topics in forensic research. Particularly sensitive is the period between the end of rigor mortis and start of degradation processes. For the early and late postmortem phase up to now many methods have been published in matters of delimitating the time of death but not all of them are necessarily feasible. So far, to our knowledge no histological or fine structural methods for the delimitation of the time since death have been published, specifically in using skeletal muscle as the target tissue. Using the rat as a pilot model the main purposes of this study now are (i) to characterize post mortal changes of the skeletal muscle of the hindlimbs using qualitative and quantitative light and electron microscopical analyses and (ii) to assess if the postmortem decrease of the pH-values as well as (iii) the duration of the primary fixation has to be considered or can be neglected for further studies on human corpses. Three male rats (Fisher 344) were sampled concerning the M. vastus lateralis and M. biceps femoris at pre-defined points of time. Fixation of the muscle samples was performed using a buffered glutaraldehyde solution under (1) standardized conditions (pH 7,2) and (2) appropriate fitting to the decreased postmortem pH-values. Samples were left in the fixation medium until joint further processing. To test possible influences of the latter a second experiment was carried out using a standardized fixation period of 12h at pH 7,2. Light- and electron microscopical images were analysed qualitatively as well as quantitatively using morphometrical/stereological procedures. Preliminary results on light microscopical level indicate observable qualitative differences between the adapted fixation pH-values and the standard one but this was not underpinned by morphometrical analyses. Comparison of fixation period of time denotes a comparable result to the latter. Qualitative and quantitative electron microscopical analyses of extra- and intracellular components of the muscle samples will follow to verify and underline these preliminary results. Results should finally lead to a catalogue of parameters for further studies on human corpses to delimitate the time of death.

**Keywords:** Skeletal Muscle; Rat; *Post mortem*; Ph-value; Fixation Period; Light Microscopy; Electron Microscopy

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# ANTERIOR TEETH FEATURES AND TRAITS IN AN AZOREAN POPULATION: FORENSIC IMPLICATIONS

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**Introduction:** Anterior teeth present different individual features and traits such as rotations, displacement of teeth from the arch form, peg shaped lateral incisors, spacing between teeth (eg:diastema or tooth loss) or supernumerary teeth. These features can be seen as distinctive between individuals. There is a lack of population data regarding such features or traits in the Portuguese population. Therefore, the aim of this study was to identify the frequency of central incisors rotations, peg shaped lateral incisors, diastema, supernumerary teeth, missing anterior teeth, tooth fillings, decay teeth and fractures in a Azorean Population.

**Materials and Methods:** Data from 191 adult patients (>18 yo) attendants of the Ribeira Grande Health Center Dental Clinic were collected. Patients were examined for the presence of the upper and lower incisors and canines as well as the features or traits described previously.

**Results:** 191 individuals were studied, 64.4% of which were females; sample's mean age was 33 years old (84 maximum; 18 minimum). No supranumerary teeth were found; there were: 2 bilateral lateral incisor agenesis in females and 4 unilateral (3 females and 1 male); 2 cases of bilateral peg shaped lateral incisors and one unilateral; 23 cases of middle diastema (74.19% of all diastemas; mean 2.23mm). 46.6% of the cases had no central incisors rotation; winging was present in 7.3% and counter-winging in 37.7% of the patients. Of the 2299 teeth studied, 6% were lost in 33 partially dentate patients (17% of both males and females). None of the patients had dentures or partial dentures. Lower teeth were found less likely to be missing than upper teeth. The more absent maxillary teeth were the lateral incisors and canines; the more absent lower teeth were the central incisors. 4 central incisor fractures were seen in males and 6 in females, representing 0,5% of the features in the population.

**Conclusions:** The results showed that, in this population, traits like peg shaped lateral incisors, lateral incisor agenesis, middle diastema, fractures or tooth loss are rare, and therefore can be seen as a distinctive feature in human identification.

**Keywords:** Forensic Science; Forensic Odontology; Forensic Anthropology; Dental Anatomy; Anterior Teeth

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# TALON CUSP PREVALENCE IN A PORTUGUESE POPULATION: ITS DISCRIMINATIVE VALUE

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**Introduction:** Dental morphology can be used in forensic human identification, since it often represents features that can discriminate among individuals. However, its usefulness will depend, among other factors, on its population frequency. The aim of this study is to determine the prevalence of talon cusps in a Portuguese population, and their most common presentation.

**Materials and Methods:** 302 patients from the Clinical Services of the Faculty of Dental Medicine of University of Porto were assessed for talon cusps presence; Talon cusps were assessed and classified as talon, semi talon and trace talon.

**Results:** Sample's age ranged between 18 and 83 years (mean age = 39; standard deviation 17.1). 188 were females (62.3%). 3417 anterior teeth were observed. Talon cusps were detected in 19 individuals (6.3%); and in 7 individuals, the talon cusp was bilateral. Talon cusp was observed in 0.8% of the teeth studied. The maxillary lateral incisors were the most common teeth showing a talon cusp (82.1% of all cases). Morphologically, 50% were trace talons, 35.7% were semi talons and 14.3% were talons.

**Conclusions:** Talon cusp is an uncommon trait; therefore it can be potentially useful in forensic human identification.

**Keywords:** Forensic Science; Forensic Odontology; Forensic Anthropology; Dental Anatomy; Talon Cusp

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# PREVALENCE OF MISSING ANTERIOR TEETH IN A PORTUGUESE POPULATION AND ITS USEFULNESS IN BITE MARK ANALYSIS

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**Introduction:** Bite mark study relies on the ability to distinguish among individuals through human dentition. There are several characteristics that can be used in the comparison, especially in the anterior dentition, such as teeth rotation, overlapping, diastema or the presence or absence of a tooth, being this last feature particularly useful as a distinctive feature with great discriminative value. Moreover, there is little information published on the frequency of missing anterior teeth and therefore a study in a Portuguese population can be of value. The aim of this study was to identify the frequency of missing anterior teeth, as well as other space producing characteristics, like diastema, agenesis or fractures.

**Materials and Methods:** 302 adult patients (>18 yo) attendants of the Clinical Services of the Faculty of Dental Medicine of University of Porto were assessed for upper and lower incisors and canines presence; other features like agenesis, diastema and fractures were evaluated as well.

**Results:** Subjects' age ranged between 18 and 83 years (mean age = 39; standard deviation 17.1). 188 of the patients were females (62.3%). There were:

a) 4 cases of lateral incisor agenesis, 3 of them bilateral (1 male and 2 female);

b) 32 cases of interincisive diastema (10.6%) 13 males and 19 females with a mean width of 2.4mm;

c) 10 fractures (2.3%), 9 of which affected upper central incisors.

d) 237 patients were dentate (78.5%), 65 were partially dentate (21.5%), and, of those, 51 (16.9%) did not wear denture;

e) 48 had missing teeth with an open gap and only 3 had no spacing because the gap was closed.

Males presented more tooth loss than females. Upper central and lateral incisors were the most common missing teeth, followed by lower central incisors; lower canines were the least common absent teeth.

**Conclusions:** Missing anterior teeth and other space producing characteristics can be a useful in bite mark analysis. In our population these particular traits are rare: agenesis (1.3%), interincisive diastema (10.6%), fractures (2.3%) and missing anterior teeth not replaced by denture (16.9%). Therefore, the study of these features can give helpful information as a potential discriminating feature and validation for identification in byte mark analysis.

**Keywords:** Forensic Science; Forensic Odontology; Forensic Anthropology; Missing Teeth; Bite Mark

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# IMPLEMENTATION OF EUROPEAN METHODOLOGY EXPERTISE IN BRAZILIAN

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**Abstract:** Medical evaluation of bodily harm is action designed to meet exactly the consequences that a trauma, often accidental, has upon the integrity and health of the psychophysical person. The use of tables in the current Brazilian context is directly related to Medical and Dental Expertise in Civil Law. This paper, through demonstration of a case, is analyzing the guidelines for assessing the quantification of damage to physical and psychological integrity. We compared the table in the contract of personal insurance (SUSEP), Brazilian law, with the "Table of Evaluation of Permanent Disability in Civil Law, " Portuguese law. The use of scales for assessment of injury by different experts, must lead to similar conclusions before sequelae similar profiles, which did not occur in the case study. It follows therefore that there is a need to develop a scale more refined skills appropriate to the reality of the dental field.

**Keywords:** Stomatognathic System; Valuation of Damage, Masticatory Damage; Table

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# A NEW METHODOLOGY TO EVALUATE MASTICATORY FUNCTION IN A CLINICAL AND FORENSIC PRACTICE

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**Abstract:** The increase of violence and car accidents cause severe damage to the individual, mainly on the face. The facial region contains elements and important organs, among them the stomatognathic system. Among the various functions of the stomatognathic system, chewing is one of the most important and can be defined as the set of phenomena which aims to crushing and grinding food. The physical integrity of the human body is protected by the State. If the individual suffers damage, the agent of the damage can be punished for the crime committed, as well as obligated to compensate the victim. Body damage is, most of the times, a primary biological damage that can lead to disturbances of skills, life situations and victim's perception. For the evaluation of bodily harm, it is necessary that a professional expert in the area examines the victim. In the case of evaluation of loss/reduction of the masticatory function, a dentist expert is necessary to determine how much this function was affected. However, due to the described methodologies in the literature, which are difficult to standardize and of reduced expert and clinical application, this evaluation is many times carried through in a wrong and subjective way. This paper presents a new methodology for evaluation of the masticatory efficiency composed by small spheres (pellets) prepared by extrusion and spheronization using a conjugate of pectin/casein/dye. The pellets are packed in PVC capsules. When the capsules are chewed, the pellets are broken down and the dye is released in proportion to the energy used. The sample is consisted of adults with healthy permanent dentition, absence of intra-oral lesions, without changing the perioral musculature and general good health, who chewed capsules as the usual, right and left. The systems were chewed three times daily for five days. After chewing, the contents of the capsule are dissolved in water and filtered. The analysis of the content of the capsules was made in spectrophotometer and statistical analysis was done using the Split-half reliability test. The methodology proved to be quick, simple, reproducible, with a low cost and effective and can be used as a complementary method to evaluate the masticatory efficiency in different conditions.

**Keywords:** Stomatognathic System; Masticatory Function; Evaluate Masticatory Function; Methods

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# A MODEL FOR PERFORMING RADIOGRAPHIC STUDIES IN ISOLATED MAXILLARY BONES FOR IDENTIFICATION PROCEDURES

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**Abstract:** The use of odontological clinical records for identification purposes are a useful help in the forensic practice. In some cases the postmortem radiographic studies are not similar to those existing in the medical records. This problem adds some difficulties in the identification processes. We have developed a simple system that allow us to easily reproduce the living conditions for post-mortem field radiographic studies without any expensive equipment. This method is easy to be standardized and it has and high reproducibility standards'.

**Keywords:** Forensic Odontology; Radiography

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# THE KEY ROLE OF FORENSIC DENTISTRY FOR IDENTIFICATION OF CRIMINAL SEXUAL ABUSE: A SEXUAL CASE REPORT (IV)

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**Introduction:** The identification of an individual from dental traces collected at the crime scene is one of the objectives of the criminal investigation. When, at the crime scene, objects are found with tooth marks, the intervention of Forensic Dentistry may represent the only way to obtain positive identification of the authors bite mark. The forensic analysis of a bite mark consists of detection, recognition, description and comparison of bite marks on either individuals or inanimate objects. The forensic investigation involves several steps.

The first question that arises is whether this injury is a bite mark, or may have been caused by another factor. The second question that arises after establishing the injury as a bite mark and human, whether it was caused by an adult or a child. The third question that arises in research identification, after recognizing trauma as a bite mark, is if it is comparable to exclude or include - establishing the causal link with the subject, establish the identity of the perpetrator in a bite mark case. Objectives. In this medico-legal case, a sexual abuse, the victim of the crime presented to examination had a mark on her left arm consistent with a bite mark, probably from the aggressor during the crime perpetration. The Portuguese Criminal Police requested to South Branch of National Portuguese Institute of Legal Medicine, an expert forensic odontologist examination from the victim.

The objectives were: 1) the reconstruction of the morphological profile of the bite mark in the victim; 2) the identification of the author of the bite mark - inclusion or exclusion of the suspect. Each stage of the analysis adds to the confirmation (or rejection) of concordance between the dental features present on the arm of the victim and the dentition of the suspect.

**Materials and Methods:** In this study, we used the guidelines of ABFO and IOFOS for the reconstruction and analysis of morphological profile of bite marks on human skin and collection of dental morphological profile of the alleged perpetrator of the bite mark to establish the identity to a high degree of certainty.

**Results:** After reconstruction of the profile of bite mark, the positive identification or exclusion of the suspected is based on a comparative scientific method, which must take into account the chain of custody and all the useful information related to this case study.

**Discussion and Conclusion:** The protocol followed in this medico-legal case study is a scientific analysis of the facts which when presented in the court will be defendable under ruthless cross-examination. The pattern association of dental features in this sexual abuse case demonstrated a degree of concordance present between the tooth marks in the victim's body and the suspect´s dentition. The photographic images were enlarged so that the features could be visualized.

**Keywords:** Forensic Dentistry; Individual Positive Identification; Sexual Abuse

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# PUPIL FUNCTION AS A PARAMETER FOR BEING UNDER THE INFLUENCE OF CENTRAL NERVOUS ACTING SUBSTANCES FROM A TRAFFIC-MEDICINE PERSPECTIVE

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**Introduction:** To evaluate an individuals driving safety objective measurement methods are still required which allow reproducible, reliable and subsequently verifiable data to be collected.

**Materials and Methods:** In the present study we exposed healthy test subjects (n=41), as well as persons who were under the influence of drugs and/or medication (n=105), to different light stimuli and tested the pupillary light reflex in order to gain a better understanding of the physiological and pathological pupil function. The tests were performed using a "Compact Integrated Pupillograph" (CIP), which enables pupil reactions to be measured using infra-red technology. The applicability and value of infra-red pupillography as an objective measurement method for assessing persons with impairments of the central nervous system in terms of their driving safety and fitness to drive have already been discussed in own former presentations. Based on first results, which already have been presented in the past, we split the pupil light reflex in further parameters in order to assess impairment of the central nervous system. The statistical analysis of these parameters showed - in accordance to our former presentations - highly significant differences between the two groups, especially for the initial pupil diameter, the slow phase of pupil re-dilation, the total reaction time and the 2/3 constriction time of the pupil light reflex, partly depending on the intensity of the light stimulus applied.

**Conclusions:** On the basis of the results obtained, we confirm the results reported in the past stating that infra-red pupillography represents an objective method of measuring pupil function. Furthermore the synoptic examination of numerous parameters measured by this system, and the possibility of examination under various conditions, especially in terms of light stimuli intensity, made it possible to achieve highly significant differentiation between persons with impairments of the central nervous system and control persons. In order to increase legal certainty it would thus appear desirable to make infra-red pupillography a routine part of police checks.

**Keywords:** Traffic Medicine; Alcohol/Drug Abuse; Infra-Red Pupillography; Pupil Function

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# SR AND PB ISOTOPE RATIOS IN HAIR KERATIN: METHODS AND APPLICATION FOR GEOGRAPHICAL HUMAN PROVENANCE

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**Abstract:** The isotopic composition in human tissues (i.e. hair, nails, teeth, bones) derives from dietary inputs through water and food [1-2], which originate from the environment (i.e. soil, geology, precipitation) propagating through food webs to animals and humans. Different parts of the world are characterised by variation in amount of precipitation and by variable underlying geology that translates to different isotopic ratios in soils, vegetation, precipitation etc. Therefore, isotopic ratios measured in human tissues may reflect the composition of a geographical area where the person has been for a period of time. Some tissues like teeth and bones with slow turn over are formed during childhood and early youth and reflect the composition of the geographical location where the person was living during that time. However, tissues like hair and nails are inert and continuously grow reflecting the composition of the location where the person has been most recently.

The application of isotopic ratios for geographic human provenance has the potential to become an important technique in forensic investigations of unidentified crime victims. This technique was first applied in ecology and archaeological sciences with the main focus being the application of stable isotopes (i.e. #948;2H, #948;18O, #948;13C, #948;15N)[2]. Radiogenic isotopes such as strontium (Sr) and lead (Pb) are increasingly being used in geographic human provenance in an archaeological context. Sr and Pb isotope ratios correlate with soil and water composition and environmental pollution. In this paper we present Sr-Pb isotope data from human hair samples. Hair grows approximately 1.5cm a month and provides isotopic information of the most recent whereabouts of a person. We propose a chromatographic technique to extract Sr and Pb fractions from between 2mg and 30mg of hair under low-blank conditions (<50pg Sr and <100pg Pb). The samples yield 4- 50ng of Sr and up to 45ng of Pb. We demonstrate the potential of Sr and Pb isotope ratios as a geographic provenance tool for humans having undergone recent travel. One specific example discussed in detail is of a person that moved from India to The Netherlands. Changing isotopic compositions of hair are shown to correlate with soil (Sr) and street dust (Pb) isotopic composition from both countries.

Work has begun to assess the processes that influence the turn over time of Sr and Pb within the body to determine the time resolution of geographic information retained within hair.

**Keywords:** Isotopes; Geographic Provenance; Human

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# INFLUENCE OF TEMPERATURE AND HUMIDITY FOR THE PRESERVATION OF BODIES BURIED IN CHARNARIUM

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**Abstract:** This paper aims to present the results of temperature and humidity measurements made during two years in sheep where bodies were found mummified in Mosteiro da Luz, centre of Sao Paulo city, Brazil. Results are presented and analysed, and related the findings of mummified bodies and the influence of temperature and moisture on mummification.

**Keywords:** Mummification; Funerary Environmental; Archaeothanatology

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# FORENSIC CHARACTERIZATION OF SUSPECTED PHYSICAL ABUSE OF CHILDREN IN THE NORTH OF PORTUGAL

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**Abstract:** This is the first study aiming to characterize suspected physical abuse (PA) against children, performed in Portugal. Forensic reports of suspected cases presented for medico-legal examination between 2004 and 2008, in the North of Portugal (n=1130), were studied.

Selection criteria were: victim's age (0-18 years); denouncement of PA; intra-familial occurrence. Cases involving cumulatively PA, and/or sexual abuse or neglect were excluded. Forensic assessment was requested by police enforcement (79.6%) and by the Prosecutor (19.6%). Male victims prevailed (53.1%). The average age (years) of victims was 9.9. In 57.4% Medical-legal examination was performed within the first 5 days after alleged abuse. The majority involved only one suspected abuser - father (53.2%) or mother (12.6%). Blunt force trauma was used in a total of 71.9% (58.6% associated with punch, snap, kick, scratch) surpassing all the other mechanisms. The use of multiple instruments was reported in 21.9%. Injuries were found scattered on the body surface in 35.6% and limited to the head/face/ neck in 30.5%. In 67.8% of cases, injuries consistent with PA were identified, without record of serious trauma. In the remaining 32.2% no injuries were observed.

These results are not consistent with published literature on the subject, regarding frequency of serious trauma. This may be due to non referral and/or underreportment of suspected cases by primary care health professionals, although this is mandatory by law in Portugal.

**Keywords:** Forensic Characterization; Child Physical Abuse; North of Portugal

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# MASS DESASTER IN RIO DE JANEIRO - BRASIL. LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO-BRAZIL

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**Abstract:** The Mass Disaster of the mountain range from the state of Rio de Janeiro was to catastrophe with the biggest number of dead men that it took place already in Brazil up to the moment. It is the 10th catastrophe occurred in the world-wide extent producing multiple victims as a result of strong rains.

There were more than thousand deaths and 450 missing persons in the reached local authorities. The Mountain range From the state of Rio de Janeiro understands seven urban community of the mountain region in the state of the Rio of January - Brazil, all the local authorities were affected, being the most reached city of Nova Friburgo. It took place 450 deaths and owing to the victims great number, the local Legal Medicine Institute (IML) asked for support of the IML of central office of the capital of the State of the Rio of January and of the IML of the State of Sao Paulo.

A room of skills was improvised, in the building of the local secondary school of sports, with installations for the realization of examinations necropsy, for the Public prosecution service and the Public Defender. The Team of Skills was composed by Forensic scientists, Criminal Experts, Dentists, Dactyloscopyst and Assistants of Necropsy.

The expert team carried out the identification of practically all the bodies, which in his majority was showing up in putrefying process, in different phases, and with traumatic injury. The experience of the authors in this event of catastrophe highlights the necessity of competence and empower of teams for acting in Disasters of Masses, with total integration of many people area of expert acting of all the towns of our country and also with the promotion of I interchange with other countries, aiming at the empower of the public acting in these situations and promoting the significant reduction of the chaos powders-catastrophes, with worthier and quick handling of all the bodies.

**Keywords:** Disaster of Mass; Identification; When They Disappeared; Human Rights

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# GARROTE VIL, HISTORICAL REPORT OF CASE NECROPSY IN THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SAO PAULO - BRAZIL, WHEN THE ORGANIZED CRIME USED SIMILAR TALENT TO EXECUTION OF THE VICTIM

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**Case Report:** The Garrote Vil or Spanish Tourniquet was an instrument of execution used by the judiciary for the fulfillment of death penalty when if they were condemned in the Iberian Peninsula, during more than six centuries, being shut in the century XX. One of the last victims executed by this method in that country was Salvador Puig Artich, an opposing anarchist to the government of Francisco Franco in 1974. One similar technique being used by the organized crime of the State of São Paulo in Brazil. The instrument that composes this technique consists of a ring put around the neck of the victim, whose diameter is when flagpole was progressively reduced through one rotating up to culminating in the strangulation. This technique of execution was banished of the Spanish Territory, as well as, in whole world. However, this method of this execution being re-discovered by the crime organized and used for the execution of victims characterized like coldnesses of the criminal world, in the city of Sao Paulo - Brazil. The authors report a case occurred in Sao Paulo in the April of 2011. A body of adult person, the masculine sex, without identification, of approximately 30 years, found in place which peculiarities it did so that the putrefaction was prosecuted in the form of saponification, making possible a good conservation of the body together with the talent used for the execution. In the cervical region a wire was giving three turns (three bound ones), with the tips connected with one wooden flagpole, which probably with his movement of rotation produced the reduction of the diameter of the bound ones of the wire, provoking, so, the death for mechanical asphyxia in the suffocate kind. The finds necropsy revealed: Stains of Tardieu, fracture of the bone hyoid, characteristic of asphyxia death.

**Keywords:** Vile Tourniquet; Crime; Organized; Human Rights

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# SUICIDE IN BRAZIL: WHO ARE THEY? AS THEY DIE? ANALYSIS OF 59 CASES OF SUICIDES IN 2010

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**Abstract:** The World Health Organization (WHO) says the world suicides numbers have been progressively increasing. The estimation for 2020 is that there will be 1.530.000 suicides cases. This study evaluates the suicides cases autopsied in the Institute of Legal Medicine of the City of Osasco, in Sao Paulo State, in 2010. The study examined 59 suicides cases in 1154 violent death (5.11%), in The State of São Paulo 2010. We verified the predominance of males (74,5%) and de age around 20 and 30 years old (32,2%). The white race was predominant 66%) and singles were the marital state predominant (61%). Most of the cases happened at the victim's house (74, 57%). The study shows that 61% of the victims had finished 8 to 11 years of school. The most predominance of kind of suicide was the mechanical asphyxia, suffocation by hanging (57,62 % - 34 cases), followed by poisoning cases (11,8%), aggression for gunshot (10,1%). The alcoholic evaluation was made in 52 cases (88,1%), those, 33,8% showed Positive. We verified also a two cases with the presence of cocaine in the urine. The analysis of specific forms of suicide showed that: in cases of hanging victims had no variations in age, race and sex in regard to general data, the location of death was the residence of the victim in 97% of cases, the mechanical characteristics manifestations were: single loop, suspended from the body at the rear (occipital), the findings describe internal Tardieu's signal (sub-pleural petechiae), hyoid fracture and sub-pericardial petechiae. In cases of poisoning there was a significant preponderance of females (71%), the principal agent was the carbamate, with a case of drug (bromazepan) and a case for domestic gas. In injuries by projectile from a firearm, there was a predominance of the victims married and aged over 45 years, all lesions were single shot in the cranial region, a case coming into the oral cavity with features and all shooting near or leaning, dosage alcohol was positive in 50% of cases. The remaining cases were: 05 by being hit by train, four-decay time (rain), two stab wounds and one by being hit by car

**Keywords:** Suicide; Hanging; Violent Death; Human Rights

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# DEATHS BY POISONING CHEMICAL IN THE FIFTH BIGGEST CITY OF SÃO PAULO STATE (OSASCO) - BRAZIL. REVIEW OF 67 CASES IN THE PERIOD JANUARY TO THE JUNE 2010

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**Abstract:** We reviewed autopsies performed at the Legal Medicine Institute (IML) of the City of São Paulo in Brazil, the population of 10,886,518 inhabitants in 2010. Between January 1 and June 30: 4879 autopsies were performed on four units of the IML, all of these cases were studied that cause the death was classified as poisoning or intoxication exogenous chemical agent per share, totalling 67 cases (1, 39%).

Toxicology tests were performed in 64 cases, there was held in 03 cases and 6 cases the tests were negative, all nine treated with hospital confirming the diagnosis in the hospital. Of the 67 cases there was a male predominance: 70% were men. There were no cases in children under 15 years, there was a prevalence between 21 and 40 years, totalling 46% of the total, over 60 years observed 5 cases (7.4%). The main chemical agent were found Pesticides with 27 cases (40.2%), including 25 cases of Carbamate and 02 Organophosphate; all the chaos over 60 years were carbamate, the second most frequent agent was cocaine (a drug of abuse) with 17 cases (25.3%), then the ethyl alcohol with 15 cases (22.3%), the lower was the rate of drug with 8.9% (6 cases), there was a case of methanol and a by Carbon Monoxide.

The place of death was determined in 59 cases, 50% of these were in the residence and 40% in health services. In the study of victims by carbamates was found the same male predominance (40%), maintaining the general pattern for age and place of death. In the case of cocaine there was a marked male predominance with 94% of cases, only one case of females in age there was also variation in relation to the general pattern with 23.5% of cases aged between 15 and 20 years and only 5.8% of cases aged over 40 years. Where the change of Ethyl Alcohol in age pattern was reversed, 66.5% of cases were aged over 40 years and no cases below 20 years, ranging from the Place of Death where 26% of cases occurred in a public place via against 7.5% of the general pattern. In deaths due to drugs 50% of cases were above 40 years and there was no case below 20 years. In the case of pesticides and medicines no case had a history of accidental ingestion of the chemical were all described as suicide, which did not occur in cases of cocaine and alcohol, the majority considered accidental. In this period were not found cases of death by chemical poisoning under 15 years in São Paulo.

We conclude that the Osasco, The City of São Paulo State, the chemical agent of choice is the suicide carbamate, with cocaine and alcohol-related accidental cases, the predominant sex is male and aged 20 to 40 years, the use of alcohol ethyl alcohol and drugs is more pronounced above 40 years of cocaine and below 30 years. Significant was the predominance of male and disturbing to younger 20 years in cases of cocaine.

**Keywords:** Chemical Poisoning; Exogenous Intoxication; Violent Death; Cabamate; Human Rights

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# TOTAL OF EXPERT EXAMINATIONS CARRIED OUT BY THE LEGAL MEDICINE INSTITUTE OF THE STATE OF SÃO PAULO-BRAZIL, IN THE PERIOD OF JANUARY OF 2009 TO DECEMBER OF 2010

**Author(s):** Camargo R[1]; Candido M[1]; Aguiar Sarmento G[1]; Hoppe L[1]; Colmenero JM[1]; Oliveira JP[1]; Zeri Nunes S[1]; Telles GP[1]; Andrade EFM[1]

**Institution(s):** [1]LEGAL MEDICINE INSTITUTE OF SÃO PAULO, BRAZIL

**Abstract:** The Legal Medicine Institute of the State of São Paulo appears among the institutions with the biggest movements of Forensic Skill of the World. There are 57 posts in the whole state, with 528 forensic scientists and experts, attending to a population of 41.262.199 inhabitants (IBGE 2010). The Legal Medicine Institute of the State of São Paulo comes year after year incorporating technological Know how, as well as enabling the whole staff, creating expert comparable standards to the countries that detain the best technology in this area. In the analysed biennium there happened a total of 946.750 expert examinations distributed in seven categories what we will present following: 821.236 expert examinations of bodily harms in living people; 61.928 examinations necropsy, 251.460 Ad Cautelam examinations; 54.018 toxicological examinations; 396 anthropological examinations; 832 legal dentist examinations; 8.340 anatomical pathology examinations.

**Keywords:** IML; Toxicology; Ad Cautelam; Pathology; Necropsy; Human Rights

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# THE CRASH ACCIDENTS DRIVING TRAFFIC IN THE STATE OF SÃO PAULO - BRAZIL. THE NECROPSIES EXAMINATIONS WERE ANALYSED AT THE LEGAL MEDICINE INSTITUTE

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**Abstract:** The traffic accidents in our country kill more than 50.000 persons each year, more than 300 thousand injured ones and represent millions in costs for the treatment of the surviving victims, from the service Nosocomial-daily pay up to the programs of rehabilitation of the cripples of this "urbane war ". Several laws, as the obligatory of the use of helmet for the motorcyclists, which lees so that the tax of mortality in this transport type reduced 300%, as well as the limit of speed, the prohibition of use of alcoholic drink for the driver of vehicles, have since objective reduces the mortality as well as the damages to the health of the general population.

The increase of the items of security inserted in the vehicles brought to the occupants good condition of security. Still there persist the rates lifted up for the deaths by running over, caused fundamentally by in observance of the laws of part of the drivers of vehicles and along the pedestrians. In the period from 2004 to 2010, 39.730 persons were carried out necropsies in victims of traffic accident in the Legal Medicine Institute of the State of São Paulo.

According to data published by the Foundation State System of Analysis of data (Seade), the traffic accidents surpassed the rate of murders and assumed the leadership of the causes of death not natural in the State of São Paulo, in the years of 2007 and 2008. The murders occupied this post for more than 20 years.

**Keywords:** Traffic Accident; Murder; Necropsy; Seade

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# POSTER SESSION

## Session D2

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# UNIDENTIFIED BODIES:THE USEFULNESS OF FORENSIC ANTHROPOLOGY

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**Abstract:** Unidentified bodies: the usefulness of Forensic anthropology Clarice Mestre, Luisa Eiras, Gonçalo Carnim, Maria Cristina Mendonça, Jorge Costa Santos, Eugénia Cunha National Institute of Legal Medicine, South Branch Lisbon, Portugal Using 5 cases of unidentified bodies analyzed at the South Branch of the National Institute of Legal Medicine in Portugal, we aim to highlight the major contributions of forensic anthropology to this type of case. The bodies were found, in different stages of preservation and decomposition, in abandoned houses and in any case there was an estimation of time elapsed since death. The expertise's started with forensic pathology with the external examination and autopsy. Forensic anthropology analysis happened after that. A holistic approach was tried namely to the analysis of clothes in order to achieve an estimation of postmortem interval. For the reconstructive phase of identification, the forensic anthropologist was paramount to age at death, ancestry and even to sex. Both the clavicle and sternal end of the fourth rib as well as root transparency proved to be very helpful and reliable. Once the biological profile accomplished, whenever there was a suspicion on identification, exclusions were able to be done. Dental data was not particularly informative since the majority of the individuals displayed severe antemortem tooth loss which, however, not always was linked with advanced age. Antemortem lesions, specifically ancient fractures revealed to be the most relevant factors of individualization. The same can be said about surgical devices. The absence of reference to those elements in the list of missing individuals of the Police precluded, in some, their identification. Yet, positive identifications for others were achieved. Some suggestions to improve positive identifications are given.

**Keywords:** Unidentified Bodies; Forensic Anthropology

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# METHOD OF AGE ESTIMATION OF ADULTS FROM THORACIC VERTEBRA

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**Abstract:** After attending this presentation, attendees will be introduced to a new method of age estimation based on changes in the morphology in thoracic vertebrae. This presentation will impact the forensic community and/or humanity by allowing forensic anthropologists and pathologists to verify and use this new aging method for narrowing age ranges estimation, and therefore for more correct age at death estimation, essential in identification of unknown human remains.

There are still more than 9.000 missing persons in Bosnia and Herzegovina from the recent war, believed to be dead. The process of recovery and identification of the deceased will inevitably take at least the next several years.

During the examination of hundreds of skeletal remains exhumed in Bosnia and Herzegovina, the authors found that the pattern of changes observed in the vertebral body can be used as additional indicators for estimation of age at death. The variables that contribute to the overall pattern of change include (1) the sequence of fusion of the internal rim of the epiphyseal rings to the surface of the vertebral body, (2) the subsequent absorption of the rings into body, and (3) age related changes to superior and inferior edges and surfaces of the body itself. The progression of the union of epiphyseal rings in vertebrae in teenagers and young adults was studied and described by McKern and Stewart (1957), Albert and Maples (1995) and Maples (2010). Preliminary study about changes in the morphology in thoracic vertebrae in adults Klonowski at all have presented in 2007.

The remains used in this study comprise individuals killed during the period from 1992 to 1995 in northwest Bosnia. All of the individuals examined for this study were exhumed from individual or mass graves, between 2001 and 2010. For this study, a series of three vertebrae from 360 skeletal remains representing males of known age were examined. For each individual, the last three thoracic (Th10 - Th12) were examined. The remains were completely skeletonized. The process of decomposition of soft tissues and skeletonization was natural and all examined vertebrae were dry, showing no trace of soft tissue (e.g. free of intervertebral cartilage and periosteum), which enabled the observation of changes in fusion of the vertebral rings. Three features at the vertebrae bodies were examined: fusion of the internal rim of epiphyseal rings observed from posterior (dorsal) view, changes in shape of the superior and inferior edges of the vertebral body and changes of texture of the superior and inferior surface of the vertebral body. Each vertebra was scored according to the presence and development of those three features with age.

In preliminary study, comparison of real and estimated ages of identified remains has shown that age-related changes observed in the vertebral column can contribute significantly to narrowing estimated age ranges, especially for individuals between the ages of 25-45 years, who constitute the majority of the missing from Bosnia and Herzegovina.

This study will combine different stages for each of three morphological features observed in thoracic vertebra, in order to develop distinctive phases for age estimation.

**Keywords:** Age Estimation; Thoracic Vertebra; Bh Population

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# CHANGES IN EMOTIONAL BONDS BETWEEN DECEASED AND KINSFOLK IN SITUATIONS OF DISASTER: FEBRUARY 27TH 2010 - CHILE. THE INVISIBLE EMERGENCY

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**Abstract:** In this particular paper events which happened in Penco parochial Cemetery related to the crumbling of a wall containing graves during the megaearthquake of February 27th 2010 in Chile from a forensic anthropological intervention perspective are discussed.

The relevance of the lack of integral assistance with a social and cultural perspective and the corresponding consequences of the earthquake are highlighted. Thus, emotional implications, identity and affection consequences which derive from the loss of bond among kinsfolk and their corresponding deceased when cemeteries are significantly damaged with no inmediate adequate response are analyzed.

Forensic Anthropology as integral discipline shows outstanding advances in its interventions related to disasters. However an adjoining and coordinate kind of work in association with other areas and various institutions based on updated protocols that can lead the way in the emergent complexity of social phenomena which happen during the different stages of a disaster is required.

**Keywords:** Forensic Anthropology; Earthquake; Emotional Bond

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# A MULTIDISCIPLINARY APPROACH FOR THE SEARCH OF BODIES BURIED IN SOIL: AN EXPERIMENTAL STUDY FROM NORTHERN ITALY

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**Abstract:** In the forensic practice one of the most difficult scenarios concerns the search for buried corpses (as in mafia cases). In these instances valuable data may derive from a multidisciplinary approach which takes into account the contribution of botany, geopedology and anthropology in order to verify the interaction between the presence of a decomposing corpse and the natural environment. In addition, the use of geophysical and geochemical methods may bring about several advantages for the search for cadavers; however, in literature very few studies deal with experimental projects including the analysis of the complicated interactions between buried bodies and soil.

This experimental study is an attempt to study the different aspects and interactions of burial, decomposition and environment with animal samples, and took place within the Ticino natural park (Lombardia). Ten ditches were filled with 11 pig carcasses weighing between 60 and 90 Kg. The botanical characteristics of the area were periodically recorded in order to verify possible modifications induced by the burial. In addition, periodical analyses of ditches were performed by a georadar in order to verify possible modifications of the soil induced by the burial. Periodical exhumations of samples (corpses) were performed: each sample underwent autopsy in order to verify the decomposition processes which had affected the skin surface and the viscera.

Results showed relevant interactions between the soil and the remains, significant and unexpected modifications in vegetation up to 7 months, as well as a drastic reduction in the georadar response after 5 months. Moreover, the results proved the importance of such experimental strategies for the purpose of devising search criteria for buried bodies.

**Keywords:** Buried Corpses; Forensic Anthropology; Forensic Archaeology; Botany; Geopedology; Georadar

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# POST-MORTEM CT: METHODOLOGY AND APPLICATIONS

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**Introduction:** Post-Mortem Computed Tomography (PMCT) is a useful method to investigate the cause of death and specific injury in trauma victim: to recognize foreign bodies (such as bullets in gunshot injuries, explosion debris etc.), for personal identification especially in the case of deep tissue alterations (carbonization, mass disaster), to identify injuries in traumatic deaths, as well as in drowning and in decomposed remains. In this work we analyze the different possible applications of this method on cases relating different fields of study: from forensic pathology, to forensic anthropology and paleopathology.

**Materials and Methods:** 14 cases were studied: 5 corpses with injuries concerning forensic pathology, one of which exhumed five months after the decease; 5 cases concerning forensic anthropology (two corpses partially skeletonized and skeletal remains attributable to three subjects); 4 paleopathologic cases: one egyptian mummy and medieval skeletal remains attributable to three subjects. A Multislice CT (MSTC) [Aquilion 16®, Toshiba] was used for all analyzes obtaining a volumetric scan with a basic isotropic voxel of 0,5 mm. The images were post-processed (Vitrea2®, Vital Imaging) obtaining multiplanar reconstructions and different 3D reconstructions of various anatomical areas. In 5 cases CT was used as a preliminary and complementary investigation to the traditional autopsy.

**Results:** PMCT was performed on 5 corpses as a preliminary investigation, for forensic purposes. In all cases, as support of the traditional autopsy, this method was useful to study visceral and bone injuries allowing to determine and define the cause of death (major trauma by car accident, positional asphyxia, drowning, major trauma and carbonization by air crash, congenital unknown vertebral malformation). In forensic anthropology PMCT was also useful for identification purposes: in one case through the comparison of a previous fracture, in three other cases in positive ensuring the alleged identity, and in negative excluding the identity on the basis of comparation of the ante-mortem radiographs / CT and PMTC. In one case PMCT allowed to study bone injuries resulting by dismemberment, helping sex determination. From paleopathologic point of view, PMCT was helpful to detect cause of death and ante-mortem and post-mortem bone injuries: in the egyptian mummy it has shown the presence of a widespread parasitic disease with multiple visceral localizations and a chronic heart failure as contributory cause of death; in medieval skeletal remains PMCT cleared the macroscopic evidence of significant injuries caused by sharp and blunt force trauma.

**Discussion and Conclusions:** The implementations of PMCT in the study of corpses and skeletal remains has proved to be useful and beneficial when used in addition to traditional autopsy either alone, confirming the characteristics of operator-indipendent method, objective and non-invasive technique to identify cause of death, even in ancient remains. Its importance was particularly significant in asphyxial death and in blunt and sharp force injuries, permitting to differentiate ante- and perimortem injuries. MSCT has proven useful to identify both positive and negative personal identification by comparison with antemortem radiographs (or scans) of the subject. Through an integrated and multidisciplinary approach was therefore possible to apply PMCT to a significant and heterogeneous cases, proving its usefulness not only in forensics but in bioarchaeology and paleopathology as well.

**Keywords:** *Post mortem* CT; Multislice CT; Forensic Anthropology; Forensic Pathology; Paleopathology

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# MEDULLA TYPES OF HAIR AMONG THE RASTOGIS

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**Conclusions:** Four hundred and ninety five hairs collected from 100 individuals (50 males and 50 females) belonging to the Rastogi community of Meerut city of Uttar Pradesh ,India have been analysed for their medulla types.. The percentage of different types of medulla are Absent (61.80), Fragmented (19.50), Discontinuous (17.30) and Continuous (1.00) respectively. Each and every hair strand has been studied for their medulla types from the root to the tip and photographed. In all the hairs where medulla have been found to be present, it occurs as a single or multiple fragments at various location of the hair.

From this it seems probable that the hair medulla develops from one or more sites which may join together or remain separated to give rise to different types of medulla.

**Keywords:** Medulla Types of Hair Among the Rastogis

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# ETHNIC DETERMINATION USING THE GENOME PROFILING METHOD

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**Abstract:** [Introduction] Recently, due to the increasing social internationalization, the number of unidentified cadavers is increasing globally. Cadavers are sometimes believed to be foreign. However, it requires great effort and financial resources to carry out mitochondrial DNA, or autosomal and Y chromosomal STR analysis to determine their ethnic origin. Recently, the genome profiling (GP) method was reported to analyze the whole genome of animals and plants rapidly, precisely and inexpensively. Therefore, we hypothesized that it may be possible to determine a human's ethnic origin using the GP method. [Method and materials] A total of 50 individual 1ng DNA samples extracted from human urine samples were randomly amplified with a random primer. 10uL of amplified DNA samples were electrophoresed on a temperature gradient. Species identification dots (spiddos) were obtained from the produced electrophoresis images. The pattern similarity scores (PASS) were calculated for the spiddos and all samples were cluster analyzed using Ward's method. [Results] Although there were some exceptions, most of the European, African and Asian samples clustered based on their ethnic origins. [Discussion] Using the GP method, which amplifies the whole genome randomly, we may be able to determine the ethnic origins of unidentified cadavers rapidly, precisely and inexpensively. We will analyze the relationship between the GP method and other DNA analysis methods in the future.

**Keywords:** DNA; Genome Profiling; Ethnic Identification

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# IMPLICATION OF HUMAN MTDNA, Y-CHROMOSOME AND JC VIRUS GENOTYPE ANALYSIS WHEN DETERMINING THE ETHNIC ORIGIN OF HUMANS

**Author(s):** Takasaka T[1]; Mclean S[1]; Miyamori D[1]; Ikegaya H[1]

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**Introduction:** Both mtDNA and Y chromosomes were used to investigate how modern humans dispersed within and out of Africa. JC virus (JCV) is a member of the Polyomaviridae family. JCV is usually transmitted from parents to children. JCV strains globally can be classified into more than 10 major genotypes, with each genotype occupying a unique geographical domain, suggesting that the evolution of JCV occurred in association with the division of human populations. Research on the origin of humans in the fields of Virology, Anthropology and Forensic Medicine research used only JCV, mtDNA, Y-chromosome analysis respectably from the DNA samples of different humans. Until now no study has analyzed the JCV, mtDNA and Y-chromosome from individual human samples. The aim of this study is to analyze the JCV, mtDNA and Y-chromosome of individual humans from around world and try to provide evidence that may indicate the relative reliabilities and validities of different methods when determining the genetic origin of humans.

**Materials and Methods:** Urine samples were collected from volunteers or patients from 26 countries. DNA samples were extracted from the collected urine samples. Using the PCR method that amplifies the 610-bp JCV IG region, we detected JCV DNA from 150 urine samples. We constructed a NJ phylogenetic tree from the DNA sequences of the JCV IG region. Using molecular phylogenetic analysis of the JCV IG region the genotype was determined. From JCV positive sample DNA, the control region of the mtDNA genomes were amplified using PCR. We estimated the haplogroup of the mtDNA from mtDNAmanager (Web-based tool for the management quality analysis of mtDNA control region sequences). Y-chromosome haplogroups were classified using a Y SNP kit. Then the labeled DNA was hybridized with allel-specific oligonucleotides in a Bead Mix array. The hybridized microspheres was read by the Luminex 200 systems.

**Results:** This research sets out to determine the geographical origin of human populations. However, using mtDNA haplogroup analysis and Y-chromosome haplogroup analysis it was difficult to distinguish the geographical origin of the volunteers from the samples they provided. Classification of the geographical origin of human samples was particularly problematic using Y-chromosome haplogroup analysis. The results showed that samples collected from European volunteers were mostly of the European JCV genotype. While the samples collected from Northern Europe and the Mediterranean region volunteers were of both European and Asian mtDNA and Y-chromosome haplogroups.

**Discussion:** The research results also show that volunteers from which samples were collected, from Asia are of mixed JCV genotypes, mtDNA haplogroups and Y-chromosome haplogroups. Furthermore, volunteers who provided samples for analysis from the African region, which is commonly believed to be the birthplace of mankind, were of mixed mtDNA haplogroups and Y-chromosome haplogroups. Identification of a human's geographical origin using data collected from JCV genotype analysis showed results that were more uniform in nature then that from Y-chromosome and mtDNA analysis. However, it should not be forgotten that samples were collected from only 26 nations, which makes up only as small percentage of countries in the world. Therefore it is suggested that further research using a greater number of samples collected from a greater number of counties is necessary before conclusions may be drawn on the relative benefits of the different types of methods used to identification the genetic origin of humans.

**Keywords:** DNA; MtDNA; Y-chromosome; Jc Virus

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# SYSTEM OF SKELETISATION DONE USING AN INDUSTRIAL BOILING PAN

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**Abstract:** The field of study of Forensic Anthropology has widened as its functions have been redefined. Thus, it is quite usual that, after a preliminary study, the removal of soft organs from a corpse or its remains becomes necessary. There are many methods to carry out this function, standing out among them the use of cadaveric fauna, chemical composites and boiling. Following the setting up of the new premises of the Catalan Institute of Legal Medicine the Forensic Pathology Service and consequently the Forensic Anthropology Unit were duly provided with all the necessaries. An industrial boiling pan was designed, a receptacle whose internal working size is 1,800 cm long, 700 cm broad and 65 cm high what allows to place a corpse or its remains of an average height inside it in order to boil them. Heating is generated by warming up the oil inside the metallic planks that shape the boiling pan. The system is complemented by a small crane that raises a platform where the corpse is placed thus allowing an easier introduction of the corpse inside the boiling pan. In the same way, a fume extraction system was devised together with a timer in order to control time and water temperature. Thanks to this system, as a whole, we have been able to remove soft tissues at one stage with the ensuing boiling time saving and the reduction of the risks of burns and other injuries caused by accidents due to the adjustment of the time of corpse manipulation to the strictly required time.

**Keywords:** Forensic Antropology; Skeletisation System

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# APPLICATION OF THE MAXILLARY SUTURE OBLITERATION METHOD FOR ESTIMATING AGE AT DEATH IN GREEK POPULATION

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**Abstract:** A recently developed method for estimating adult skeletal age is based on maxillary suture obliteration. The purpose of this study is to test the accuracy of the revised maxillary suture method in estimating age at death on a skeletal sample from Greece. The sample consists of 271 skeletons (150 males, 121 females) of known age and sex and comes from several cemeteries of the country and from Human Skeletal Athens Collection. By using the method of Mann et al. we correctly estimated age for 89% of males and 84% of females. This finding suggests that the method is applicable to estimate the age-at-death in Greek population.

**Keywords:** Age Estimation; Maxillary Suture; Forensic Science; Human Skeleton

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# FOUR CASES REGARDING HUMAN REMAINS IDENTIFICATION: AN EVOLUTION OVER THE LAST THIRTY YEARS?

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**Abstract:** Introduction Identification of human remains is a complex process that relies on the contribution of multidisciplinary forensic medicine specialties. Currently, forensic genetics plays a central role in this context, but it can't be used as a method of screening and therefore requires data that will direct, at least in terms of probability, the comparison with certain genetic profiles (of the subject, or of one of his relatives, to which the remains may belong). For these reasons, it is necessary to underline the methodological approach that should characterize personal identification investigations, giving the correct importance to the classic anthropological and odontological evaluations that can guide the genetic investigation in an area sufficiently circumscribed and then integrate results.

To this end, it seems useful to compare the methodology used in four cases, two of which related to activities carried out in '70s, in pre-DNA time, and two recent in which genetic analysis followed the traditional investigations.

The first two cases, relating to the 70's, were about a completely skeletonized body and a fully carbonized body: the identification was based almost exclusively on the traditional approach to anthropological and odontological investigations (macroscopic evaluation, radiography, comparison to ante-mortem data). The third and fourth cases concern two partially skeletonized bodies found in summer 2005: the traditional anthropological and odontological approach, fundamental in defining the general characteristics of the remains (sex, age and height), was followed by genetic investigation comparing the DNA profiles taken from personal material (toothbrushes) of two missing persons, who presented characteristics consistent with those obtained from the remains.

The comparison between the first two and the other two cases highlight the usefulness and validity in the third millennium of the classic anthropological and odontological methods, because in the two recent cases the genetic investigation could be targeted and sent quickly confirmation of identification thanks to the results of other analysis.

This should always be kept in mind with a view to better management of technology, economic and human resources.

**Keywords:** Human Remains Identification

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# IMPORTANCE OF FOOT AND FOOTPRINTS IN FORENSIC ANTHROPOLOGY CASEWORK

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**Abstract:** Human foot has been in the focus for a variety of reasons in the past i.e. detailed study of diabetic foot, for orthopedic reasons, for anatomical purposes, study of foot by foot and shoe industries and Army, and the most important is forensic study of foot. Now, it has been universally accepted that a mature foot and its impression are not only unique to an individual but also provide highly valuable clues regarding personal identity. Human feet separated from the body are usually recovered at the scene of mass disasters- both man made and natural. Footprints can be found as a kind of evidence and can be collected from almost all types of crime scenes. Human foot and footprints can provide clues for personal identification in three ways i.e. by reconstruction of body size (estimation of stature and body weight) from different segments of the foot and footprints, sex determination from dimensions of the foot and footprint and by individualistic characteristics of the foot and footprints. Estimation of stature from foot and footprints is based upon the fact that like other parts of the human body, the foot also has a definite and positive relationship with stature of a person. Sexual dimorphism naturally exits in different dimensions of the foot and footprints. The individualistic characteristics like corns, pits, humps, creases, deformity, an extra toe etc. can be considered as useful forensic evidences in establishing personal identity.

The paper discusses with examples various methods of personal identification (e.g. estimation of stature, from individualistic characteristics and relationship of body weight) from foot and footprint with reference to a study of north Indian population.

**Keywords:** Forensic Anthropology; Footprints; Stature Estimation; Body Weight; Individualistic Characteristics

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# A NEW METHOD OF FACIAL RECONSTRUCTION IN THE TROPICAL CLIMATE AND ITS ADVANTAGES COMPARED TO THOSE USING THE WAX

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**Abstract:** Personal identification is one of police duty when they find a person with unknown identity. In Indonesia every medical doctors has obligation to help the police to identify the unknown person, especially those related to the crime, mass disaster or terrorisms. In this case, the police usually ask the forensic pathologist to identify the body and to do the autopsy to determine the cause and mechanism of death. When the victim is skeleton, even after the doctor has been sure about the identity, sometime the family need visual proof to be sure that the skeleton is really their relative.

In this aspect, facial reconstruction is very useful for family to recognize the victim. Facial reconstruction is the process to make a profile of face on the skull or replica of the skull. Usually facial reconstruction is performed by putting the wax onto the skull by using the data of the thickness of 15 points on the face. The result of facial reconstruction is the face that can be recognize visually by the family.

In Indonesia that is a tropical country, the use of wax is not very useful because the temperature make the wax to be softened and the face is distorted. Based on that condition, we developed a new technique of facial reconstruction by using the pulp of newpaper, talcum venetum, tacol glue and brown dye. First we make the pulp by soaking the pieces of newpaper into a pail containing water, overnight. Tacol glue was added into the pulp to make it sticky. The skull or replica of skull is cleaned and put on a cylinder container (such as biscuit container). Then, the pulp was put onto the skull or replica of the skull until the face contour can be seen and then the skull is dried in the room temperature. Talcum venetum is added by a little water, tacol glue and brown dye (for the wall paint) to make a sticky mass with the skin color. The talcum mixture is covered layer by layer onto the newpaper layer of the face, until the face is reconstruct.

The nose, lips and ears are the parts, that we must make and predict scientifically and by using the art feeling. After the outer layer was dry enough, the surface is smoothened by using the sandpaper. And the last step are put the hair to make the eye brow, eye lashes, moustache, beard and wig to make hair, according to the information from the family or relatives. The advantage of this method are: (1) we can reconstruct the face in 3 condition: thin, ideal and fat, (2) the hardness is stable from influence of weather, (3) the appearance of face is much better due to the smoothness of the skin, (4) repeatable, because the "face" layer can be release from the skull by sawing through the vertex and back of ears, then head can be re-united by using power glue.

The skull then can be used again for next facial reconstruction. (5) the profile of face is very similar to the victim, as already we proved it in our cases by using this method.

**Keywords:** Key Words: Personal Identification, Facial Reconstruction, Tropical Climate

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# ESTIMATION OF STATURE FROM HAND AND HAND PRINTS OF HARYANVI POPULATION OF NORTH INDIA

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**Abstract:** The present work is concerned with the estimation of stature from hand and hand print dimensions of a Haryanvi population of North India. The study is based on a cross-sectional sample of 200 individuals (87 males and 113 females) aged 19-29 years collected from the Chhachhrauli and Bilaspur Blocks of Yamunanagar District of Haryana State of north India.

The data was collected from different educational institutes (schools and colleges) and house-to-house survey of the study area during a field-work conducted in October, 2010. Four anthropometric measurements, viz. hand length, breadth, hand print length and hand print breadth were taken on each individual using standard techniques and instruments. The hand breadth showed significant bilateral differences (P=0.05) in males as well females, with right side breadth somewhat higher than that of the left side. All the four measurements show positive correlation with stature.

However hand length and hand print length were better correlated with stature. Regression equations have been derived for estimation of stature from all the four measurements. Since there are no statistically significant differences between actual hand length and hand length measured from prints of hands, the regression formulae for stature estimation could also be applied to hand prints at crime scenes.

**Keywords:** Forensic Anthropology; Stature Estimation; Hand and Hand Print Measurements; North India

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# STATISTICAL FACIAL APPROXIMATION IN 3D WITH TIVMI USING GEOMETRIC MORPHOMETRICS

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**Abstract:** Forensic sciences are required to provide identification methods reliable and reproducible enough to be valid in the legal system. Facial approximation, or "estimation of the antemortem facial appearance of an individual from unknown skeletal remains" (as defined by the SWGANTH), should also tend to fulfil those criteria.

We propose an objective approach for the prediction of facial features based on traditional and geometric morphometrics. A warping algorithm is used to distort a neutral face in 3D until it fits the estimated landmarks. Texturing of the facial approximation is then available to customise the subject. The method was implemented in the TIVMI software (Treatment and Increased Vision for Medical Imaging). This computer program has been designed according to the needs of anthropologists increasingly using 3D imaging. DICOM analysis, HMH-based surface reconstruction and geometric operations (landmarks, planes, segments and outlines) are available in 3D.

The first step of the facial approximation technique is to collect the coordinates (x, y, z) of a precise list of bony landmarks (˜ 50). This can be made in TIVMI after reconstructing a skull from a CT-scan, or after importing a laser scanned surface. The coordinates may also be recorded directly on the skull using a digitiser and imported in TIVMI. A study of a 500 CT-scan head sample of adult French (18 - 96 years, sex ratio 1.13:1) allowed for the elaboration of an automatic prediction of the facial landmarks. Principal component analysis is used to define the craniofacial shape and multivariate regressions are ran, combining PC scores and biological factors (sex, age, corpulence), to estimate the 3D cutaneous coordinates. Soft tissue depths are independently predicted using both craniometrics and biological factors, which help the individualisation of the approximation.

This second step is automated in the software and produces the list of the most probable position of the facial landmarks.

The third step is to apply the warping algorithm to a neutral face. For this operation, two groups of landmarks are distinguished, anatomical and STD points. The anatomical landmarks are strictly homologous and define the shape of the facial organs (eyes, nose, mouth and ears), while STD points are non-homologous (those are projected from bony landmarks on the soft tissues) and render the general shape of the face. The warping algorithm is programmed to give an optimal precision in fitting the anatomical landmarks and to let a higher degree of freedom at the STD points. This allows for a smoother approximation more flexible to the facial variability. Finally, the fourth step is to add textures and colours to the model in order to enhance its realistic aspect. Skin, eyes and hair colour, hairstyle and suggestion of facial hair are available. Ageing of the model can also be performed through the modification of the skin texture.

Different facial approximations from the same skull and from different subjects are presented in order to visually evaluate the variability of the results that can be obtained from the single neutral face model. If the biological factors are not available, it is also possible to propose several approximations including the morphological changes between male and female, young and old, normal corpulence and overweight. Even if significantly different, the changes related to these groups may be subtle and visual evaluation of those differences on the approximated faces will be used to discuss the relevance of the use of such factors. The face created may also be exported in independent graphic software to add elements and make modifications specific to the forensic case investigated.

Further research will be led to test the accuracy of this statistical facial approximation technique through the comparison of predicted faces with photographs.

**Keywords:** Facial Reconstruction; Facial Reproduction; Computed Tomography; Software; Imaging

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# RESEARCH ON THE COMPUTER AIDED FOOTPRINT SEARCHING SYSTEM

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**Abstract:** Bare footprints are commonly used in identifying suspects. In this paper, a database of 700 bare footprint samples is established based on the integer morphologic characteristics of bare footprints, namely the length of the footprint, the length of the bottom of the heel to the top of each of the five toes and the width of the footprint. Then a footprint searching system is programmed with MS Visual FoxPro software. Searching experiment is made with the seven measurements defined above and different error thresholds between the same measurement of questioned and known footprints.

The results show that the rate of unique footprint found and matched is increased from seventy six to ninety five percent as the threshold narrowed down from five to three millimeter. It is concluded that the seven measurements selected are appropriate to describe the morphologic features of bare footprints.

Therefore it is quite efficient in the searching of probable suspects within a database setup in one police department and several police departments in different cities as well. In this case, footprint evidence can be utilized more easily and effectively not only in the sorting out but also the identifying of suspects.

**Keywords:** Bare Footprint; Morphologic Characteristics; Computer; Search

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# A STUDY OF FINGERPRINTS IN RELATION TO GENDER AND BLOOD GROUP

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**Abstract:** Fingerprint evidence is undoubtedly the most reliable and acceptable evidence till date in the court of law. A fingerprint is an impression of the friction ridges of all part of the finger. A friction ridge is a raised portion of the epidermis on the digits or on the palmar and plantar skin, consisting of one or more connected ridge units of friction ridge skin. Due to the immense potential of fingerprints as an effective method of identification an attempt has been made in the present work to analyze their correlation with gender and blood group of an individual. This prospective study was carried out over a period of 2 months among 200 medical students (100 male 100 female) belonging to the age group 18- 25 of Kasturba Medical College, Mangalore, India. Each subject was asked to press his fingertip on the stamp pad and then to the paper to transfer the fingerprint impression. The same method was repeated for all the fingers of both hands. After the fingerprints were acquired, details such as name, sex and age were noted. The details of their blood group were noted from their college identity cards. The fingerprint patterns were studied with the help of a magnifying lens and were according to Henrys system of classification. Results show that each finger print is unique; loops are the most commonly occurring fingerprint pattern while arches are the least common. Males have a higher incidence of whorls and females have a higher incidence of loops. Loops are predominant in blood group A, B, AB and O in both Rh positive and Rh negative individuals except in O negative where whorls are more common. We can conclude that there is an association between distribution of fingerprint patterns, blood group and gender and thus prediction of gender and blood group of a person is possible based on his fingerprint pattern.

**Materials and Methods:** This prospective study was carried out over a period of 2 months among 200 medical students (100 male 100 female) belonging to the age group 18- 25 of Kasturba Medical College, Mangalore, India. Subjects were asked to press his/her fingertip on the stamp pad and then to the paper to transfer the fingerprint impression for all the fingers of both hands separately on the respective blocks on the same sheet of paper. The details of their blood group were noted from their college identity cards. The fingerprint patterns were studied with the help of a magnifying lens and were classified according to Henrys system of classification. The distribution of dermatoglyphic fingertip patterns in both hands of individuals and its relationship with gender and different ABO and Rh blood groups was evaluated and analysed statistically.

**Results:** Results show that each finger print is unique; loops are the most commonly occurring fingerprint pattern while arches are the least common. Males have a higher incidence of whorls and females have a higher incidence of loops. Loops are predominant in blood group A, B, AB and O in both Rh positive and Rh negative individuals except in O negative where whorls are more common.

**Discussion and Conclusions:** Each fingerprint is unique hence it can be very effectively used as an evidence for identification in the court of law. Loops are the most commonly occurring fingerprint pattern and Arches are the least common. Loops are predominant in blood group A, B, AB and O in both Rh positive and Rh negative individuals except in O negative where whorls are more common. Whorls are more common in blood group O negative.

- Loops and arches are maximum seen in blood group A while whorls are more common in blood group O.
- Blood groups A and B were found to be the most common (equally predominant) among males, blood group O was the most commonly seen blood group in females.
- Males have a higher incidence of whorls and females have a higher incidence of loops.

Thus prediction of gender and blood group of a person is possible based on his fingerprint pattern.

**Keywords:** Fingerprints; Gender; Blood Groups

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# GENDER DETERMINATION IN ADULT EGYPTIANS FROM COMPLETE AND FRAGMENTED TIBIAE: AN ANTHROPOLOGICAL STUDY

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**Abstract:** sex determination from skletal remains forms an important component in the identification procedure. the aim of the present study was to establish standards for determinig sex from complete or fragmented tibiae in adult egyptians. the study was carried out on 100 tibial bones with known sex (64 males, 36 females). seven tibial dimensions were used; condylo-malleolar length; circumference at the nutrient foramen; minimal shaft circumference, anteroposterior dimension at nutrient foramen; tve dimension at nutrient foramen; proximal epiphyseal breadth and distal epiphyseal breadth. 4 discriminant functions were generated; one using the 7 varaibles, one using 2 varables, and 2 employing one varables.

The results showed that complete tibiae can be sexed with 86.4% accuracy using the 7 varables and the same degree of accuracy was achieved using only 2 variables while discriminant functions using one variable showed accuracy of 66.7%. the study concluded that the tibia (fragmented or complete) can be used for sex determination with a high degree of accuracy from 66.7% to 86.4%.

**Keywords:** Sex Determination; Discriminant Analysis; Tibia; Forensic Anthropology; Egypt

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# A VERY RARE CASE OF SPLIT ATLAS WITH KLIPPEL FEIL SYNDROME IN THE FORENSIC ANTHROPOLOGICAL PRACTICE OF ALBANIA

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**Case Report:** Congenital abnormalities are a consequence of pathological alterations suffered during intrauterine life, some of which are inherited and have genetic disorder as the main etiology. A considerable percentage of these anomalies have to do with skeleton.

In this paper presented is a very rare case of split atlas (bipartite atlas) with Klippel Feil Syndrome, discovered during the exhumation of a female corpse in March 2009, in a village near Tirana. The victim was found dead in a well near the house two years ago. The manner of death was considered suicide. During the second autopsy after the exhumation, detected was the aforementioned double osteological anomaly.

Then presented are some general embryological, clinical data as well as an analysis of the respective literature on these anomalies.

In conclusion, the acquaintance of congenital anomalies is important to avoid diagnostic mistakes in the Forensic Anthropology practice.

**Keywords:** Split Atlas (bipartite Atlas); Klippel Feil Syndrome; Forensic Anthropology; Albania

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# UNUSUAL ASPHYXIAL DEATHS

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**Introduction:** Violent mechanical asphyxiation as a cause of death in the forensic practice is frequent, notwithstanding whether it is a homicide, suicide or an accident. Purpose of this paper is to present unusual ways of occurrence of violent asphyxiation with four cases analyzed in our Institute.

**Material and methods:** four death cases have been analyzed with cause of death being violent asphyxiation occurred in an unusual way, such as: neck compression case, case of stuffing of the larynx-pharynx opening with the tongue suppressed by a lace tied up around an open mouth, a case of a combination of positioned asphyxia and neck compression and a case of ambient asphyxia combined with hypothermia. From analyzed cases it was concluded that the death of two of the cases was a result of an accident, one is a murder case, and one a suicide.

**Results**: There were not significiant findings on the external examination, except superfitial injuries, conjunctivas hyperemia and typical outline and color of livores mortis, whereas the finding of internal examination of the organs revealed atypical changes: congestion of the organs, spot-like bleedings of the pleura and epicard. Death with analyzed cases has occurred as a result of an unusual way of asphyxia, a combination of different asphyxias or a combination of asphyxia and hypothermia and therefore it is interesting to find out which is the prevailing one.

**Conclusion:** active participation in crime scene investigation, analysis of circumstances preceding the event and exclusion of other reasons for death are necessary upon adopting the final conclusion regarding violent asphyxias as a cause for death.

**Keywords:** Unusual Asphyxia; Accident; Homicide; Suicide

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# OBSERVING THE RESIDUAL RINGS FORMED FOLLOWING EXPERIMENTAL SHOTS FIRED

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**Abstract:** The case presents the results of experimental shots fired at a "biological model target" (a pigs head). The shots were fired from a long range with sniper rifle "TRG 22 Sako", using full-jacket and semi-jacket pointed bullets cal. .308. The examination of the entrance wound showed the ring of residue on the inside part of the pigs skin. The effect was caused by using the pointed bullets.

**Keywords:** Gunshot Wounds; Ring of Residue; Pointed Bullets

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# ANALYSIS OF THE LOW JAW IN THE ACT OF IDENTIFICATION

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**Case Report:** On 21 of September 11.07 2006, it has been carrying out inspection of one deserted trash near the river Lepenec under the leadership of prosecutor, technician of criminology and the institute of forensic medicine . Namely, in this place there was find most of black trash bags full with humans bones. After we strengthen that they are human bones we put hypothesis that the bones are probably from the old graves. At the beginning we thought that this material was find perhaps during the building of some project. In R. of Macedonia there is a law about the period during the building a new project . If the workers during the building find any artefacts or humans remainders they must stop with their work and then they wait permission for continue their work from the Ministry of culture. In this case the builders probably liked to avoid this law and because of that they put the bones in the black trash bags and unloaded them to the savage trash. During the detailed analyse with crime-scope CS-16-500 every bone it was consolidated that the bones were old more than 100 years. There was not any pathological and traumatic changes on the bones. We connected the bones and so we statement that in these material there are five bodies. The long bones were dominate while the skulls were fewness. The special interest for us were the seven low jaws because we liked according to them to predict the gender and the age. In this work we especially examined the corner between the body and the branch of the low jaws, the condition of the alveolar crest and also the condition of the teethes.

**Keywords:** Identification; Skeletons; Jaw; Crime-Scope

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# THE SUDDEN DEATH OF YOUNG PEOPLE AND PROBLEMS OF GENETIC TESTING

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**Introduction:** Authors present a project concerning the possibility of genetic testing in cases of sudden and unexpected deaths of young people under 40 years of age. In this group, it is possible to find cases where even after the use of all currently available investigative techniques we fail to determine the exact cause of death. The aim of this project is not only to establish the diagnostic measures to determine the frequency of genetic pathologies related to malignant arrhythmias and cardiomyopathy, but also direct clinical examination of relatives of deceased by a cardiologist.

**Methods:** The project of sudden deaths monitoring in the region of South Moravia, Czech Republic involves the cooperation of forensic physician, pathologist, geneticist and a cardiologist. We examined all deaths younger than 40 years, with lack of pathologic or toxicologic finding explaining the cause of death, most commonly with autopsy diagnosis of acute heart failure. Especially, we will focus on sudden unexplained deaths. We will exclude patients with presence of measurable blood alcohol levels, positive toxicology examination, atherosclerosis as a leading cause of death, and with positive microbiologic and/or virologic examinations. We will contact direct relatives and we will offer them clinical cardiology examination together with genetic testing (genes: KCNQ1, KCNH2, KCNE1, SCN5A, KCNE2, ANK2 and TNNT2).

**Results:** We have focused on cases of deaths in the period from 2007 to 2010. Over this period an autopsy was performed in a total of 10,301 deaths. Of these deaths under 40 years of age in 1352 people with traumatic cause of death was determined in 77.8% of them (1052 persons), pathological cause of 19.8% (267 persons). The remaining 33 deaths it was impossible to determine the cause of death, mostly due to the very advanced putrefactive changes. Pathological causes of death (267 persons) in young individuals were then surveyed in the various diagnostic groups. The majority of deaths was due the cardiovascular disease - 28.46% (76 people). The second largest group in this age category - over 13% of deaths (35 people) was sudden and unexpected death, the cause of death has not been possible to determine precisely. Other causes possibly related with inheritability were primary cardiomyopathy (4.12%, ie 11 persons) and a diagnosis of SIDS (2.62%, ie 7 persons). Among others, a relatively large group of early diagnosis the causes of death were diseases of the digestive system (10.49%), respiratory system (10.11%) and nervous system (8.61%). 7.12% of sudden deaths among young individuals, then falls to the conditions associated with pregnancy, childbirth, puerperium and perinatal conditions. Neoplasms (including malignant blood diseases) were the primary cause of death in 4.49% cases of death. From the group 35 persons died suddenly only 15 relatives agreed with molecular autopsy and till end of 2010 we examined 10 persons for above mentioned genes for LQT. We found some common polymorphisms at SCNA gene we found G87A, IVS9-3c>a, A1673G(H558R), G3183A, IVS25+65g>a and C5457T. In two persons we found at KCNE2 gene mutation A22G(T8A), which was described as mutation for drug induced LQT syndrome, same mutation was found in 2 relatives we performed interview with recommendations of potentially dangerous drugs to avoid. Relatives, who were willing to participate (together 27 persons from 10 families) had cardiology examination with normal output: no clinical significance for cardiac pathology.

**Conclusions:** Molecular autopsy is helping to state diagnose of sudden unexpected deaths and has advantage for survived relatives. Future possibilities would probably help to discover more genes responsible for sudden unexpected deaths.

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**Keywords:** Sudden and Unexpected Death; Malignant Cardiac Arrhytmias; Lqt Syndrome; Molecular Autopsy

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# MODEL FOR STUDYING LIVE CELLS IN FUNCTIONAL ANALYSES IN A FORENSIC SETTING. STRESS RESISTANCE OF TENOBLASTS SAMPLED POSTMORTEM FROM INFANTS (SIDS AND CONTROLS)

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**Abstract:** Whereas simple post mortem DNA analyses only requires access to tissue samples or blood, investigations of gene function and specific cellular mechanism under different conditions related to the cause of death relies on the ability to culture living cells secured at autopsies. Using cultured fibroblasts from Achilles tendons (tenoblasts) collected postmortem and exposed to heat and oxidative stress we have studied gene expression and stress resistance. In this study we present the conceptual idea of using postmortem-derived cells for intervention studies. Fibroblasts from SIDS (sudden infant death) and controls (n=42) were grown in culture media and evaluated for differences in sensitivity towards lethal oxidative and heat stressors by exposure of the cells to 43°C or a concentration of 50µM Menadione; an oxidative stress inducer. The mean survival time of cells exposed to either a continuous thermal stress at 43°C or to 50 µM menadione, was estimated by a dye exclusion viability assay. We found that the mean survival of all tested cells was 38.6 h (SE 1.19, CI 95% [36.16 - 40.96]) when exposed to thermal stress and 16.2 h (SE 0.65, CI 95% [14.86 - 17.47]) when exposed to menadione. There was no significant difference in mean survival during thermal stress for SIDS (38,5 h) versus controls (39h) (p=0.92). When exposed to menadione, the SIDS cells had a lower mean survival time of 15.7 h compared to 17 hours for control cells, although non-significant (p= 0.40). Resistance towards oxidative stress was positively correlated with heat stress resistance in SIDS. We found no correlation between survival rates and putative SIDS risk factors such as sleeping position, co-sleeping, head covering, signs of subtle inflammation, or age of donor, or the number of hours from time of death to sampling of the achilles tendon (postmortem interval) in SIDS or control cells. The methodology presented in the study of stress sensitivity and survival of cells from deceased individuals may be used to address the impact of other cell stressors on additional cellular functions and thus form the basis for future molecular studies of causes of death.

**Keywords:** Cell Growth; Fibroblasts; Cell Stress; Heat Stress; Oxidative Stress

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# INVESTIGATION OF ROAD ACCIDENTS, POSSIBILITIES AND OBJECTIVE LIMITATIONS

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**Introduction:** The aim of this study is to highlight the contribution of the forensic expertise in the complex investigation of road accidents.

**Materials and Methods:** we have analyzed the forensic expertise from the last three years effectuated in lethal accidents.

**Discussion:** between 2008-2010 in Timis country there have been effectuated 360 autopsies in case of death by road accident. We present a case in which the victim, a 37 year old male, a participant of traffic belonging to the vulnerable groups, pedestrian, has increased his vulnerability by consuming alcohol ( 2,55g /1000 ). In the genesis of this accident, speed, road conditions that are propitious for high speed and low lighting have contributed. After the autopsy the elucidation, through expertise, of more aspects related to the dynamic of the accident vehicle speed upon impact and the report of causality between the accident and death.

**Conclusion:** to the able to respond as fully as possible to the prosecution bodies in forensic expertise, objectivity is required in the initial forensic findings so that the data can be correctly correlated in subsequent expertise.

**Keywords:** Car Accidents; Victimi; Pedestrian

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# MEDICO-LEGAL INVESTIGATION AND AUTOPSY MACROSCOPIC/MICROSCOPIC FINDINGS-CASE PRESENTATION

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**Introduction:** Autopsy is an important tool in modern death investigation. External examinations are not only cost-effective but also a necessary element in any death investigative. It is of significant importance the link between medico-legal expertise and autopsy/macroscopic/ microscopic findings.

**Case Report:** A 4 years old boy has died in the hospital/Kosovo as a result of trauma. The autopsy has been performed by a forensic pathologist, who has found many bruises / hematomas on the body of the child as well as tamponada cordis that was concluded to be the final cause of the death. In the beginning the child's mother has confessed that she has bitten her child. Later she has changed her confession. The court has asked from an international forensic pathologist the second opinion. He has concluded according to photos undertaken during the autopsy that the child had suffered from Kawasaki disease, which has not been proved. There have not been found relevant signs or symptoms confirming the disease. Histopathology examination of tissue samples collected during autopsy has shown that as a result of severe trauma including chest trauma, pericardial sanguinal effusion might has leaded to cardiac tamponade, while myocardial contusion with cardiac shock has resulted to sudden death. There has not been found histological changes for Kawasaki disease

**Conclusions:** Considerable disparity could be shown in the quality of medico-legal investigation if not taken into the consideration team approach to defining the definitive cause and the manner of the death.

**Keywords:** Autopsy; Sudden Death

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# STATISTICAL ANALYSIS OF SUICIDES IN CANTON TICINO (SWITZERLAND): A SUTDY OF THE LAST TWENTY YEARS

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**Abstract:** A great amount of suicides occurs in the daily investigation activities of the Scientific Police units and of Forensic Pathologists working in Canton Ticino. For this reason, it is important to study the suicide cases during the last 20 years in this region since these results are necessary in order to evaluate the variables, like the victims age, the period of the year/week and the execution manner. In summary, the results indicate a constant preponderance of males among the victims and a progressive increase of age at the death. Statistical data present the firearms-shooting as the most frequent suicide execution manner, in the second range there are the hanging and the headlong fall, and then the exogenous intoxication, drowning and train crash.

Above all, men choose the firearms shooting and women prefer the headlong fall technique. Cases of attempted suicides have been analyzed separately. At the same time the number of "assisted suicides" (peculiarity of Swiss Confederation) was indicated.

We want to give a graphic representation of collected data, by homogeneous criteria, analyzing sex, victims age, month of year and day of the week when the event occurred, way of execution, in the period from year 1991 to 2010, in order to point out differences and correspondences in suicide population. In the future, we would like to compare this information with the ones collected in the neighboring Italian Piedmont region.

**Keywords:** Suicides; Statistical Analysis; Switzerland

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# A CASE REPORT: MURDER OF CASTEL SAN PIETRO PART II - SMOTHERING OF A PREGNANT WOMAN INTOXICATED WITH ZOLPIDEM

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**Case Report:** Few days after a female death body, about 30 years old, was found in Lake Como, the woman could be identified thanks to two tattoo and the teeth print. She was missing since 8 days. Her long stay in water and, above all, the time elapsed between the recovery and the autopsy (due to bureaucratic reasons) made the external examination of the dead body more difficult. A lot of injuries has been revealed, among others: a large, oblique and deep wound at the anterior part of the neck, which reached vertebrae; an ecchymosis on the vestibular surface of the upper lip and an haematic infiltration of soft tissues near the left portion of the mandible. During the autopsy we found: over distended and over inflated lungs, lung ecchymoses, some subepicardial petechiae, spleen and left kidney dilacerations. We found also the presence of a physiologically developed foetus at 13 weeks of gestation. Histological examinations revealed oral and mandibular lesions vitality, while the injury on the anterior part of the neck was determined to be post-mortem; a Scanning Electron Microscope examination confirmed this characteristic, so we were able to attribute the neck injury to a post-mortem dismemberment attempt. The toxicological analyses revealed the presence of a short-acting nonbenzodiazepine hypnotic (Zolpidem®, imidazopyridine), in toxic concentration. (Toxicological data will be discussed during the "2011 Joint SOFT-TIAFT International Conference", which will be held in S. Francisco from 25 to 30 September 2011) Data analysis revealed the cause of the death was probably due to an acute mechanical asphyxia in a seriously altered subject, in respect with the alertness state, caused by a massive dose of hypnotic drugs. The neck injury is suggestive of a post-mortem dismemberment attempt, made by a saw. Few months after, the husband of the victim was declared guilty of intentional homicide and interruption of pregnancy and convicted with a life sentence.

**Keywords:** Murder; Smothering; Zolpidem; Dismemberment

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# FATAL AORTOESOPHAGEAL FISTULA CAUSED BY COIN BATTERY INGESTION IN A 18-MONTH-OLD GIRL: A CASE REPORT

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**Case Report:** We report a case of a 18-month-old girl who died from a massive bleeding due to an aortoesophageal fistula caused by a 20-mm lithium button battery lodged in the oesophagus. A 18-month-old girl was brought to a paediatric emergency department because, shortly before presentation, the parents saw her vomiting blood after being fed some milk. When she arrived at the hospital, the girl was awake and alert and appeared uncomfortable in her mother's lap; clinical examination showed tachycardia and laboratory results revealed a severe anaemization (haemoglobin was 7.6 g/dl). Within few hours after admission, the girl's clinical condition deteriorated, she developed haematemesis and collapsed. Despite intensive resuscitation, the patient remained unresponsive, and death was declared 3 hours after. During the autopsy, we found a CR 2032 coin type battery (3 Volt lithium manganese dioxide battery, diameter 20 mm) located in the middle third of the oesophagus. The oesophageal wall had transmural erosion with fistulization into the aortic wall, between aortic arch and descending aorta. At visual inspection, the battery showed signs of corrosion with defects on its surface. Approximately 250 mL of blood was found in the stomach and all the bowel until the ileo-cecal valve was full of blood. Piceous stool was found in the remaining bowel, whereas we saw normochromic stools in the rectal ampulla. Histological examinations revealed severe necrosis of both oesophageal and aortic wall; a Scanning Electron Microscope examination confirmed this characteristic and showed there was leakage from the battery.

**Keywords:** Battery Ingestion; Aortoesophageal Fistula

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# BNP SERUM AND CTNI LEVELS IN THE POSTMORTEM DIAGNOSIS OF CONGESTIVE AND ISCHEMIC CARDIAC DISEASE

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**Introduction:** The forensic assessment of sudden cardiac death is notoriously difficult. The limitations of autopsy in the diagnosis of death due to heart disease, ischemic or not, are well known. In clinical practice, natriuretic peptides have been introduced as biomarkers of cardiac function. B-type natriuretic peptide (BNP) is a vasoactive neurohormone secreted by cardiomyocytes in response to pressure and volume overload.

**Materials and Methods:** We studied 133 cadavers (96 males and 37 females) from forensic necropsies. The mean age of the subjects was 58.4 years (SD 17.7 years, range 15-96 years). Cases were selected according to the post-mortem interval and circumstances of death. According to the cause of death, cases were divided into two main groups, (1) cardiac deaths (n=60) and (2) control group (n=73). In the cardiac deaths group, two categories were established according to morphological features of the heart: (1a) 'ischemic deaths' (N=37) and , when evidence of significant stenosis in one or more of the epicardial coronary arteries was found and HE staining showed specific signs of necrosis, and (1b) 'congestive heart' (n=23), when the histological pattern suggests failure of the heart pump, including dilated cardiomegaly, myocardial degeneration and ventricular dilatation. Serum samples were measured in duplicate for BNP, cTnI. Histological studies with hematoxylin-eosin (HE) staining and Masson's trichrome staining in formalin-fixed paraffin sections were performed. Statistically significant correlations were determined between different variables and discriminant analysis was applied. A non-parametric test (Kruskal-Wallis Test) was used to compare groups. Also specific contrasts for each variable grouped according to the diagnostic categories were carried out using the Mann-Withney Test. For each of the variables studied a ROC (receiver operating characteristic) curve was drawn and the area under the curve was measured using a non-parametric method.

**Results:** No statistically significant correlations were obtained between the levels of the biochemical markers analyzed in serum and the post-mortem interval or the use of cardiopulmonary resuscitation for either group. The levels of cTnI ($P<0.001$) and BNP ($P<0.01$) differed significantly, the highest levels of cTnI and BNP being obtained in the group of cardiac deaths. In addition, we performed a comparative analysis between the two categories established in the group of cardiac deaths. For cTnI the highest levels were obtained in the group of ischemic deaths and for BNP the highest levels were found in the congestive heart group. For the ROC curve, we chose as 'state variable' the group of 'cardiac deaths' (n=60). Statistical differences were found for the areas under the curves corresponding to the cTnI ($p<0.001$) and BNP ($p=0.014$). The area corresponding to cTnI was 0.673, while that for BNP was 0.624. According to our results, the cut-off point proposed for the diagnosis of myocardial infarction in clinical settings (cTnI > 0.4 ug/L) showed a sensitivity of 76 %, and a specificity of 57 %. For BNP values of 40.0 pg/L, we obtained a sensitivity of 63% and a specificity of 54.4%. When the group of 'ischemic deaths' was chosen as 'state variable', statistical differences were found for the area under the curve corresponding to the cTnI values ($P=0.004$) but not for BNP ($P=0.859$). The area under the curve corresponding to cTnI was 0.662. If, on the other hand, the group of 'congestive heart' is chosen as 'state variable', statistical differences can be found for the area under the curve corresponding to the the BNP ($P=0.001$) but not for cTnI ($P=0.284$). The area under the curve corresponding to BNP is 0.729.

**Conclusions:** BNP serum levels in autopsy cases can play a important role in the diagnosis of sudden death, acting as a complementary tool to a thorough macroscopic and histological examination. It can used along side cTnI as a way to make differential diagnosis between ischemic and congestive types of cardiac disease.

**Keywords:** Biochemistry; *Post mortem* Diagnosis; B-type Natriuretic Peptide; Troponin; Cardiac Disease

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# INJURY PATTERN IN PEDESTRIAN-MOTORCYCLES COLLISION IN THE CITY OF BARCELONA IN 2010

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**Introduction:** A total of 1464 autopsies were performed in Barcelona at Forensic Pathology Service of Institute of Legal Medicine in Catalonia during 2010. From these autopsies, 75 were traffic accidents; 19 car accidents, 18 motorbikes, 2 of them were cyclist and 36 were pedestrians. Six of these pedestrians were impacted by motorcycles. The proliferation of two-wheeled vehicles in large cities makes necessary to know the injury pattern of pedestrian fatalities.

**Materials and Methods:** The material used in this investigation was contained in the database of the Forensic Pathology Service of the Institute of Legal Medicine in Catalonia. Statistical study of the database and review of indexed literature was performed focus on the injuries sustained by a pedestrian collided by a motorbike.

**Results:** The six pedestrians were impacted by a motorcycle in 2010 in the city of Barcelona; all collisions were produced between May and September. The average age presented by the subjects was 69.5 years and the standard deviation was 14.7 years. In relation to gender 3 of them (50%) were male Related to the sustained injuries, all of them had traumatic brain injury. 83% presented subdural hematoma, 83% had sustained subarachnoid hemorrhage, and 50% hemorrhage located in the brainstem. An association of subarachnoid hemorrhage and subdural hematoma was present in 66% of the pedestrians. Base skull fractures were found in 50% of the cases with vault fractures in only 16% of the cases. Liver injuries were found in one third of the cases. On the other hand, hip fractures were found only in one case, and equal frequency was observed for thoracic trauma, consisting in bilateral rib fractures and sternum fracture. The skin injuries are mainly blunt injuries, and were found them in upper and lower extremities and face.

**Conclusions:** Traumatic brain injuries in motorcycle-pedestrians collisions have a different injury pattern from the pedestrians impacted by a car. This is due to the different kinematics presented by the pedestrian, the post-impact projection and the stiffness difference among both kind of vehicles.

**Keywords:** Pedestrians; Head Injury; Motorcycles; Forensic Pathology

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# DENTAL BIOGRAPHY OF UNIDENTIFIED SKELETAL HUMAN REMAIN

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**Abstract:** A dental autopsy of unidentified human skeletal remains can contribute to a preliminary generic profile of the subject to assist law enforcement agencies in the search for missing persons (or identify victims of crime). Forensic odontologist should retrieve all possible data obtainable from jaws and teeth including a tooth sample, samples of any dental material used in treated teeth, record the periodontal status, and take periapical x-ray images. Manufactures of dental treatment products, prosthetics, dental pigmentations and crown characteristics, are all recorded during the dental autopsy along with dietary and voluptuary habits. The state of oral and periodontal health contribute to a creating a dental biography of the deceased. In skeletonized and dry jaws, palaeopathological protocols for periodontal status evaluation should be considered, as soft tissues are not present and clinical assessment may not be possible. In this work the methods and results of three dental autopsies performed on skeletonized skulls are presented. The periodontal status was assessed using the textural and architectural variations of the inter-dental septum and the extent of bone loss, as usually done during a palaeopathological evaluation, in combination with dental radiology images. The periodontal status was arrived at by applying Kerr's (1988) scoring system. The combination of paleopathological and odontological methods used during dental autopsies can improve dental data retrieval. Particularly useful are periodontal evaluations, diagnosis and findings of skeletonised jaws in the final dental autopsy report.

The periodontal status and the possible detection of periodontal disease of the unidentified remains can widen the generic biological profile, offering extra potential data for the dental biography of unknown ancient remains and in DVI process.

**Keywords:** Forensic Odontology; Dental Autopsy; Human Identification

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# P-SELECTIN AND PECAM-1 FOR AGE ESTIMATION OF INJURIES

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**Abstract:** In the forensic pathology routine casework, the time of infliction of wounds may be a critical issue. Conventional histological methods allow for a rough age estimation, but suffer from high imprecision. Platelet-selectin (P-sel) shows rapid dynamics in the early phase of an injury. Under normal conditions, it is stored in Weibel-Palade bodies in endothelial cells and in a-granules in platelets. After an injury, a degranulation occurs in these cells and P-Sel is transferred to the cell membrane, however only for a short time, implying that membrane-bound P-Sel will disappear within hours after an injury. We decided to take advantage of the possible co-localization of P-Sel and the Platelet Endothelial Cell adhesion molecule (PECAM-1), abundant in the cell membrane of both endothelial cells and platelets, and applied the proximity ligand assay (PLA) technique, which uniquely produces a reaction only when two secondary antibodies are physically very close.

Further, von Willebrand factor (vWF) is also stored in the same granules as P-sel. This co-localization should therefore be expected to produce a PLA reaction under normal conditions. Degranulation due to vessel injury should reduce the positivity when these cells release P-Sel to the cell membrane and vWF to the circulation.

We also investigated some other combinations of antibodies to factors involved in the coagulation and complement systems, and to early inflammatory markers. The positivity of P-Sel - PECAM-1 showed a discrete time window. P-Sel - PSGL-1 also showed a limited, and earlier, time window. The appearance of coagulation factor complexes of various kinds showed variable time patterns that need further studies. Having stated that, the reactivity of the different antibody combinations of the coagulation and complement systems consistently produced a negative reaction in uninjured samples, as well as injuries of older age. We believe that this methodology, using suitable combination of antibodies, will improve the age estimation of injuries, and that the technique can be used by unexperienced users, since the all-or-none response that this method provides allows for an easy interpretation.

**Keywords:** Immunohistochemistry; Age Determination; *Post Mortem*; P-selectin

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# EPIDEMIOLOGICAL FINDINGS IN MEDICOLEGAL AUTOPSY CASES WITH POSITIVE NARCOTIC RESULTS

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**Abstract:** Norway is a rich and well developed Scandinavian country, which has several times been appointed the world's best country to live in by the UN. However, the country also has a very high number of drug deaths, especially heroin related deaths. We have assessed all medicolegal autopsy reports from a 10 year period (2000-2009, Institute of Forensic Medicine, University of Oslo): a total of 9141 cases. In 2184 cases (approx 24%) where the manner of death was considered unnatural (accidental poisoning, other accidents, suicides and homicides), narcotic substances (opiates, opioids, amphetamines, THC, cocaine, etc) were detected, mainly in peripheral blood. Only individuals above the age of 18 were included in the study.

In this group of unnatural deaths with positive narcotic findings, 1515 (69%) individuals were categorized as accidental poisoning - "unintentional overdose". A total of 411 (19 %) were suicides. Included in this group were 239 (11% of total, 58 % of suicides) categorized as intentional poisoning. 203 (9%) of the individuals were categorized as accidents other than poisoning (mainly traffic accidents). 55 individuals (2.5 %) were victims of homicide. It has been a general impression that the total number of substances (legal drugs as well as narcotics) found in each individual has increased during the last years.

We have found that this is a general trend in our material, but even so, there is a significant year-to-year variation. Different toxicological epidemiological findings in relation to various variables (manner of death, gender, age etc) will be presented.

**Keywords:** Drug Related Deaths; Toxicology; Manner of Death

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# MAJOR TRAUMA FROM A MANGLED BODY: DIAGNOSTIC POSSIBILITIES IN FORENSIC PATHOLOGY

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**Introduction:** The statistical data on accident trends recorded in the Italian territory and supplied by INAIL (National Institute for Occupational Accidents and Occupational Diseases) in recent years speak for themselves. Faced with a decline in reported events, fatal accidents have increased. Many of these covered the construction industry: downward trend that was confirmed in the first half of 2010, in a context where the work is irregular and the "underground" phenomenon are of absolute importance and consistency.

**Materials and Methods:** The case is considered the most destructive and tragic accidental death observed at the Institute of Forensic Medicine of the Magna Graecia University, and occurred in Calabria Calabria Region in the last ten years. The investigative procedures have been designed to: safety procedures relating to equipment and the entire production cycle; analysis of the reasons for which the worker has come in direct contact with the machine grind-stones; the reasons why during maintenance of machinery, the same is to be subdivided (human error or technical error?); any pre-existing pathological conditions of the worker; results of chemical and toxicological examinations. The investigations of forensic pathology were targeted to the identification of tissues not affected by the trauma that could provide the technical elements used for the reconstruction of the injury.

**Results:** The shredder-stone is made of a metal shaft on which are mounted radially some hoes in steel, turning, grind the stony material. The destruction of the body of the victim, "wrapped" around the axis in steel, has produced an impressive framework prejudices and allowed to proceed only in search of alcohol in the vitreous humor. No other tissue was capable of being examined and the section of the tiny bones, muscles and loss of all other body fluids has not allowed the usual laboratory tests coroner.

**Discussion and Conclusions:** The authors discuss the diagnostic difficulties present in the study of pre-existing pathological bodies torn to pieces by high-energy impact detrimental. Judges often ask the forensic pathologist to clarify the clinical picture of disease which had affected the victim or whether the same at the time of the accident, was under the influence of substances of toxicological interest likely to affect its behavior. In most cases it is only possible because of the conditions of discovery of the body, providing details only as a guideline, but not subtle problem on reconstruction issues that have effected for the purpose of the proceedings.

**Keywords:** Fatal Occupational Injury; Forensic Pathology; Molecular Autopsy

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# BONE MARROW EMBOLI

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**Abstract:** Bone marrow embolization of the pulmonary arteries is estimated to occur in 7% of non-selected autopsy material, in various settings. The authors report a forensic series. Material and Methods: Two hundred and fifty forensic autopsy cases with histopathological examination, performed in Coimbra and Central area of Portugal during a period of two months, were reviewed. The presence of bone marrow emboli (BME) in the lungs was searched for and the case characteristics evaluated.

Twelve autopsies (4.8%) presented one or more BME inside the lumen of pulmonary arteries with various calibres. The cause of death in those autopsies was both natural and non-natural (falls, road and work accidents, intoxication). An extra case was found where the BME was in the right ventricle, partially surrounded by a thrombus, as if "in transit". Discussion and Conclusions: Pulmonary BME may occur in various settings - orthopaedic procedures, neoplasms, trauma and bone fractures, resuscitation (CPR) manœuvres injuries, etc. They may be responsible for death or just represent an incidental finding, depending on the quantity and death circumstances.

This fact emphazises the importance of lung samples procurement for microscopic evaluation, both in natural and non-natural deaths.

**Keywords:** Bone Marrow Emboli; Lung; Forensic Autopsy

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# THE CONTRIBUTION OF THE FORENSIC AND THE ANATOMICAL PATHOLOGY TO THE MEDICO-LEGAL INVESTIGATION OF A FETAL DEATH

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**Abstract:** In forensic pathology, the main goals of fetus pathological examination are the following: to estimate fetal age, to determine whether or not the child was stillborn, to estimate the time-span during which the fetus had a separate existence, to determine the cause and manner of death and to assist in identifying the mother in cases of abandoned fetus. This examination is dependent on the quality of the initial fetal autopsy, whose best results are achieved by the co-work of a forensic pathologist and anatomical pathologist.

This kind of autopsy must include the examination of the placenta, which may be very useful to estimate gestational age and establish cause of death. Visceral maturation, a good indicator of gestational age, particularly in cases of fragmented fetus, where biometric parameters are lacking, is assessed by macroscopic and microscopic evaluation. Furthermore, histological study is essential to determine the cause of death in case of natural death and to assess vital reaction, nature, extent and severity of traumatic lesions in case of violent death.

The authors present the case of an autopsy of a fetus that was found in a sewer, still showing the umbilical cord and a portion of the placenta. After the forensic autopsy, it was possible to achieve the above mentioned objectives, including identification of the mother through DNA testing.

**Keywords:** Fetal Autopsy; Medico-legal Investigation; Forensic And Anatomical Pathologist

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# POSTMORTEM LEVELS OF TRACE ELEMENTS IN LUNG AND HISTOLOGIC EXPRESSION BY SEM IN DROWNING

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**Abstract:** The objective was to determine the concentrations of trace elements in the upper and middle lobes of lungs of patients deceased due to drowning and other cause of death. The different concentrations of heavy metals and essential elements (Sr, Br, Cd, Pb, Cu, Zn, As, Se) has been determinated in lungs of drowned individuals and died by other cause of death. Solutions of lungs were prepared by acid-assisted microwave digestion by employing HNO3 and H2O2, and analyzed by inductively coupled plasma mass spectrometry (ICP-MS). These materials were obtained by non-destructive method.

We found significantly higher levels of strontium, bromine are in lung of corpses who died from drowning in deaths from other causes. In the case of drowning the highest levels found in the upper lobes. Emphysema and hemorrhage were evidenced by SEM in cases of drowning compared to other causes of death.

**Keywords:** Drowning; Trace Elements; Lung; Scanning Electron Microscopy

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# CARDIAC CONGENITAL MALFORMATIONS AND SUDDEN DEATH. THE STORY OF A CASE

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**Case Report:** Congenital malformations may be the cause of sudden death. The authors present the case of a congenital cardiopathy underlying an unexpected death in an adult. Case Report: A 54 years-old male was found dead at its working place, thus being submitted to a forensic postmortem examination.

The autopsy revealed bicuspid aortic valve associated to a right coronary artery, whose calibre is significantly reduced. Pulmonary œdema and generalized vascular congestion were present. Discussion and Conclusions: Cardiac malformations may occur isolated or in association, resulting from compromised in utero morphogenesis of one or more heart compartments.

They may be clinically symptomatic from an early age or an autopsy incidental finding, eventually leading to an unexpected fatal outcome, as in the case reported, highlighting the importance of a thorough search for congenital malformations - either ‘major’ or ‘minor’ - and even in an adult.

**Keywords:** Sudden Cardiac Death; Congenital Malformations; Bicuspid Aortic Valve; Coronary Stenosis; Adult

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# SUDDEN DEATH DUE TO 'PATENT FORAMEN OVALE AND DUCTUS ARTERIOSUS'

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**Case Report:** Cardiac congenital malformations may cause sudden death. The authors present the case of a congenital cardiopathy underlying an unexpected death in an infant. Case Report: A 2 months and 2 days-old male was found dead by the parents while sleeping in their bed. He was born in a risk socioeconomic family, since both progenitors were smokers and illicit-drug consumers and he had suffered of neonatal abstinence syndrome after birth. A forensic postmortem examination was performed.

Toxicology was negative. The autopsy revealed 'patent foramen ovale and ductus arteriosus' with signs of morpho-functional repercussion, generalized vascular congestion, spleen and œsofagus hemorrhagic areas, as well as absence of traumatic lesions. Discussion and Conclusions: Heart malformations may occur isolated or in association. The simultaneous presence of 'patent foramen ovale and ductus arteriosus' was estimated in 12%, by an Italian Group.

Congenital heart defects remain a major cause of death in infancy and childhood (8-11 per 1000 live births) and the background of more than 85% is multifactorial, including not only genetic and chromosomal conditions but also environmental teratogens, namely smoking, alcohol and illicit-drugs consumption.

**Keywords:** Sudden Death; Congenital Heart Defects; Lifestyle Factors

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# FORENSIC HISTOCHEMISTRY: AN UP-TO-DATE OR AN OBSOLETE TECHNIQUE?!

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**Abstract:** Introduction: At the molecular era, is 'Histochemistry' useful or a time-consuming, money-spending, obsolete technique? The authors will answer this question using practical examples.

**Material and Methods:** Two hundred and fifty forensic autopsy cases with histopathological examination, performed in Coimbra and Central area of Portugal during a period of two months, were reviewed and the pertinence of Histochemistry (Special Staining) evaluated.

**Results:** Histochemical techniques allowed to confirm, complement or deny data from hæmatoxylin-eosin stained slides observed under light microscopy, both from natural and non-natural causes of death, whose examples will be exposed in the poster.

**Discussion and Conclusions:** The relevance of Histochemistry in the Forensic Pathology setting is beyond doubt, since it supports or rules out hypothesis put forward during medico-legal autopsies or other procedures. It is an easy, not expensive and quick tool for everyday routine work, as well as for investigation or teaching purposes, whose performance and interpretation yet require experience.

**Keywords:** Histochemistry; Forensic Autopsy

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# ELDERLY SUICIDE - WHO, WHAT, WHEN, WHERE, HOW AND WHY - A 5 YEAR REVIEW SOUTH BRANCH OF THE PORTUGUESE NATIONAL INSTITUTE OF LEGAL MEDICINE

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**Abstract:** Elderly suicide is a major concern in all developed countries and it can be considered a measurement of how organized a society is. Many predisposing factors have been identified which are related to this manner of death, like medical illnesses, mainly depression and social isolation.

In the present study the authors want to identify probable predisposing factors to suicide in an elder population of the metropolitan area of Lisbon - Portugal. In order to establish a profile of the typical suicidal elder, the authors evaluated all the files of admitted corpses at the Forensic Pathology Department of the South Branch of the Portuguese National Institute of Legal Medicine, aged over 64 and with the manner of death recorded as suicide, during a 5-year period (2006-2010).

**Keywords:** Suicide; Elder; Predisposing Factors

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# DEATH IN YOUNGER THAN 18 YEARS OLD: REVIEW OF THE AUTOPSY FILES PERFORMED AT THE SOUTH BRANCH OF THE NATIONAL INSTITUTE OF LEGAL MEDICINE, PORTUGAL

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**Abstract:** It is well known that, in modern societies, trauma is the first cause of death in pediatric age. Some patterns of children injuries have been identified concerning the victims' gender (boys more than girls) and a few related circumstances (more in summer time and at the weekends). However, there is not much information about deaths among children and youth in Portugal. In this context, a retrospective study of the files related to autopsies performed in younger than 18 years old at the South Branch of the National Institute of Legal Medicine (SB-NILM) during a six years period (2005-2010) was extensively done. Data was collected from 255 autopsy reports and other available information.

The results concerning socio-demographic data, manner and cause of death as well as some patterns related to sex and age groups are presented and discussed.

**Keywords:** Pediatrics; Forensic; Pathology

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# EFFECT OF DISGUISE ON HUMAN LISTENERS' SPEAKER RECOGNITION

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**Abstract:** The effect of 10 types of voice disguise on human listeners' speaker recognition was investigated. The voice disguises were raised and lowered pitch, fast and slow speech, whisper, pinched nostril, mask worn over mouth, use of bite block (pencil), objects in mouth (chewing gum), and imitated foreign/regional accent. These voice disguises are relatively common in forensic casework. Normal and disguised voice recordings were produced by 10 male speakers (university students of similar age). Another 10 male students acted as listeners. 5 of the listeners were familiar to the speakers and 5 were not. Listeners were presented with normal-voice versus normal-voice pairs and normal-voice versus disguised-voice pairs and their task was to classify the pair of recordings as having been produced by the same speaker or by different speakers. The results show that:

(1) different disguises resulted in different error rates, with whisper resulting in the largest number of errors;

(2) individual listeners differed in error rates and in the extent to which disguise affected those rates;

(3) listeners who are familiar with speakers generally outperformed listeners who were not.

**Keywords:** Disguised Voice; Auditory Recognition; Speaker Recognition

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# APPLICATION OF GEOGRAPHIC LINGUISTICS IN FORENSIC SPEAKER ANALYSIS

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**Abstract:** Geographic Linguistics describes the geographic distribution of language phenomenon by language map. This is based on the investigation of language facts about lots of locations. It explores the diachronic change of the language phenomenon combined with the cause explanation of the phenomenon with some social factors. This paper attempts to introduce the theory of Geographic Linguistics into forensic phonetic field and apply it for investigating a speakers' identity, such as the living area and the age of the speaker. Its application, value, approach and procedure are discussed utilizing the real casework and Chinese dialects. And theories and academic achievements of Geographic Linguistics, partitions of Chinese dialects and Chinese dialect maps were applied to analyze the cases. The results are as follows: Application of Geographic Linguistics in forensic speaker analysis is possible and successful.

Phonetic characteristics of initial consonants, dialect grammar and vocabulary,Chinese dialect maps and partitions of Chinese dialects are important clues for it. And this study provides reference for dialect analysis and dialect automatic recognition. It is also useful for forensic speaker identification.

**Keywords:** Geographic Linguistics; Speaker Identity Analysis; Forensic Speaker Analysis; Dialect Recognition

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# STUDY ON INDIVIDUAL CHARACTERISTICS OF STOPS IN MANDARIN

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**Abstract:** The aim of this paper is to study individual characteristics of stops in Mandarin and discuss the application of stops in speaker identification. Ten female college students were chosen as speakers. Each two speakers were asked to talk naturally by telephone and we recorded their talking again after two weeks. The speeches include checking the same faxes with different vague characters and talking about some topics freely. Words composed of six stops in Mandarin were selected from their speeches. The VOT(voice onset time)and GAP are measured manually for statistical analysis.

The results show that:

(1) Individual characteristics and inter-speaker variation are shown on the VOT and GAP, which is useful in speaker recognition and identification.

(2) The intra-speaker variation is smaller than the inter-speaker variation.

(3) The acoustic patterns of stops established via VOT and GAP display the individual characteristics more obviously. It confirms the principle that intra-speaker variation is smaller than inter-speaker variation quantitatively and then provides a strong support for speaker identification using the acoustic characteristics of voiceless consonants.

**Keywords:** Individual Characteristics; Stops; Mandarin

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# THE FORENSIC TRANSCRIPT: STATE OF THE ART IN ITALY

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**Abstract:** Has arisen the idea that anyone can give opinions or views on the language we speak. The transcript, for example, has been always considered a simple task so as not to require extensive studies and specializations. Many people, in fact, it does its main job and livelihood despite not having followed any study or course of studies on language or language. In short, both the transcript of a meeting of a condominium is kidnapping in Italy can be done by anyone and without requiring any degree or any specific jurisdiction. In fact transcribe an oral communication involves a myriad of problems that only an expert is able to sense and control. The speech is characterized by parallel channels of communication such as gestures and intonation, is strongly influenced by channel noise, context.

The transcriber, for its part, is in a position that are alien to the communicative situation, does not receive all the communicative act in its entirety but only the sound channel, and also must be translated into characters (graphemes) and transpose on paper created a communication to be composed of oral elevations of voice breaks, pitch changes, changes of emphasis, change of style (ironic, playful, teasing, serious), and feelings such as anger, happiness, anger laughter, when they have all these facts only a few suprasegmentals punctuation mark (punctuation). The transcript must therefore be addressed as a serious theoretical problem before and after practice. In this complex technical operation, a frequent problem concerns the case of misinterpretation of what is heard and then transcribed. The translation must be understood as interpretation of the original signal is then carried out by experts who know in depth the language and culture is the source language than the target. An example is that in both productions dialect productions in different languages. A striking example that has aroused much interest in Italian public opinion was that concerning the kidnapping and murder of thirteen year-old Yara (in 11-26-2010). After a series of wiretaps investigations have led to a sentence produced in a phone call made by a young Moroccan boy living in the city. For a simple error in translation of a sentence produced in Arabic and translated << Allah mi perdoni, non l'ho uccisa io >> (Allah forgive me, I didn't kill her) instead of <<Allah mi protegga>> (Allah protect me).

This work, therefore, aims to present the complex and articulated Italian situation regarding the transcript in the forensic field. Specifically, the work provides: 1. deepening of the legislatures position in relation to the expertise of transcription (see art. 221 of Criminal Procedure Code for the appointment of Surveyor of Transcription); 2. a register of professionals working in the field and especially the identification of specific skills have to be to do a better job of forensic expert transcriber in Italy; 3. they also consider the views of the media and public opinion on the issue of wiretapping and transcription; 4. finally, we evaluate the recognition of professionalism in economic terms by private and state institutions.

**Keywords:** Linguistics

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# COMPARATIVE RESEARCH ON FORENSIC ADMINISTRATION SYSTEM BETWEEN CHINA AND GERMANY

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**Abstract:** Without the appropriate national legislation and Originated from the planned economy era, China has not formed a unified and comprehensive Forensic Administration system until 2005. A new law was made on February 28, 2005 by the Standing Committee of the Tenth National Peoples Congress "on the issue of Forensic Administration System". The law tries to solve the multiple identifications, repeated as well as overlong ones. So it makes clear that the Ministry of Justice is the national department in charge. In details, it contains a basic content and the fundamental legal framework. It's of positive significance. However there have been reforms not in place, and other problems, such as the multi administrative departments in charge in practice as well as the ambiguous administrative rights. In order to safeguard the neutrality and authority of Forensic Service and to protect the litigants' rights in the lawsuit, we must perfect our current Forensic Administration system. Germany is typical of Continental Legal System countries.

Our legal system has been deeply affected by Germany since the Qing Dynasty. So it's of great significance to study in-deep and learn from Germany to improve our existing system, which is closely related to the lawsuit system. Germany's Administration system concretes executive and social power and displays a mixture one. Its organs distribution appears the combination of the centralism and decentralism. Its experts' management implements a strict pre-qualification and self-discipline system. All of these above can be effectively functional in practice. China's Forensic Administration system is different from Germany in the department in charge as well as the management of the organs and the experts. All of these differences come from the individual legal standardization, division system, and inherited aspects of the historical evolution.

We should pay attention to these differences, when we learn from Germany, and then combine the administrative and judicial regulations, to define our department in chief and straight out the limits to rights, to expand the scope of forensic service which is divided into "three categories" and to strength the conditions for organs and experts' access. All of these need the association's active involvement so that we can reach a perfect Forensic system, in which all the litigants' rights could be guaranteed. In this way, we may improve our legal construction.

**Keywords:** Forensic Science; Forensic Administration System; Administrative And Judicial Regulation

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# ENVIRONMENTAL MONITORING OF BACKGROUND DNA WITHIN A FORENSIC BIOLOGY LABORATORY

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**Introduction:** The presence of background DNA in a forensic laboratory is a potential source of contamination and poses a serious risk to criminal investigations. It has been demonstrated that typeable amounts of DNA can be retrieved from various surfaces in a forensic biology laboratory. This precipitated a number of procedural changes within the Victoria Police Forensic Services laboratory including the introduction of an ongoing environmental monitoring (EM) program. The EM program requires regular sampling of a wide range of surfaces for assessment of DNA quantity and origin. The surfaces tested include those that can be categorised as being of low, medium or high risk to a criminal investigation if they contained human DNA.

**Results:** Over one hundred samples have been collected from laboratory items, equipment and surfaces that were either in direct or indirect (potential sources of secondary transfer) contact with casework samples. The results indicated the presence of human DNA on numerous items such as gowns, unused gloves, various pieces of laboratory equipment and furniture. The results obtained revealed a number of improvement opportunities, including consideration of laboratory design and layout, laboratory processes, cleaning methods and procedures, protective clothing and staff training.

**Conclusions:** The EM program has led to improvements in the overall management of the laboratory and reduced the risk of contamination events affecting criminal investigations. It is recommended that forensic laboratories consider the implementation of a similar EM program to supplement their quality management system.

**Keywords:** Background DNA; Quality Management; Environmental Monitoring

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# EXAMINATION OF MARKS ON THE STRAIGHT-SLOT SPRING LOCK UNLOCKED BY SPECIAL TOOLS

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**Abstract:** Straight-slot spring lock, as one of the most common spring lock, is widely used in door or safes of government, corporation, and family. In this paper, some kinds of special tools and means of unlocking straight-slot spring lock skillfully are summarized, and the experimental research to the positions and characteristic of the marks has been carried on. The characteristic of straight-slot spring lock unlocked by special tools technically was studied experimentally. In the experiment, the straight-slot spring locks, which unlocked though a normal way earlier, were unlocked by different people, different kinds of tools and different means respectively, then the marks left were observed and analyzed through a stereoscopic microscope. The experimental research concentrates on following aspect, the characteristic of the marks on the straight-slot spring locks when unlocked by special tools, the influence of type of tools and unlocking skill level and using means on the marks.

The experimental research indicates that there are some distinct differences between the marks on the straight-slot spring lock when unlocked by special tools and when unlocked normally using original key in spherical surface of round marbles, cylindrical surface of flat marbles, inner wall of core, and side face of core. The marks on lock when unlocked with different means have its different characteristic respectively. The type of special tools and the executant's skill level has effects on the emergence probability and location of marks.

Therefore, the method is put forward that the marks on the unlocked lock can be used to distinguish between special or original key through examining the shape of marks formed, then analyze the tape of special tools, using means and skill degree. It will be very useful to estimate criminality and analyze criminal scene.

**Keywords:** Mark; Straight-Slot; Spring Lock; Special Tool

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# TOOL ESTIMATION USING MANUFACTURE FEATURES OF WIRE CLIPPERS ON MARKS

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**Abstract:** Wire clippers are common cutting tools used by criminals on crime scenes especially in burglaries. Their cutting marks can be important clues for identifying the criminal tool. In this paper 6 types of wire clippers which are commonly appeared on Crime Scenes were collected in order to study the manufacture features of different brands of wire clippers and their corresponding characteristics on tool marks.

Each wire clipper using different cutting edges was used to cut lock beams whose diameter is 3mm three times. Manufacture features of these wire clippers and their toolmark characteristics on broken ends were measured under microscope and statistically compared. The manufacture features are the thickness of top edge, grip clearance of blades, milling width and interval of side blades. The toolmark characteristics on broken ends are height and thickness of top marks, width of milling marks of side blades and interval of milling marks.

The results show that there are systematic differences of manufacture characteristics exists among the 6 types of wire clippers. Detailed tool marks on broken ends reflect these subtle difference consistently and, thus, can be effectively used for estimating the types and brand of wire clippers.

**Keywords:** Wire Clippers; Manufacture Features; Tool Marks

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# MATRIX ASSISTED LASER DESORPTION IONISATION MASS SPECTROMETRY IMAGING (MALDI MSI) OF FINGERMARKS RECOVERED FROM DIFFERENT DEPOSITION SURFACES

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**Introduction:** Fingerprint pattern recognition remains an integral method of identification in forensic investigations. Many techniques are currently available which allow the enhancement and recovery of fingermarks left at a crime scene. The choice of enhancement method is more often based on the surface a fingermark was deposited on, rather than the chemical composition of the mark, with different deposition surfaces requiring different enhancement protocols for optimum recovery of the mark (Lennard 2001). One limitation of these techniques is that only one image of the fingermark can be obtained, which could potentially not be of sufficient quality to ascertain an individual's identity. Our research group previously employed Matrix Assisted Laser Desorption Ionisation Mass Spectrometry Imaging (MALDI-MSI) to map the distribution of both endogenous and exogenous species within fingermarks in a single analysis, whilst simultaneously providing high resolution images of the fingermark ridge pattern (Wolstenholme et al 2009). In this study, only one deposition surface (aluminium sheets) was employed, which limited its applicability at real crime scene scenarios. In the current study, ungroomed fingermarks were deposited on a range of deposition surfaces and lifted using forensic tape before undergoing analysis by MALDI-MSI.

**Methods:** Fingermark Preparation: Ungroomed fingermarks were prepared by cleaning hands with alcohol wipes and carrying out normal work activities for a period of 15 minutes before deposition on various surfaces including a knife (metal, non porous surface), an air tight plastic container (non porous surface), a laboratory beaker (glass, non porous surface), a wooden tray (thin cracked varnished wood, semi-porous) and a belt (leather, semi-porous surface). Fingermarks were then recovered using a CSI lifting tape. MALSI-MSI Analysis: All mass spectrometric analyses were conducted using a modified Applied Biosystems API Q-Star Pulsar i hybrid quadrupole time-of-flight (QTOF) instrument. The orthogonal MALDI source has been modified to incorporate a SPOT 20 kHz Nd:YVO4 solid-state laser (Elforlight Ltd., Daventry, UK), having a wavelength of 355 nm, a pulse duration of 1.5 ns and producing an elliptical spot size of 100 × 150 µm. Images were acquired using 'oMALDI Server 5.1' software supplied by MDS Sciex (Concord, Ontario, Canada).

**Discussion:** Fingermarks have been analysed by MALDI-MSI after lifting from a variety of surfaces, showing that the methodology is not surface-specific, unlike many of the conventional fingermark enhancing techniques currently employed. The distribution maps of both endogenous and exogenous compounds within fingermarks were obtained, which potentially enables chemical information about the donor (such as drug use or dietary habits) to be gained, even if the fingermark is unsuitable for comparison. The methodology employed in the study potentially enables MALDI-MSI to be incorporated into the current forensic workflow. Further work is in progress on a wider range of deposition surfaces (both porous and non-porous) in order to ascertain its suitability on surfaces most commonly encountered at real crime scenes. Investigations are also ongoing into the suitability of the method to recover wetted fingermarks, as well as those subjected to various environmental conditions.

**Keywords:** Fingermarks; Lifting; Surfaces; MALDI MSI

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# SIMILARITY IN CUT MARKS USING DIFFERENT KNIVES AT DIFFERENT PENETRATING ANGLES: AN EXPERIMENTAL STUDY

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**Introduction:** Cut mark analysis allows experts to group cutting tools in specific classes by studying the microscopic patterns of striations in the kerf wall and floor. These patterns eventually may help to identify the blade that originates them. However, the identification of one specific blade from the striation pattern can be challenging due to the influence of the angle at which the blade penetrates when knives with different tooth spacing are involved. In this experimental study we compared the microscopic striation pattern produced by 2 knives with differing tooth spacing when penetrating at different angles.

**Materials and Methods:** 40 samples of human costal cartilage obtained from 2 male adult individuals, 52 and 61 year-old, who were autopsied at the North Branch of the National Institute of Legal Medicine, were used. In 20 of the samples, knife A (shortest tooth spacing: ~0.7 mm) was used at a 90 º penetrating angle and in the remaining 20 samples, knife B (largest tooth spacing: ~2.8 mm) was used at a 180º penetrating angle. All samples were preserved in a formalin 10% solution for 7 days after which a cast of the kerf wall was made with Mikrosil®. Casts were observed with an Olympus SZX10 research stereomicroscope using an Olympus KL1500 Compact cold light source for stereomicroscopy and macroscopy. Image capture and processing, as well as the measurements of the distance between striations in the kerf wall were performed using Olympus "cell^B" software at a 0.63X magnification.

**Results:** The mean distance between striations in the kerf wall of the two sets of cut marks was similar; however they differed in the pattern of the striations at the point of blade entrance. This study highlights the importance of analyzing the overall pattern of striations against the mere quantification of the distance between striations.

**Keywords:** Sharp Instruments; Sharp Force Trauma; Cut Marks

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# POSTER SESSION

## Session E1

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# MEDICO-LEGAL AGE ESTIMATION IN LIVING INDIVIDUAL: THIRD MOLAR MINERALIZATION

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**Abstract:** According to the Study Group on Forensic Age Diagnostics (AGFAD), the radiological evaluation of third molar mineralization is a major criterion for chronological age estimation of living individuals. This investigation studied third molar development in 329 orthopantomograms (40,4% males) of Portuguese individuals, patients of Dental Medicine Faculty of Lisbon University, with an age range between 14,0 to 22,8 years, through five different methods (Demirjian, Haavikko, Harris and Nortjè, Kullman and Solari). The results show a better correlation, between real and estimated age, in Demirjian and Solari methods. Demirjian method was used to analyse the other results statistical variables. Third molar development occurs earlier, in average 9 months, in males, in stages D-G. In stage H there's no significant difference.

There's no significant difference between mineralization of molars in the same arch, however, in the inter-arch comparison, the maxillary molars have a premature development, statistically different in stages F (males), G and H. The age 18 is reach in stage G and H, respectively, by females and males. Under the Portuguese Penal Code, section 19, the age is one of the factors of exceptional of criminal responsibility. For criminal pursuit, they state being minor than 16 years of age. This limit is reached for both sexes in the stadium F.

However in any stage we can deduce the majority or minority in relation to the age of criminal responsibility. New studies about the influence of socioeconomic and genetic factors, in third molar development, are necessary.

**Keywords:** Forensic Identification; Dental Age Estimation; Orthopantomogram; Dental Development; Third Molar

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# ODONTOLOGIST'S ROLE IN DIAGNOSING CHILD ABUSE AND NEGLECT

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**Introduction:** Various forms of abuse and violence represent a major problem in modern society. Effectiveness of dental practitioners in diagnosing and preventing physical abuse and neglect depends on experience or expertise; it is important to encourage dental community to seeking information on this issue. Indeed, over 75% of abusive injuries occur in the head, face, oral cavity and surrounding structures because these areas are more exposed and accessible to physical abuse. The aim of this work is to review oral and dental aspects resulting of different forms of abuse and discuss odontologist's role in confirmation of suspected cases of injuries due to violence.

**Discussion:** State of the Art Forensic odontologists have an important role in the identification of pathognomonic signs of abuses, recognized in the orofacial region. Over 75% of abusive injuries include contusions, burns or laceration of the frenum, tongue, lips or oral mucosa. Clinicians should also be aware of direct dental injuries such as fractured, displaced or avulsed teeth, when history event is inconsistent with resulting damage. Relevant signs of dental neglect include rampant caries and poor hygiene in child, possibly associated with their parents' negligence. It is also important to emphasize that not only multiple injuries, but also injuries in different stages of healing should be considered as suspicion of abuse.

**Final Comments:** Final Remarks Dentists have an ethical and moral duty to protect mistreated children and to ensure that children's rights are respected. Dental health community is in an unique position to recognize and to report suspected cases of abuse and neglect. Understanding prevalence and etiology of violence and abuse can encourage dentists to take a proactive role in helping these victims

**Keywords:** Forensic Odontology; Chil Abuse; Orofacial Injuries

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# EPIDEMIOLOGICAL STUDY OF POST TRAUMATIC OROFACIAL DAMAGE BASED ON CIVIL, CRIMINAL AND LABOR LAW

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**Introduction:** The purpose of this study was to identify the type of orofacial injuries found in reports of Clinical Forensic of South Delegation from Medico Legal Institute, in Portugal, between 2005 and 2009, based on Civil, Criminal and Labor Law. The final objectives were, determine: (1) the most frequent types of trauma, (2) the orofacial areas most affected, (3) the prevalence of orofacial lesions/sequelae, (4) the average number of disabilities evaluated or period of illness from those, based on Civil, Criminal and Labor Law.

**Methods:** This retrospective study was conducted entirely in Clinical Forensic of South Delegation from INML. The target population consisted of the victims of preliminary, interlayer and final reports of the clinical forensic procedures carried out between 2005 and 2009. The population sample comprised a total of 1422 victims of both sexes, without restriction of age, of whom 232 had suffered some type of orofacial injury. All the variables were defined according to the authors to discriminated the lesions/sequelae of orofacial area.

**Results:** The most common trauma was the facial (54%), followed by oro-facial (15%). The most frequent injuries/sequelae were: Scars (27.91%), excoriations (15.05%) and ecchymosis (8.25%).

**Keywords:** Orofacial Damage; Corporal Damage; Civil Law; Criminal Law; Labor Law; Orofacial Injuries; Orofacial

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# DENTAL IDENTIFICATION USING DENTAL CONE BEAM COMPUTED TOMOGRAPHY

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**Abstract:** In recent years, three-dimensional structural understanding has become necessary in advanced dental treatment, and dental cone beam computed tomography (CBCT) is considered to be a very effective method. Its advantages in comparison with general medical CT are its high image resolution and small installation area requirement. This apparatus was originally used for diagnosing pathological changes in the jaw-bone, and morphological examination before orthodontic treatment, impacted-tooth extraction, and dental implant treatment.

In this study, we evaluated the possibility of applying CBCT to individual dental identification. First, we carried out CBCT of a dry skull with remaining teeth, restorations and prosthesis, and confirmed that the highest tube voltage of 90 V and tube current of 2.5 mA were optimal CT conditions for detecting intraoral restorations and prosthesis while repressing metal halation as much as possible.

Thereafter, we performed CT of soft tissue attached to the heads of cadavers used for anatomical practice by dental students of our university, under the same conditions. Then, three-dimensional images were constructed using analytical software. As a result, the presence of restorations and prosthesis was readily confirmed, and the three-dimensional morphology, which was difficult to confirm using simple X-ray images, could be understood. T

hese results suggest the usefulness of CBCT for dental examination of dead bodies which mouth opening is impossible, and the possibility of yielding more detailed information for investigating unidentified bodies.

**Keywords:** Dental Identification; Cone Beam Computed Tomography; Forensic Odontology

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# AGE ESTIMATION BY DENTAL PARAMETERS - VALIDATION IN A PORTUGUESE POPULATION OF THE TWO METHODS: KVAAL AND SOLHEIM, BANG AND RAMM

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**Introduction:** To test the applicability of morphological and radiographic parameters used in forensic identification, particularly in estimating the age. Thus, a sample of the Portuguese adult population was used to test our hypothesis. Likewise, this experimental study intends to compare the chronological age with the estimated dental age using the methods of Kvaal and Solheim as well as the Bang and Ramm.

**Materials and Methods:** Thirty-five single-rooted teeth were analyzed throughout this study. For the radiographic analysis which used the method of Kvaal and Solheim (1994), all measurements were made by the digital radiography software Kodak RVG 2200 intra-oral with exposure factors of 60-70 KVp and 7mA. The morphological parameter, the translucent dentin were assessed in both the intact and sectioned tooth. The objects used in this study were sectioned by a tungsten carbide drill in a vertical surface with a buccolingual direction. The relationship between the coefficients was calculated among the age, the ratios and the level of inclusion was $p < 0.05$.

**Results:** The statistical analysis showed that the Pearsons correlation was the strongest (0,86) for the Bang and Ramm (sectioned tooth)method indicating that age can be estimated better with this particular method

**Conclusions:** The dental age calculated either through the method of Kvaal and Solheim or Bang and Ramm is not considerably different from the individual's chronological age.

**Keywords:** Kvaal and Solheim; Bang And Ramm; Age Estimation by Teeth; Dentin Translucency Length

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# AN INTEGRATED APPROACH (CHEMICAL AND MORPHOLOGICAL METHODS) TO ESTIMATED THE AGE BY UNIRADICULAR TEETH ANALYSIS

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**Abstract:** Measurements of age-related changes in dental tissues are often used when estimating the age of an individual. With the new available technology, these methods should be standardized and reproducible. We have studied in previous works (Lopez Nicolas et al , 1989,1990,1991,1993,1996) different morphological parameters.

The aims of the present paper is to improve the accuracy of the age estimation using together different methods of measurement(hydroxyapatite concentrations and morphological studies). In this study we have analyzed 74 uniradiculars teeth (55 central incisives and 19 canines) from 74 different people of age between 30 to 85 years.

We have used a SEM model Jeol 6100 (microanalysis detector INCA from Oxford). Acquisition time 50 sec., dead time <30%, 20 Kv, image resolution 2048x1536, speed fast, data: 8 bits. In each teeth we have analyzed 3 zones in enamel, dentine and dental cement, measuring the following elements: O, F, Na, Mg, P, S, Cl, K, Ca, Mn, Fe, Co, Cu, Zn, As, Se y Pb . To get a variation coefficient under 0,1 (10%) we have selected the zone and made three measurements. The mean value has been the used as final result. The morphological parameters were studied by IBAS methods.

The use of both methods improves in a 25% the accuracy of the individual measurements, the error of estimation using a multiple lineal regression model was + 5 years.

**Keywords:** Forensic Odontology; Age Estimation; SEM Model

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# DEVELOPMENT OF A FINGERMARK RESIDUES DATING TECHNIQUE: STATISTICAL SELECTION OF TARGET LIPID COMPONENTS

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**Abstract:** The initial fingermark residues composition and its aging kinetic significantly vary within deposits from the same donor and between deposits from different donors. That variability constitutes one of the major drawbacks in the development of dating methodologies. This study aims therefore at improving reproducibility by defining and selecting more adequate aging parameters. To that effect, the chemical composition of fingermark residues of different donors were first analysed using GC/MS as a function of time.

Then, different statistical methods already used in other forensic areas (e.g. in drug analysis) were applied to the data in order to select potential target compounds to estimate the age of fingermarks. The target compounds had to show a good reproducibility within deposits of the same donor and between deposits of different donors in order to be applicable to everybody's fingermarks. Finally the chosen target compounds were tested for dating purposes.

**Keywords:** Fingermarks; Initial Composition; Lipids; Aging; Dating; Statistics; GC/MS

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# MODERN COMPUTER 3D TECHNOLOGIES OF CRANIOFACIAL IDENTIFICATION WITH THE USE OF THE SOFTWARE SYSTEM TADD SM AND 3D SCANNER ARTEK IN RUSSIA. THE USE OF 3D SKULL IMAGES IN CRANIOFACIAL IDENTIFICATION WHEN APPLYING THE PHOTO SUPERIMPOSITION METHOD

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**Introduction:** The purpose of this presentation is to demonstrate one of modern craniofacial identification methods applied in Russia which is based upon using the software system TADD SM for 3D modeling of the skull surface.

**Materials and Methods:** The method of computer photo superimposition in confirming the identity of a human skull of an unknown individual is often used in modern forensics. In Russia a computer modification of the photo superimposition method is based upon the use of the software system TADD (developed by: Abramov S., Boldyrev N., Bannikov A.). There are some configurations of this system. The first configuration. TADD consists of a digital video camera and a PC. This configuration creates a partially automatic process of photo superimposition facilitating a search on a database. A photo of an individual is scanned and represented on the screen. Then it is corrected within the program: 16 constant anatomic points are generated. These constants are matched with the same constants of the skull surface. The visible calvarium outlines and facial features contours are traced. Then visible marks are inserted on the skull. The computerized 3D skull model is formed by continuous data points and projected onto the received image of the head in such orientation and magnification as to make the constant points of the skull image and the head image coincide or be as close to each other as possible. The next step is the examination of the superimposed images of the head and skull. Thus the ratio of their constants and contours are observed as the images are scaled and standardized to the soft tissue thickness of a human head. During this procedure interactive recording of the details is carried out. The ratio of the contours of the head and skull elements are observed according to the same techniques as described above. For obtaining the final results of the comparative inquiry process we should take into account the revealed similarities and differences. Then the results are automatically recorded in a form of 3 tables. The second configuration called «3d TADD». This is a software video metrical system of noncontact measurements of compound spatial objects, used to get a complete 3D model of the skull. It includes: • Four high resolution video cameras; • Two projectors of structured light; • A managed positioning device; •A PC; The 3D skull model, created with this software system, is a mathematically accurate halftone computer copy of the skull surface which is presented on a PC screen as a "virtual skull". Moreover its scale can be changed, it can be moved, and undergo any of the mentioned modifications necessary for the photo superimposition method. Complete 3D skull models recorded with the use of the computer are saved in the database. It enables investigators organize a comparative inquiry procedure using any computer any time. They only need the 3D model of a skull, not the actual specimen. They may correct previously obtained data, make control examinations, reinvestigate former materials and investigate new ones. The third configuration, the latest one is TADD SM Artec 3D - the new quality product that is very mobile, easy and more multifunctional than the second configuration. It keeps all functions of TADD and comes with the new generation of portable 3D scanners produced by Artec. This is a 3D video camera that captures video, each single frame of which is a 3D image. The scanning process becomes extremely straightforward; one need only walk around the object continuously capturing it with the camera from various angles, while the accompanying software automatically combines all the scanned frames into a single mesh. The scanner can be used as a hand held device, allowing the user to scan outside or those items that should not be transported.

**Final Comments:** Nowadays the TADD system is widely used in forensic identification in Russia due to its effectiveness and being constantly modernized.

**Keywords:** Forensic Identification; Superposition; 3d Model; Skull; Scanner

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# A COMPARISON OF THE SHOEPRINTS' IMAGES ACQUISITION TECHNIQUES USED IN SWISS FORENSIC UNITS

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**Abstract:** Shoeprint - is always one of the most often found evidences at the crime scenes. Even though the criminals have learnt to wear gloves to avoid leaving fingerprints on the surfaces, they would not have thought about to hide the design and characteristics of the bottom of the shoes. The forensic experts of shoeprint focus on the different subjects for years, such as determining the best sampling technique (for example, gelatin lifters, electrostatic lifters, adhesive tapes...), developing algorithms for automatic acquisition and comparison of traces, etc. In Switzerland, gelatin lifter is the most widely used in transferring evidence, which is the best method for collecting shoeprints at the crime scene, basis on researches. From time to time, the laboratories of Swiss Forensic Services have replaced the traditional analogue camera by the digital camera. Even if the digital photography has speeded up the approach in the labs and reduced the problem of material shortage from the suppliers, the resolution offered, even by the best professional digital cameras, is not always satisfied. The technique of shoeprints' images differs in the Swiss cantons and they were compared. When the class characteristics match, the comparison would then focus on the study of "individual" characteristics. However, the result obtained by this study indicates that most of the testing techniques only guarantee the images with 400dpi, which this resolution is not sufficient to have a sound quality of the shoeprints' characteristics. Ticino is the only canton that is currently using an acquisition technique to guarantee the image with more than 1000dpi. The principle of this new approach will also be presented.

**Keywords:** Shoeprints; Gelatin Lifters; Digital Photography

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# USE OF STYRYL 11 AND STAR 11 FOR THE LUMINESCENCE ENHANCEMENT OF CYANOACRYLATE DEVELOPED FINGERMARKS IN THE VISIBLE AND NEAR-INFRARED REGIONS

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**Abstract:** In current casework, most fingermark detection techniques rely on luminescence visualisation in the visible region. Highly luminescent backgrounds and multi-coloured surfaces can often interfere with fingermark enhancement leading to poor contrast. Detection in the near-infrared region (NIR) has been shown to be effective in minimising the interferences from such surfaces. In this project a range of laser dyes were tested as post cyanoacrylate stains for visualisation of fingermarks in the NIR region. These dyes were tested in a range of different solvents and on a variety of different surfaces. Styryl 11 was soluble in all solvents tested and gave strong results on the surfaces evaluated. When compared to rhodamine 6G, the dye was superior only when viewed in the NIR region. Styryl 11 was combined with rhodamine 6G (STaR 11) and this gave stronger luminescence when compared to styryl 11 on its own. Stronger luminescence at all wavelengths was observed on all surfaces tested. Repeat experiments also indicated that reliable and consistent results could be obtained with using either styryl 11 or the styryl 11-rhodamine 6G mixture.

**Keywords:** Latent Fingermarks; Cyanoacrylate Stain; Near-Infrared; Styryl 11; Rhodamine 6G

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# STUDY ON A FLUORESCENT SMALL PARTICLE REAGENT FOR THE DETECTION OF FINGERPRINTS

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**Abstract:** Small particle reagent (SPR) is a widely used physical development technique. Molybdenum disulfide or titanium dioxide based SPR has been reported to develop the fingerprints on wet surfaces. A new fluorescent SPR has been studied in this paper. Good results have been observed on most nonporous surfaces, including porcelain, glass, cardboard, metal foil, plastic, rubber, leather, painted wood etc. This fluorescent SPR is capable to be used on wet, cold or icy surfaces as well as the dry one. It can also be used on surfaces having a residue, such as soda pop running down the side of a can. This new SPR has been compared with conventional small particle reagent and found to be superior with regard to sensitivity, clarity and contrast on colorful surfaces. Whether or not this SPR can be used on aged fingerprints has also been tested. The fluorescent SPR can be applied either by spray or dipping. The developed fingerprints can be lifted by fingerprint tape. The fluorescence of the developed fingerprints can be observed under long UV light and the fluorescence is stable for a year.

**Keywords:** Small Particle Reagent; Fingerprint; Detection; Fluorescence

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# THE DEVELOPMENT OF BLOOD FINGERPRINT BY A FLUORESCENT SMALL PARTICLE REAGENT

**Author(s):** Liu L[1]

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**Abstract:** The previously reported amindo black 10B method of developing blood fingerprints is sometimes found to be ineffective and inadequate, especially on dark and colored surface at the crime scene. To find a convenient and widely used method is the main goal of this study. A fluorescence small particle reagent for developing latent blood fingerprints is exploited. A multitude of forensic relevant substrates have been tested for the fingerprint experiments. Our results indicate that the new fluorescent small particle reagent is applicable for latent blood fingerprint development on various materials, including metal foil, glass, porcelain, plastic, painted wood etc. The developing procedure and the fingerprint labeling results of this fluorescent small particle reagent are presented in this study. Affected factors of the development are discussed.

**Keywords:** Blood Fingerprint; Development; Fluorescent; Small Particle Reagent

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# STUDY ON FLUORESCENT DYES DOPED NANOCOMPOSITES FOR DEVELOPING LATENT FINGERPRINTS

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**Materials:** With the recent innovations in nanotechnology, the potential usage of nanomaterials in forensic science has been studied. Doped silica nanoparticles were described as developing agents for latent fingerprints. In this study, we have succeeded in trapping fluorescent dyes in silicon dioxide-based nanocomposites, doped xerogels, using the sol-gel method. We have tested the development of latent fingerprints left under different conditions. Our results indicate that the fluorescent dye doped xerogels can be used for developing latent fingerprints on various forensic relevant materials, including metal foil, glass, plastic, porcelain and paper. The fabrication procedure and fingerprint labeling results of these new doped nanocomposites are presented in this exploratory study.

**Keywords:** Nanocomposite; Fingerprint; Fluorescent

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# INVESTIGATION OF HYDROGEN CYANIDE GENERATION FROM THE CYANOACRYLATE FUMING PROCESS USED FOR LATENT FINGERMARK DETECTION

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**Abstract:** Cyanoacrylate fuming is one of the most common techniques employed for the detection of latent fingermarks on non-porous surfaces. The technique is generally applied by exposing items of interest to the vapours generated by heating a suitable quantity of commercial cyanoacrylate adhesive. In this study, the potential for highly toxic hydrogen cyanide (HCN) to be generated from the overheating of cyanoacrylate was investigated. Two commercial cyanoacrylate adhesives and two quantitative methods for the determination of HCN were employed: (i) the sodium picrate method; and (ii) the picrate-resorcinol method. 13C nuclear magnetic resonance (NMR) analysis was used to confirm the presence of cyanide. In addition, the thermal decomposition of cyanoacrylate was studied using simultaneous Thermogravimetric and Differential Thermal Analysis (TGA-DTA).

It was determined that detectable and quantifiable amounts of HCN were generated from the thermal decomposition of cyanoacrylate monomer and polymer at temperatures as low as 200°C. Using an optimised picrate-resorcinol method, it was shown that around 10 µg of HCN could be generated from the heating of 1 g of cyanoacrylate monomer at 200°C. For one of the adhesives testing, this increased to above 100 µg of HCN when 1 g of cyanoacrylate monomer was heated at 280°C.

Recommendations are provided that, if followed, should ensure that the cyanoacrylate fuming process can be safely applied with minimal risk to the operator.

**Keywords:** Fingermark Detection; Cyanoacrylate Fuming; Cyanide Generation

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# STUDY ON A NEW METHOD OF TITANIUM DI OXIDE WET POWDER TO DEVELOP LATENT FINGERMARKS ON ADHESIVE SIDE OF TAPE

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**Abstract:** In this study, Titanium Di Oxide was used for developing fingermarks on adhesive side of tape. Mix Titanium Di Oxide into distilled water and surfactant. Then grind the mixture to stringy wet powder. The Titanium Di Oxide Wet Powder is productive for fresh fingerprint on adhesive side of transparent tape as well as aged one.

The procedure is simple in application. After the wet powder was applied to the fingermarks on adhesive side of tape to be processed by brush, the item was rinsed with water. Then clear prints were shown with no background staining. Titanium Di Oxide Wet Powder is innoxious without irritating odour. And it is harmless to users.

**Keywords:** New Method; Titanium Di Oxide Wet Powder; Develop; Latent Fingermarks; Adhesive Side of Tape.

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# PRÜM'S DECISIONS DNA

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**Abstract:** A 27 de Maio de 2005, ainda antes dos referendos que ditariam o abandono do modelo de Constituição para a Europa, foi assinado o Tratado de Prüm com o objectivo de, como consta do seu segundo parágrafo, "aprofundar a cooperação entre os Estados Membros da União Europeia numa área de liberdade de circulação de pessoas, com o objectivo de combater de forma mais efectiva, o terrorismo, a criminalidade transfronteiriça e a imigração ilegal."

O Tratado de Prüm captou pouca atenção pública e académica (Ziller, 2007, p. 24), e também em Portugal, passando os olhos pela produção jurídica nacional , ninguém diria que se está perante uma matéria importantíssima que, apesar dos recentes desenvolvimentos, leia-se, a incorporação do conteúdo das principais disposições do Tratado de Prüm, o acervo de Prüm, ou o adquirido de Prüm, no quadro jurídico da União Europeia, levada a cabo pelas Decisão 2008/615/JAI e 2008/616/JAI do Conselho de 23 de Junho de 2008 , representa para alguns, senão um passo atrás no processo de cooperação policial e judicial da União Europeia em matéria criminal, bem como no próprio processo de integração europeia, pelo menos, três passos em frente e dois para trás (Geyer & Guild, 2006).

Na impossibilidade de se desenvolver, em tempo útil, as questões mais sensíveis relacionadas com a interoperabilidade de bases de dados e informação, no quadro da Europol e dos gabinetes Sirene , o Tratado de Prüm consubstanciou, sem dúvida uma forma de pressão, de um grupo de Estados, em relação aos restantes.

Se a Europa nunca foi tão próspera, tão segura e livre. Onde a violência da primeira metade do séc. XX deu lugar a um período de paz e estabilidade sem precedentes na história europeia (Strategy, 2003).

A necessidade de incrementar a cooperação policial transfronteiriça emergiu fundamentalmente do processo de integração e da posterior implementação do mercado único europeu (Mitsilegas, 2009, pp. 5-9), trave mestra da constituição económica europeia (Machado J. E., 2010, p. 269), num espaço sem fronteiras internas, onde a liberdade de circulação de bens, serviços, pessoas e capitais, são elementos estruturantes (Machado J. E., Direito Internacional do Paradigma Clássico ao Pós-11 de Setembro, 2006 ), pautados pelo respeito pelos direitos fundamentais e pela cidadania europeia, a actividade criminosa parece ter-se constituído como a quinta liberdade, face à qual a cooperação entre os Estados em matéria penal e de polícia tem aumentado, nos últimos anos, de forma muitas vezes referida como proporcional (Morini, 2008), os atentados de 11 de Setembro de 2001, corporizados no ataque às torres gémeas do World Trade Center, e os ataques, em solo europeu, de 11 de Março de 2004 à Estação de Atocha em Madrid, e ao Metro de Londres, a 7 de Julho de 2005, vieram recolocar a questão do combate ao terrorismo na ordem do dia. ,

O crime organizado transnacional tornou-se uma ameaça crescente no mundo Pós-Guerra fria. O mundo do crime soube aproveitar como nenhum outro o desenvolvimento das novas tecnologias e fontes de informação e fundamentalmente, a cada vez maior mobilidade das pessoas, bens e serviços, em áreas sem controlo de fronteiras, numa economia globalizada (Brady, 2007).

Num momento em que se anuncia a provável reformulação do adquirido de Schengen, no sentido de incrementar o controlo de pessoas através da verificação documental permanente, como resposta às novas formas de criminalidade organizada e imigração ilegal, como referiu recentemente o presidente do Observatório de Segurança Criminalidade Organizada e Terrorismo (OSCOT) , será difícil evitar perspectivas securitárias.

Na sociedade hodierna os perfis de ADN para uso forense e policial constituem um importante campo para o desenvolvimento de modelos de vigilância panópticos. O Tratado de Prüm, com o objectivo de melhorar a cooperação no combate ao terrorismo e como forma de combater o crime e a imigração ilegal, implementou a troca transnacional de perfis de ADN, sendo um exemplo de um sistema de vigilância (Prainsack & Toom, 2010).

A defesa acérrima do projecto ficou a dever-se ao Ministro do interior alemão, Otto Schily, que em 2003, considerando que as medidas adoptadas no âmbito do Tratado de Schengen, nomeadamente a abolição das fronteiras e o início da cooperação policial não seriam suficientes para responder aos níveis crescentes de criminalidade transfronteiriça (Prainsack & Toom, 2010).

Até hoje, apenas a Áustria, Bulgária, Finlândia, França, Alemanha, Luxemburgo, Roménia, Espanha, Eslovénia e a Holanda, comparam perfis de ADN no âmbito do regime de Prüm, com uma periodicidade e actualização diária (Prainsack & Toom, 2010).

O alargamento da União Europeia e a abolição das fronteiras internas conduziram a grandes desafios ao nível da segurança. Para a incrementar recorreu-se à troca de informações entre autoridades judiciárias, utilizando-se o princípio da disponibilidade.

Embora a iniciativa tenha surgido como um acordo multilateral, um grupo pequeno de Estados membros, liderados pela Alemanha , conseguiram transformar, por incorporação, este tratado em direito da união, no âmbito do 3.º pilar, através de uma Decisão do Conselho.

Consubstanciando um progresso no que respeita à cooperação no âmbito da luta contra o crime, a aplicação destas regras de Prüm levantam necessariamente questões que se encontram “do outro lado da trela” e que lutam por assumir a “liderança do passeio” , ou seja, questões de liberdade, de direitos fundamentais, desde logo por inexistir, como veremos, um quadro minimamente estável e comum em todos os Estados membros, no que respeita à protecção de dados.

O princípio da disponibilidade encontra-se definido no Programa de Haia (2004) para fortalecer a liberdade, segurança e justiça na União Europeia, como a possibilidade de uma autoridade judiciária de um Estado membro, que carece de uma informação para levar a cabo a sua função, poder obter essa informação de outro Estado membro, sendo que as autoridades judiciárias desse outro Estado membro que detêm a informação torná-la-ão disponível para o fim invocado, considerando as necessidades da investigação em curso no outro Estado membro.

A questão fulcral do Tratado de Prüm é a criação de uma rede de bases de dados nacionais (Kierkegaard, 2 0 0 8).

A realidade imposta pelo Tratado de Prüm e o posterior adquirido levantam, fundamentalmente duas preocupações: se a fórmula utilizada para o reforço da integração é a correcta (questão do deficit de controlo democrático), e os problemas relacionados com a inexistência de mecanismos de protecção de dados unificados (questão da garantia de privacidade de dados e informação).

**Keywords:** Prüms; DNA

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# A CASE REPORT OF FORENSIC IDENTIFICATION USING A SINGLE TOOTH: COMBINATION OF DNA PROFILING AND THE DATE OF BIRTH ESTIMATION BY RADIOCARBON ANALYSIS

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**Introduction :** In the identification for forensic medicine, it is important that we should use as small a sample as possible. Here, we present a case report of identification with a lower 1st incisor by using radiocarbon analysis for estimating date of birth (DOB) and DNA profiling. 2.

**Case report :** A woman was found dead in a house. The police proved that she was the resident of the house (a woman born in 1978) by the matching of fingerprints, whilst alleged parents did not believe the identification result. Then, carbon-14 analysis and DNA profiling were undertaken for the identification. 3. Cadaver sample A lower right 1st incisor was subjected to the following analysis. 4. Radiocarbon analysis The enamel of lower right 1st incisor of the cadaver was physically and chemically isolated from the dentin and other adherent tissue. The enamel sample was divided into incisal and cervical regions with a diamond disk. For these two region samples, the conversion to graphite and measurement of carbon-14 with accelerator mass spectrometer were performed by Paleo Labo Co (Toda Japan). 5. DNA profiling DNA was extracted from the root of lower right 1st incisor of the cadaver. Buccal swabs were obtained from the alleged parents and DNA was extracted for reference samples. Short Tandem Repeat (STR) polymorphisms and gender determination were analysed by using AmpFlSTR Identifiler kit (Applied Biosystem). And mitochondrial DNA hypervariable region 1 (HV1) were amplified and its DNA sequences were determined. 6. Result and Discussion 6.1. Radiocarbon analysis The carbon-14 concentration in enamel reflects that in the atmosphere at the time of enamel formation. The carbon-14 concentration in the atmosphere remained relatively stable until 1955, but then increased with the increase in the number of aboveground nuclear bomb test, and reached a peak in 1963 when the Test Ban Treaty was signed. The carbon-14 concentration of samples is gives two possible enamel formation ranges. These ranges were produced according to the corresponding period before and after the 1963 peak of nuclear bomb test. Tooth formation starts on the incisal sides and is completed on the cervical side. In this case, the carbon-14 value of the incisal region was higher than that of the cervical region, indicating this tooth formed after the 1963 peak. The carbon-14-estimated date of birth (1975.8 to 1983.5) was compatible with the actual date of birth (1978.9). 6.2. DNA analysis Reliable strong signals were detected in the 15 STR loci and gender marker. In each STR type, the cadaver and the alleged father/mother had a common allele. In mitochondrial DNA HV1 analysis, DNA sequence of the cadaver was matched to the sequence of the alleged mother. The biological child-parents relationship between the cadaver and the alleged parents was proved by STR and mitochondrial DNA tests. Identification case with one tooth by radiocarbon analysis for estimating DOB and DNA profile was presented. The lower 1st incisor which we used as a sample is one of the smallest teeth. It is extremely significant that sufficient information was obtained from this kind of small tooth sample.

**Keywords:** Radiocarbon; Enamel; Date of Birth; DNA; Short Tandem Repeat; Single Tooth; Forensic Odontology

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# FORENSIC APPLICATION OF NGM PCR AMPLIFICATION KIT

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**Introduction:** Forensic DNA typing using traditional nuclear STR loci has played an important role in criminal investigations and forensic identification. The introduction of extended ESS loci in forensic practice had the objective of improving discrimination power, sensibility, robustness and results' quality compared with standard size STR amplicons. NGM PCR amplification kit contains 10 loci from previous SGM Plus kit plus three mini-STR (D10S1248, D22S1045 and D2S441) and two midi-STR (D1S1656 and D12S391) recommended by EDNAP and ENSFI. Here we show our sensitivity testing and the behavior of this kit in real samples from our routine casework compared with a standard kit.

**Methods:** The commercial control DNA007 (0.1ng/ul) was used for sensitivity studies using serial dilutions: (1ng, 500pg, 250pg, 125pg, 62.5pg and 31.25pg). The same control was used for inhibition testing with three humic acid concentrations (20, 50 and 80 ng/µl). 24 samples were selected from routine casework, including blood stain swabs, cigarette butts, and fingernail scraps. DNA was extracted using different methodologies according to the sample in question and quantified with Quantifiler Human DNA Quantification Kit using an ABI Prism7000 Sequence Detection System (AB). PCR were performed using the STR multiplex kits NGM and Identifiler (AB) according to manufacturer's instructions. Fragments were detected by capillary electrophoresis in an ABI 3130 Genetic Analyzer (AB) and analyzed using GeneMapper ID V3.2 software (AB). Allele peaks of all samples were interpreted when greater than or equal to 50 RFUs.

**Results:** With NGM, full profiles were obtained with dilutions above 250pg. With less than 125pg input, partial profiles were observed with allele and locus drop-out. A full profile was also obtained in the different concentrations of humic acid showing that NGM has resiliency towards inhibitors. In routine casework samples NGM performed better than Identifiler, with the later rendering a mean recovery of 11 STR markers per sample against an average recovery of 14 markers with NGM.

**Conclusions:** NGM kit is showing to be a very sensitive and informative kit, with improved resistance to inhibitors compared with previous amplification kits. It can be used in a broad range of samples usually present in forensic genetics laboratories, giving high quality results.

**Keywords:** Ngm; Sensitivity Testing; Inhibition

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# HUMAN IDENTIFICATION SET ON MITOCHONDRIAL DNA ANALYSIS

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**Case Report:** Apart the Universal Declaration of Human Rights that advises identification before all body inhumations, returning the identity to an unidentified corpse and subsequent return of the corpse to his family is, itself, the instrument that enables the beginning of the family grieving. When there are skeletonized bodies, forensic anthropology is the first approach towards the identification, that, most of the time, cannot go further than establish some pointers that will lead to further attempt to genetic identification. When there is degraded or low copy number of nuclear DNA, analysis of mtDNA is remarkable helpful for investigation and resolution of cases of missing persons, skeletonised bodies, mass disasters or terrorism victims.

Mitochondrial DNA (mtDNA), independent of the nuclear cell, with high copy number per cell, maternal inheritance, high mutation rate and absence of recombination, turn to be a very important toll in forensic genetics. The discrimination power of the mtDNA (between non related individuals) comes from the polymorphic nature of its hypervariable regions and is highly used to identify human remains. In this work is reported a homicide case with one unidentified dead body that were presented to the National Institute of Legal Medicine (INML), with instructions to achieve individual identification. Body remains were a femur and two premolars that were subjected to forensic anthropology and forensic genetics analysis. Due to the weather conditions to which the human remains of this case were exposed for a very considerable period of time, it was not possible to achieve positive identification via forensic anthropology. Genetic profiles from relatives of the alleged missing individual were determined using a set of 17 STRs present in commercial Kits. It was not possible to obtain a complete individual genetic profile of the remains, so, to establish matrilineal relationship the analysis of mtDNA was unavoidable.

DNA was extracted from the bone and the teeth using NucleoSpin® DNA Trace (Macherey-Nagel). PCR amplification was performed with pairs of primers L15971/ H017 and L16450/ H599 in a primer mix using QIAGEN® Multiplex PCR Master Mix in a final volume of 10 µl. Thermocycling conditions were: an initial denaturation at 95ºC for 15 minutes, followed by 35 cycles of 30s at 94ºC, 90s of 58ºC and 60s of 72ºC and a final extension for 10 minutes at 72ºC. PCR products were purified with MicroSpin™ S-300 HR Columns (Illustra™, GE Healthcare). The cycle sequencing was performed using the ABI Prism® BigDye® Terminator v.3.1 Cycle Sequence Kit (Applied Biosystems) and purified with DyeEx™ 2.0 Spin Columns (Qiagen). T

he mtDNA sequences were analysed in the sequencer 3130 - Genetic Analyser (ABI PRISM®) with the ABI DNA Sequencing Analysis Software v.5.2 and the SeqScape® Software v.2.5. The obtained haplotypes were compared with the Cambridge Reference Sequence (CRS) and typed following the nomenclature recommendations of the IUPAC. Mitochondrial DNA analyses allow us to confirm that the human remains studied belong to an individual of the matrilineal relationship of the pointed relatives.

**Keywords:** Mitochondrial DNA; Human Identification

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# SEQUENCING ANALYSIS IN FORENSICS: THE EASY WAY

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**Introduction:** Frequently, Forensic Genetic Laboratories have to deal with sequencing of forensic samples from caseworks. This situation can be due to STR structure determination, animal species sample donor investigation but, most of the times, it is related with mitochondrial DNA studies performed in bad quality samples with degraded DNA or in hair shafts samples. In the past years many scientific articles have been published concerning sequencing of forensic samples, especially in hairs, most of them presenting technical procedures related to sample extraction or sequencing methodology. However, few articles have focused on the different ways Forensic Scientists can handle existing software to successful determination of DNA sequences. With this work we present an example of how investigators can use the plenitude of the software's capacities to achieve its goals such as to optimize DNA sequence reading.

**Materials and Methods:** Applied Biosystems SeqScape v2.5 software was used for sequence analysis using rCRS obtained from NCBI's nucleotide database as reference sequence. Samples from two caseworks in which D-loop mitochondrial DNA HVI complete region was sequenced using BigDye® Termination v3.1 Cycle Sequencing kit (Applied Biosystems) are showed to exemplify different ways of DNA sequence reading with the same software.

**Results:** Analyzing DNA sequences with SeqScape can be performed in different ways - either analyzing DNA sequence electropherograms or using the automated procedure of the software. In terms of sequence determination the results are the same, or at least should be, as even using a lesser automated software, different operators should obtain the same information. However, less trained and even well trained operators could encounter some difficulties when analyzing DNA sequence electropherograms and, because of that, other technician(s) should accompany the editing procedure to ensure that no error is passed on. This is a slow process and is very error-prone because human nature acts on repetitive processes. On the other hand, if using an intelligent system, this is much less error prone because it's not dependent on human procedure, except for the final edition part. It can also be reanalyzed by colleagues in a fraction of time. The use of an intelligent system permits the technician to perform the required analysis in less time.

**Discussion and Conclusions:** The correct use of sequencing edition software can be just as important as applying the best techniques for DNA extraction and/or sequencing of forensic samples. This leads to time reduction in analysis and to sequence end quality improvement which means optimization of DNA sequence reading in forensic casework.

**Keywords:** Sequencing Edition; Sequencing Software; Seqscape; DNA Sequence Optimization

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# SNPS AS ADDITIONAL GENETIC INFORMATION

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**Introduction:** In most Forensic Genetic Laboratories, kinship casework is performed with the use of one, or even two, of the most commonly used commercial autosomal STR kits: Identifiler /Identifiler Plus and Powerplex16/PowerPlexHS. However, these genetic systems are sometimes not sufficient to solve the intended casework so that Forensic Scientists uses additional autosomal STR commercial kits as FFFL, Power ES or even NGM. However, the use of a new kit in these situations may not be very effective since it will provide information on only few new loci. On the other turn, the use of SNP multiplexes provide a different type of information complementary to that studied with commercial STR kits and also presents a reduced cost/benefit relation. The aim of the present study is to demonstrate that SNP multiplexes can be used to obtain additional genetic information that complements the information obtained with commercial kits and with lesser costs.

**Materials and Methods:** We have studied from our routine casework 43 normal paternity investigations which included alleged father, mother and child. DNA extraction was done from blood stains and/or buccal swabs using Chelex® methodology and quantification was achieved using Applied Biosystems Quantifiler® Human DNA Quantification kit on an ABI Prism 7000 Sequence Detection System. All subjects were genotyped with Applied Biosystems Identifiler and Promega Powerplex 16 System kits, following the manufacturer's instructions but with reduction of volume reaction to half. In addition, these individuals were also typed with two SNP multiplexes based on SNPforID 52-plex, designed to amplify a total of 20 loci using previously published conditions. Capillary electrophoresis was done on an Applied Biosystems 3130/3130xl instruments with POP-4 polymer for STR genotyping and POP-6 for SNPs. Allele calling was obtained using GeneMapper v3.2 software and Paternity Index (PI) and Paternity probability (W) were calculated with in-house designed Excel spreadsheet.

**Results:** We will present four paternity investigation cases genotyped with STRs and SNPs to demonstrate the usefulness of SNP studies. Using only Identifiler or Powerplex 16 in these paternity caseworks we obtained average values of PI and W of 1.734x109 and 99.9998% or 2.337x1010 and 99.99991%, respectively. Using both kits, average PI was 2.245x1011 and W was 99.99998%. However, when analyzing the 20 SNPs together with Identifiler or Powerplex 16, mean values of PI and W were 1.124x1011 and 99.99998% or 8.555x1011 and 99.999993%, depending if the first or the second kit was used. When using both autosomal STR kits with the 20 SNP loci mean PI was 8.464 x1012 and mean W was 99.999998%, which are expectable statistical parameters for this kind of forensic casework.

**Discussion and Conclusions:** The use of one of the mentioned commercial autosomal STR kits together with the analysis of the 20 SNP loci presents results of PI and W similar or greater that the combined use of the two STR kits. However, SNPs study had lower costs when compared to the use of an additional autosomal STR commercial kit. Thus, we conclude that when there is the need to examine a greater number of loci to gather more genetic information for parentage investigation casework, the use of SNP analysis may be a good alternative to the use of further commercial STR kits.

**Keywords:** STRs; SNPs; Paternity Investigation; Additional Genetic Information

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# PHYLOGEOGRAPHY OF Y-CHROMOSOME STRS FROM CLINICAL CONTEXT SAMPLES.

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**Introduction:** Forensic geneticists use several Y-STRs, whose variability allows its use in discrimination among individuals in a population, providing great utility in forensic identification, paternity investigation, ancestry studies and genealogies reconstruction. The Y-chromosome regions with forensic interest include the set of loci defined as European Minimal Haplotype. Currently, through the Y-Chromosome Haplotype Reference Database (YHRD) is possible to study 17 Y-chromosome STR loci with the possibility of searching identical haplotypes in different populations on different regions of the globe. But as it is known, this chromosome is connected to male infertility. Among the causes of male infertility of genetic origin, the Y-chromosome microdeletions represent the most common cause and the study of these deletions is one of the strategies employed to diagnose male infertility. This study aimed to characterize the phylogeography of Y-chromosome in these individuals using casework and control samples.

**Materials and Methods:** Y-STRs were studied in samples from 49 patients previously screened for the presence/absence of the three AZF regions and in 50 control samples from individuals also studied for male infertility but with no Y-chromosome deletions, previously characterized at molecular level. All samples were collected under informed consent. After DNA extraction, AmpFlSTR® Yfiler® PCR Amplification® kit (AB) was used to genotype Y-chromosome profile, following the manufacturers recommendations and detection of amplification products was done by capillary electrophoresis using Applied Biosystems 3130 Genetic Analyzer. After that, haplotypes were subsequently searched for in Y-STR database in order to detect possible matches with existing worldwide haplotypes.

**Results:** With the study of 99 samples, we have detected 93 different Y-STR haplotypes, but 1 haplotype shared by two individuals and 5 haplotypes with STR deletions. When inserting the 93 complete haplotypes into the Y-Chromosome Haplotype Reference Database, 78% of these were unique for the studied Portuguese population, with no overlaps with haplotypes at the database. In casework-samples, 10 haplotypes were already present in the database - two haplotypes were identical to the ones detected by other authors in the Portuguese population and the others were detected in samples from Brazil, Germany and USA in what concerns Eurasia, while 6 of these haplotypes were also found in African and Mixed populations. As for control-samples, four of these haplotypes were coincident with samples already detected in the Portuguese population, and also 10 haplotypes gave matches in the database but with higher number of matches per haplotype - 31 coincidences in control samples versus 20 matches in casework-samples.

**Discussion and Conclusions:** From the standpoint view of phylogeography, most of the haplotypes detected (78%) are characteristic of male Portuguese population. Concerning the two groups studied, there is a clear difference between haplotype matches in the database for casework-samples and control samples. About 20% of haplotypes from each group are coincident with samples from different populations - for casework-samples, with Brazil, Germany, USA and Portugal samples, while for control samples, we have detected matches in Germany, Brazil, USA, Poland, Slovakia, Italy, Morocco, Algeria and Portugal among others. This study demonstrates also that some of these haplotypes are found in areas of the globe such as Germany, USA and Brazil, countries with strong Portuguese migration movements, but still that the Portuguese population has unique characteristics concerning Y-chromosome genetics.

**Keywords:** Y-STRs; Haplotypes; Portuguese Population; YHRD; Phylogeography

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# VALIDATION OF A REAL TIME PCR ASSAY FOR SIMULTANEOUS QUANTIFICATION OF TOTAL HUMAN AND MALE DNA

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**Abstract:** In forensic genetics, the determination of DNA quantity obtained from evidence samples can be an important laboratory procedure especially in sexual assault samples, often composed by unbalanced male/female DNA mixtures, and in biological samples exposed to different environmental conditions leading to DNA degradation and also inhibitors, which can interfere with PCR reactions. In this casework samples, it is useful for the Forensic Geneticist to have some information about the recovered DNA quality and quantity before STRs amplification.

Recently, a real-time PCR approach has been developed in order to quantify the relative male and female DNA in a sample containing a mixture of two or more individuals, contributing not only for total DNA amount determination, but also to ascertain the presence and quantity of enough male DNA for autossomal and Y-STRs amplification. It is our goal to test and validate this PCR technology in order to apply it regularly in our difficult samples casework. Samples used in this work were cell lines 9947 and ABI 007 control DNA, included in PCR kits, diluted from initial estimated concentrations to almost 1 pg/µl. A mixture study was also performed in samples prepared with the male/female ratios 1:0, 1:1,1:2,1:5,1:10,1:20 and 0:1.

Using the quantification results those mixture samples were added to an PowerPlex® 16 HS (Promega Corporation) All the samples were amplified using the Quantifiler® Duo kit in the ABI 7500 (Apllied Biosystems) according to manufacture's guidelines. In order to test for the precision, accuracy a set of eight serial dilutions containing 50,16.7, 5.56, 1.85, 0.62, 0.21, 0.068 and 0.023 ng/µl of the human male DNA standard present in the kit. For the reproducibility test of the technique all the samples were processed in duplicate, in two different days. Linearity of quantification of the assay was determined from the standard curves for human and human male targets at concentrations ranging from 0.023 to 50 ng/µl. As expected a linear relationship between the CT values and the DNA quantity template was confirmed and R2 values remained >98.0%. We could also verify the ability to detect male/female mixtures, even in the limit of detection of male DNA in the presence of a large quantity of female DNA.

The Quantifiler® Duo kit DNA quantification kit proved to be very useful for the quantification of total human DNA and human male DNA, especially in mixture samples, and in the near future could be an important tool for the difficult samples study.

**Keywords:** PCR Assay; DNA; Sexual Assault

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# THE GENETIC IDENTIFICATION OF UK BLOWFLIES USED IN TIME OF DEATH ESTIMATIONS - A SNAPSHOT® APPROACH TO SPECIES ID

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**Abstract:** A dead body is an attractive habitat for many insect species but it is the members of the Blowfly family (Calliphoridae) that are usually the first to arrive, using the body as an oviposition site. The stage of larvae found on a body can be a useful indicator of time since death but in order for species specific life cycle data to be applied, accurate species identification is critical. Damaged, unviable or immature specimens can be difficult to identify morphologically and recent work has focussed on the genetic identification of blowfly species. The aim of this study is to assess the potential of various genetic regions to differentiate between UK blowfly species of forensic importance. Nine genetic regions, including both nuclear and mitochondrial DNA, have been sequenced for six UK species commonly used in forensic investigations. Results show that whilst most regions are suitable for distinguishing between species, problems still exist when identifying closely related species such as Lucilia illustris and Lucilia caesar. Analysis revealed that the mitochondrial regions Cytochrome Oxidase I and II (COI and COII) and Cytochrome b are capable of distinguishing between all species examined. As the rapid identification of species is advantageous in forensic investigations, a SNaPshot® approach to species ID was investigated. The COI region was chosen due to its high levels of inter (3.2 - 11.6%) versus intra (0 - 0.9%) species variation. Genomic DNA was extracted from wild-caught specimens collected from throughout the UK and COI amplified and sequenced in house. Alignments allowed species specific SNPs to be identified and a SNaPshot® assay to be designed. A 6-plex SNaPshot® assay revealed a unique haplotype for six different blowfly species with each species differentiated based on between 2-4 SNPs. Identifying conserved regions within this gene for the SNaPshot® primer design was problematic. Therefore, a multi-gene approach to species ID is planned for the future.

**Keywords:** Genetic Identification; Blowflies; Time of Death Estimation

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# GENOTYPING OF 52 AUTOSOMAL SNPS (SNPFORID) IN MALAYSIAN POPULATION

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**Abstract:** The analysis of degraded DNA can be problematic. Single nucleotide polymorphisms (SNPs) have the advantage over Short Tandem Repeats (STRs) that they only require a small amplicon to be amplified. However, before applying to casework, it is important to develop allele frequency database from relevant populations. The purpose of this study is to characterize three Malaysian major ethnic groups; Malay, Chinese and Indian, using the 52 autosomal SNP markers that identified in the SNPforID project .

To carry out the study, four sets of 13-SBE plexes have been developed and evaluated before analyzing 50 bloodstained samples from each ethnic. Allele frequencies, observed heterozygosity and genetic distance (FST) between populations are presented for all markers.

**Keywords:** SNP; Malaysia; Genotyping

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# CYP2D6 *3 AND *4 ALLELE FREQUENCIES AND GENE COPY NUMBERS OF PSYCHIATRY PATIENTS

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**Abstract:** CYP2D6, head a list of the polymorphic enzyme, is selected to assess the pinpoint the location of the pharmacogenetic in forensic sciences. To determine the CYP2D6 enzyme activity which is responsible of the metabolism of tricyclic anti depressants (TCA), selective serotonin reuptake inhibitors (SSRI), anti epileptics, ß-blockers and opiates, alleles and enzyme efficiency of individuals will be determine by these genotype and phenotype studies.

The aim of this study was creating the basis for pharmacogenetic research about CYP2D6 polymorphism in forensic pharmacogenetic and developing efficient, low priced and confidential analysis methods which can be used in both antemortem and postmortem cases. In this preliminary study, blood samples of 78 patients, who treated in Psychiatry Department of Istanbul University Cerrahpasa Medical Faculty, and used one or more drugs such as quetiapine, haloperidol, risperidone and sertraline which metabolized by CYP2D6 enzyme were collected and in addition to this 20 blood samples of volunteers accepted to join the research were collected.

All of blood samples were isolated by DNA isolation kit. Real Time polymerase chain reaction (Real Time-PCR) was used to detect *3 and *4 mutations and also to quantify the CYP2D6 gene copy number with two regions (exon 9 and intron 6) with albumin as internal control. By analyzing gene copy number and determining allele frequencies of *3 and *4, we would be presented the profile of psychiatry patients in terms of CYP2D6 polymorphism which is crucial enzyme for metabolism of antipsychotic drugs.

It is being considered that this study may also contribute to forensic field of pharmacogenetic on misinterpretation of overdose or malpractice cases etc.

**Keywords:** CYP2D6; Pharmacogenetic; Gene Copy Number; Antipsychotic Drugs

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# FORENSIC AUTOPSIES IN PREGNANCY-RELATED MATERNAL DEATHS IN THE NORTH OF PORTUGAL

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**Abstract:** Pregnancy-related maternal death is by definition the death of a woman resulting from or related to her own pregnancy and/or postpartum condition. Maternal deaths are uncommon. The Portuguese National Statistics Institute reveals that the mortality rate in Portugal during 2009 was 7/100000 inhabitants. A significant proportion of pregnancy-related maternal deaths are sudden and unexpected and may raise suspicion of a violent death (accident, suicide or homicide) or medical malpractice. These factors make the forensic autopsy important in providing information, not only about what really happened (cause and manner of death) but also to help to learn lessons and prevent future deaths.

Because there are lack of forensic autopsy data in these deaths in Portugal, the authors present a report of all pregnancy-related maternal deaths in which a forensic autopsy was performed in the North of Portugal during 2009 and 2010 (n=5). The victims' age ranged from 24 to 38 years old. Four of the deaths occurred during pregnancy (one during the first trimester and three during the third trimester) and one during the puerperium (7 days after delivery). The causes of death identified were: acute ischemic heart disease, choriocarcinoma, spontaneous rupture of splenic artery, hepatic cirrhosis and viral myocarditis.

The identified causes of death are consistent with the reported international data which presents a long list of conditions unique to pregnancy, associated with pregnancy and unrelated to but exacerbated by it involved in these deaths. In conclusion, the investigation of pregnancy-related maternal deaths is one of the most challenging tasks of the forensic pathologists and this presentation attempts to raise the concern about the importance in the establishment of a protocol with standard procedures on forensic autopsy practice of pregnancy-related deaths, which should include gathering medical and obstetrical history, performing and/or reviewing various laboratory tests, and performing a complete autopsy with enlarged histopathological examination and toxicological analysis in all cases, in order to harmonize procedures and perform an efficient approach to these cases. This allows, in future, to compare our data with the one from others countries.

**Keywords:** Pregnancy-Related Maternal Deaths; Forensic Autopsy

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# CAN A MISPLACED BLADDER CATHETER BE A CASE OF DEATH BY MALPRACTICE?

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**Abstract:** A 62 years old male, retired and previously working as barman, with previous history of hypertension and benign prostatic hypertrophy (BPH) with episodes of urinary retention and confusion, was found dead in his bed at a bed breakfast (BB). For unknown reasons his social pension wasn't being paid and he was receiving help from state social services. For that reason the state social services were paying his stay at the BB and he was at a day centre where his meals were provided. With frequent urinary retention caused by BPH he permanently had a bladder catheter that was frequently changed in a primary care facility. This man was last seen around 10 a.m. by the BB owner when the later went to clean the room and found the guest still in bed. The guest told him he would readily prepare himself and get out of the room. In the afternoon, the BB owner received a call from the day centre searching for his guest. Around 3.30 p.m. the BB owner went to the room and found his guest dead at his bed. The cadaver was then moved to the Forensic Pathology Services with an unknown cause of death.

At the outer necropsy exam could be noticed cachexy, a volumous and tense tumefaction in the hipogastrum and a catheter extruding from the urethra. At the inner necropsy exam was found a dilated and tense urinary bladder containing 1.500 cm3 of blurred urine; the inner tip of the catheter was found at the prostatic urethra and, when removed, blood clots were observed in the catheter. Toxicological exam in search of alcohol, illicit and prescript drugs returned negative. Histological exam of the kidneys revealed polimorphonuclear neutrophyles in the interstitium and filling the renal tubuli, alterations compatible with multifocal lesions of acute pyelonephritis; the prostate showed fibro-mio-glandular hyperplasia. Obstruction to the flow of urine, with attendant stasis and elevation in urinary tract pressure, impairs renal and urinary conduit functions and is a cause of acute and chronic renal failure. Postrenal failure usually occurs in older men with prostatic obstruction. Mechanical obstruction can occur at any level of the urinary tract. The kidney involved by an acute obstructive process is usually slightly enlarged, and there is dilation of the calyces, renal pelvis, and ureter above the obstruction. Azotemia develops when overall excretory function is impaired, often in the setting of bladder outlet obstruction. Urinary tract obstruction must always be considered in patients with urinary tract infections as urinary stasis encourages the growth of organisms. Complete obstruction with infection can lead to total destruction of the kidney within days. Clinically, catheter-associated infections usually cause minimal symptoms without fever. In possession of this information a case of malpractice was raised as this men died in a clinical picture of acute pyelonephritis and acute renal failure (ARF) due to urethral obstruction by a misplaced bladder catheter.

As written in the Portuguese law, the clinical records must accompany the cadaver to the Forensic Pathology Services but, in this as in many other cases, they are very succinct and sparse. It would be very important to clarify earlier episodes of urinary retention and confusion and all the visits to the medical services trying to verify if the patient monitoring was correct. It wasn't possible to determine whether the bladder catheter as incorrectly placed or if it moved from its place during normal daily life.

Being so, the cause of death was diagnosed but the medico-legal ethiology couldn't be determined.

**Keywords:** Bladder Catheter; BPH; ARF; Pyelonephritis

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# GLOTTIC OEDEMA - A SURGICAL COMPLICATION AS A CAUSE OF DEATH -CASE REPORT.

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**Abstract:** Post-surgical oedema of the airway is a common complication which can occur after surgery, with sometimes fatal consequences. Although rare, this event can lead to respiratory arrest, requiring the need for re-intubation or even an emergency tracheotomy. During the surgical procedure, the endotracheal tube causes pressure against certain structures which can lead to oedema of the uvula and subsequent airway obstruction. This can then give rise to ulceration and necrosis of the epiglottis. There are other causes which can explain laryngeal oedema, one of these being anaphylaxis. In order to eliminate this possibility as a potential cause, it is important to check for the serological markers of anaphylaxis in order to focus the diagnosis, which should then be combined with the typical - though not pathognomonic - gross, and microscopic findings. We present the case of a male, 32 years of age, who was admitted for cervical-area surgery (thyroidectomy and amygdalectomy).

According to the clinical records, there were no complications during the surgical procedure. The day after the procedure, the patient suffered cardio-respiratory arrest, approximately 15 hours after admittance. The medical team attempted an orotracheal intubation which was rendered impossible due to a substantial laryngeal oedema. A tracheotomy was also impossible, and as such led to the patient's death. Since the death took place after a surgical procedure, in the hospital, the cause of death was classified "undetermined". The possibility of anaphylaxis was considered by the medical team, as a consequence of the drugs administered during that period. The deceased was subsequently moved to the Forensic Pathology department of The North Branch of the National Institute of Legal Medicine so that a medico-legal autopsy could be performed.

The gross findings were as follows: oedema of the uvula and epiglottis, stenosis of the glottic aperture, large amount of white foam in the airway. Microscopy confirmed the presence of laryngeal oedema and associated signs of infection. The serological levels of IgE and tryptase were found to be within normal parameters. Taking into consideration clinical information, circumstances of death, gross and microscopic findings, negative results in both toxicological and serological studies, the conclusion for this case was that death was caused by asphyxia due to a laryngeal oedema, possibly related to a surgical complication, such as the intubation during surgery. Although rare, this surgical complication can occur.

The literature refers to an incidence of approximately 12% of epiglotic ulceration (51% in the posterior glottis and 15% in the trachea in the place of the orotracheal cuff), in cadavers submitted for autopsy after intubation during surgery.

**Keywords:** Glottic Oedema; Surgery; Intubation

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# DOMESTIC VIOLENCE: DOUBLE HOMICIDE FOLLOWED BY SUICIDE?

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**Abstract:** Domestic violence concerns any conduct or omission of a criminal nature that inflicts physical, sexual, psychological or economical damage to a person usually cohabiting within the same household. It is a universal problem that afflicts thousands of people, frequently in a dissimulated silent way.

The victims are essentially married women, with ages ranging from 26 to 45 years old, whereas the aggressors commonly are married man between 26 and 55 years of age. According to the World Health Organization (WHO), between 10% to 34% of all the women in the world have been physically abused by their partners. The authors present three cases of domestic violence victims: mother, father and son. The couple was, at the time, going through divorce and the wife was planning to leave the household. The crime scene investigation revealed that the three individuals laid on the kitchen floor of their home, covered in blood. The site was chaotic, with several blood stains and spatters across the walls and floor, where two knives with blood residue where found, next to a bottle with traces of pesticide. Prevention policies must be embedded in our society, especially when concerning the development of new programs and services more specific to the population.

It is in this context that the post mortem and local examinations come forth also as a contribution to the eradication of such violence, by providing evidence towards the enforcing of justice.

**Keywords:** Domestic Violence; Mortality; Forensic Autopsy

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# DEADLY POISON BY DIQUAT IN THE CENTER BRANCH OF THE NATIONAL INSTITUTE OF LEGAL MEDICINE OF PORTUGAL

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**Abstract:** Herbicides are pesticides of low toxicity to mammals, used to fight, biochemically, unwanted plants that affect crops. These can be classified as dipiridilos and phenoxy acids. Paraquat is the type of herbicide belonging to the latter group, the dipiridilos, more often found in the toxicological analysis in cases of poisoning by herbicide (voluntary or involuntary).

The physiopathology and mechanism of action is widely studied and represented in the medical literature. It does not happen the same with diquat, another dipiridilo, much less frequent and unknown. It is known that its mechanism of action is the production of free radicals (like paraquat), that their absorption is lower, thus reducing their toxicity and that their targeted organs are the brain stem, the gastrointestinal tract and kidneys and that they reach the lungs with less severity (the opposite of what happens to paraquat). The rarity of diquat poisoning, lethal or not, makes the publication in the medical literature essentially aimed to deepen the knowledge of its physiopathology, thus facilitating the diagnosis and treatment.

The authors present two cases of victims of fatal poisoning with diquat, autopsied at the Delegation of the Center of the National Institute of Legal Medicine of Portugal, during the year 2010.

**Keywords:** Herbicides; Diquat; Intoxication; Autopsy

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# FETAL AUTOPSY OF A DISMEMBERED BODY

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**Abstract:** Normally the fetal autopsies must answer a series of questions such as: determination of gestational age, whether or not life ex utero, determination of the duration of life ex utero, cause of death, date of death and identification. That is why the examination of the external habit is of great importance. It should be noted morphological parameters of maturity (tegument, phanero, external genitalia, umbilical cord) and metric weight parameters (body weight, crow-rump length, crow-heel length, foot length, hand length). The internal habit should not be forgotten: organ weight, points of ossification and histological exams of the viscera (especially the lungs). As well as anatomical malformations or traumatic injuries, in order to determine the cause of death. All this is affected by an incomplete body or in advanced state of putrefaction. The authors present a fetal autopsy case. The body was found abandoned in a vineyard, dismembered (only present the skull, the upper trunk and upper limb), in an advanced state of putrefaction. Presence of fungi was observed at the body surface. Due to these circumstances the calculation of gestational age was determined by examining the hand, ears and eyeballs. A print blood was taken and genetics verified that the body belonged to a male fetus and connected it to the presumed mother.

**Keywords:** Fetal Autopsy; Dismembered; Putrefied; Identification

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# HUMAN DEATH RESULTING FROM A RAM ATTACK: A CASE REPORT

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**Introduction:** Animal attacks to people are relatively common, particularly when considering bites and other minor injuries with domestic pets. Exposure at workplace, such as in farms, animal related hobbies or outdoor activities also increase the risk of injury. Fatal injuries are not so common; however, in rural environments, horses, cows and bulls have been implicated in human fatalities. Animals usually considered to be reasonably safe, such as sheep, are less reported. Our objective is to contribute to the study of unusual deaths involving cattle attacks to humans, through the presentation of a rare fatality case due to trauma produced by a farm animal.

**Case Report:** The subject, a 76 year old female, was found on a field nearby her home, in a kneeling position with her back against a stone wall. That field was used by a neighbour to keep some sheep. The woman had left home around 3 p.m., and the husband found her around 8 p.m. After the body was found, a niece of the victim went to the spot and was attacked by a ram. That ram missed one of the horns; the other had a rounded shape and measured about 3x2x2 centimeters. Body examination at the scene and the circumstances of death, associated with previous episodes of violence involving that specific animal and other people, suggested that the fatality was related to a violent ram attack to the victim. The autopsy was performed by a team of the North Branch of the National Institute of Legal Medicine. The clothing exhibited a small amount of blood. External findings included multiple bruising and abrasions on the head, trunk and lower limbs. Internal findings included mild subdural, subarachnoid and intraventricular haemorrhages, extensive soft tissue blood infiltration (multiple and extensive hematomas) and chest trauma with bilateral multiple rib fractures.

**Discussion and Conclusions:** External and internal findings were compatible with blunt force injuries, such as those that might result from those produced by an animal (the ram's head impact against the victim's body). The bruising pattern observed on the body was similar to the observed on the living niece of the victim. Internal findings were also compatible with blunt force trauma. The cause of death was hypovolemic shock associated with chest trauma. The context where the victim was found and the attack to the niece by the animal, as well as the previous episodes involving the same ram, were important to identify the responsible traumatic agent and determine the manner of death as accidental.

**Keywords:** Animal Attack; Ram; Accident

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# INTRAFAMILIAR HOMICIDES IN RURAL CONTEXTS: TWO FATAL AGRESSIONS WITH UNUSUAL INSTRUMENTS

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**Introduction:** Domestic violence is a worldwide problem, intrafamiliar homicide being one of its most extreme forms. Although intimate partner homicides may receive increased attention, some domestic homicides occur in the parent/offspring relationship. Instruments used to commit homicides are commonly the available ones at the aggression environment. Literature has pointed firearms as the most common weapons, especially in North America; knives or other sharp blade instruments are also very frequent, probably due to their presence in every home. In specific socio-economic contexts, such as a rural one, aggressions with unusual instruments may happen. Literature has also pointed the upper part of the body (head, face and neck) as a preferential target in intimate partner violence. Our objective is to highlight the extreme violence and common features in two homicides, through the presentation of two unusual cases in intrafamiliar context, contributing to the study of intrafamiliar violence.

**Case Report:** The first case's subject was a 72 year old male which, according to the police information, had been allegedly killed with a "podão" (a farm tool) by his son, following a family argument. The autopsy was performed by a team of the North Branch of the National Institute of Legal Medicine. External findings included extensive scalp lacerations with boné exposure, as well as a defense wound in the right hand. Internal findings included multiple depressed skull fractures, subdural, subarachnoid and intraventricular haemorrhage. The second case's subject was a 72 year old female, found dead at her home with multiple head lesions; according to police information, when talking to neighbours, her husband admitted killing her with a shovel. External findings included massive face and scalp lacerations with bone exposure; no defense wounds were found. Internal findings included multiple depressed skull and facial fractures, subdural and subarachnoid haemorrhage and brain lacerations. In both cases, external and internal findings were consistent with a head trauma produced by a heavy instrument with a cutting edge.

**Discussion and Conclusions:** The two cases have many overlapping and converging features differenciating them from the most frequent domestic violence cases: they are extremely violent and happened in the same rural area, in a family environment, with elderly subjects. Aggression targeting the head is consistent with previous reports; interestingly, unusual instruments producing fatal injuries with a very similar mixed mechanism (both blunt and sharp) were used. Social and cultural factors can explain the use of this kind of instrument instead of the most ordinary ones, such as firearms and knives.

**Keywords:** Homicide; Intrafamiliar Violence; Head Injuries

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# FORENSIC PSYCHIATRIC EXPERTISE ON MENTAL DISORDERS INDUCED BY NEW-TYPE DRUGS

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**Abstract:** Compared with traditional drugs like heroin and marijuana derived from plants with a long history, New-type drugs like methamphetamine (ice), ketamine and amphetamine ,which are chemical synthesis, came later and were used by drug abusers since the middle 1990's in mainland China. According to the National Drug Abuse Monitoring Annual Report 2009 and 2010 issued by Chinas State Food and Drug Administration, the drug abuse rose in methamphetamine but fall in heroin among the new drug abusers. Although new-type drugs have less influence on addiction, its stronger hallucinogenic actions induce more illusion and secondary thinking disorders (delusion of persecution as the common), and easily lead drug abusers to make serious violent attacks such as homicide and injury. Its wide availability and low price make new-type drugs easy access to increasing abusers, bringing worse damages to the society than traditional drugs. I. Diagnosis of Mental Disorders Induced by New-type Drugs Its symptoms very similar to schizophrenia, and lasting several months after abstention in some cases (The longest period takes two years discovered by our institution) easily result in misdiagnose. China's forensic psychiatric organizations began to know these mental disorders early this decade and kept focusing in the following years, but analysis on cases reviewed by our institute shows that misdiagnose still happens occasionally in these years on account of the negligence of the drug abuse history as well as less sensitivity to it. The confirmation of drug abuse history is the key to the diagnosis.

The basis of the confirmation includes:

1. The statement of drug abuse made by the examinee.
2. Testimony of witnesses.
3. Record of drug abuse history made by police authorities.
4. Proof by lab on blood, urine, nail or hair tests of containing drugs or its metabolites.

In fact, the 3 and 4 above may be the most substantial evidence. So far, most forensic psychiatric organizations in China are not equipped with accredited lab, while our institute took the lead in studying and was able to test blood and urine samples twenty years ago, and developed the technology of hair sample testing (including hair, pubic hair and armpit hair). At present we are doing technical research on sample testing of nail and toenail. II. Assessment of Criminal Responsibility The idea is held differently among various forensic psychiatric organizations.

The common assessment is full or diminished criminal responsibility while some organizations refuse to assess. Our institute presents:

1. Forensic psychiatric organizations should assess the criminal responsibility under current laws. Refusing lacks the legitimacy temporally although difficulties may occur in assessment.
2. The existing Criminal Law, as well as the Criminal Law Amendment (8) applied in May 1st this year, makes no provisions on the criminal responsibility of mental disorders due to drugs. This blemish of legislation becomes the main reason of the difficulty in assessment.
3. The assessing standard should be stricter than "legal insanity" since drug abuse is " actio libera in causa ".
4. Patients who misuse drugs or are forced to take drugs and commit the crime without recognition and control ability should be assessed as no criminal responsibility. Patients who lack knowledge of the effect of drug abuse and commit the crime for the loss of recognition and control ability could be assessed as diminished criminal responsibility. In other conditions, patients should be assessed as full criminal responsibility.
5. Only the Legislature can sweep away the difficulties of the assessment of the criminal responsibility .
6. We suggest the propaganda of the damages of taking drugs should be more pressing and deeper by relevant departments to strengthen the diffusion of knowledge on mental disorders induced by drugs and reduce the risk of drugs in the first place.

**Keywords:** Forensic Psychiatry; Drug Abuse; New-Type Drugs; Diagnosis; Assesment of Crimimal Responsibility

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# A REVIEW OF NEWS ARTICLES PUBLISHED IN TURKEY BETWEEN 2005-2010 CONTAINING JUVENILE PERPETRATORS OR VICTIMS: A RETROSPECTIVE STUDY

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**Abstract:** Adolescence is a period in life which attracts warnings from all parts of society. Juvenile delinquency and crimes committed against children comprise a significant part of all crime. News involving children have always attracted more attention when compared to other news that are published in the press. This is why a notion has emerged that children are being exploited through the news because of their newsworthiness. The existence of children in the judiciary system as perpetrators and victims and the news published by the press increase the degree of trauma that the children face. This study aims to provide a preliminary examination regarding how crimes involving children as perpetrators or victims are portrayed to the general public. For this purpose, four daily newspapers with highest circulation demographics, published between the dates of January 1st, 2005 and December 31st, 2010 are selected for screening purposes. Key factors regarding juvenile delinquency have been determined. The newspapers have been screened in light of these factors. The content, which newspaper the articles belong to and their writers will be evaluated through content analysis methods. The content analysis and statistical evaluation of the study is still in progress.

**Keywords:** Juvenile Perpetrators; Juvenile Delinquency; News

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# MEDICOLEGAL EVALUATION OF MOBBING.

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**Abstract:** The term "mobbing" is often applied extravagantly as a synonym for every professional disagreement. According to the German operational and judicial practice contemporarily most frequent and favourite paraphrases mobbing includes: intended chicanery/hostility (systematics) towards a person (purpose, asymmetry of power) in certain frequency/continuity (at least once a week for six months) with the intention to ostracize a person from his/her employment. The definition excludes temporary conflicts and focuses on the breaking point where the psychosocial situation begins to result in psychiatrically or psychosomatically pathological conditions. In other words, the distinction between "conflict" and "mobbing" does not focus on what is done or how it is done, but rather on the frequency and duration of the ill treatment described. There is a recent legal regulation for mobbing which is accepted by the Parliament on 11.01.2011, and expected to come into practice on 01.07.2012 in Turkey. Discussions on mobbing has been a contemporary effort, and the Department of Forensic Medicine of Istanbul University Istanbul Faculty of Medicine had been one of the leading actors to raise awareness on this problem. Mobbing is not a medical diagnosis. Nevertheless psychological effects and potential impairment of health makes it a health problem as well as a medicolegal case. Alleged mobbing cases who applied for medicolegal evaluation in between 01.01.2008-15.05.2011 were included in this study to search for existence, frequency and duration of ill treatment with consequences on health, and aim of this study is to raise a discussion on six month cut off point of duration. Eighty three alleged mobbing cases applied to the outpatient clinic of the Dept. Of Forensic Medicine, and 56 of these cases have been found consistent with mobbing according to their physical and psychological findings, psychiatric diagnosis and duration of ill treatment, but 4 cases. Female - male ratio is 4:1. Average age is 39,8±8,4. A great majority of the cases are highly educated with a range of 84,3%. More than half of the cases (51.8%) had more than one psychiatric diagnosis. Most of the cases (82.1%) had to continue working in the same work place. Four of the cases had been subjected to ill treatment for less than 6 months, however psychiatric symptoms and loss of function had been found highly severe and considered as mobbing regarding health impairment. There is a cut off point for duration of ill treatment which is described as six months. Although frequency and duration is prominent for definition of mobbing cases, severity of ill treatment and health consequences could not be excluded in a fair decision. Hence a multidisciplinary approach including medicolegal perspective is essential to evaluate mobbing cases.

**Keywords:** Mobbing; Ill Treatment; Medicolegal Evaluation; Psychiatric Diagnosis

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# ELDER ABUSE: AN INTEGRATIVE INTERPRETATION

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**Abstract:** Elder abuse is an issue that, while being far from recent, has not received the attention it requires. In fact, and like other crimes, the abuse inflicted on the elderly remains one of the hardest criminal actions to study, given that it encompasses a set of behaviors that is hard to define, describe and characterize. Since the end of last century, elder abuse has generated more interest. While there is no consensual and broad definition of this phenomenon, it is known that it occurs more frequently than would be desired; for this, it is imperative that more attention is given to this issue. Based on an extensive literature revision, an interpretative analysis integrating different approaches to this phenomenon was sought, in an effort to characterize it. Because this issue is not always diagnosed due to the difficulties in its identification, an attempt will be made at classifying different types of elderly abuse, identifying risk factors and alert signs that allow for a global assessment of the situation. Furthermore, model adaptations, such as the public health model or the attachment model, will be presented. These model adaptations, in an integrated fashion, offer alternative ways to assist in abuse situations involving the elderly.

**Keywords:** Elder Abuse; Neglect; Risk Factors

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# CREDIBILITY ASSESSMENT IN CHILD SEXUAL ABUSE CASES

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**Abstract:** The growing public awareness of child sexual abuse has contributed to an increase in the reporting of these cases, and to an increase in the number of cases where, in the context of judicial processes, psychological assessment is conducted on the victims, aiming at measuring the impact of the abuse, witness credibility and ability to testify. In these cases, forensic psychological assessment should attend to a number of issues, such as perception, memory, developmental maturity, suggestibility, the child's level of understanding (e.g., being able to differentiate truth from lie, reality from fantasy). When analyzing witness credibility, structured criteria must be used so that the conclusions are not the result of impressions or unscientific hunches. Hence, and for the purpose of debating the pertinence of objective procedures when conducting credibility assessments in child sexual abuse allegations, a content analysis based on 19 criteria will be conducted on a case subjected to forensic psychological assessment by order of the court. It is also intended to demonstrate that an expert, with both training and experience, should carry out forensic psychological assessment, so as to assure that the criteria based assessment process may contribute in a decisive and fair manner to judicial decision-making.

**Keywords:** Sexual Abuse; Children; Credibility; Forensic Psychological Assessment

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# DEPRESSION, ANXIETY AND SOMATIZATION IN WOMEN VICTIMS AND PERPETRATORS OF IPV IN MOZAMBIQUE

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**Abstract:** There is limited investigation in Sub-Saharan Africa, particularly Mozambique, about the mental health (depression, anxiety, somatization) of women victims and perpetrators of IPV by type (psychological aggression, physical assault, sexual coercion and injury), and "predictors" of mental health in women that are both victims/perpetrators of IPV across types.

Mental health data were analyzed with bivariate and multivariate methods among 1442 women visiting the Forensic Services at Maputo Central Hospital (Maputo City, Mozambique).

Victims and perpetrators of IPV by type (psychological aggression, physical assault, sexual coercion and injury) scored higher in depression, anxiety and somatization than women who did not, but significance levels differed. In general, greater proportions of perpetrators than victims were within/above norms for psychiatric out-patients when contrasted to those who did not. Significance levels differed. However, there were a larger number of IPV victims than perpetrators within/above norms for psychiatric out-patients. Control by and over partner, mental co-morbidity, social support and to some extent childhood abuse and sleep difficulties were more important factors in "predicting" mental health problems in women who were both victims/perpetrators of IPV across types than demographics/socio-economics and life-style.

The current findings may be helpful for the development of prevention and treatment strategies for IPV-related mental ill-health in Mozambique. Finally, more research is warranted concerning, for instance, the influence of controlling behaviours on the experiences of mental health in women victims and perpetrators of IPV in Sub-Saharan Africa, not least in Mozambique.

**Keywords:** Women; Depression; Anxiety; Somatization; IPV Victims and Perpetrators; Controlling Behaviours; Soci

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# MYTHS AND FALSE BELIEFS REGARDING CHILD SEXUAL ABUSE IN SCHOOLTEACHERS

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**Abstract:** Child sexual abuse is currently the object of great social concern and great interest in both scientific and academic areas. This has provided a new visibility to this phenomenon. However, many false beliefs persist about child sexual abuse, contributing to concealing this issue or to limiting detection as well as the design and implementation of adequate intervention strategies. The main purpose of this study was to assess schoolteachers' knowledge and attitudes regarding child sexual abuse. For this purpose, a quantitative method was chosen and a questionnaire was administered to a non-probabilistic convenience sample comprised of 71 schoolteachers, working in public education schools. Results show that schoolteachers have false beliefs and endorse myths related with child sexual abuse in most items of the questionnaire, except for those in the "Responsibility" subscale. Factors such as age, gender and professional experience do not appear to influence the Reality Perception Index. Results show no significant differences between genders. Schoolteachers under 31 years old, as well as those over 50 years of age have fewer false beliefs and endorse fewer myths. The category of schoolteachers with under 5 years of professional experience have the highest average value in Reality Perception Index, i.e., endorse fewer myths and have fewer false beliefs. Globally, schoolteachers have sufficient reality perception of sexual abuse cases; particularly in the "Responsibility" subscale they reveal good reality perception. Another important finding is that schoolteachers appear to have little ability to face a child sexual abuse suspicion or allegation, due to their lack of knowledge regarding available resources in the community. One of the reasons for this lack of knowledge may have to do with their lack of formal training on child sexual abuse.

**Keywords:** Child Sexual Abuse; Schoolteachers; Myths; False Beliefs

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# COPING STRATEGIES AND RESILIENCE IN SEXUALLY ABUSED CHILDREN

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**Abstract:** Coping strategies are essential for the individual's successful adaptation, since they act as mediators for the stressful effects of some life events. Aiming at analyzing the importance of coping strategies in children who were victims of sexual abuse, a qualitative approach was used, allowing for a better understanding of the way in which coping strategies can help us comprehend how the child has adapted to an event that, for most cases, is traumatic. The sample for this study was comprised of 10 children (5 girls and 5 boys), aged between 8 and 12 years, gathered from a group of 28 children victims of sexual abuse who were followed in an outpatient clinical psychology service. The 10 children were selected based on individual scores on the Schoolagers Coping Strategies Inventory (SCSI), developed by Ryan-Wenger (1990), adapted for the Portuguese population by Lima, Lemos and War (2002). Five children were selected for their lower scores in the range of SCSI (GI) and five for their high scores (GII). Children in GI were found to use avoidance and escape as coping strategies. Other reactions to stressful events include anger or crying, as a result of their perception of the abusive behaviors as being negative. The problem-solving strategies they present, sometimes viewed as problematic other times as appropriate, range from magical to realistic, and encompass the available resources. The group of children who use a greater number of coping strategies exhibits positive personal characteristics such as autonomy, self-esteem and positive social orientation, identified as factors that promote and facilitate the resilience processes. In short, the psychological characteristics of resilient children include intelligence and problem-solving ability, autonomy or internal locus of control, high self-esteem, empathy, desire and ability to plan, and sense of humor (Aglio Bianchini, 2006; Poletto, Wagner Koller, 2004).

**Keywords:** Child Sexual Abuse; Coping Strategies; Resilience

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# INVESTIGATING THE DRUG/CRIME LINK: A CASE STUDY

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**Abstract:** The intersection of substance abuse and criminal behavior happens so frequently that some authors consider that, while analyzing one of these behaviors, one must attend to the other as well. A significantly high number of inmates serve time for crimes more or less directly linked to psychoactive substance abuse. Thus, this close connection between both behaviors emerges as a pertinent issue, due to its frequency, to its severity, and to the fact that, while it is not a recent issue, it is so persistent that it remains current. However, it cannot be stated that this close relationship is, necessarily, causal in nature. This study does not look for an explanation, in the positivist sense of the word, for the co-occurrence of these behaviors; rather, it aims at gaining more in-depth knowledge of a case of drug addiction and violent criminal behavior. The purpose of this study is to analyze the global functioning of a specific case, where long years of multiple substance abuse were accompanied by increasingly more violent criminal behavior. In order to obtain a more in-depth understanding of this case, a personality assessment was conducted, using the Portuguese version of the Revised NEO Personality Inventory. For the purpose of better capturing the subject's global functioning, his relational style was also analyzed, with resort to the Adult Attachment Scale-R. Furthermore, information was collected through a structured, directive interview about the subject's substance use, his criminal behavior and the circumstances surrounding the onset of these behaviors along the subject's existential path. The subject, male, 37 years old, presents a history of 15 years of problematic substance abuse, including three arrests and one prison sentence for murder, as well as an active participation in several crimes such as drug trafficking, auto theft and armed robbery. From the analysis of this case conclusions are drawn, such as the predominance of an insecure attachment pattern, low scores on personality traits like agreeableness and conscientiousness, that allow for some suggestions regarding prevention strategies to be implemented among the youths.

**Keywords:** Drug/crime Link; Personality Assessment; Attachment Pattern

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# DRUG/CRIME RELATIONSHIP: A QUALITATIVE ANALYSIS OF WOMENS HISTORIES

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**Abstract:** The close relationship between substance abuse and criminal behavior is as frequent as it is complex. If, on the one hand, this association cannot be considered linear, on the other hand, many of those externalizing criminal behavior end up using substances as well, as if this behavior became an accessory to their criminal lifestyle. The reverse is also true, where many of the youths who start abusing substances tend to, at a later stage, engage in criminal activity. It is apparent that the deviant trajectories involved in the drug/crime problem present differences to be taken into consideration, namely regarding gender. In an attempt to better understand the deviant trajectory among women with substance abuse problems, the biographic method was used to analyze the specificity of such trajectories, as far as substance abuse and criminal behavior are concerned. The deviant histories were told by five females with a history of substance abuse and criminal behavior, aged between 35 and 46 years old. The exploratory, transversal, qualitative study was based on observation and on self-report data, and aimed at gathering information regarding those women's trajectories in terms of substance abuse and criminal behavior. For this purpose, semi-structured and semi-directive interviews were conducted, and the information pertaining to these women's histories, narrated in the first person, was recorded. Some specifics were found, such as the late onset of substance abuse, always under the influence of the boyfriend, also an addict. Involvement in prostitution was general, and constituted an opportunity for the commission of property crimes, justified as a way of guaranteeing economic means to support these women and their boyfriends' addiction. Other specifics were found, like the escalation and the abuse patterns, as well as the types of crimes committed. This study presents these specifics and suggests strategies to approach these women, who rarely resort to centers specialized in assisting substance abusers.

**Keywords:** Substance Abuse; Crime; Biographic Analysis

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# THE STUDY OF STRESS FACTORS OF SCHIZOPHRENIA, SIGNATURES AND METHODS OF MURDER

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**Abstract:** This study was designed to analyze subjectively the issued eighteen events which were happened in the past to find out the perceived type of stress and the person that facilitate stresses in schizophrenic patients. And then, we examined the distinct murder styles of schizophrenic patients which were considerably different from the characteristics of general murder crimes. The stress perceived in homicidal schizophrenics were totally divided into nine stress factors such as conflicts with parents or family members, failure and frustration in occupation, not promoted, marital discords, unrealistic contents of thought, problem of interpersonal relationship, absence of stress, and lastly illness and re-adimission. Especially, the determinant stress factors happened just before homicide were conflicts with parents or family members and failures and unrealistic contents of thought and the objects of murder were also parents or family members. The methods of schizophrenic homicide being obviously discriminated from general murders method were characterized with several key factors such as the pattern of murder, tools used, victims condition, people targeted and peculiarities. In other words, there were over-killing modes with tough tools such as the kitchen knife and hammers placed at home, the family members or parents targeted, the deep scars intensively distributed on the head and chest, the peculiarities like the eyeballs extracted from the face and amputated cord of victims ankles, largely many defensive scars existed on arm and wrist, and so on. Based on these results of thirty-three cases, schizophrenic murders previously experienced a determinant stress triggering ones murder and showed that the methods included very cruel, peculiar, over-killing, and excessive patterns.

**Keywords:** Homicide; Schizophrenia; Murder Pattern; Stress Type

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# ASSESSMENT FOR IMPAIRMENT OF MENTAL DISORDERS DUE TO BRAIN DAMAGE CAUSED BY TRAFFIC ACCIDENTS

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**Abstract:** Due to poor operability of the mental disability assessment terms stipulated in the current "Assessment for Body Impairment of the Injured in Road Traffic Accident"(GB18667-2002, thereafter as AIIRTA), as well as lack of objective examinations and quantitative indicators in impairment assessment, there are inconsistencies in terms of assessment conclusions, which brings some difficulty to traffic accident claims. Based on experience, this article presents its own views on some issues related to technical operations in mental disability assessment. 1 Assessment time As best assessment time, it is recommended that 6 months after head injury among mild extent impairment (Level 7-10) and 9 months after head injury among moderate and severe extent impairment (Level 1-6) . 2 Nature of disease and causality According to AIIRTA, mental disability is limited to organic mental disorder which has direct causation with head injury caused by road traffic accidents. 3 Psychiatric treatment Mental disability assessment should emphasize that the injured be subject to psychiatric treatment and the assessment be conducted according to the degree of mental disorder after the completion of standard psychiatric treatment. 4 Understanding and application of mental disability assessment provisions in AIIRTA Mental disorder due to head injury can result in different levels of deterioration of the injured capability at home, at work and in social activities. According to the various impact levels to maintain normal life or the different degrees of deterioration, we are able to understand and grasp the differences among the various grades of impairment. The method to "first assess the impact level then determine the degrees" can effectively reduce the differences. 5 Standard tools commonly used in mental disability assessment 5.1 IQ measurement IQ measurement is an objective and quantitative indicator for intelligence impairment assessment. The accuracy, stability as well as effectiveness of intelligence tests are affected by various factors. It is obviously wrong if IQ measurement is used as the sole basis for mental disability assessment. Attention is required to compare with the pre-injury level of intelligence. 5.2 Activity of Daily Living Scale (ADL) and Social Disability Screening Schedule (SDSS) ADL and SDSS can provide to assessors relatively objective quantitative information evaluation of the damage to the injured capacity in daily living activities and in social functions. 6 Objective examination tools commonly used in mental disability assessment 6.1 Brain Imaging Brain imaging technologies such as head CT, MRI examination can reflect the pathological form of head injury and the integrity of brain structure. Therefore, it can help to determine the nature, location and extent of the injury as well as the original injury or disease situation. It can also be served to determine the relationship among the accident, injury and sequelae. 6.2 Neural Electrophysiological examination The more severe is abnormal level of Brain Electrical Activity Mapping (BEAM), the higher incidence of mental disorder. Both the prolongation of latency in Event-related Potential (ERP) P300 and the decrease of amplitude can be objective indicators as cognitive decline to the brain damaged. 7 Disguise and exaggeration Disguise and exaggeration do exist in mental disability assessment, especially for mild brain injury. Comprehensive assessment should be used in mental disability assessment. Different methods can be used to identify the cases of disguise and exaggeration such as two must-digit memory test, simple self-report questionnaire of psychiatric symptoms, etc. 8 Social Survey Emphasize on the role of social survey in mental disability assessment can be more realistic and can better objectively reflect the injury and the real situation of remaining mental disorder.

**Keywords:** Mental Disorders Due to Brain Damage; Impairment; Assessment; Traffic Accident

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# THE INFLUENCE STUDY OF 3-POLYUNSATURATED FATTY ACIDS FOR THE AGGRESSIVE BEHAVIOR IN MICE

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**Introduction:** To explore the relationship between the Omege-3 polyunsaturated fatty acids and the aggressive behavior in mice.

**Materials and Methods:** Seventy-tow male, four-week-old, Kunming mice were divided into three groups randomly: control group, fish oil group, simvastatin group and aggressive-reference group, the mice of aggressive-reference group, which applied in the aggression evaluation only and without any intervention, were grouping-raised and the mice of other three groups were isolating-raised. The mice of control group, fish oil group and simvastatin group were adaptive isolated-rearing for four weeks firstly, from the fifth week, the mice of control group were given normal saline 0.5mL/d respectively, the mice of fish oil group were given fish oil (the content of EPA and DHA is 30%) 0.72g/Kg/d respectively, and the mice of simvastatin group were given simvastatin 0.02g/Kg/d respectively, each reagent was given intragastrically and the intervention lasted for consecutive twelve weeks. At the beginning and end of the intragastric administration, the aggression of each mouse was evaluated by recording the latent period of assault, the frequencies of tail swing, the frequencies of assault and the cumulative time of assault. After the last aggressive evaluation, the mice were killed by decapitation and the brains were collected, then the contents of the eicosapentaenoic acid and the docosahexaenoic acid were determined by Gas Chromatography-Mass Spectrometry.

**Results:** (1) After a twelve-week intragastric administration and isolated-rearing, the latent period of assault of the mice in the control group was shortened. The frequencies of tail swing, the frequencies of assault and the cumulative time of assault were increased. (2) In the mice of fish oil group, no significant differences were occurred in the latent period of assault, the frequencies of tail swing, the frequencies of assault and the cumulative time of assault before and after the intervention. (3) In the mice of simvastatin group, the latent period of assault was shortened, the frequencies of tail swing, the frequencies of assault, the cumulative time of assault were increased, and the extent of reduce and increase were significantly larger than that in the control group. (4) After the intervention, the differences of the latent period of assault, the frequencies of tail swing, the frequencies of assault and the cumulative time of assault among the three groups were significant($P<0.05$). (5) After the intervention, the content of eicosapentaenoic acid in the control group, the fish oil group, the simvastatin group was 1.67±0.37μg/mg, 2.02±0.39μg/mg, 1.41±0.32μg/mg respectively. (6)After the intervention, the content of docosahexaenoic acid in the control group, the fish oil group and the simvastatin group was 5.50±0.69μg/mg, 6.39±0.80μg/mg and 4.98±0.98μg/mg. (7) The contents of EPA and DHA were positively correlated to the latent period of assault, but were negatively correlated to the frequencies of tail swing, the frequencies of assault and the cumulative time of assault.

**Conclusions:** A certain causal relationship was confirmed between the ?-3 polyunsaturated fatty acids and the aggressive behavior induced by stress in mice.

**Keywords:** Forensic Psychiatry; 3-Polyunsaturated Fatty Acids; Aggression; GC-MS

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# VICARIOUS VICTIMIZATION: THE CHILD WHO WITNESSED HIS FATHER'S HOMICIDE

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**Introduction:** This poster focuses on vicarious victimization, this means the crime consequences suffered by others (e.g., relatives and friends) and not by the victim himself. The objectives of this case study are to assess and reflect about the impact of psychotherapeutic intervention in this type of victimization, besides underlying the relevance of multidisciplinary intervention.

**Case Report:** The case refers to Ricardo (fictional name for ethic and deontological reasons), an 8 year old boy who witnessed in his home at the age of 5 the homicide of his father by a group of armed men due to old disputes. His school signaled him to a social project of psychotherapeutic intervention (play therapy) due to learning difficulties and dysfunctional interpersonal relations. The teachers describe this child's behaviors as aggressive and manipulative because of the crime he observed. Ricardo was assessed in two moments, at the beginning of the psychotherapeutic process (play therapy) and at the end. The assessment used the Bateria de Investigação Neuropsicológica Infantil (child neuropsychology tests) and Rorschach Test for personality and emotional function. As a consequence of school schedules Ricardo only underwent 8 sessions of play therapy.

**Discussion and Conclusions:** In the final assessment of the psychotherapeutic process, Ricardo showed better results in general, for instance, a lower level of impulsivity, a better ability to naming emotions and life events, a better performance in school and with his colleagues. The case study I would like to present allows us to understand that Legal Medicine, as a social science, is responsible not only for legal assessment of the cases, but also for the recommendation for a multidisciplinary intervention thereby showing the importance of prevention, rehabilitation and reintegration. The results illustrate the importance of the psychotherapeutic intervention in the domain of vicarious victimization supported by a multidisciplinary work as proposed by the Instituto Nacional de Medicina Legal. This path leads to an effective response to victim needs when they are signaled.

**Keywords:** Vicarious Victimization; Play Therapy; Psychological Assessment; Multi-disciplinary Intervention

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# FTIR BLACK TONERS ANALYSIS: ATR VS DIAMOND CELL

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**Abstract:** Black toners are used in printing devices to produce copies or printed images. The use of efficient analytical methods for toner differentiation became very important in the forensic analysis due to the increasing rate of crime related with copied documents such as counterfeiting, fraud, anonymous letters, among others.

In the present work we report a comparative study of Fourier Transform Infrared (FTIR) Spectroscopy black toners between Attenuated Total Reflectance (ATR) and diamond cell analysis. The ATR-FTIR analysis was performed with three crystals: Germanium, Silicium and Diamond. Transmittance analysis was performed with a diamond cell. A variety of factors were analysed such as sample preparation, spectra quality, range of IR transparency, noise and consistency.

This study provides data that clearly indicates diamond cell as the best technique for black toner analysis.

**Keywords:** Fitr; Art; Diamond Cell; Black Toners

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# INVESTIGATION OF THE ACCORDANCE OF NEW SEXUAL ROLE: SEXUAL IDENTIFICATION BETWEEN 12 TRANSSEXUALS AFTER SURGERY

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**Introduction:** Sexual identity disorder is a strong and persistant desire of being in a role of the opposite Sex. Persistant desire of belonging to the opposite Sex. Accompanying with unsatisfactory of biological sexuality. Common treatment of this disorder is sexuality transforming surgery , that in Iran allows by Iman Khomeini's ordain at 2006. Based on the new researches about the cure of this disorder after sexual transforming surjery , it always emphasize that surgery leads good results. The goal of this research is to investigate the accordance of new sexual role sexual identification in transsexuals after sexual transforming surgery.

**Materials and Methods:** Method of this research is cross sectional , in a small scales, and samples consist of 12 transsexuals , 9 male to female transsexuals and 3 female to male ones that they spend for average 6 years after surgery. Cases are 25 years old in average and they are in the middle familial economical levels. Cases are interviewing by a clinical psychologist filling the small MMPI-I questionnares MMPI-II MF scale and Bam sexual role sexual attitude measurement.

**Results:** Duties information of cases were analyzed by descriptive statistical methods. According to the results , cases have a normal psycho-social behavior and the score of them in MMPI-I test are in a normal range.

**Conclusions:** In bam tests and MF scale , they had a good accordance to new sexual identification and sexual role. No one of them were not ashamed of their decide. They had good accordance to new sexual identity and sexual role because of their good support asfter transforming sexuality surgery.

**Keywords:** Sexual Role; Sexual Identity; Transsexualism; Sex Reassignment Surgery

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# POSTER SESSION

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# LES MORTS VIOLENTES: ASPECTS MÉDICO LÉGAUX ETUDE RÉALISÉE AU SERVICE DE MÉDECINE LÉGALE CHU BENI MESSOUS 2000-2010

**Author(s):** Sbaihi A[1]; Laidaoui D[1]; Mostfaoui A[1]; Merah F[1]

**Institution(s):**[1]CHU BENI MESSOUS

**Abstract:** La mort violente est une mort provoquée par une intervention volontaire ; homicide, suicide ou par un accident Toute mort violente relève du champ de la médecine légale et aussi de l'enquête de police Le médecin légiste qu'il soit sur une scène du crime ou dans une salle d'autopsie apporte le constat de ce fléau social, ses données autopsiques trouveront tous leurs intérêts dans la reconstitution du fait criminel, accidentel, ou suicidaire. Son intervention est aussi déterminante en particulier quand le décès survient quelque temps après ou lorsque un état antérieur traumatique ou pathologique intervient dans le décès. Nous rapportons à travers une étude rétrospective les cas de morts violentes recensées sur une période de 10 années au service de médecine légale du CHU Beni Messous. Alger Ce travail se propose de préciser les aspects épidémiologiques des morts violentes et l'intérêt du recours à l'autopsie médico légale

**Keywords:** Homicide; Suicide; Accident Autopsie

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# L'EXPERTISE DU DOMMAGE CORPOREL EN DROIT ALGÉRIEN

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**Abstract:** La recrudescence des coups et blessures volontaires et involontaires fait augmenter les statistiques des traumatismes corporels en Algérie. Après la prise en charge des victimes et le traitement des différentes lésions, ces derniers revendiquent la réparation du dommage corporel en vue d'indemnisation. C'est sur ce point qu'intervient le médecin expert dans l'appréciation de l'incapacité totale de travail et dans la quantification du pretium doloris, du préjudice esthétique et de l'incapacité partielle permanente cette dernière représente la partie la plus importante dans l'expertise médicale car elle est la base des sommes à allouer aux victimes qui constitue une phase importante de la réparation en droit Algérien.

**Keywords:** Dommage; Expertise Médicale; Réparation en Droit Algérien

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# ASPECTS ÉTHIQUES ET JURIDIQUES DE L'HOMICIDE INVOLONTAIRE DU FŒTUS

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**Abstract:** Quel statut doit-on conférer au fœtus ? Est-ce un être vivant à part entière sujet avec des droits et objet de droit ? Est-ce un être potentiel jouissant d'une partie de droits et non d'autres ? Le fœtus a été protégé par l'ancien droit le code pénal Napolitain de 1810 sanctionnait les violences ayant provoqué un avortement, actuellement la protection du fœtus diffère d'un pays à un autre : de l'Italie qui sanctionne toutes les interruptions de grossesse, à la G.B, l'Allemagne et certains états des États-Unis où il n'y a pas d'homicide involontaire du fœtus, l'Espagne ne sanctionne l'avortement que s'il est provoqué par une imprudence grave (article 146 CPE). Dans notre droit Tunisien le fœtus a des droits civils tel que l'héritage, dans le domaine pénal l'article 217 du code pénal tunisien stipule que : « Le fait de causer par maladresse, imprudence, inattention, négligence ou manquement à une obligation de sécurité ou de prudence imposée par la loi ou le règlement, la mort d'autrui…est puni de deux ans de prison…»

D'après le principe de « l'interprétation stricte de la loi pénale » est nommé « autrui » une personne viable et vivante ce qui n'est pas le cas du fœtus. La jurisprudence Française récente n'a pas retenu l'homicide involontaire du fœtus en 1999 et en 2001, un amendement de loi n'a pas été retenu par le sénat, en Tunisie la jurisprudence n'a jamais retenu un homicide volontaire ou involontaire sur un fœtus.

D'un point de vue éthique la loi actuelle parait ne considérer un Homme ayant un statut juridique qu'une fois il est viable et ayant vécu cependant certaines lois -comme le code de l'environnement en France- protègent des animaux à naître (le crapaud vert). Ce paradoxe pourrait amener le législateur à réfléchir dans la précipitation à ce sujet si une affaire serait médiatisée alors qu'une solution devrait être prise dans la réflexion pour la protection de l'enfant « avant comme après sa naissance » comme le souligne la Convention Internationale des Droits de l'Enfants de New York de 1990

**Keywords:** Homicide Involontaire; Fœtus; Éthique

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# RACHI ANESTHESIE ET SYNDROME DE SUSAC: PROBLEMES D'IMPUTABILITE

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**Case Report:** La difficulté de l'établissement des critères d'imputabilité est à illustrée par un dossier d'expertise médicale dans le cadre pénal où une femme à poursuivie son médecin expert anesthésiste réanimateur pour coups et blessures involontaires. Il s'agit d'une femme âgée de 33 ans G2 P2 césarisée pour un utérus cicatriciel avec un bassin limite, Elle a été opéré sous rachianesthésie ponction au niveau L4 L5. 10mn après la ponction installation d'un bloc sensitif en damier, avec un niveau supérieur à D4 sans retentissement hémodynamique, l'anesthésie a été convertie en anesthésie générale. Après le réveil elle présenté un déficit moteur complet des deux membres inférieurs, une aphasie, un nystagmus horizontal et une hypoacousie bilatérale, deux heures après l'acte elle aurait présenté un ptôsis bilatéral avec une mydriase bilatérale. Elle a été explorée par une TDM cérébro médullaire une IRM pan médullaire, une angio IRM et une PL revenus toutes normales.

L'évolution était marquée par une récupération partielle du déficit moteur avec persistance de l'hypoacousie, le diagnostic évoqué était un syndrome de Susac incomplet, elle a été mise sous corticothérapie. Elle a été vue en expertise 3 ans après elle a présenté la même symptomatologie avec une amélioration du déficit moteur et de l'hypoacousie. Le syndrome de Susac est une pathologie rare, en 2002 seulement 46 cas on été décrits dans la littérature, il s'agit d'une micro angiopathie cérébrale, rétinienne et cochléaire, secondaire à des occlusions artériolaires évoluant par poussée et qui touche essentiellement des femmes jeunes en période d'activité génitale. Dans la littérature il a été décrit 4 cas de syndrome de Susac au cours de la grossesse et il est connu qu'il peut y avoir.

Des aggravations au cours de la grossesse dans d'autres pathologies où le mécanisme étiologique est similaires (la fréquence des poussées varie de 38 à 75 % selon les études au cours des grossesses ou en post-partum ans le LES) L'étude du dossier les experts se sont heurtés aux difficultés suivantes: l'établissement de la réalité du diagnostic vu la rareté du syndrome et la difficulté de réunir les critères de diagnostic; l'établissement du mécanisme physiopathologique ou l'interaction entre la grossesse et l'acte lui-même.

**Keywords:** Rachianesthésie; Syndrome de Susac; Responsabilité Médicale; Imputabilité

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# AUTOMUTILATION ASSISTÉE OU "ARTISAN- AUTOMUTILATEUR" DUNE GRANDE DEXTÉRITÉ?

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**Introduction:** L'automutilation selon la définition de Bernard Richard est «l'altération intentionnelle consciente et directe des tissus de lorganisme sans volonté de mourir ».Dans une approche phénoménologique, lautomutilation est pluri-disciplinaire interpellant en premier lieu les psychiatres et les cliniciens du comportement mais aussi la sociologie et lanthropologie. Lautomutilation est une réaction manifestement « anormale » mais nest pas un objet purement psychiatrique. Elle est également rencontrée dans le milieu carcéral et aussi dans larmée comme moyen de simulation dun accident ou dune maladie dont le but dobtenir un bénéfice direct.En Algérie, nous navons pas détudes chiffrées sur ce phénomène mais au niveau de nos services de médecine légale, nous enregistrons de plus en plus de cas d'automutilation où il sagit souvent de fausses déclarations dagression pour des afin de bénéficier dune incapacité de travail et déposer une plainte contre des prétendus coupables. Le diagnostic est souvent aisé pour le médecin légiste où sont rôle est très déterminant pour d'éventuelles poursuites judicaires.

**Cas clinique:** Nous proposons un cas d'automutilation examiné sur réquisition de l'officier de police judicaire au niveau du service de médecine légale du CHU de Sétif que nous avons jugé assez particulier. Il sagit dun patient de 29 ans, électricien, marié et père dun enfant de 02 mois, habitant dans la même maison que ses parents et le reste de ses frères et sœurs dans une petite agglomération rurale. Pas d'antécédents judiciaires ni psychiatriques , pas d'antécédents d'automutilations antérieures, chirurgie esthétique en 2007, un nomadisme médical depuis 4 ans. Des examens complémentaires (TDM, IRM, un EMG…etc.) demandés par les médecins sur insistance du patient et qui se sont tous avérés sans anomalies. Selon le rapport de la gendarmerie : Impliqué lui et sa famille dans une rixe avec une autre famille voisine, notre patient a été convoqué le lendemain par la gendarmerie dans le cadre dune enquête suite à une plainte déposée par la famille voisine. Il déclare avoir été kidnappé le soir même de la rixe par six personnes cagoulées, quon laurait emmené dans un terrain vague à 800 mètres de chez lui, on laurait ligoté et agressé à l'aide de couteaux. On l'aurait libéré vers 04heures du matin. Il serait rentré chez lui en trouvant la porte ouverte de la maison. Sa femme ne se serait pas inquiétée de l'absence de son mari, elle se serait couchée assez tôt et ne s'en serait pas aperçue de son retour au petit matin. Le lendemain, notre patient a été se faire photographier ses blessures mais n'a pas porté plainte auprès de la gendarmerie ni pour kidnappig ni pour agression et il n'a pas été non plus se faire soigner. L'examen clinique retrouve : Des lésions d'automutilation typiques à l'aide d'un agent tranchant assez impressionnantes par leur étendue. Elles ont concernées toutes les parties du corps excepté le visage, les mains, les fesses et les organes génitaux. Le dos, plus que le reste du corps est la partie la plus marquée par de nombreuses plaies, longues, superficielles, linéaires et continues, parallèles verticales, traversées par d'autres plaies horizontales de même nature et aussi nombreuses donnant un quadrillage assez impressionnant témoignant de la grande dextérité de l'auteur. Nous avons conclu à une automutilation à l'aide d'un agent tranchant pour toutes les lésions lésions constatées sur le corps sauf pour les lésions du dos où nous avons émis des réserves. Classiquement le dos n'est pas une zone de prédilection, difficilement accessible par le sujet lui-même et les lésions seraient beaucoup moins typiques et moins régulières que celles retrouvées chez notre patient. Les hypothèses posées: S'agit-il d'une automutilation assistée par une tierce personne ? S'agit-il d'un « artisan -automutilateur » d'une grande dextérité ? ou dune pathomimie?

**Keywords:** Automutilation; Simulation; Pathomimie; Anthropologie

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# LES ABUS SEXUELS ENTRE CONJOINT ENTRE TABOU, RELIGION ET LOI

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**Abstract:** Les auteurs se proposent de démontrer que le devoir conjugal rend permis tout ce que la loi et la religion répriment car jusqu'à nos jours les abus sexuels infligés à la femme par son conjoints ne sont pas reconnus comme des infractions au code pénal algérien et ne font l'objet d'aucune répression judiciaire.

Cependant la religion musulmane interdit formellement certains actes entre conjoints, telle la sodomie, le rapprochement sexuel au mois du jeun (ramadan) et pendant la période des règles. Aujourd'hui, certaines femmes pour ne dire que celles qui osent en parler et par l'occasion saisir les tribunaux, pour abus sexuels au sens propre du terme, se disent victimes par leurs maris qui estiment avoir pratiqué tout leur droit au terme de la religion et de la loi.

Les plaintes se multiplient et la loi reste muette voir indifférente à leur souffrances, alors que ce genre d'abus est catalyseur de beaucoup de procès en divorce.

**Keywords:** Viol; Sodomie; Loi; Religion

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# REFLEXION MEDICO-LEGALE SUR LES DECES SUITE A UN SUICIDE PAR EGORGEMENT: A PROPOS DE CAS D'AUTOPSIES

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**Abstract:** Les pendaisons, les armes à feu, les noyades et les intoxications médicamenteuses aigues volontaires sont classiquement, les moyens suicidaires les plus employés. L'égorgement, quant à lui, demeure un moyen presque exclusivement homicide et la littérature ne fait état que de rares cas de suicide par égorgement. Le suicide par égorgement est une conduite autodestructrice, violente et spectaculaire.

Ce type de suicide, est marqué par: Son caractère exceptionnel; L'extrême violence qu'il peut revêtir (réalisation ou mise en scène). Les difficultés médico-légales qu'il pose.

La mort suicidaire par égorgement, impose de nombreuses interrogations où de par la particularité du moyen d'exécution, soulève une problématique autant médico-légale que clinique (psychiatrie).

**Keywords:** Suicide; Égorgement; Autodestructrice; Violence; Problématique

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# LES ASPHYXIES MECANIQUES ACCIDENTELLES CHEZ L'ENFANT A L'EXCEPTION DES NOYADES: A PROPOS DE 11 CAS

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**Introduction:** Les asphyxies accidentelles demeurent un problème majeur chez les enfants et sont réputées être la cause de morts évitables et maitrisables. Le but de ce travail est d'étudier les aspects épidémiologiques et thanatologiques de ces asphyxies et de proposer des mesures préventives.

**Materials and Methods:** Étude rétrospective, sur une période de 20 ans, de tous les cas d'asphyxie mécanique mortelle accidentelle à l'exclusion des noyades observées chez des enfants âgés de 1 à 18 ans colligés au Service de Médecine Légale de l'Hôpital Farhat Hached de Sousse (Tunisie)

**Results:** 11 cas ont été collectés (10 garçons et 1 fille). L'âge variait entre 2 et 17 ans. L'origine rurale des victimes était retrouvée dans 72.7 % des cas. Nous avons trouvé 4 cas de suffocation par un corps étranger des voies aériennes, 4 cas de pendaison (36,4%), 1 cas de confinement, 1 cas de compression thoraco-abdominale et 1 cas de strangulation (9%).

**Conclusions:** Il est important de comprendre ce phénomène afin de proposer des moyens de prévention adéquats.

**Keywords:** Médecine Légale; Asphyxie Mécanique; Accident; Enfant

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# IMMOLATION PAR LE FEU: ACTE DE DESESPOIR OU DE REVOLTE

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**Abstract:** L'immolation par le feu n'est pas un phénomène nouveau, l'histoire récente a retenu plusieurs cas dans le monde. A travers l'histoire, les motivations des révoltés usant de cet ultime et extrême acte se ressemblent : souffrance, pauvreté, misère et mauvaise gestion… S'immoler par le feu est un châtiment infligé à soi-même, la personne qui passe à l'acte est dans un état émotionnel limite, elle n'a d'autres moyens d'exprimer son mécontentement et son refus que son corps. En Algérie, ces derniers temps le suicide par immolation par le feu connait une nette recrudescence, un phénomène récent qui touche le monde arabo-musulman. En effet depuis le geste protestataire catalyseur de Mohamed BOUAZIZI en Tunisie à l'origine d'une révolution populaire, on dénombre en Algérie des dizaines d'actes similaires, ce phénomène se déroulant actuellement par vague. Ce mode de suicide n'a jamais été observé auparavant dans des sociétés à confession musulmane « sunnite », le suicide étant prohibé dans la religion musulmane. Il s'agit en général d'un acte désespéré, marquant une révolte contre une injustice selon les convictions de la victime, c'est un geste surtout protestataire s'inscrivant dans une revendication statutaire qui révèle l'ampleur des frustrations qui prévalent dans ces pays, ayant pour motifs des orientations principalement socio-économiques. Pour comprendre les vraies motivations et les raisons d'un tel acte dans notre pays, on a pris comme échantillon les victimes par immolation enregistrées durant le 1er semestre de l'année encours dans la wilaya d'Oran, 2ème grande ville d'Algérie et capitale économique. Cette étude est menée par l'équipe du service de médecine légale du C.H.U. Oran, les corps de ces victimes qui décèdent pour la majorité dans des services spécialisées de soins intensifs et dans le service des brulés de chirurgie plastique, souvent après une longue souffrance, sont systématiquement transférés à l a morgue pour être autopsiés et ceci pour les besoins de l'enquête judiciaire puisqu'il s'agit d'un acte suicidaire.

**Keywords:** Immolation; Feu; Suicide; Désespoir; Révolte

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# ROLE DU MEDECIN LEGISTE DANS LE REDRESSEMENT DE DIAGNOSTIC MEDICO-LEGAL DE BLESSURES

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**Abstract:** Le médecin légiste est celui qui constate, décrit le traumatisme et en prévoit l'évolution ; son intervention peut redresser le diagnostic et conditionner la prise en charge des victimes. Lors de l'établissement de son rapport, il doit se soucier des causes exactes du traumatisme et des circonstances de sa survenue pour mesurer son ampleur et son retentissement global en termes d'incapacités. Les observations illustrées nous permettent de discuter l'intérêt d'instaurer un suivi régulier des victimes, dans le souci de suivre l'évolution des blessures et leur impact sur le plan judiciaire. Ceci ne peut se réaliser que dans le cadre d'une unité d'explorations médico-judiciaires plus adéquates, moderne, répondant aux différentes catégories de victimes.

La collaboration avec les confrères des plateaux techniques biologique, radiologique et clinique pour les avis spécialisés a une double vocation.

**Keywords:** Médécine Légale; Diagnostic; Blessures

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# APPROCHE MEDICO-LEGALE, A-PROPOS D'UNE OBSERVATION D'UN CAS DE MALTRAITANCE INFANTILE, DE LA CONSULTATION A L'AUTOPSIE

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**Introduction:** La maltraitance des enfants est un fléau social souvent observé mais généralement ignoré et caché à cause du tabou et des conséquences qu'elle peut engendrer. Elle a pour conséquences : l'absence d'épanouissement, des lésions organiques des régressions psychiques ou pire : la mort. Objectifs: 1 - Tirer la sonnette d'alarme devant des enfants maltraités; 2 - Prévenir la survenue de catastrophes (mort).

**Methods:** Ce cas illustre les difficultés et le manque de coordination entre les différents intervenants dans la prise en charge de l'enfance en danger. Il étudié:

1 - Sur le plan médico-légal;

2 - Sur le plan psychologique;

3 - Sur le plan clinique.

**Discussion and Conclusions:** L'enfant S.L est un exemple qui illustre bien la maltraitance dans toutes ses formes : physique, psychique et sexuelle que peut subir un enfant. Il s'agit de situation rare mais non exceptionnelle. L'hôpital doit rester un sanctuaire non seulement pour l'enfant malade mais aussi pour tout enfant en souffrance. Ceci justifie la création, à l'hôpital d'un service ou unité de soins d'urgence pour prise en charge multidirectionnelle de l'enfance en danger dont le signalement à l'autorité judiciaire doit faire l'effet d'un clignotant au rouge.

**Keywords:** Autopsie; Maltraitance Infantile

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# CIVD DU POST-PARTUM ET RESPONSABILITE MEDICALE- A PROPOS D'UN CAS

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**Abstract:** La CIVD constitue un événement brutal et imprévisible pouvant émailler l'évolution compliquée du post-partum générant par la même, en cas de décès de la parturiente, des interrogations mettant en jeu la responsabilité de l'équipe soignante. Le médecin légiste est alors appelé à intervenir dans ce cadre . A travers un cas issu de notre expérience, nous discuterons des différentes approches et difficultés médico-légales rencontrées lors des investigations réalisées en autopsie.

Sur la base des données scientifiques actuelles, nous tenterons de comprendre dans quelle mesure l'autopsie peut-elle contribuer à la reconstitution de la traçabilité des actes de soins effectués.

**Keywords:** CIVD; Autopsie; Actes de Soins; Responsabilité

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# IMMOLATION ET REVENDICATION SOCIALE - UNE APPROCHE MEDICO-LEGALE NOUVELLE

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**Abstract:** Les récents événements connus par certains pays du bassin méditerranéen nous ont interpellé par rapport à l'émergence de situations médico-légales nouvelles pour lesquelles des pistes de réflexion doivent être envisagées dés lors que l'intervention du médecin légiste devient nécessaire. Parmi ces situations, nous avons constaté l'augmentation en terme de fréquence de cas d'immolation par le feu à des fins revendicatives et dans des circonstances variées.

Dans le cadre de regroupement de personnes ou isolé , ces cas d'immolations posent des problèmes médico-légaux certains et les questions qui se posent alors revêtent des difficultés d'approche médico-légale que nous tenterons de rapporter à travers notre expérience.

**Keywords:** Immolation; Revendication; Approche Médico-légale

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# LES VICTIMES MASCULINES DE VIOLENCES SEXUELLES: LEXPÉRIENCE DU CENTRE DACCUEIL EN URGENCE DES VICTIMES DAGRESSION (CAUVA) DE BORDEAUX

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**Abstract:** Les violences sexuelles subies par les hommes sont une entité de la victimologie encore mal connue par la communauté scientifiques internationales et trop peu détudes y sont consacrées alors que les auteurs sont unanimes sur les risques quelles font encourir aux victimes, à savoir le risque de transmission dinfections sexuellement transmissibles, dominé par le VIH, ainsi que les lourdes conséquences psychologiques de tels actes.Trois facteurs de risques sont identifiés, il sagît de lappartenance à la communauté homosexuelle, de lunivers carcéral et des périodes de conflits armés.

Notre étude rétrospective porte sur une période de 10 ans au cours de laquelle nous avons pris en charge 112 hommes victimes dactes de pénétration anales. Sont but est dapporter des repères épidémiologiques et de confronter nos résultats aux données de la littératures afin démettre des recommandations de prise en charge. Nous avons pu mettre en évidence que les hommes victimes de viol sont des hommes jeunes, agressés en zone urbaine sur la voie publique le soir par des hommes inconnus avec une recrudescence du phénomène en été.

Ces dossiers représentent moins de 0,5% de l'ensemble des victimes prises en charge au CAUVA. Comme il l'est souligné dans la littérature, le recours à l'évaluation psychologique est peu fréquent et le délai de prise en charge tardif ne permet pas l'administration d'une trithérapie antirétrovirale d'urgences qui limiterait le risque de transmission du VIH. Dans la majorité des cas, aucun diagnostic psychiatrique n'est posé mais ce résultat est à nuancer par le fait que la volonté institutionnelle au CAUVA n'est pas d'établir des diagnostic mais de permettre aux victimes de se libérer par le biais d'un premier temps de parole. Le seul facteur de risque mentionné dans la littérature est retrouvé dans cette étude est l'univers carcéral ce qui s'explique par le fait que la question de la sexualité des victime n'a pas été posée et que la France n'a pas été le théâtre de conflit armé entre 1999 et 2010.

Il est fondamental que les professionnel de santé se forme à l'accueil et à l'évaluation pluridisciplinaire de ces victimes en s'efforçant d'une part de réduire les délais de prise en charge afin de limiter le risque de transmission du VIH et d'autre part de favoriser l'évaluation psychologique initiale. Il serait également intéressant de réfléchir à une étude multicentrique nationale ou internationale.

**Keywords:** Violence Sexelle; Centre Daccueil; VIH

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# ESTIMATION DU DELAI POST-MORTEM A PROPOS DE 20 OBSERVATIONS

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**Abstract:** Dans ce travail, nous rapportons 40 observations où grâce aux méthodes classiques et à une nouvelle méthode, nous estimons le délai post-mortem. La nouvelle méthode consiste en l' utilisations des réseaux de neurones artificiels à propagation avant et à apprentissage supervisé que nous avons testé sur un échantillon de 257 individus .

**Keywords:** Délai *Post mortem*; Neurones Artificiels

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# VACCINATION ET MORT SUBITE: QUEL LIEN D'IMPUTABILITE?

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**Introduction:** La vaccination est considérée comme l'un des moyens les plus efficaces de protection dont dispose la médecine. Bien que très rare, les accidents de vaccination peuvent parfois se révéler dramatiques. Le médecin peut se trouver confronté à des situations de mort subite dans un délai variable après la vaccination. La détermination de la relation de causalité entre les deux évènements devient une question cruciale. L'objectif de ce travail est de tenter d'établir le lien d'imputabilité entre la mort subite et la vaccination contre respectivement l'hépatite virale B et la « DTCP » (Diphtérie, Tétanos, Coqueluche, Poliomyélite), à travers l'analyse de deux cas autopsiques

**Case Report:** Cas n°1 - Un nourrisson, âgé de 03mois, en bon état de santé apparente, décède quelques heures après la vaccination contre DTCP. L'autopsie et l'histologie ont conclu à la présence d'une encéphalite lymphocytaire.

Cas n° 2 - Un jeune étudiant âgé de 22ans consulte aux urgences pour douleurs thoraciques, trois heures après une vaccination contre l'hépatite B. Le diagnostic de myocardite aigue est retenu. L'évolution est marquée par l'aggravation de son état aboutissant au décès. L'examen histologique confirme le diagnostic de myocardite, la recherche virale est négative.

**Discussion and Conclusions:** Plusieurs questions se posent à propos de la certitude scientifique du lien d'imputabilité du décès à la vaccination, dont notamment l'hypothèse physiopathologique pouvant expliquer le mécanisme de la mort dans les suites de celle-ci. Hormis les cas où une alternative causale a été démontrée (vaccination au Smallpox…….), l'hypothèse d'un cumul causal ou d'une coïncidence d'événements est à retenir.

**Keywords:** Vaccination; Morte Subite

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# RESPONSABILITE MEDICALE EN MATIERE DE CORONAROGRAPHIE A PROPOS DE DEUX AFFAIRES

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**Abstract:** Depuis plusieurs annes, le nombre daffaires en responsabilit mdicale est en nette augmentation. Ce phnomne universel est en grande partie du au fait que, face aux progrs de la mdecine, les malades sont devenus de plus en plus exigeants, acceptant mal l''accident mdical. La coronarographie sest impose ces dernires annes comme lexamen de rfrence dans lexploration de la pathologie coronarienne puisquelle permet de faire un bilan exact des lsions et quelle est parfois complte par une angioplastie. Les progrs dans lexploration des coronaropathies et le recours de plus en plus frquent la coronarographie se sont accompagns par une mise en cause judiciaire croissante des mdecins concerns.

En effet, bien que de ralisation trs courante, ce geste nest pas dnu de risques pouvant aboutir au dcs ou une infirmit grave. Nanmoins, si les diffrents types daccidents de coronarographie sont bien connus des cardiologues, leurs consquences mdico-lgales le sont beaucoup moins. Il nexiste notre connaissance aucune tude tunisienne sur la sinistralit de cette technique et les problmes mdico-lgaux spcifiques quelle pose dans notre pays. Le but de ce travail est de: discuter les circonstances de mise en cause de la responsabilit mdicale au cours de la coronarographie, prciser les particularits de la responsabilit mdicale et faire le point sur la lgislation en vigueur ainsi que lvolution de la jurisprudence en la matire, travers ltude de deux affaires en responsabilit mdicale en coronarographie colligs dans le service de mdecine lgale de lhpital Charles Nicolle.

**Keywords:** Cardiologie; Coronarographie; Responsabilit Médicale; Expertise

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# A HARMONIZAÇÃO DA AVALIAÇÃO DO DANO ESTÉTICO ODONTOLÓGICO NO BRASIL

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**Materials and Methods:** O presente trabalho é uma proposta de harmonização da avaliação do dano estético odontológico no Brasil. A pretendida harmonização da avaliação do dano corporal passa, dentre outros aspectos, por uma necessária uniformização de terminologia e adequação de conceitos. Nesse sentido, fez-se uma revisão bibliográfica do conceito doutrinário sobre deformidade permanente, do art. 129 do Código Penal Brasileiro, comparando-o com a metodologia europeia para avaliação e quantificação do dano estético no âmbito do direito civil. Verifica-se que, geralmente, o dano estético buco-maxilo facial recebe uma avaliação civil que varia entre 0 a 4 numa escala de sete graus, salvo quando há danos cutâneo, mucosa ou ósseos associados às lesões dentárias, o que permitiria uma quantificação em graus de gravidade superior.

Nesse contexto, justificaria a classificação deformidade permanente, no direito penal brasileiro, quando a avaliação atingisse o grau 5 ou superior.

**Keywords:** Deformidade Permanente; Dano Estético; Perda Dentária

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# ABUSO INFANTIL: A PROPOSITO A UM CASO DE ABUSO FISICO E SEXUAL EM MENOR

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**Introduction:** Segundo a OMS, considera-se como abuso infantil o castigo corporal, os actos de omisso e discriminçao, tais como a ausencia de na protecçao da criança, relativamente a situçoes de violencia previsivel provocada por amigos, vizinhos ou visitas da casa da familia; ausencia de utilizaçao dos serviços de saude, bem como ameaças persistentes, humilhaçoes, o isolamento e a rejeiçao. Magalhes T. 2010, considera ainda como abuso infantil o testemunho, pelas crianças, de violencia entre membros adultos de sua familia o que em si acarreta serias consequencias. Sao considerados como factores de riscos: baixo nivel socioeconomico e educacional, inexperiencia e falta de conhecimento basico sobre o processo de desenvolvimento da criança e antecedentes desviantes (Magalhes T., 2010). Estes abusos destacam-se, muitas vezes, por grande violencia exercida no menor sem meios de defesa e que, partida, esperaria encontrar num adulto um apoio e uma segurança, e por vezes, nao sao por uma.

**Case Report:** Apresenta-se um caso de maus-tratos e violencia sexual numa menor de 10 anos, concretizados por parte da madrasta e de vizinho. Tratava-se de criança aos cuidados da madrasta, a qual nao cuidava do bem fisico e psicologico e social da referida menor, tendo a mesma, sido violada por vizinho. O exame objectivo revelou criança de aspecto desnutrido, com diminuto peso corporal, com grau de higiene muito baixo, apresentando, na altura de admissao no Serviço de Urgencia do hospital, laceraçoes a nivel vaginal e anal, que necessitaram de sutura. A menor foi referenciada ao serviço de protecçao social no sentido de providenciar um encaminhamento social e psicologico da referida menor.

**Conclusions:** O abuso fisico e sexual de menores constitui uma preocupaçao das entidades de saude e forenses. De facto, em Luanda registam-se casos elevados de tais situaçoes, estando no ambito da investigaçao criminal o despiste de todas as situaçoes existentes, no sentido de procurar melhorar as condiçoes de vida sociais das crianças de Luanda.

**Keywords:** Lesão; Maus-tratos; Abuso Sexual

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# IDENTIFICAÇÃO DAS ESPÉCIES ANIMAIS MAIS FREQUENTES EM ESTUDOS DE ANTROPOLOGIA FORENSE

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**Abstract:** A determinação de espcie a partir de amostras de tecidos, nas quais se inclui o tecido ósseo, uma componente importante da anlise antropológica e forense. Na maioria dos casos a identificação da espécie a que pertence um osso, realizada a partir das suas características anatómicas macroscpicas possvel. Esta análise pouco dispendiosa, relativamente rápida e, na maioria das vezes, bastante precisa. Implica a presença física das peas a analisar e um grau de conhecimento bastante aprofundado em Osteologia Comparada por parte do técnico, bem como o recurso a manuais de Anatomia e em casos mais complexos, a esqueletos já identificados para efectuar a comparação das peças ósseas. Este trabalho analisa os processos que incluem ossos nos humanos que foram remetidos para o Servio de Patologia Forense, designadamente para a Antropologia Forense, do Instituto de Medicina Legal, Delegação do Sul entre os anos de 2004 e 2010 e Delegação do Centro entre os anos de 2001 e 2010, abordando as diferenças osteológicas entre as diferentes espécies animais de modo a que, através destas características, estas possam ser identificadas e esta informação possa ser incluída nos relatírios do Serviço. Apesar de a descoberta de ossadas animais no ser considerada merecedora da ateno do Direito, quando estas se encontram associadas a ossadas humanas, a sua análise pode ter um contributo considerável para a interpretação dos factos que levaram ao cenário em questão.

Apresenta-se, como forma de concluso, uma chave dicotómica para identificação específica de ossos do esqueleto apendicular, com o propósito de auxiliar neste tipo de análise em situações futuras.

**Keywords:** Anatomia Comparada; Osteologia Forense; Identificao de Espécie; Restos Cadavéricos de Animais

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# DESENVOLVIMENTO DAS CIÊNCIAS FORENSES NA UNIVERSIDADE DE AVEIRO: ENSINO, DIVULGAÇÃO E EXTENSÃO UNIVERSITÁRIA

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**Abstract:** A universidade de Aveiro é uma universidade relativamente jovem (fundada em 1973) com forte componente de investigação em áreas como ciências costeiras e do mar, ciências dos materiais e electrónica, estas com laboratórios "associados" e uma diversidade de oferta formativa e de temas de investigação incluindo a biologia celular e genética molecular com grande desenvolvimento no Departamento de Biologia e com crescente desenvolvimento das ciências da saúde (recentemente foi mesmo implementado um curso de Medicina conjuntamente com o ICBAS-Porto). Reconhecendo o crescente interesse pela área das ciências forenses e em particular pela Genética Forense, o Departamento de Biologia da Universidade de Aveiro tem acolhido algumas vertentes de ensino e investigação em estreita colaboração com o Instituto Nacional de Medicina Legal.

As Genética Forense na UA, iniciou-se com a abertura de temas de pesquisa e de projeto para alunos dos últimos anos de licenciatura em Biologia e posteriormente a área temática passou a integrar o plano curricular de mestrados quer de Biologia Aplicada quer de Psicologia Forense. Para públicos mais genéricos, realizaram-se já com grande sucesso quatro edições de curso livres de introdução às ciências forenses e desenvolveu-se uma forte aposta na vertente da divulgação científica dirigida especialmente para os jovens envolvendo palestras em escolas e estágios em contexto laboratorial onde são desenvolvidos mini-projetos de genética forense com simulação de casos reais, integrados em iniciativas de âmbito nacional - Programa Ocupação Científica de Jovens nas Férias, Semana Aberta da Ciência e local como a Academia de Verão.

Com escolas secundárias tem sido implementada uma rede de colaboração muito favorecida pela Área de Projeto, um espaço em que os alunos com grande autonomia desenvolvem temas específicos ao longo do ano, sendo que as ciências forenses e a genética forense têm gozado de um certo "efeito CSI" potenciando a motivação dos jovens para estes temas.

**Keywords:** Ensino; Jovens; Universidade de Aveiro; Efeito CSI

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# REALIDADE DA SINISTRALIDADE RODOVIÁRIA EM ANGOLA

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**Introduction:** A sinistralidade rodoviária causa aproximadamente, um milhão de mortes por ano, nas estradas de todo o mundo, sendo a segunda maior causa de morte na população jovem, e estima-se que mais de vinte milhões de pessoas fiquem incapacitadas todos os anos (OMS 2007). Tal Situação, constitui um grave problema de saúde pública e económica em Angola, sendo considerada a segunda maior causa de morte, depois da malária. De facto tem-se constatado um elevado número de vítimas nos últimos anos neste país. Neste trabalho apresentamos o impacto da prevalência da sinistralidade rodoviária, bem como os factores que contribuem para o aumento desta na sociedade Angolana.

**Materials and Methods:** Estudo descritivo retrospectivo dos dados colhidos na Morgue Central e Direcção Nacional de Viação e Trânsito de Luanda, entre 2005 a 2009. Variáveis estudadas: tipo de acidente (colisão, capotamento, despiste, atropelamento e outros); consequências (mortes e feridos) e os factores de risco (humano, via, ambiente). Os dados colhidos foram inseridos e processados através do Microsoft Office.

**Results:** Em Angola entre os anos de 2005 a 2009 registaram 49155 acidentes de viação, dos quais: 48516 feridos, e 10478 mortos. Houve maior registo de casos na província de Luanda com 10416 acidentes, sendo 5953 feridos e 2489 mortes. Do total de acidentes (49155), foram registados 24320 colisões (49,47%), 4470 despistes (9.o9%), 4586 capotamentos (9.33%), 13677 atropelamentos (27.82%) e 2094 outros acidentes (4.25%) "explosões, colapso da via, etc". (estatísticas da Direcção Nacional de Viação e Trânsito de Angola) Apesar do enorme número de vítimas, em Angola escasseiam medidas de prevenção, estudos respeitantes ao impacto físico, psicológico e não só dos acidentes de viação no indivíduo. Constatou-se que, as condições dos veículos e ambientais, assim como os comportamentos dos condutores, relacionados com o não cumprimento das regras do código de estrada, o consumo de bebidas alcoólicas e de outras substâncias psico-activas, contribuem para o elevado números de acidentes.

**Discussion and Conclusions:** A sinistralidade rodoviária é um fenómeno civilizacional, fruto da existência e da circulação em massa de veículos na via pública. Afecta praticamente todas as famílias directa e indirectamente. As suas causas assentam numa dinâmica, em que intervêm alguns factores inter-relacionais: humano, veículo, via e ambiente. Sendo assim é necessário educar o utente, criar um ambiente seguro e legislação, de forma a mudar o comportamento humano, o que contribuirá para prevenção e diminuição da sinistralidade rodoviária.

**Keywords:** Sinistralidade Rodoviária; Comportamento; Vítima; Angola

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# MORTE SÚBITA, POR ASFIXIA, EM CRIANÇA

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**Abstract:** As mortes súbitas em criança relacionadas à aspiração de corpos estranhos são relativamente freqüentes, principalmente em menores entre 1 e 4 anos. Geralmente tais objetos são pequenos e esféricos como bolas de gude, balas, moedas e tampas de plástico. O presente caso é atípico e faz referência a uma criança de 1 ano que aspirou uma bola de gás, daquelas utilizadas em festas, que caprichosamente se inseriu entre as cordas vocais obstruindo totalmente as vias aéreas. Até a realização da necropsia os pais não tinham idéia do motivo da asfixia, pois não houve testemunhas do fato. Muito embora a criança tenha sido levada para emergência de um Hospital, a mesma já chegou sem vida, refletindo a gravidade da obstrução das vias aéreas. A necropsia foi fotografada em todas as suas etapas, para melhor documentação pericial.

**Keywords:** Asfixia; Corpo Estranho; Morte Súbita

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# DETECÇÃO DE SANGUE EM AMOSTRAS POR TIPAGEM DE mRNA

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**Introduction:** A determinação da natureza do material biológico em amostras criminais é um passo fundamental no processo laboratorial em genética forense. As amostras de sangue são o tipo de amostra mais comum na prática forense e são, normalmente, fáceis de detectar embora seja obrigatório verificar a sua natureza. Para esse efeito, existem vários testes de orientação e alguns testes de certeza. Contudo, a maioria desses testes são trabalhosos e, para além disso, utilizam produtos altamente tóxicos. Assim sendo, a tipagem de mRNA pode ser um método alternativo aos testes de certeza para sangue, uma vez que é específico para este material biológico. O Serviço de Genética e Biologia Forense da Delegação do Centro do INSTITUTO NACIONAL DE MEDICINA LEGAL, IP tem vindo a participar em exercícios colaborativos da EDNAP (European DNA Profiling Group) relativos à tipagem de mRNA em diferentes tipos de material biológico e pretende-se, com este trabalho, apresentar os nossos resultados e as potencialidades desta técnica.

**Materials and Methods:** A tipagem de mRNA foi efectuada em quatro passos: 1. Extracção de RNA com co-extracção de DNA de 6 amostras e duas séries de diluições em zaragatoa e papel FTA. (5, 1, 0.1, 0.01 e 0.001µl) utilizando o AllPrep DNA/RNA Mini kit (Qiagen); 2. Transcrição reversa com o SuperScript III kit (Invitrogen) para obter cDNA; 3. Endpoint PCR com dois multiplexes (2-plex: HBB e HBA; 5-plex: CD3G, ANK1, ALAS2, PBGD e SPTB); 4. Aplicação das amostras num ABI Prism 3130 Genetic Analyzer (AB). O DNA extraído foi amplificado com o kit AmpFlSTR NGM PCR Amplification kit (AB) de acordo com as instruções do kit e a separação electroforética foi realizada num ABI PRISM™ 3130 Genetic Analyser. A análise foi efectuada com o programa GeneMapper v3.2.1

**Results:** Com o 2-plex foi possível obter resultados em todas as amostras. Os marcadores HBA e HBB correspondem às subunidades alfa e beta da hemoglobina A e, por isso, são marcadores altamente específicos e sensíveis na detecção de sangue. O 5-plex é um multiplex moderadamente sensível, tendo-se obtido, ainda assim, bons resultados, excepto num marcador (PBGD - porfibilinogénio deaminase). Relativamente às series de diluições, o comportamento verificado com as amostras manteve-se, com o 2-plex a produzir melhores resultados que o 5-plex. Nestas diluições, os resultados terão também sido afectados com o suporte da amostra, tendo-se obtido melhores resultados com as zaragatoas, comparativamente com os do papel FTA. Com o DNA co-extraído foram obtidos perfis completos em todas as amostras não diluídas excepto em uma delas. Nas séries de diluições, apenas foram obtidos perfis completos com as primeiras duas diluições (5 e 1µl).

**Conclusions:** A tipagem de mRNA para a detecção de sangue mostrou-se uma técnica sensível embora morosa. Para amostras forenses, esta metodologia pode ser de grande utilidade se a co-extracção de DNA for utilizada. Contudo, em amostras limite, o processo de co-extracção pode não produzir a quantidade de DNA necessária para a obtenção de um perfil completo, necessário para a resolução da perícia. Assim sendo, são obrigatórios mais estudos para que a implementação desta técnica na rotina laboratorial seja possível.

**Keywords:** mRNA; Testes de Certeza; Sangue

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# COMPARAÇÃO DE DOIS MÉTODOS DE ORIENTAÇÃO PARA DETERMINAÇÃO DA PRESENÇA DE SÉMEN EM CASOS DE AGRESSÕES SEXUAIS

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**Introduction:** Sempre que chegam ao Serviço de Genética e Biologia Forense da Delegação do Centro do Instituto Nacional de Medicina Legal amostras suspeitas de possuírem sémen efectuam-se provas preliminares de orientação e de certeza, de modo a permitir a determinação de material biológico em análise. As provas de orientação utilizadas podem incluir a análise da actividade da fosfatase ácida prostática. O líquido seminal contem elevada quantidade de fosfatase ácida, que tem a capacidade de hidrolizar fosfatos orgânicos em meio ácido. O kit Phosphatesmo KM é uma das provas regularmente utilizada para a pesquisa de sémen. Este kit contem tiras comerciais que na presença de fosfatase ácida desenvolve uma mancha de cor violeta. A técnica de Florence é outra das provas utilizadas para detectar a presença de fosfatase ácida. Esta enzima, na presença de Reagente de Florence (Lugol) forma cristais de iodeto de colina de cor castanho-amarelado, visualizáveis ao microscópio.

**Materials and Methods:** Um conjunto de 31 amostras foi submetido a provas preliminares de orientação no âmbito de diversos casos de agressão sexual. Para a prova de Florence foi cortado um pequeno pedaço de tecido para uma lâmina e colocadas duas gotas de reagente de Florence. Colocou-se uma lamela por cima e a lâmina foi visualizada ao microscópio. No caso da reacção ser positiva visualizam-se cristais de colina de formato romboédrico e cor castanho-amarelada. Para a prova de Phosphatesmo KM, foi cortado um pequeno pedaço do mesmo tecido para um vidro de relógio e colocadas duas gotas de água desionizada. Após um minuto removeu-se a gota da solução resultante e colocada na tira de reacção do kit. Após um minuto foi lido o resultado. No caso da reacção ser positiva visualiza-se a formação de uma mancha de cor violeta.

**Results:** Nas 31 amostras analisadas pelos dois métodos o resultado foi idêntico, não tendo havido discrepâncias.

**Discussion:** A utilização do kit Phosphatesmo KM é menos trabalhosa que a prova de Florence e permite obter um resultado mais rápido, podendo igualmente ser utilizado no local do crime. A desvantagem principal é o custo.

**Keywords:** Provas de Orientação; Agressões Sexuais; Sémen

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# LANDMINE INJURIES: LESÕES DOS MEMBROS INFERIORES POR EXPLOSÕES

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**Abstract:** A cada 20 minutos uma mina terrestre explode em algum lugar do mundo, ferindo uma ou mais pessoas. Aqueles que sobrevivem a tal evento ficam habitualmente afectados por graves sequelas, nomeadamente mutilações dos membros e stress pós-traumático. Estima-se que existam mais de 100 milhões de minas terrestres espalhadas por 68 países do mundo, em campos de cultivo, estradas, ruas, atalhos ou fontes de água. As minas não atingem apenas militares, mas também cidadãos civis. Para além dos danos humanos, causam ainda grandes danos à agricultura e às infra-estruturas de um país. A desactivação de minas é assim uma necessidade. É certo que retirar minas envolve todavia custos muito significativos, pois a desactivação de uma única mina custa cerca de US $ 1.000. Contudo, gasta-se cinco vezes mais para dar assistência a uma vítima afectada pela explosão destas e que necessite de uma prótese. Os autores apresentam casos de vítimas de explosões, abordando as características de lesões músculo-esqueléticas e vasculares produzidas pelos estilhaços e pelo Efeito Blas. Elementos que irão determinar o respectivo prognóstico, sublinhando as lesões muito graves produzidas pelo efeito blast, que necessitam de uma abordagem cirúrgica imediata, com um desbridamento agressivo para a preservação de tecidos viáveis. Infelizmente, quase sempre a amputação é inevitável.

**Materials and Methods:** Apresentação de caso e revisão de literatura.

**Results:** São observadas características de lesões músculo-esqueléticas e vasculares produzidas pelos estilhaços e pelo Efeito Blast.

**Discussion:** O revestimento cutâneo ("pé de mina" aberto ou fechado) e a lesão vascular vão determinar o prognóstico. São descritas arterites, espasmos e trombos na origem da isquemia além da síndrome de compartimento frequentemente associada.

**Conclusions:** O efeito blast ocasiona lesões muito graves que necessitam de uma abordagem cirúrgica imediata, com um desbridamento agressivo para a preservação de tecidos viáveis, mas quase sempre a amputação é inevitável.

**Keywords:** Blast Injury; Minas Terrestres; Amputação dos Membros Inferiores

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# MECANISMO DE AÇÃO DAS LESÕES NOS ACIDENTES DE PARAQUEDISMO: ESTUDO NECROSCÓPICO

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**Abstract:** As lesões ortopédicas são as mais frequentes nos acidentes de paraquedismo. Articulações de carga, como os tornozelos, joelhos, ancas e coluna vertebral, são as mais envolvidas. A maioria das lesões acontece no momento do contacto com o solo e dependem essencialmente do mecanismo de ação envolvido: Aterragem com rotação; Aterragem com o dorso; "Opening shock" ou Queda livre vertical. O termo "Paratrooper fracture" é usado genericamente para as fracturas bimaleolares ou tri maleolares, por vezes de ambos os tornozelos, mas o seu padrão é muito variável. Nos acidentes em total queda livre, a maioria das vítimas morrem imediatamente ou pouco tempo depois em decorrência do TCE ou de hemorragias internas (laceração da aorta, lesão renal, hepática ou esplénica). Nas mortes tardias o TCE é a causa mais comum ou associado a sépsis, embolias pulmonares ou complicações de afogamento (em quedas na água). Fracturas expostas dos joelhos, dos punhos, assim como fracturas em anel da base do crânio (queda em pé) podem indicar que a vítima estava consciente ao tentar-se proteger da queda.

Os autores apresentam um caso de páraquedista que aterrou em queda livre vertical em decorrência de falha do páraquedas, evidenciando a partir do mesmo, como o padrão das lesões depende claramente do segmento que atinge primeiro o solo, assim como do peso, da idade e das respectivas vestes, além das características do terreno. Sublinham ainda como o conhecimento dos elementos anteriormente assinalados, pode ajudar a esclarecer as causas do acidente ao permitir o confronto das lesões com seus possíveis mecanismos de ação, sendo a interpretação do padrão das fracturas fundamental para uma correta apreciação médico-legal dessas lesões.

**Keywords:** Paratrooper Fracture; Acidente de Paraquedismo; Queda Livre

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# LESÕES ORTOPÉDICAS COMO MEIO DE RECONSTRUÇÃO DOS ACIDENTES DE VIAÇÃO

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**Introduction:** Os acidentes de viação são as causas mais frequentes de morte violenta em adultos jovens. Os gastos no atendimento de urgência, na reabilitação das vítimas e nas respectivas indemnizações, contribuem para que seja um importante problema de Saúde Pública. A percentagem de peões entre todas as vítimas de acidentes de viação é um dos elementos significativos no âmbito da segurança rodoviária, sendo o comportamento destes e dos condutores a principal causa dos sinistros. A reconstrução dos acidentes é fundamental no âmbito do enquadramento e abordagem legal destas situações, principalmente quando a única testemunha é o próprio condutor ou nos casos em que a única evidência é a vítima (politraumatizada no SU ou morta) como nos casos de "hit and run" . Neste contexto, a interpretação das lesões assume a maior relevância no sucesso da reconstrução do evento.

**Materials:** Casos clínicos e revisão de literatura.

**Results:** Confronto das lesões com os possíveis mecanismos de acção através de estudos imagiologicos e necroscópicos. É possível obter informação relevante para a determinação da direcção do impacto, tipo de colisão, veículo e velocidade, para além da posição das vítimas no seu interior.

**Discussion:** As lesões devem ser associadas ao impacto inicial, o primeiro contacto da vítima com o veículo ("bumper fracture" nos peões ou "dashboard fractures" nos ocupantes). Estas não são apenas detectadas nas autópsias, mas também nos sobreviventes. A não documentação destes elementos pode prejudicar ou inviabilizar uma reconstrução forense futura e os resultados de um eventual processo judicial.

**Conclusions:** A reconstrução dos acidentes de viação começa a ser uma realidade em Portugal. A introdução de softwares específicos permite a reprodução simulada do evento em imagens 3D, tendo as lesões como ponto de partida. As lesões mais frequentes são do foro ortopé

**Keywords:** Reconstrução dos Acidentes de Viação; Biomecânica do Trauma; Traumatologia

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# AUTÓPSIA MÉDICO-LEGAL DE UM CADÁVER SUBMETIDO A CIRURGIA CLANDESTINA. A PROPÓSITO DE UM CASO

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**Introduction:** A prática da medicina clandestina em Angola ainda se faz sentir em muitas áreas, fora do controlo das autoridades. Estes actos são muitas das vezes praticados por indivíduos curiosos sem formação médica. Tendo em conta as dificuldades de assistência sanitária e do baixo nível académico da população, muitas pessoas recorrem a práticas clandestinas de medicina. Estes actos culminam na maior parte dos casos, em sérias complicações ou mesmo a morte. A investigação médico-legal para o esclarecimento das causas de morte reveste-se de transcendente importância.

**Case Report:** Indivíduo do sexo masculino, raça negra, de 35 anos de idade, cujos familiares referem que o mesmo estava a fazer tricotomia na região púbica, tendo interrompido para atender uns visitantes. No decorrer desse encontro consumiu bebidas alcoólicas e no final do encontro retomou a tricotomia que culminou com ferimento e sangramento do escroto. Contam que a vítima manteve-se em silêncio e não recorreu aos serviços de saúde. Após alguns dias (que não sabem precisar) os familiares notaram a degradação progressiva do seu estado de saúde e convenceram-no a recorrer ao Serviço de Urgência do Hospital Josina Machel-Maria Pia, onde deu entrada já cadáver. A informação social prestada pelos familiares levantou alguma dúvida e após investigação policial, constatou-se que a vítima padecia de uma hérnia inguino-escrotal, tendo sido submetido a um acto cirúrgico com finalidade terapêutica, tendo essa cirurgia sido realizada por um indivíduo sem qualificação médica, em estabelecimento privado. Durante a autópsia constatou-se área de tricotomia, interessando o terço superior de ambas as coxas, escroto, púbis e quadrantes inferiores do abdómen; solução de continuidade suturada com fio de seda de coloração preta, orientada no sentido obliquo que ia desde a bolsa escrotal esquerda até a região inguinal homolateral, medindo quinze centímetros de comprimento. O exame do hábito interno revelou infiltração sanguínea do tecido celular subcutâneo e músculos da região inguinal esquerda, hemoperitoneu vesical e sinal de peritonite, palidez dos rins, baço, pâncreas e pulmões; cólon descendente seccionado ao nível da transição com o cólon sigmóide, com bordos infiltrados de sangue e suturado com fio de coloração azul, ausência do cólon sigmóide; porção superior do recto necrosado e abrindo-se directamente na cavidade abdominal.

**Discussion and Conclusions:** Tendo em conta os achados necrópsicos, a morte foi devido a septicemia em consequência do acto operatório ilícito. Assim conclui-se que ouve tentativa deliberada de ocultação da identidade do suposto cirurgião, por parte dos familiares da vítima e que toda a informação disponível se harmoniza coma hipótese de acidente o que não corresponde a verdade. Este caso revela a importância da necessidade de haver maior rigor na fiscalização ao Serviço Nacional de Saúde de Angola, bem como melhorar a articulação de todos os intervenientes que concorrem para a normalização do mesmo.

**Keywords:** Acidente; Cirurgia Clandestina

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# DETERMINAÇÃO DE METANOL. VALIDAÇÃO DE UM MÉTODO ANALÍTICO EM AMOSTRAS DE SANGUE POR GC-HS-FID

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**Introduction:** O metanol é um composto volátil com elevado poder tóxico para o ser humano, podendo ser encontrado na indústria como diluente químico e anti-congelante. Tal como a maioria dos solventes hidrocarbonetos, o metanol pode provocar irritações sensoriais reversíveis. As intoxicações graves são, regra geral, resultado de ingestão e, não sendo tratadas, conduzem a um estado de acidémia fórmica, toxicidade ocular, coma e em casos extremos à morte. Existem casos particulares de utilização de metanol na contaminação criminosa de bebidas alcoólicas devido às suas propriedades químicas serem muito similares às do etanol. Este trabalho tem como objectivo desenvolver e validar um método para quantificar a presença de metanol em amostras de sangue por cromatografia gasosa, com injecção de headspace, acoplada a um detector de ionização de chama (GC-HS-FID).

**Materials and Methods:** As amostras de sangue foram preparadas de acordo com o procedimento em vigor no serviço de toxicologia forense da delegação do Centro (STF-C) do Instituto Nacional de Medicina Legal, I.P., utilizando-se como padrão interno o n-propanol. O equipamento utilizado foi um cromatógrafo gasoso da marca Varian, modelo 450-GC, equipado com duas colunas cromatográficas de polaridade distinta (CP 910215 e CP 98945).

**Results:** Na validação desta metodologia foram estudados os seguintes parâmetros: especificidade e selectividade, limite de detecção (LD) e de quantificação (LQ), linearidade/gama de trabalho, robustez e precisão intermédia. Na avaliação da especificidade e selectividade do método constatou-se que a percentagem de falsos positivos e de falsos negativos foi de 0%, ficando deste modo demonstrada a ausência de substâncias interferentes. A linearidade/gama de trabalho foi estudada para o intervalo de concentrações compreendido entre 0,10 e 5,27 g/L de metanol. Em ambas as colunas analíticas o valor do coeficiente de determinação ($r^2$) foi de 0,994. Os limiares analíticos obtidos foram de 0,03 g/L (LD) e 0,1 g/L (LQ), para a coluna CP 910215, e 0,02 g/L (LD) e 0,05 g/L (LQ) para a coluna CP 98945. A precisão intermédia foi avaliada em cinco dias diferentes tendo sido analisados dois controlos a dois níveis de concentração, em triplicado (0,40 e 3,96 g/L, respectivamente). Os coeficientes de variação foram inferiores a 10% para ambas as concentrações. A robustez foi avaliada durante o processo de validação do procedimento de ensaio tendo-se mostrado adequada.

**Conclusions:** Todos os parâmetros analíticos estudados cumprem os critérios de aceitação em vigor no STF-C, permitindo que este método seja adoptado como procedimento de rotina para a detecção e quantificação de metanol em amostras de sangue.

**Keywords:** Metanol; Validação; GC-HS-FID

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# LIPOMA CEREBRAL E MORTE SÚBITA

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**Introduction:** Os lipomas intra-cranianos representam cerca de 0,1% dos tumores cerebrais. São considerados malformações congénitas, causados por uma má diferenciação e persistência anormal da meninge primitiva, com transformação em tecido adiposo durante o desenvolvimento do espaço subaracnoideu. Grande parte dos lipomas intra-cranianos é assintomática. As crises epilépticas são o sintoma mais comum.

**Case Report:** Mulher de 39 anos com antecedentes de crises convulsivas desde a adolescência, não fazia uso regular de medicação anticonvulsivante, história de etilismo e défice cognitivo. Foi encontrada morta no domicílio. A autópsia revelou a presença de um volumoso lipoma cerebral (60x35mm) associado à atrofia do corpo caloso e edema pulmonar, sem outros achados valorizáveis. A toxicologia foi negativa para álcool, drogras de abuso e medicamentos.

**Discussion:** Lipomas são tumores benignos constituídos de gordura e correspondem às neoplasias de partes moles mais comuns nos adultos. Características macroscópicas configuram a eles uma consistência mole, móvel e indolor. São extremamente raros no sistema nervoso central (SNC). A localização mais comum é é aquela associada ao CC. Foi descrita pela primeira vez em 1856 por Von Rokitanski, como um achado de autópsia. Várias teorias foram propostas para explicar a origem dos lipomas intracranianos. Acredita-se que defeitos no processo de reabsorção das meninges primitivas para a formação dos espaços subaracnóideo e cisternal, possam resultar na nidação da meninge primitiva, a qual originaria os componentes celulares dos lipomas intracerebrais. Esta teoria explicaria a localização invariável no espaço subaracnóideo ou cisternal, justificando a alta incidência de lipoma do CC nestes locais, em relação a outras partes do SNC. Macroscopicamente, são lesões que podem variar de menos de 1 cm a grandes massas. Possuem uma cápsula colagenosa aderente ao parênquima encefálico. São vascularizadas pelas artérias cerebrais anteriores ou através de ramos que atravessam o tumor. Eventualmente encontra-se um único vaso, alargado, que passa pelo tumor, dividindo-se nos ramos pericaloso e caloso marginal. Microscopicamente, são constituídos de tecido adiposo típico, e possuem cápsula com quantidade variável de fibras colágenas, as quais, nos pontos em contato com o tecido nervoso, podem penetrar no parênquima cerebral, em associação com vasos sanguíneos. Calcificações ocorrem no interior do lipoma, de sua cápsula e no tecido cerebral adjacente. Devido a estas características, a exérese cirúrgica destes tumores muitas vezes torna-se impraticável assumindo o tratamento medicamentoso no controle das crises convulsivas papel fundamental.

**Keywords:** Epilepsy; Corpus Callosum Lipoma; Forensic Pathology; Sudden Death

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# VALIDAÇÃO DE UMA METODOLOGIA PARA A DETERMINAÇÃO DE AMITRIPTILINA E NORTRIPTILINA EM SANGUE: SUA APLICAÇÃO A CASOS REAIS

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**Abstract:** A amitriptilina e a nortriptilina são antidepressivos tricíclicos amplamente usados no controlo da depressão e transtornos de ansiedade, apresentando uma série de efeitos colaterais que, não sendo graves, se revelam bastante incómodos. Estas substâncias, por apresentarem uma elevada toxicidade, surgem com alguma frequência associadas a actos suicidas. O objectivo deste trabalho foi o desenvolvimento e validação de uma técnica rápida e sensível para a detecção e quantificação de amitriptilina e nortriptilina em amostras de sangue postmortem e também provenientes de situações de âmbito hospitalar, com vista à sua aplicação na rotina pericial do serviço de toxicologia forense da delegação do Centro (STF-C) do INML, I.P.. O método desenvolvido, utilizando a extracção em fase sólida e posterior análise por cromatografia de gases associada à espectrometria de massa (GC/MS), revelou ser selectivo e linear na gama de trabalho estudada, com coeficientes de correlação superiores a 0,99 para ambas as substâncias. Todos os restantes parâmetros de validação estudados (precisão intermédia, exactidão, recuperação, limites de detecção e de quantificação) apresentaram resultados considerados adequados segundo os critérios em vigor no STF-C. O método mostrou-se adequado para a determinação das substâncias estudadas em amostras de sangue, pretendendo-se ampliar o seu campo de aplicação a um maior número de antidepressivos. Alguns dos casos analisados revelaram concentrações de amitriptilina muito superiores às consideradas terapêuticas, de acordo com a bibliografia consultada.

**Keywords:** Amitriptilina; Nortriptilina; Validação; Sangue; GC/MS

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# POTENCIANDO O "EFEITO CSI" ENTRE OS JOVENS: OS ESTÁGIOS LABORATORIAIS EM GENÉTICA FORENSE COMO ACÇÕES DE DIVULGAÇÃO E DE PROMOÇÃO DA LITERACIA CIENTÍFICA

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**Abstract:** É bem conhecido o "efeito CSI" ou seja a influência que séries televisivas em que de forma atraente e superficial a perícia laboratorial da ciência forense ocupa o lugar central tornando-se vedeta e projetando nos públicos-alvo uma modificação dos comportamentos. Sobre os jovens, o "efeito CSI" tem se traduzido num interesse quase explosivo sobre as carreiras profissionais e sobre as metodologias forenses. Este "efeito CSI" pode muito bem ser aproveitado quer para divulgar a ciência e favorecer a literacia científica quer mesmo para contribuir para o sucesso educativo dada a motivação acrescida dos jovens para esta temática. No Departamento de Biologia, desde o ano de 2000 (com a participação na Semana Aberta da Ciência e Tecnologia) que têm sido desenvolvidas várias iniciativas neste âmbito com uma programação de Genética Forense.

Apresenta-se um balanço da experiência de 11 anos, com particular relevo para o programa Ocupação Científica de Jovens nas Férias, promovido pelo Ministério da Ciência e Tecnologia o qual proporciona aos estudantes do ensino secundário uma oportunidade de aproximação à realidade da investigação científica e tecnológica. Neste trabalho são resumidas as estratégias em laboratório, o perfil dos participantes, as suas expectativas e o impacto destes estágios no seu futuro académico e profissional.

**Keywords:** Divulgação Científica; Ciência Viva

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# BRUCELOSE PROFISSIONAL - O PERITO E O LABORATÓRIO

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**Abstract:** O Decreto Regulamentar 6/2001 de 5 de Maio, republicado pelo Decreto Regulamentar 76/2007 de 17 de Julho e sob o código 51.02 descreve a Doença Profissional Brucelose tendo como Factores de Risco as Brucelas. As Doenças e outras Manifestações Clínicas identificadas, estão divididas em formas Agudas, formas Sub-agudas e Focalizadas e formas Crónicas, sendo o Prazo de Caracterização (prazo indicativo), respectivamente de 2 meses, 6 meses e 1 ano. A Lista Exemplificativa dos Trabalhos susceptíveis de provocar a Doença, contém os seguintes itens:

1. Trabalhos em matadouros, talhos, fábricas de enchidos ou conservas de carne, queijarias e os que exponham ao contacto com caprinos, bovinos, ovinos, suínos, com suas dejecções ou produtos dos seus abortos.
2. Trabalhos em laboratórios em que haja contacto com os agentes das doenças.
3. Trabalhos em esgotos.
4. Trabalhos realizados em consultórios ou outros estabelecimentos de Medicina Veterinária.

Será útil para o Perito Médico ter conhecimentos mais específicos sobre a Brucelose (Febre de Malta, Febre Ondulante) e sobre as Brucelas habitualmente patogénicas para o homem, métodos de diagnóstico, especificidade e sensibilidade dos testes laboratoriais, aspectos que serão abordados neste trabalho.

**Keywords:** Brucelose; Brucelas; Perito Médico; Laboratório

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# PERÍCIA MÉDICA NO ÂMBITO DO DIREITO DO TRABALHO: CONTRIBUIÇÃO DOS DADOS EPIDEMIOLÓGICOS

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**Abstract:** Fazendo parte de complexos sistemas produtivos, os homens são em sua maioria trabalhadores expostos a vários riscos ocupacionais no decorrer de suas vidas no ambiente de trabalho. Devido aos conflitos gerados entre empregados e empregadores, tal situação vem determinando uma demanda cada vez maior de perícia médica em processos judiciais, nas quais existe a necessidade do estabelecimento do nexo causal entre o agravo á saúde seja um Acidente de Trabalho, Doença Profissional ou Doença Ocupacional e o ambiente de trabalho com seus riscos. Neste estudo objectivamos discutir como os dados epidemiológicos podem contribuir para a melhor discussão do nexo causal em perícia médica judicial trabalhista. Com base nas informações analisadas, sugere-se que para realizar uma avaliação médica pericial em casos que tenha suspeita da ocorrência no ambiente de trabalho ou relacionada a este, é necessário preencher algumas premissas: A constatação (diagnóstico) de um agravo à saúde, doença ou sequela, com dano corporal, seja físico ou mental; A confirmação da existência de um ambiente de trabalho com riscos ocupacionais, onde existam agentes capazes de causar o agravo à saúde em questão; Plausibilidade de relação entre o agravo à saúde apresentada e os riscos ocupacionais do ambiente de trabalho, ou seja, o estabelecimento do nexo causal. No Brasil, além dos parâmetros estabelecidos pela literatura científica e legislação trabalhista, o Conselho Federal de Medicina através da RESOLUÇÃO CFM nº 1.488/1998, no seu artigo 2º, definiu que: "Para o estabelecimento do nexo causal entre os transtornos de saúde e as actividades do trabalhador, além do exame clínico (físico e mental) e os exames complementares, quando necessários, deve o médico considerar: I - a história clínica e ocupacional, decisiva em qualquer diagnóstico e/ou investigação de nexo causal; II - o estudo do local de trabalho; III - o estudo da organização do trabalho; IV - os dados epidemiológicos; V - a literatura actualizada; VI - a ocorrência de quadro clínico ou subclínico em trabalhador exposto a condições agressivas; VII - a identificação de riscos físicos, químicos, biológicos, mecânicos, estressantes e outros; VIII - o depoimento e a experiência dos trabalhadores, e; IX - os conhecimentos e as práticas de outras disciplinas e de seus profissionais, sejam ou não da área da saúde." Um dos problemas mais críticos no estabelecer o nexo de causalidade em procedimentos periciais onde está em discussão o ambiente de trabalho, é conseguir elencar todos estes parâmetros.

Dentre estes, a maior dificuldade é a análise dos dados epidemiológicos. Apesar de no Brasil todas as empresas serem obrigadas a elaborar o perfil epidemiológico dos agravos à saúde, a grande maioria não o faz. As importantes bases de dados dos Ministérios da Saúde, da Previdência e do Trabalho possuem muitas informações, mas separadamente não se consegue elaborar um perfil epidemiológico mais consistente. Além disso, a grande maioria dos trabalhos científicos publicados na área de epidemiologia são estudos descritivos, sendo importante salientar que este tipo de estudo não permite a confirmação de hipóteses de associação causal entre factores de riscos e agravos à saúde. Como o objectivo de uma perícia médica judicial trabalhista é verificar, por meio da avaliação médica e um conjunto de saberes especializados e da legislação em vigor, a existência de uma doença ou outro agravo que possa ter sido adquirida ou agravada no ambiente de trabalho.

As informações epidemiológicas constituem um importante parâmetro orientador para a realização desta avaliação, na busca de questões a serem investigadas durante a avaliação médica pericial.

**Keywords:** Perícia Médica Judicial; Epidemiologia; Acidentes de Trabalho; Doença Ocupacional; Doença Profissional

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# VIOLÊNCIA NAS RELAÇÕES DE INTIMIDADE: COMPORTAMENTOS E ATITUDES.

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**Abstract:** O tema da violência nas relações de intimidade tem suscitado grande relevância científica, social e política, multiplicando-se as acções preventivas com vista à consciencialização para o problema. Este estudo procurou traçar a prevalência da violência (física, física severa e emocional) nas relações juvenis de intimidade e caracterizar as atitudes dos jovens face às diferentes formas de violência. A amostra final do estudo integrou 4667 jovens com idades compreendidas entre os 13 e os 29 anos (M=18.9; S.D.=2.68), que se encontravam a frequentar o ensino secundário, profissional ou universitário, sendo 57.7% raparigas. Para a recolha dos dados foram utilizados dois instrumentos, duas versões adaptadas por Machado, Matos e Gonçalves (2001) de instrumentos construídos para a avaliação das atitudes e comportamentos face à violência conjugal: ECVC-2 (Escala de crenças em relação à violência nas relações íntimas) e o IVC-2 (inventário de comportamentos de violência nas relações íntimas).

De uma forma geral, e ainda que no plano atitudinal se tenham apurado reduzidos níveis globais de legitimação da violência, os participantes de sexo masculino surgem como sendo mais tolerantes à violência íntima. Em termos comportamentais, verificou-se que 25.4% dos jovens envolvidos em relacionamentos amorosos tinham sido vítimas durante o ano anterior ao estudo e 30.6% tinham apresentado comportamentos violentos face ao seu parceiro actual.

Em formato poster, pretendemos apresentar os principais resultados deste estudo, sugerindo igualmente pistas para a prevenção deste tipo de abuso íntimo.

**Keywords:** Violência; Comportamentos; Atitudes; Género

19th IAFS WORLD MEETING
9th WPMO TRIENNIAL MEETING
5th MAFS MEETING

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# DISCURSOS JUVENIS SOBRE A VIOLÊNCIA OCORRIDA NA INTIMIDADE.

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**Abstract:** Este estudo, de carácter qualitativo, procura explorar as percepções e representações da população juvenil face aos diferentes tipos de violência (física, psicológica e sexual) ocorridos nas suas relações amorosas. Mais especificamente, como percepcionam a sequência interactiva e contexto em que surgem os actos abusivos ocorridos nas relações amorosas e, ainda, analisar quais as suas percepções acerca das significações e do impacto da violência experienciada/exibida pelos jovens envolvidos em relacionamentos amorosos, designadamente ao nível das diferenças de género. Para recolher os dados recorremos à técnica de focus group, tendo-se realizado um total de 9 grupos de discussão que integraram diferentes grupos formativos: 3 grupos com jovens inseridos no ensino universitário, 3 grupos com jovens ao nível do ensino secundário e ainda 3 grupos com jovens fora do sistema de ensino.

De uma forma geral, os participantes, na formulação das suas percepções sobre o que poderá constituir abuso físico e psicológico, parecem atender essencialmente às circunstâncias e contextos, às consequências, à intenção e ao impacto do abuso. A violência psicológica surge representada como o tipo de abuso mais preponderante, comparativamente com a violência física. Por sua vez, a violência sexual surge conceptualizada como um tipo de abuso pouco frequente neste tipo de relacionamentos amorosos. De igual modo, é perceptível um viés de género na representação social das agressões femininas e masculinas, em que a violência feminina surge concebida como mais aceitável do que a masculina.

Em formato de poster, iremos apresentar os principais resultados deste estudo, procurando igualmente delinear pistas de intervenção/prevenção da violência nas relações de intimidade.

**Keywords:** Percepções; Violência; Intimidade; Género

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# RESOLUCIÓN DE UN CASO DE HERMANDAD COMPLEJO MEDIANTE EL EMPLEO CONJUNTO DE MARCADORES GENÉTICOS AUTOSÓMICOS, SEXUALES Y HAPLOIDES

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**Abstract:** Se presentaron cuatro adultos (H1, H2, H3 y H4), todos ellos de filiación incierta respecto de una madre común, y con un número de presuntos padres comprendido entre uno y tres. En principio, la hipótesis de un progenitor común para los cuatro hermanos alcanzó un Indice de Hermandad (IH) superior a 2,7 x 107 y una Probabilidad de Hermandad (W) superior a 99,99999%. La maternidad común de los cuatro adultos se vio apoyada por un haplotipo común de ADN mitocondrial (HVR-I y II). Sin embargo, se encontraron un total de 18 inconsistencias en marcadores autosómicos STRs para la hipótesis de paternidad y maternidad comunes de los cuatro hermanos. Dos hermanos (H1, varón y H2, mujer) fueron supuestos inicialmente de padre y madre comunes y confirmados mediante una batería de 23 sistemas de STRs autosómicos (IH>300,000, W>99,99999%). Además, la valoración de haplotipos de ADN mitocondrial y STRs de cromosoma X fue consistente con dicha hipótesis. El tercero de los hermanos, H3, varón, fue excluido respecto de la paternidad común con H1 mediante STRs de cromosoma Y (11 inconsistencias). Por último, se encontraron 4 inconsistencias en marcadores STRs de cromosoma X y 2 inconsistencias en STRs autosómicos para la hipótesis de una paternidad común de H3 y H4, siendo éste último mujer. La batería de 23 STRs autosómicos produjo valores de IH y de W no concluyentes para la hipótesis de que H3 y H4 tienen padre y madre comunes (IH~3, W~70%). En conclusión, pudo establecerse una maternidad común para los cuatro supuestos hermanos, una paternidad y maternidad comunes para H1 y H2 y uno o dos padres diferentes al de H1 y H2 para los hermanos H3 y H4. La utilización conjunta de marcadores genéticos autosómicos, sexuales y haploides puede volverse imprescindible en casos de hermandad complejos pero, así mismo, puede no resultar concluyente en casos de medio hermanos en los que no existe información adicional.

**Keywords:** Parentesco; Hermandad Compleja; STRs Autosómicos; ADN Mitocondrial; Cromosoma Y; Cromosoma X

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# LA IMPLANTODONTIA COMO MEDIO DE REPARAR LA FUNCIÓN MASTICATORIA: UN ANÁLISIS EN EL CONTEXTO DE LA EVALUACIÓN DEL DAÑO CORPORAL

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**Discussion:** La evaluación del daño corporal tiene por objetivo definir y valorar técnicamente las lesiones y los elementos de daño susceptibles de ser objeto de sanción penal, de indemnización, de beneficios fiscales y sociales, etc. La sustitución de dientes naturales por coronas protéticas sobre implantes es considerada, por algunos profesionales, como suficiente para devolución completa de la función masticatoria. Sin embargo son necesarios subsidios para la comprensión de las peculiaridades de esta terapia aunque el Derecho Civil visa a la reparación integral del daño. A partir del levantamiento bibliográfico por medio de consulta electrónica a la base de datos Medline/Pubmed, se verificó las diferencias entre el funcionamiento biológico y mecánico de los dientes comparados a las coronas protéticas soportadas por implantes. Fueron incluidos estudios experimentales, clínicos y de revisiones que demostraron ausencia de propriocepción, disminución acentuada de la vascularización del tejido conjuntivo adyacente y de la capacidad de defensa del tejido, además suceso de recesión gingival con compromiso estético en los sistemas de implantes dentarios. Además de eso, la pérdida del hueso consecuente de la pérdida dentaria, frecuentemente, impide la instalación del implante en la posición deseable causando problemas biomecánicas. Los datos obtenidos apuntan que no hay una restitución completa de la función dentaria y que la prótesis sobre implante presenta incontables peculiaridades que deben ser llevadas en consideración en el momento de la evaluación clínico - jurídica al daño buco maxilofacial.

**Keywords:** Implantes Dentários; Daño Corporal; Derecho Civil; Odontologia Legal

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# LA JUSTICIA TRANSICIONAL EN COLOMBIA

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**Abstract:** La violencia política de Colombia abarca aproximadamente cinco décadas, tiempo comprendido entre la mitad del siglo XX hasta la primera década del siglo XXI, a partir de la conformación de las Fuerzas Armadas Revolucionarias de Colombia (FARC) ocurrida en el año de 1964, comienzan a parecer diferentes grupos agrupaciones armadas organizadas al margen de la Ley en distintas regiones del territorio nacional como: Las Fuerzas Armadas revolucionarias de Colombia (FARC), el ejercito de Liberación Nacional (ELN), el Ejército Popular de Liberación (EPL), el movimiento 19 de Abril (M-19), el grupo guerrillero indígena Movimiento Armado Quintín Lame, las Autodefensas Unidas de Colombia (AUC) y el narcotráfico como un factor desestabilizador y agravante de la violencia en el país. Estos grupos cometieron delitos como homicidios, masacres que corresponden a la violencia masiva contra la población civil utilizada por Grupos Armados Organizados al Margen de la Ley como resultado de la ofensiva paramilitar en poblaciones bajo el control de la guerrilla, ataques contra instalaciones militares, contra poblaciones, desplazamiento forzado, reclutamiento forzado de menores, graves violaciones a los Derechos Humanos, entre otros. Teniendo en cuenta el derecho Internacional y la Constitución Política de Colombia, la paz no sólo es un derecho sino que es un fin en sí mismo y tienen un carácter multifacético, es un derecho colectivo.

Por esta razón Colombia como nación ha hecho una apuesta a la justicia de transición hacia la consecución de la paz. En el año 2005 se creó la Ley de Justicia y Paz, con el fin de brindar herramientas que permitieran la desmovilización de los Grupos Armados Organizados al Margen de la ley mediante la Ley 975 del 25 de Julio de 2005, que tiene por objeto facilitar los procesos de paz y la reincorporación individual o colectiva a la vida civil de miembros de grupos organizados al margen de la ley, garantizando los derechos de las víctimas a la verdad, la justicia y la reparación. Esta Ley responde a la necesidad de desarrollar por primera vez a lo largo de la historia de Colombia un mecanismo judicial en el que se incorporan los derechos a la verdad, la justicia y la reparación. La Unidad Nacional de Fiscalías para la Justicia y la Paz creada por esta ley, para investigar las circunstancias de tiempo , modo y lugar en donde se realizaron las conductas punibles, las condiciones de vida, sociales, familiares e individuales de los postulados a la Ley de Justicia y Paz y las conductas anteriores, los antecedentes judiciales y de policía y los daños individuales o colectivos que causaron de manera directa a las víctimas, tales como lesiones físicas, psicológicas, sufrimiento emocional o perdida financiera o menoscabo sustancial de derechos fundamentales. En Colombia, se decidió que la justica penal adelantara el proceso de justicas transicional bajo el contexto de verdad justicia y reparación y con una consecuencia de pena atenuada para los integrantes de los Grupos Armados Organizados al Margen de la Ley que confesaran de forma completa y veraz los hechos cometidos durante su militancia en el grupo armado ilegal con la obligación de la administración de justicia de verificar lo expuesto por el integrante del grupo armado.

La Unidad Nacional de Fiscalías para la Justicia y la Paz a Febrero de 2011, ha documentado 1.672 masacres, 35.549 desapariciones forzadas, 3.557 casos de reclutamiento forzado de menores, 176.612 homicidios, 80.392 desplazamientos forzados, 177 casos de violencia de género, 3.773 secuestros, 3.626 extorsiones, 87 casos de narcotráfico y 29.592 de otras conductas; estadísticas que son el resultado de la recolección de información. Investigación y que permiten el acceso a la justicia de las víctimas y que la aplicación de la justica transicional en Colombia.

**Keywords:** Justicia Transicional; Delitos; Verdad; Reparación

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# DIAGNÓSTICO MOLECULAR DE LA MUERTE SÚBITA CARDIACA DE ORIGEN ISQUÉMICO

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**Introduction:** Entre el 80 y 90% de las muertes súbitas (MS) son de origen cardiaco (MSC). Entre la causas de MSC, el infarto agudo de miocardio (IAM) representa el 75-80% de los casos. El problema en este tipo de muertes surge cuando al fallecer un sujeto por un IAM, en minutos desde que aparecen los síntomas, no hay tiempo suficiente para que se produzcan cambios estructurales (micro y macroscópicos) evidentes, hecho que dificulta considerablemente el diagnóstico de la causa de la muerte. En el diagnóstico de MSC de origen isquémico, siempre, el objetivo ha sido buscar marcadores de lesión miocárdica precoz, y para ello se han empleado clásicamente métodos morfológicos, histoquímicos, inmunohistoquímicos, y bioquímicos, sin resultados claramente concluyentes. Si consideramos que la respuesta más precoz ante una isquemia, es la que se produce a nivel molecular, podríamos analizar esta respuesta a mediante el estudio, tanto en tejido como en otros fluidos, de la expresión molecular, a través del análisis del ARNm que codifica diferentes moléculas implicadas en los mecanismos fisiopatológicos de la isquemia miocárdica. El conocer esta respuesta molecular nos podría permitir encontrar marcadores moleculares muy precoces de lesión miocárdica isquémica.

**Materials and Methods:** Se han tomado muestras de miocardio, líquido pericárdico y sangre procedentes de tres cadáveres sometidos a autopsia judicial en el Instituto de Medicina Legal de Granada. El primer cadáver se trata de un varón de 79 años, fallecido por MSC por IAM. El segundo, de 62 años, falleció por asfixia mecánica (ahorcadura), y el tercero de 77 años, murió por una fractura de cadera complicada. Hasta su estudio el tejido cardiaco se conservo, a -80Cº, el líquido pericardio y la sangre se conservaron también a -80Cº, en tubos específicos que estabilizan el RNA intracelular. Posteriormente se procedió a la extracción de RNA en cada tipo de muestra empleando kits comerciales, partiendo de 150 mg de tejido cardiaco, y de 2 ml de sangre y el líquido pericárdico estabilizados. Una vez extraído el RNA, se cuantifico y se valoro su calidad por espectrofotometría, para posteriormente realizar una retrotranscripción a cDNA. Una vez obtenido el cDNA, se realizo una PCR para cada tipo de muestra de cada cadáver, amplificando moléculas estructurales: troponina T, troponina I, cadena pesada de la miosina cardiaca (MYH7), cadena ligera de la miosina cardiaca (MYL3), alfa actina cardiaca y H-FABP, moléculas inflamatorias: TGF-ß y MMP-9, y moléculas implicadas en la angiogénesis: HIF-1a y VEGF-1. Posteriormente se analizo la expresión de tales moléculas en geles de agarosa.

**Results:** Se extrajo de forma eficaz RNA de calidad, tanto en muestras de tejido, como de sangre y líquido pericárdico, obteniendo concentraciones de RNA de entre 0.14 y 0.75 µg/µl, con unas ratios de absorbancia 260/280 de entre 1.9 y 2.1. Tras la realización de PCR convencional, para valorar la expresión de las diferentes moléculas antes mencionadas, en cada tipo de muestra de cada cadáver, se encontraron diferencias llamativas entre el las muestras del fallecido por MSC y los otros dos, concretamente en la expresión de troponina T, troponina I, MYH7, MYL3, TGF-ß, y MMP-9.

**Conclusions:** Según nuestros resultados pensamos que la expresión de moléculas como troponina T, troponina I, MYH7, MYL3, TGF-ß, y MMP-9 se podrían plantear como marcadores precoces de MSC de origen isquémico, siendo necesario el desarrollar un estudio con mayor número de muestras que permita establecer la relación entre la expresión de estas moléculas y la MSC de origen isquémico.

**Keywords:** Muerte Súbita Cardiaca; Cardiopatía Isquémica; Genetica; Expresión

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# VIOLENCIA DE GENERO: HOMICIDIO POR ASFIXIA MECÁNICA

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**Case Report:** El caso trata de una mujer de 33 años de edad identificada, que en el día 8 de septiembre del 2009 es hallada en el interior de Hangar en un Aeropuerto de la ciudad de Medellín, según lo consignado en la inspección técnica del cadáver, se observa un cadáver de sexo femenino, el cual se encuentra tendido en el suelo en posición y orientación natural decúbito lateral izquierdo, se halla atada de manos en región dorsal, región lumbar y en los tobillos con una soga de color amarillo. Al inspeccionar el cuerpo se le halla en la región craneana una chaqueta color beige, dos bolsas plásticas color blanco, una bolsa plástica color negro y una toalla color blanco que cubre totalmente el cráneo, se visualiza además en el cuello y atado alrededor del mismo, un cordón negro y una camiseta color blanco con estampado. El cadáver se recibe embalado en bolsa plástica, luego de retirar el embalaje se documenta el cadáver de una mujer joven vestida con manos embaladas con signos de inmovilización premortem en miembros superiores e inferiores, caracterizados por escoriaciones y equimosis rojizas en tercio inferior de antebrazo derecho e izquierdo y en tercio inferior de pierna derecha e izquierda. Presenta bolsa plástica en la cabeza, signos de asfixia mecánica como petequias faciales, palpebrales, en mucosa oral y en paladar, hemorragias conjuntivales, marcada congestión facial, fluidez sanguínea y hemorragias en peñasco bilateral. Además se observan traumas de tipo contundente, como hematoma de color rojizo en la región occipital derecha, hematoma facial en región maxilar izquierda, hematomas torácicos y abdominales. Múltiples hematomas y equimosis en miembros superiores e inferiores. Se realizan incisiones tradicionales y especiales, estudio ginecológico y toxicología .

**Discussion:** Asfixia etimológicamente significa ausencia de pulso. Reportamos este caso de violencia de género ocurrido en un Aeropuerto donde su muerte es secundaria a asfixia mecánica homicida, con signos de tortura e inmovilización premortem. Entre los años 2006 y 2009 de los 732 casos de muertes en mujeres estudiadas en la Regional Noroccidente Medellín, en 21 de ellas la causa de muerte fue sofocación. En la literatura revisada las muertes ocasionadas por sofocación, se relacionan con traumas contundentes. Los hallazgos característicos se relacionan con los documentados y descritos en la mujer hallada en el hangar del Aeropuerto como son: hemorragias petequiales la cual se observan en la piel, en las escleras y en las membranas serosas, aumento de la fluidez sanguínea y la cianosis cutánea en región facial.

**Conclusions:** Al realizar una necropsia radicada como homicidio en una mujer, uno de los puntos en los cuales se hace relevancia es en la agresión sexual, traumas contundentes y signos de inmovilizacion. Hallazgos documentados en el estudio realizado de la occisa donde una necropsia completa, con incisiones especiales, estudios ginecológico y toxicológico nos permite concluir el caso.

**Keywords:** Homicidio; Anoxia; Sofocación; Cianosis; Femicidio; Signos de Inmovilización

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# ESTUDIO DEL COMPORTAMIENTO POSTMORTEM DE MARCADORES DE DAÑO CEREBRAL

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**Introduction:** En estudios previos ( Hans, 1989; Vázquez, 1995; Sánchez Rodríguez y Osuna, 1993) se ha demostrado la utilidad de isoenzima CK-BB y CK total como marcadores de daño cerebral difuso o sufrimiento cerebral secundario a hipoxia. Otros autores ( Coe, 1985, 1993; Madea, 2007) destacan la utilidad de un estudio bioquímico postmortem en determinadas circunstancias donde no es posible el diagnóstico macroscópico o histológico bien porque los hallazgos sean inespecíficos y no expliquen la causa de la muerte, bien por las influencias de los cambios que ocurren tras la muerte, autolisis y putrefacción, que introducen modificaciones e interferencias a la hora de interpretar lo observado. Se plantea en estos casos la necesidad de establecer uno o varios fluidos relacionados con los compartimentos donde se encuentre el daño y donde se vea menos afectado por las interferencias del intervalo postmortem o la agonía. La interrelación de los diferentes compartimentos y de las sustancias bioquímicas que son demostrativas de lesión o daño puede ser de gran interés para aquellos tejidos donde la autolisis y la putrefacción ocurren de forma precoz en el intervalo postmortem, permitiendo que se pueda realizar una aproximación diagnóstica mediante un estudio en otro compartimento sometido a menos influencias de los fenómenos cadavéricos.

**Materials:** La muestra de los tres fluidos seleccionados , suero, líquido cefalorraquídeo y humor vítreo, se ha obtenido de 82 cadáveres ( 55 hombres y 27 mujeres) de edad media 51 años (SD 18.9; range 85- 18 años) cuya procedencia es de la Univerdidad de Dumdee ( Escocia). Se han clasificado las causas de la muerte en cuatro grupos diagnósticos: grupo 1(15 casos con lesiones macroscópicas de daño cerebral en diferente intensidad o grado de afectación); grupo 2 (23 casos de muerte por hipóxia cerebral con daño cerebral difuso no macrocópico); grupo 3(23 de muerte cardiaca ) y grupo 4 (21 casos con otras formas de causas de muerte no incluidas en las las anteriores categorías, miscelánea). El intervalo postmortal en los diferentes grupos diagnósticos no presenta diferencias significativas (44 horas postmorten de media para el grupo 1; 31,46 horas para el grupo 2; 38,28 para el grupo 3 y 38,53 horas para grupo 4.

**Results:** En nuestro estudio se encuentra que CK en suero tienen una correlación estadísticamente significativa con los siguientes parámetros en suero: CK-BB ( 0.270); ( LDH (0.610); Aldolasa (0.612); con GGT (0.264); Leucinaminopetidasa (0.414). Ck total en humor vítreo con Aldolasa en humor vítreo (0.769) y con Aldolasa en suero (0.340) y menos relación con Aldolasa en Liquido cefalorraquídeo (0.272). LDH en liquido cefalorraquideo (0.281). CK en Liquido cefalorraquídeo tiene relación con: CK_BB en liquido cefalorraquideo(0.705) con la LAP en Lcr (0.553) ; LDH en Lcr (0.484) y en menor medida con CK en suero (0.243); con LDH en humor vítreo (0.221) ; Aldolasa en suero (0.246); Aldolasa en Liquido cefalorraquideo (0.242) y con LAP suero (0.259). La isoenzima de la Creatinquinasa ( CK-BB) en LCR, presenta una correlación etadistícamente significativa con: CK total en suero (0.298); con CK en LCR (0.705); con LDH en suero (0.238) y en LDH LCR (0.441) ; Aldolasa en suero (0.374); Aldolasa

**Discussion and Conclusions:** En nuestro estudio concluimos que los marcadores estudiados pueden ser de utilidad para el diagnóstico de muerte de origen cerebral ante la sospecha diagnóstica y en ausencia de hallazgos demostrativos de lesión macroscópica o histológica inespecifica al encontrase en relación con enzimas relacionadas con sufrimiento cerebral como la CK total y su isoenzima BB (CK-BB). Por otro lado se puede hacer el estudio de algunas de estas sustancias y también de CK y CK- BB en otros compartimentos diferentes al líquido cefalorraquídeo donde principalmente ofrecería resultado más significativos pero que es más susceptible de poder sufrir un deterioro precoz por la evolución de los fenómenos cadavéricos.

**Keywords:** Daño Cerebral; Marcadores

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# UN CASO DE HERIDA PENETRANTE ATÍPICA EN UN ATROPELLO

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**Introduction:** En España. La práctica de las autopsias derivadas de muertes violentas o sospechosas de criminalidad vienen reguladas por la Ley de Enjuiciamiento Criminal, artículo 7…….La autopsia médico legal o judicial comienza con la diligencia de levantamiento del cadáver (inspección ocular, examen del cadáver, etc), para posteriormente realizar la autopsia propiamente dicha en los Institutos de Medicina Legal. En el caso de los accidentes de tráfico, nuestra legislación permite que el levantamiento del cadáver se realice directamente por la Guardia Civil de Tráfico, quién lleva a cabo un atestado o descripción de cómo ha ocurrido el accidente que posteriormente se remite al Juez para incorporarlo a las diligencias judiciales. En éste último caso, el Médico Forense, al no acudir al lugar del accidente, desconoce como se produjo el mismo, lo que en ocasiones puede desembocar en que, en algunos de ellos, como es el caso de los atropellos, se carezca de la información inicial que proporciona la inspección ocular en el lugar de los hechos y que al realizar el examen del cadáver, éste presente lesiones que pueden inducir a error al presentar características compatibles con otros mecanismos de producción. Puesto que el atropello supone un traumatismo complejo con múltiple variedad de lesiones, pueden plantearse problemas de diagnóstico médico legal de algunas de las lesiones que presente el cadáver, debiendo realizar un diagnóstico diferencial con otras posibles etiologías médico legales, tales como el homicidio

**Materials and Methods:** Un ejemplo de ello queda reflejado en nuestro estudio, puesto que se trata de un varón fallecido tras sufrir un atropello por un camión al bajarse del automóvil que conducía, en una autovía. Al iniciar la autopsia y realizar inicialmente el examen externo del cadáver, se observó, entre otras lesiones, una herida de características inciso-punzante en la región dorsal media superior que no parecía compatible con las características del atropello sufrido, se planteó la posibilidad de que dicha herida hubiese sido producida por un arma blanca, barajándose la posibilidad de una etiología homicida. Tras el análisis del atestado realizado por la Guardia Civil de Tráfico, con el correspondiente reportaje fotográfico, y la recuperación de algunos restos del vehículo que pudieran ser los responsables de la herida mencionada, se procedió a realizar un estudio comparativo morfológico, comprobándose la compatibilidad de uno de los restos metálicos con la lesión observada, y completando el estudio con la realización de un análisis de ADN de los restos sanguíneos hallados en el objeto

**Discussion and Conclusions:** La finalidad de dicho estudio estriba en la necesidad de realizar en los casos de accidentes de tráfico, un estudio pormenorizado tanto de los hallazgos provenientes del lugar de los hechos, como de los observados en el cadáver, debiendo realizar una autopsia reglada y no dar por válidas meras hipótesis sin confirmación objetiva

**Keywords:** Heridas Atípicas; Atropello

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# ESTRANGULACIÓN ATÍPICA BAJO CONTENCIÓN MECÁNICA EN PRISIÓN

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**Introduction:** Las muertes en custodia o en privación de libertad tienen una gran importancia médico-forense tanto por su complejidad como por sus repercusiones en diferentes ámbitos: sanitario, social, administrativo... y para dirimir la posibilidad de reclamación de responsabilidad criminal o de tipo institucional. Por todo ello, la investigación médico-forense debe ajustarse a protocolos específicos de actuación.

**Materials and Methods:** Estudio retrospectivo de un caso complejo de muerte en situación de privación de libertad y contención mecánica ocurrida en el año 2009. Se valoró el expediente del Servicio de Patología Forense de la ciudad de Barcelona. Se analizaron informes de levantamiento de cadáver, autopsia médico-forense, toxicología, histopatología y biología, así como la documentación aportada por el centro penitenciario, y por el cuerpo policial de Mossos d'Esquadra.

**Results:** Varón de 23 años de edad, de raza negra, y sin antecedentes psiquiátricos u orgánicos conocidos que, estando en prisión, hizo un intento autolítico mediante ahorcadura con una sábana. Se le indicó contención mecánica médica mediante inmovilización en decúbito prono sobre la cama con ligadura de las cuatro extremidades. Transcurridas unas horas en esta posición, y entre controles periódicos de los funcionarios, fue encontrado éxitus con el cordón del pantalón de su chándal rodeándole el cuello. La autopsia demostró un surco continuo horizontal de estrangulación supraglótico, ausencia de signos de defensa y lucha y de otros indicios de violencia externa. También se observaron infiltrados hemorrágicos en fascia epicraneal y cuero cabelludo. En la disección protocolizada del cuello se evidenció lesión hemorrágico-congestiva lineal transversal en la raíz de la lengua y estructuras faríngeas, marcado edema periglótico en ausencia de fracturas de hioides y de cartílagos laríngeos. Signos de Otto y Amusat negativos. Los análisis toxicológicos en sangre y vías de eliminación descartaron la presencia de etanol, carboxihemoglobina, drogas de abuso y psicofármacos. La biología excluyó la presencia de espermatozoides y/o de líquido prostático en cavidad rectal. El estudio genético de restos ungueales demostró una mezcla de perfiles procedente de dos varones, siendo uno de ellos compatible con el finado. En las muestras de cabello, de 12 cm de longitud, se detectó la presencia de cocaína, cannabidiol (CBD) y delta-9-tetrahidrocannabinol (THC).

**Discussion:** DISCUSIÓN: Se trata de una muerte violenta en la que se plantearon dudas acerca de su etiología médicolegal por la gran dificultad de culminar una autoestrangulación en el contexto de las medidas de seguridad en contenciones mecánicas en prisión. No obstante, el intento de autolisis previo, la no evidencia de signos de defensa y lucha, la ausencia de tóxicos y el surco de estrangulación sin características homicidas, orientaron como hipótesis más probable la etiología suicida. La causa de la muerte se valoró como una anoxia anóxica por compromiso cervical extrínseco por estrangulación. Dicha estrangulación es atípica por los hallazgos periglóticos, que podrían estar relacionados con la constricción cervical previa mediante intento de ahorcadura y posterior restauración del flujo sanguíneo.

**Conclusions:** Desde el punto de vista médico-legal consideramos que la constricción cervical por intentos de autolisis previos puede producir lesiones internas que, asociadas a otros mecanismos, como el descrito, contribuyan a la muerte por insuficiencia respiratoria.

**Keywords:** Estrangulación Atipica; Contención Mecanica; Muerte en Custodia

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# UTILIDAD DE LAS DOCIMASIAS FETALES EN UN CASO DE PARTO GEMELAR

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**Introducción:** En el estudio de niños recién nacidos y muertos, el médico forense debe, entre otras cosas, establecer si el niño nació vivo o no y determinar la causa de la muerte y su etiología médico legal (natural, accidental o criminal). Las "docimasias fetales" es un término que se utiliza para designar a distintas pruebas que se realizan en los órganos para la comprobación de signos de vida en los cadáveres, particularmente en la investigación de la existencia de vida extrauterina en los casos de infanticidio. Así en materia de muerte en recién nacidos, y aparte de la autopsia, pruebas microscópicas de tejidos y otros exámenes o análisis, para la demostración de la vida autónoma del feto, las docimasias son otras de las pruebas básicas a las que recurre la Medicina Legal. El objetivo de la presentación es ver la utilidad de las llamadas "docimasias fetales", en un caso de muerte de dos recién nacidos gemelos.

**Material y método:** Se presenta el caso de un parto gemelar acaecido en el domicilio y sin control médico. Las diligencias del levantamiento pusieron de manifiesto la presencia del dos cadáveres recién nacidos en los cuales se tenía que establecer el mecanismo y causa de muerte, así como si hubo sobrevivencia al parto o no. Se procedió a la realización de la autopsia judicial en el departamento de patología forense del Instituto de Medicina Legal de Catalunya (IMLC). Practicándose según el protocolo habitual un examen externo e interno a ambos neonatos (A y B), y remitiendo todos los órganos al INTCF para el estudio histopatológico (incluida la docimasia pulmonar histológica). Previamente a la apertura de los cadáveres se practicaron las docimasias radiológicas (Docimasia radiográfica de Bordas). Después se procedió a la apertura de los cadáveres (neonato A y neonato B) y se realizaron las siguientes docimasias: - Docimasia diafragmática de Casspes - Docimasia pulmonar óptica de Bouchet - Docimasia pulmonar hidrostàtica de Galeno También se realizaron estudios histopatológicos de la placenta y de cordón umbilical de ambos neonatos.

**Resultados:** Los resultados del examen externo (fenotipo y grado de desarrollo) y aplicando las tablas de Dubowitz, a ambos neonatos A y B, se comprobó una edad gestacional de 34 semanas, que se considera a término en un parto gemelar. No se encontraron anomalías del desarrollo, ni defectos congénitos en ninguno de los neonatos (neonato A y neonato B). Las docimasias mostraron una clara diferencia entre ambos neonatos siendo positivas para el neonato A y negativas para el neonato B. Además el estudio histopatológico de los pulmones también coincidió en el resultado obtenido de las docimasias. Neonato A: Radiografía con aire en pulmones y visualización de la silueta cardíaca. Aire en cámara gástrica. Neonato B: Radiografía en la se observa ausencia de expansión y aire pulmonares. No se identifica la silueta cardíaca. No se objetivó aire en la cámara gástrica.

**Conclusiones** Las docimasias fetales actualmente continuan siendo una de las herramientas sencillas y fáciles de realizar por los médicos forenses, que han demostrado su gran valor diagnóstico en casos de muertes neonatales. Las docimasias radiológicas son una prueba complementaria muy útil, barata y sencilla y de gran ayuda en la investigación muerte de recién nacidos.

**Keywords:** Docimasias Fetales; Parto Gemelar

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# CRITERIOS PARA EL ESTABLECIMIENTO DE RELACIONES CAUSALES EN LA VALORACION PERICIAL DE VICTIMAS CON DANO PSIQUICO

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**Abstract:** Un aspecto importante de las consideraciones en el peritaje psicologico es el estudio de la relacion causal. Aqui presentamos un resumen y adaptacion de las categorias y criterios de Ruiz, Llor, Garcia y Arenas (2004) y Llor y Ruiz (2009). CRITERIO 1: La informacion suficiente. Los datos aportados (documentos, informes medicos, etc) y la informacion obtenida en las entrevistas deben se valoradas como suficientes para poder pronunciarse. Seria imprudente emitir un juicio si se carece de alguna informacion estimada necesaria para el analisis de la relacion causal. CRITERIO 2: Valoracion de la credibilidad del relato. Es un aspecto crucial dentro de la evaluacion de la victima. En el contexto de un proceso judicial, existen ganancias que obligan a descartar la falta de honestidad del entrevistado. En este sentido, son varios los procedimientos dirigidos a validar la credibilidad del relato, siendo recomendable utilizarlos conjuntamente: a) Tecnicas de entrevista (analisis de contenidos y del lenguaje no verbal); b) Tecnicas psicometricas; y c) Tecnicas psicofisiologicas. CRITERIO 3: Certeza de la existencia de un factor traumatico. Con toda la informacion recogida es necesario determinar si la situacion sufrida por la posible victima reune criterios cientificos suficientes para alcanzar la certeza de que se trata de factor traumatico de estres de suficiente intensidad como para causar dano en personal normal. CRITERIO 4: Certeza de la existencia de un cuadro clinico identificable. El estado psiquico de la victima debera reunir criterios suficientes para llegar a la certeza de que supone una alteracion reconocible como un cuadro clinicamente relevante. Para ello, la entrevista clinica, las pruebas complementarias realizadas, y los informes de otros profesionales deben indicar la presencia de psicopatologia siguiendo los criterios internacionalmente reconocidos. CRITERIO 5. Sucesion temporal entre agente y efecto compatible. El factor traumatico identificado debe anteceder en el tiempo al cuadro psiquico de la victima, siendo necesario descartar que la sintomatologia estuviera presente con anterioridad a la aparicion del factor traumatico. CRITERIO 6. Certeza etiopatogenica del cuadro clinico. El cuadro clinico de la victima deberia presentar caracteristicas compatibles con un cuadro reactivo. Se debe considerar la presencia o ausencia de antecedentes clinicos previos, la forma de aparicion de los sintomas, la mejoria clinica apreciada a partir del alejamiento del factor traumatico de estres, etc. En todo caso, debe descartarse la existencia de otras causas de caracteristicas mas endogenas, como trastornos psiquiatricos mayores y trastornos de la personalidad. CRITERIO 7. Descartar otras fuentes de estres alternativas al factor traumatico en estudio. Hay que comprobar la existencia e intensidad de otras fuentes de estres que pudieran justificar la psicopatologia de la victima. Si las hubiera, el perito debe analizar la secuencia cronologica de todas ellas incluido el factor en estudio, asi como la influencia de cada una sobre el estado de la victima. Obviamente hay que contemplar la posibilidad de una multicausalidad no disyuntiva. Aunque la realidad aparezca mas compleja, es tarea del perito trabajar en la separacion de las diferentes causas reales concurrentes, para deducir la magnitud de su influencia y, por tanto, la pertinencia o no de la imputabilidad. CONSIDERACION FINAL. El cumplimiento total o parcial de los distintos criterios propuestos conducira a conclusiones mas o menos contundentes sobre la existencia de relaciones causales entre fenomenos especialmente complejos como son aquellos relacionados con el dano psiquico.

**Keywords:** Criterios Causalidad; Relacion Causal; Dano Psiquico; Valoracion Pericial

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# DETERMINACIÓN DE METALES PESADOS EN UNA POBLACIÓN TARDORROMANA DEL MUNICIPIO DE AGUILAS

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**Abstract:** Un metal tóxico es aquel que pertenece al grupo de elementos que no son necesarios o beneficiosos, capaces de causar efectos indeseables en el metabolismo, aún a concentraciones bajas. Algunos de estos metales ingresan a nuestro organismo en porciones menores, vehiculizados por los alimentos, agua o el aire que respiramos. Dadas las características del diente, hueso y tierra, hacen que sean medios idóneos para el estudio del almacenamiento de metales pesados, gracias a la gran facilidad de obtención. La recogida de la muestras no supone ningún problema, dado que contamos con un yacimiento de restos humanos debidamente datados y clasificados. El objetivo de nuestro estudio consiste en determinar los niveles de metales pesados en muestras de hueso, diente y tierra procedentes de una necrópolis de la época tardorromana de los siglos III Y IV d.C encontrada en Aguilas Los materiales utilizados para este estudio corresponden con restos dentales que representan tanto la dentición temporal, mixta como permanente. La muestra se compone también de cráneos ,mandíbulas, tierra y huesos largos, que pertenecen a un número de 50 casos. Tras la recogida, se procedió al triturado y molido de cada muestra a continuación se procede al lavado de las mismas. Tras esta primera fase de preparación pasaremos a realizar el estudio de los niveles de metales pesados en las muestras de hueso, diente y tierra mediante la difracción de Rayos X. Los resultados serán expuestos en tablas de los que trataremos de obtener conclusiones sobre los niveles de metales pesados en una población tardorromana de Águilas. Murcia.

**Keywords:** Metales Pesados; Restos Humanos; Difraccion de RX; Contaminácion

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# LA GESTIÓN DE LAS CERVICALGIAS POSTRAUMÁTICAS. UN PROBLEMA NO RESUELTO

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**Introduction:** Sobre una muestra inicial de 6190 casos de lesionados con patología cervical en sus diferentes grados (cervicalgias, hernias etc.) bien sola o asociada a otras patologías, como consecuencia de agresiones y accidentes de tráfico, hemos realizado un análisis sobre los factores extrajudiciales que condicionan los periodos de curación y las secuelas relacionados con los procesos de gestión asistencial de la patología.

**Materials and Methods:** Hemos analizado, inicialmente, un total de 15134 lesionados reconocidos en el IML de Murcia, de los que 6190 presentaron patología cervical derivada de accidentes de tráfico y de agresiones. Se recogen las agresiones y se seleccionan utilizando como criterio la edad y el sexo, así como la existencia de patología previa, y se compara con una muestra equivalente de lesionados por accidente de tráfico verificada por un análisis de correlaciones de Pearson para el estudio de casos control

**Results:** De los 6190 casos analizados inicialmente con cervicalgia como síntoma único o unido a otros, comprobamos que 5.315 corresponden a accidentes de tráfico y 875 a agresiones, con una edad media de 34.18 ± 5.98. De ellos, 3131 son varones con una edad media de 33.85 ± 13.38 y 3042 mujeres con una edad media de 34.53 ± 13.79. Con respecto a la existencia o ausencia de patología previa, en el caso de los varones 556 tenían patología previa y 2572 carecían de ella y en las mujeres, 554 tenían patología previa y 2483 no la padecían.

**Discussion and Conclusions:** El conocimiento de las posibilidades que generan las exploraciones complementarias no justificadas asistencialmente ni pericialmente, para conseguir un incremento en las posibles indemnizaciones genera comportamientos que distorsionan la gestión de un proceso en el que el solapamiento de los recursos asistenciales (sanidad pública, sanidad privada elegida por el propio paciente o su abogado, y los recursos sanitarios de las compañías aseguradoras) ofrece un terreno abonado para la manipulación intencionada del proceso que podría evitarse con un protocolo claro y preciso que sirviera de guía al proceso asistencial y al mismo tiempo ser una ayuda inestimable para la función pericial que debe buscar la verdad y la justicia basadas en un conocimiento preciso de los hechos

**Keywords:** Cervicalgia Post Traumática

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# INFLUENCIA DE LA FISIOPATOLOGÍA EN LA CONCENTRACIÓN DE ETILGLUCORÓNIDO (ETG) EN MUESTRAS DE SANGRE PROCEDENTES DE CADÁVERES JUDICIALES

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**Abstract:** El Etil-glucurónido (EtG) es uno de los metabolitos directos del etanol (EtOH), su estructura molecular, propiedades fisicoquímicas y reducidos valores normales en el organismo, son características importantes para determinar y comparar su presencia en individuos con diferente ingesta de EtOH. El EtG se determina en 3 tipos de muestras biológicas forenses diferentes: la sangre, donde se distribuyen todos los marcadores de interés; la orina, por contener los metabolitos a eliminar por el organismo, y el pelo, que acumula metabolitos y proporciona una ventana cronológica y retrospectiva del consumo. Los niveles más elevados de EtG pueden encontrarse en sangre, sin embargo dichos niveles pudieran verse alterados por la presencia de ciertas fisiopatologías.

Se piensa que la presencia de ciertos hallazgos patológicos pueden modificar los valores normales de EtG, falseando la medición indirecta de la ingesta de EtOH. Se pretende medir la concentración de EtG como medida de la ingesta de EtOH, verificando in situ la patología presente en cadáveres, así como las alteraciones metabólicas del individuo.

Se partió de muestras sanguíneas pertenecientes a 50 cadáveres judiciales, obtenidas bajo supervisión del médico forense de guardia y la autorización del Instituto Anatómico Forense de Madrid (IAF-M). La muestra se obtuvo mediante punción en cavidad cardiaca y posterior almacenamiento a -20ºC. El procesamiento de todas las muestras para la medición de los niveles de EtG se realizó según mediante HPLC/MS/MS, según técnica estándar empleada en el IAF-M. La presencia de fisiopatologías, principalmente hepáticas, puede modificar de manera significativa los niveles de EtG, por lo que resulta imprescindible la valoración conjunta de dichas fisiopatologías y de los niveles del marcador mencionado.

**Keywords:** Ethanol; Ethyl Glucoronide (ETG); HPLC/MS/MS

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# ESTUDIO DE LA MUERTE SÚBITA DE ORIGEN INFECCIOSO. A PROPÓSITO DE UN CASO

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**Introduction:** La muerte súbita en personas jóvenes, fundamentalmente varones, es cada vez mas frecuente, y ello ha dado lugar a la realización de numerosos estudios cardiológicos y/o genéticos para tratar de diagnosticar precozmente el riesgo familiar a padecer ésta patología. No ocurre lo mismo en el caso de las mujeres, donde el fallecimiento de forma súbita es sensiblemente inferior y, en consecuencia, cuando se produce, mucho menos conocido su origen. No obstante, no siempre éstos fallecimientos tiene un origen cardíaco, olvidando frecuentemente otras posibles etiología y, en consecuencia, obviando la realización de otros estudios que bien podrían aclarar el origen de la muerte súbita de que se trate. Nos referimos al origen infeccioso en los casos de muerte repentina, donde un estudio microbiológico, unido a los estudios químico-toxicológicos e histopatológicos, pueden esclarecer la causa de un fallecimiento, en principio de origen desconocido.

**Materials and Methods:** Se trataba de una mujer árabe, joven, de 23 años de edad, que estando dando el biberón a su hijo de pocos meses, se sintió indispuesta, se acostó y poco rato después, fue hallada muerta por el marido. No existían antecedentes de enfermedad alguna salvo la existencia de fiebre, no bien datados ninguno de los antecedentes por la dificultad idiomática. La autopsia se realizó siguiendo los criterios de prevención ante una muerte de posible origen infeccioso, con la toma de muestras para microbiología, junto a muestras para toxicología e histopatología

**Results:** Los estudios preliminares, una vez descartada una posible contaminación durante la autopsia, han revelado la existencia de una capa de staphilococcus aureus muy agresiva, que ha obligado a la toma de muestras del marido e hijo para comprobar su estado y si se trata de portadores.

**Discussion and Conclusions:** En los casos de muerte súbita, no solo es preciso realizar estudios histopatológicos, preferentemente cardíacos, así como genéticos para determinar la causa de la muerte, sino que siempre hay que tener en cuenta la posibilidad de un origen infeccioso y realizar estudios microbiológicos, para tratar de minimizar en lo posible las denominadas "autopsias blancas".

**Keywords:** Muerte Súbita Infecciosa

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# TUMOR CEREBRAL: CAUSA DE MUERTE SUBITA. PRESENTACION DE DOS CASOS

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**Case Report:** CASO 1 Paciente de 7 años de edad quien es conducida a centro hospitalario por presentar vomito y cefalea, ingresa en paro respiratorio, fallece, con diagnostico de muerte súbita, es conducida al Servicio de medicina Legal y Ciencias Forenses en Medellín. En la necropsia se documenta el cadáver de una niña sin lesiones traumáticas. Al examen interno se documenta Cerebro con peso en fresco de 1305 gr, con signos de edema. Cerebelo y tallo en la fosa posterior se observa formación tumoral de bordes irregulares, lobulada, de color blanquecino, consistencia firme, al corte de aspecto nodular, localizado en el techo del cuarto ventrículo. Herniación uncal y amigdalina bilateral. Al estudio Histopatologico los cortes revelan formación tumoral constituida por células pequeñas con citoplasma eosinofilo y núcleos hipercromaticos que en sectores se disponen en seudorosetas, con lumen central y en empalizadas, además se visualizan áreas de necrosis, focos de hemorragias intratumoral y mitosis. CASO 2 Paciente de 23 años de edad quien ingresa a entidad hospitalaria sin signos vitales con antecedentes de epilepsia. En la necropsia presenta dos laceración en codo izquierdo y escoriaciones antiguas en cara anterior de pìerna derecha, las cuales sin superficiales. Al examen interno presenta congestión visceral generalizada sin signos de trauma. Cerebro peo de 1323 gramos, superficie externa congestiva, en los cortes coronales presenta formación tumoral de 5x4 cm con áreas de necrosis y degeneración quística hemorrágica que crece a partir de los núcleos de la base del lado derecho, se extiende al ventrículo lateral derecho y lóbulo temporal ipsilateral. Se observa desviación de la línea media hacia el lado izquierdo con herniación del uncus. En los cortes histopatológicos de la lesión tumoral se visualiza células tumorales neurogliales con marcadas áreas de hemorragias y necrosis En los dos casos estudiados se realiza inmunohistoquimica para determinar el diagnostico histopatológico de los tumores.

**Discussion:** Los tumores embrionarios son tumores indiferenciados de células redondas que muestran diferentes patrones de diferenciación. Representan un grupo heterogéneo de tumores del sistema nervioso central (SNC) y del periférico (SNP), y tanto su origen como su clasificación histopatológica no están claras. El meduloblastoma es el PNET del SNC más común en la edad pediátrica, suponiendo el 20-25% de los tumores cerebrales. Los PNET supratentoriales son histológicamente similares a los meduloblastomas, pero su pronóstico es más agresivo que el de éstos. El tumor embrionario más frecuente del SNP es el neuroblastoma, que presenta características histológicas similares a los PNET centrales con diferenciación. El glioblastoma es el tumor glial más frecuentes es una neoplasia indiferenciada de origen astrocitario y se origina en la mayoría de los casos de los atrocitos fibrilares, por desdiferenciación de estos. Se localiza en los hemisferios cerebrales (frontal y temporal) en los adultos y en el tronco cerebral en los niños. En relación al ependimoma el lugar más común de presentación es en cualquier sitio del neuroeje en intima relación con el epitelio ependimario o sus remanentes. Siendo más común en el cuarto ventrículo y el filum terminal. El estudio histológico revela lesiones con células son uniformes de núcleo redondo o alargado las cuales se disponen alrededor de los vasos sanguíneos formando las pseudorosetas perivasculares.

**Conclusions:** Presentamos estos casos de muerte súbita por neoplasia cerebral, la cual es infrecuente en nuestro medio. Los hallazgos macroscópicos, histopatologicos y la inmunohistoquimica nos permiten realizar un diagnostico.

**Keywords:** Muerte Subita; Tumor Cerebral. Neoplasias Cerebrales

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# INCESTO. PRESENTACION DE UN CASO

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**Introducción:** Niña de 12 años de edad, padres separados, quien visitaba por solicitud de la Comisaria de Familia a su padre todos los fines de semana. Padre con antecedentes de abuso sexual hacia cuñadas, el cual manifiesta la madre fue motivo de su separación. Es llevada por el Padre a entidad Hospitalaria donde al examen físico observan sangrado por genitales y herida perineal, que requiere sutura. Es reportado a la policía e informado a la Unidad de Infancia y adolescencia quienes realizan estudio de la escena y llevan para la realización del dictamen sexológico en la URI del Bunker de la Fiscalía, de Medellín. Al examen sexológico Himen anular con desgarro reciente a las seis de las manecillas del reloj de bordes hemorrágicos que se extiende por la horquilla vulvar hasta el periné, donde se observan los puntos de sutura. Sin signos de enfermedades de transmisión sexual.

**Metodología:** La paciente fue examinada en el Consultorio de Medicina Legal del Bunker de la Fiscalía, con base al reglamento técnico de abordaje de la Victima de Abuso Sexual

**Discusión:** Presentamos este caso por el conocimiento previo de la entidad Gubernamental sobre los antecedentes de conductas sexuales inadecuadas del padre quien finalmente cometió el abuso sexual contra su hija

**Resultados:** El conocimiento y reporte de los médicos en la atención inicial en entidad Hospitalaria, el estudio sistemático de la escena, estudio de las prendas y un examen sexológico completo, permiten generar una conclusión del caso y reducir las cifras de impunidad en estos casos.

**Keywords:** Violencia de Género; Incesto; Acceso Carnal Abusivo

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# HOMICIDIO DE MADRE E HIJO: VIOLENCIA DE GENERO

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**Case Report:** En área Rural de Municipio de Sonsón, se halla fosa clandestina en la cual a 70 cm de profundidad se documenta un costal de fibra sintética y restos de prendas de vestir. Luego de continuar el estudio de la escena a 80 cm de profundidad se encuentran los dos cuerpos en avanzado estado de descomposición con tejidos blandos, ubicados uno encima del otro. HALLAZGOS (AUTOPSIA, LABORATORIO, OTROS) Se reciben embalados separadamente: Se realizan las necropsias medico legales con los requerimientos dados en el INML para estudio de restos óseos de forma interdisciplinaria: patología forense, odontología forense, fotografía forense y antropología forense.

CASO 1 - Cadáver vestido con cambios post mortem tardíos de sexo masculino menor de 9 años de edad, con trauma de cráneo vital de origen contuso, por diastasis de suturas coronal y sagital con coloración marrón oscura en los bordes, fracturas diastasadas de las articulaciones de los arcos cigomáticos con el malar bilateral, fracturas lineales de ambos huesos temporales, en el lado derecho con zona de hundimiento. En la región derecha de la bóveda y la base del cráneo se observa coloración oscura café que corresponden a restos de sangre por presencia de hematoma extradural.

CASO 2 - Mujer de 20 a 30 años de edad, vestida, semiesqueletizado con cambios post mortem tardíos y formación de adipocira, cráneo dividido en 16 fragmentos con hallazgos compatibles con lesiones por proyectil de arma de fuego de carga múltiple por los elementos balísticos recuperados. VI. DISCUSIÓN: Reportamos estos dos casos de madre e hijo cuyas causas de muerte son trauma de tipo contundente en el menor y por proyectil de arma de fuego en la madre. En relación a la literatura mundial forense revisada los niños mayores de 3 años de edad y adolescentes son ignorados en especial los del grupo de 4 a 9 años de edad. En un estudio realizado en un periodo de 5 años del año 2000 al 2004, se revisaron 223 casos de muerte en la provincia de Quebec las causas de muertes fueron arma de fuego, trauma contundente , la asfixia, golpe brusco e intoxicación. En Colombia no existen en la literatura reportes de muertes de madre e hijos, en el caso que estudiamos hallamos dos causas de muerte diferentes en la progenitora y su hijo, trauma craneoencefálico de tipo contundente y proyectil de arma de fuego respectivamente.

Reportamos estos casos hallados en fosa común no judicializada de cadáveres madre e hijo donde la intervención interdisciplinaria de las ciencias forenses es necesaria ante la complejidad de los hallazgos, para realizar una conclusión completa y concreta de las causas de muerte.

**Keywords:** Violación de los Derechos Humanos; Violencia De Género; Infanticidio; Antropología Forense

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# PERITONITIS MECONIAL: REPORTE DE UN CASO

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**Case Report:** Niño de 36 semanas de edad gestacional, nacido por parto vaguinal pretermino, hijo de madre de 16 años de edad primigestante, con antecedente de epilepsia, cuatro controles prenatales, Al examen fisico materno con presion arterial de 130 /80 mmHg, altura uterina de 37 cm. Al nacimiento sin signos vitales, con ascitis fetal, peso 3060 gramos, talla 40 cm, perimetro cefalico de 33 cm y el toracico de 37 cm. Fallece con diagnostico clinico de ascitis por posible cardiopatia congenita En la necropsia medico legal se documenta el cadaver se sexo femenino de 36 semanas de edad por antropometria, con ascitis, no presenta hidrops fetal, sin lesiones traumaticas externas, ni malformaciones congenitas. Al examen interno, pulmones y corazon sin alteraciones macroscopicas ni histopatologicas. A nivel abdominal se observa aumento del perimetro abdominal del 36 cm a la apertura se visualiza multiples membranas de color amarillo, al higado e interasas, secrecion pardo amarillenta con exudado. En el estudio histopatologico revela serosa de intestinos con marcado engrosamiento dado por fibrina, histoicitos, celulas gigantes tipo cuerpo extraño, queratina, focos de calcificacion e infiltrado inflamatorio mixto de predominio linfocitario. La mucosa y la pared muscular no presentan alteraciones. No se visualizan granulomas ni focos de necrosis

**Conclusion**: una causa poco frecuente de muerte súbita, no hay casos reportados en nuestro medio y muy pocos casos reportados en la literatura internacional.

**Keywords:** Muerte Subita; Peritonitis; Muerte Intrauterina

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# RESPONSABILIDAD PROFESIONAL EN DERMATOLOGÍA MÉDICO-QUIRÚRGICA

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**Introduction:** Tradicionalmente, la mayoría de publicaciones especializadas en responsabilidad profesional médica han considerado la Dermatología Médico-Quirúrgica y Venereología como una especialidad de bajo riesgo de litigio o reclamación. Sin embargo, en los últimos años, el aumento de la actividad de los dermatólogos en procedimientos estéticos o cosméticos ha supuesto también un mayor riesgo de recibir una reclamación, denuncia o demanda, al tratarse de un procedimiento médico que exige un resultado: lo que hoy en día se denomina medicina satisfactiva.
Presentamos un estudio realizado en el Servicio de Responsabilidad Profesional(SRP) del Colegio Oficial de Médicos de Barcelona(COMB), analizando todos los casos de reclamaciones contra médicos existentes en la base de datos desde 1986 hasta 2010, seleccionando las reclamaciones relacionadas con la dermatología para conocer su incidencia, la tipología de los actos médicos reclamados, la vía de interposición de la reclamación y la responsabilidad de los facultativos implicados.

**Materials and Methods:** Se han analizado las reclamaciones relacionadas con la Dermatología notificadas al SRP del COMB en el período de estudio 1986-2010, amparados por el seguro médico de responsabilidad civil profesional del Consell de Col·legis de Metges de Catalunya. La cobertura de esta póliza incluye 23.426 médicos (Diciembre de 2010).

**Results:** En el período de estudio (1986-2010), se notificaron un total de 7.237 reclamaciones de las cuales 85 (1,2 %) se relacionaron con procedimientos de Dermatología. La vía de interposición más frecuente ha sido la vía judicial en un 61 % (50 % por vía penal y el 50 % por vía civil.), el resto de las reclamaciones se han interpuesto por la vía extrajudicial. El 59 % de las reclamaciones de dermatología se han producido en el ámbito extrahospitalario y el 69 % en asistencia privada. El importe total de las indemnizaciones satisfechas ha sido de 512.000 €, oscilando entre 1.000 € y 92.000 €.

**Conclusions:** 1. La dermatología es una especialidad de bajo riesgo reclamación. 2. En caso de reclamación judicial existe un porcentaje elevado de condena (34,6 %) 3. La baja siniestralidad es debida: a) Al poco riesgo quirúrgico, ya que la mayoría de intervenciones se realizan con anestesia local b) La patología cutánea en la mayoría de ocasiones no comporta riesgo vital 4. Existen dificultades diagnósticas tanto clínicas como histopatológicas en la patología del Melanoma Maligno 5. Es previsible un aumento de reclamaciones contra los dermatólogos por el amplio abanico terapéutico y por el aumento de la dermatología satisfactiva.

**Keywords:** Dermatología; Malpraxis; Responsabilidad Profesional

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# THE TEACHING OF DATA ANALYSIS TOOLS IN FORENSIC MEDICINE TRAINING PROGRAM AT THE UNIVERSITY OF CHILE

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**Methods:** Since 2005 , the first author is Chief Professor of the Resident Program in Legal Medicine. Considering the importance of processing data tools to study Crime Scenes, read investigation files, searchaproppriate bibliography , write medicolegal reports and present them in the Justice Court, we have incorporate this topic to the training Resident Program. We show the results after five years.

**Keywords:** Resident Program; Data Analysis Tools; Legal Medicine

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# LA PATOLOGÍA VASCULAR Y VENOSA EN LAS RECLAMACIONES POR DEFECTO DE PRAXIS EN CIRUGÍA VASCULAR Y ANGIOLOGÍA

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**Introduction:** La literatura científica señala que en el ámbito quirúrgico las tasas de eventos adversos son particularmente altas y el Harvard Medical Practice Study (HMPS) encontró la máxima tasa de eventos adversos en cirugía vascular (3%). Estas altas tasas reflejan la complejidad de los casos y los procedimientos que se realizan. La detección de eventos adversos, no implica la existencia de negligencia, de hecho el HMPS no encontró relación entre estas dos variables, considerándose como negligencia un 8.1% de los eventos adversos registrados en cirugía vascular. Actuarialmente, las cuotas de seguros de responsabilidad médica que realizan distinción entre especialidades apuntan a la cirugía vascular como una especialidad de "alto riesgo" de reclamación, resaltando la relevancia de estudiar las características de las reclamaciones interpuestas en ésta especialidad.

**Materials and Methods:** Se revisaron las reclamaciones registradas en la base de datos del Colegio Oficial de Médicos de Barcelona interpuestas entre 1986 y 2009 en asistencias relacionadas con la Cirugía Vascular y Angiología, analizando sus características legales y clínicas.

**Results:** El 1,3% de las reclamaciones iniciadas durante el periodo de estudio correspondían a actos médicos relacionados con la Angiología y Cirugía Vascular (91 casos). Un total de 49 se relacionaban con asistencia a patología venosa, siendo el evento adverso más reclamado la lesión neurológica (14 casos), seguido de la afectación estética (11 casos). Los 42 casos restantes correspondían a asistencia a patología arterial, siendo el evento adverso más frecuente la amputación (10 casos). La vía de reclamación más utilizada en general fue la judicial (65%), especialmente en patología arterial (83%). Las indemnizaciones resultaron más frecuentes en la asistencia a patología venosa (38%) que en la arterial (19%). Si bien la media de indemnización resultó más elevada en las asistencias relacionadas con patología arterial (93.228 euros vs. 30.144 euros).

**Final Comments:** La frecuencia de reclamación resulta similar entre las asistencias a patología arterial y venosa. Si bien las indemnizaciones resultan más frecuentes en patología venosa, la cuantía es marcadamente superior en patología arterial, señalando la especial importancia de este área de la Angiología y Cirugía Vascular respecto al riesgo de responsabilidad profesional y a la seguridad del paciente.

**Keywords:** Cirugía Vascular; Angiología; Responsabilidad Profesional; Malpraxis

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# INTOXICACIÓN POR MONÓXIDO DE CARBONO SIN HISTORIA DE EXPOSICIÓN: DOS VÍCTIMAS UN CADÁVER. REPORTE DE CASO

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**Introduction:** La intoxicación por monóxido de carbono (CO) es fácilmente diagnosticada cuando existe sospecha de exposición. La ausencia de información sobre posibles focos de producción de CO, sobretodo antes de la realización de una autopsia médico-legal, dificulta su diagnóstico. Presentamos un caso de una pareja víctima de intoxicación accidental por CO, de la que resultó una víctima mortal.

**Case Report:** Un hombre de 72 años fue encontrado muerto en el interior de su residencia, en estado de putrefacción, juntamente con la esposa, que se encontraba inconsciente. La inspección del local no evidenció señales de violencia, ni cualquier otro elemento que pudiese justificar la muerte de la víctima, ni tampoco, el estado clínico de la sobreviviente. El examen necrópsico constató signos de putrefacción en fase cromática, livores y congestión facial fuertemente rosados. Los órganos exhibieron una coloración roja vinosa y cogestión vascular acentuada. No se observó cualquier lesión traumática o alteración orgánica, que indiciase una causa de muerte evidente. Los exámenes toxicológicos demostraron una concentración de carboxihemoglobina (HbCO) del 67% y el estudio histopatológico constató autolisis celular e aterosclerosis coronaria grave en la arteria interventricular anterior. La observación clínica realizada a la esposa de la víctima, evidenció deshidratación acentuada y alteraciones del comportamiento. Los exámenes analíticos demostraron aumentos significativos de CPK, CKmb, Troponina, Mioglobina, Transaminasa Oxalacética, Lactato Deshidrogenasa, Fosfatasa Alcalina y Proteína C reactiva. No fue realizada cualquier determinación de carboxihemoglobina. Fueron solicitadas nuevas informaciones al Cuerpo Policial y a los Bomberos que estuvieron presentes en el local, los cuales recordaron haber visto un "brasero" usado para la calefacción de la habitación, el cual se encontraba apagado.

**Discussion:** La interpretación de los resultados de HbCO y su relación con la causa de muerte requiere especial atención, debido a múltiples factores intervinientes como: la concentración de CO en el aire ambiente, las concentraciones de oxigeno, el tiempo de exposición, sexo, edad, presencia de enfermedades cardiovasculares e respiratorias, consumo de tabaco, medicamentos o alcohol y el estado de conservación del cadáver. En las sospechas de intoxicación por CO en cadáveres con putrefacción avanzada, debe ser solicitada investigación de HbCO, a pesar de poder surgir dificultad laboratorial en su determinación. Del punto de vista patológico, la lesión celular probablemente es debida al efecto combinado de hipoxia celular e acción tóxica sobre la función mitocondrial. En casos no letales, la sintomatología inespecífica implica errores de diagnóstico frecuentes en alrededor de un tercio de los casos. En el caso descrito, la conjunción entre la información policial, el examen necrópsico y los resultados de los exámenes complementares, permitieron concluir que la causa de muerte fue debida a asfixia por intoxicación accidental por monóxido de carbono.

**Conclusions:** Este caso ilustra la importancia fundamental de una correcta y completa recolección de información en el local, inmediatamente antes de la realización de una autopsia médico-legal, así como, el reconocimiento de signos cadavéricos relacionados con intoxicación por monóxido de carbono y la importancia de realizar un diagnostico correcto y rápido, de modo a evitar el aparecimiento de nuevas víctimas.

**Keywords:** Carbon Monoxide; Poisoning; Accidental Intoxication