



# NEWSLETTER

INTERNATIONAL ORGANISATION FOR FORENSIC ODONTO-STOMATOLOGY

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## Index

Editor's page _____	p2
President's Page _____	p3
From the National Societies _____	p4
Journal of Forensic Odonto-Stomatology _____	p6
African IOFOS Meeting, South Africa _____	p8
Abstracts from Cape Town _____	p10

## Editor's page



Dear Colleagues

I can not believe that three years have passed so quickly! As this will most probably be our last newsletter as executive I would like to thank everyone that contributed to the Newsletter over the past three years. I have to say that the worst part of being Editor of the newsletter is to get members to contribute content for the newsletter. This is the main reason why so few editions were sent out over the past three years. It seems as if it is always the same people that contribute. The International Organisation for Forensic Odontology is a small, close-knit society and information regarding the work done and cases managed by our colleagues is important in keeping this organisation alive. I met many colleagues at the Cape Town Congress in November 2007 and listening to what they actually do makes it hard to believe that there was rarely anything to include in our Newsletter. I urge you all to change this in the future and to make it possible for the next editor to actually have the option to "choose" what he/she wants to place in the next edition and to be able to send out more than two or three editions per year.

The Cape Town congress was a very successful event and much positive feedback was received from members that participated and attended (See later in this newsletter). I personally would like to thank everyone that contributed to the success of that week, and that refers especially to everyone that participated, either with a scientific presentation or in the lively discussions that usually followed. It was good to have you all here in our crime-stricken but beautiful country – an excellent combination for a forensic meeting!

Best wishes to all

Sonja C. Boy

**Editor: IOFOS Newsletter**

## President's Page



It is hard to believe that my three year term of office is drawing to a close. The time has now come to elect a new executive who will lead the organisation for the following three years. Please pass on the names of possible candidates to Klaus Roetzscher at [Roetzscher.Klaus.Dr@t-online.de](mailto:Roetzscher.Klaus.Dr@t-online.de) as he will co-ordinate the committee for the appointment of the new executive. The election will take place in New Orleans during the IAFS meeting which is being held from the 21<sup>st</sup> to the 26<sup>th</sup> of July 2008. Please make every effort to attend this important meeting. Please also send me the names of the official delegates who will represent your organisation at the meeting.

The conference in Cape Town was thoroughly enjoyed by those who attended. A full report is included in this news letter. I would however like to give a special word of thanks to the following people who all contributed in their own ways to the smooth running of the meeting: my wife Zephné, Sonja Boy, Willie van Heerden, At Ligthlem and Elma Lauterbach.

I would like to encourage fellow associations to pass on items of news to our newsletter editor. It has been an uphill struggle finding articles for publication. There is so much going on out there, but it is never passed on for publication. We can all learn from each other, and interesting cases should be shared with the greater forensic Odontology fraternity.

I hope that the new year will treat us all kindly, and that health and prosperity will overshadow the continuing wars, poverty and economic hardships suffered by so many around us.

Hope to see you all in New Orleans,

Herman Bernitz.

## From the National Societies

### Report on International Symposium on Forensic Odontology and Disaster Victim Identification organized by Faculty of Dentistry and U21

The symposium was held on 29<sup>th</sup> and 30<sup>th</sup> September 2007. There were about 100 attendants from neighboring countries in South East Asia and locally. The attendants include academics, law enforcement officers, forensic dentists and pathologists. Dr David Sweet, the deputy chair of the scientific group, DVI Operation, INTERPOL, delivered the latest DVI protocols from INTERPOL to the audience. We also invited the software engineer of PLASSDATA, the official software of DVI operation of INTERPOL, who introduced us the latest and most updated modification of the software. Both the protocol and software have been vigorously tested in the region in recent years after the bomb attacks and tsunami victim identification. Prof John Clement from University of Melbourne also gave presentations on history and applications of forensic dentistry in DVI. The attendants also had a long discussion on the future collaboration on forensic dentistry in the region, both in training and operational level. At the end of the symposium, the attendants agreed to look at a joint diploma course in forensic Odontology from University of Hong Kong, Melbourne, British Columbia and London.



The attendants also thoroughly enjoyed the social programme by tasting the local delicacies and enjoying the beautiful night view from the peak. They built the bonding on a professional level in this symposium. Some of the presenters and senior forensic odontologists have

been invited to give lectures and workshops in some countries with less forensic experience. The symposium has truly fulfilled the purpose of sharing of experience and training of expertise.



(From Left) Prof Jin, Dr Sweet, Prof Clement, Dr Carl Leung, Dr Thomas Li and Dr David Sun

Prepared by Carl Leung  
Forensic Odontology Group, HKSAR

## Journal of Forensic Odonto-Stomatology

As from July 2008 the Journal of Forensic Odonto-Stomatology will be published free of charge on the IOFOS web page [www.IOFOS.eu](http://www.IOFOS.eu). Click on **NEW** [Journal of Forensic Odonto-Stomatology](#). The format, Instructions to authors and editorial board members will remain unchanged. The decision to adopt this format was not taken lightly, but was the option of choice considering all the facts at hand. The new free access should make the Journal available to a much wider circle of readers which in turn can only lead to its growth from strength to strength.

We urge all contributors to continue submitting manuscripts to our official publication which will grow and improve with the continued support of our members.

Our new editor Jules Kieser, who has over the years published a very successful forensic news letter in New Zealand, is committed to maintaining the high standards set by his antecedents. Change is often difficult to accept, and individuals will have different opinions, but a decision had to be made and I urge you all to accept it in good faith.

## Meet the new editor of the Journal of Forensic Odonto-Stomatology



Due to health reasons, Geoff Craig will not be able to continue as Editor for the Journal and we are pleased to introduce our newly chosen Editor, Prof Jules Kieser.

Jules Kieser was born in 1950 in Pretoria, South Africa. After obtaining a BSc from the University of the Witwatersrand in 1971, he went on to qualify as a dentist in 1975. Having completed his compulsory Army year, he went into practice first in the rural South Africa and subsequently in London and Johannesburg.

While in practice, he received his PhD in 1989 and was appointed as Reader in Craniofacial Biology and Honorary Professor of Anatomy at Wits. In 1996 he was appointed to the Chair, and Head of the Department of Oral Sciences, University of Otago in Dunedin, New Zealand. He subsequently obtained his DSc in 2001 and was awarded an *ad hominem* Fellowship in Dental Surgery from the Royal College of Surgeons, Edinburgh. He was recently elected as a professional Fellow of the Forensic Science Society (UK).

Jules has just returned from a year's sabbatical, which he spent at University College, London and at University of Queensland. His forensic research involves the biomechanics of trauma, bacterial fingerprinting of bitemarks and marine decomposition. Jules leads the Forensic Biology Group at Otago University and is currently supervising 8 PhD's and 9 Master's students. He has published over 140 full length refereed articles and has presented papers and courses all over the world.

Good luck Prof Kieser, we look forward to your valuable contribution to this journal!

## Africa Forensic Odontology Meeting

### Report on the International Congress in Cape Town, November 2007

Delegates from 13 countries attended the African IOFOS meeting and enjoyed true South African hospitality, warm weather, diverse cultures, fine cuisine and world-class wine.

A special welcoming evening for the delegates of the African IOFOS congress was hosted by the mayor of Cape Town, Mrs Helen Zille.



*Prof Bernitz, his two daughters and Mrs Helen Zille, Mayor of Cape Town and Leader of the Opposition Party.*



*The African Evening was a huge success with lots of fun, food, laughter and networking: Claus Grundmann wearing traditional Xhosa face paint. The smile testifies to the fact that the painting wasn't preceded by a ritual circumcision!*





*The secrets of wine tasting revealed after a long day of forensic odontology: from left to right, Susanna Rheinprecht, Leif Grusd, Sonja Boy and Natanya, Tore Solheim, Gerhard Steenkamp, Willie van Heerden and Sherie Blackwell.*

The academic program covered a wide range of topics which benefited both educators and learners, who were well represented at the lectures. Crimes including ritual murders, social practices of tooth mutilation and an uncontrolled epidemic of violent murders, rape and child abuse make South Africa a forensic pathologist's paradise. See below for a complete list of abstracts.

The keynote speakers were all leaders in their respective fields of forensics and included Prof Gert Saayman, Head of the Department of Forensic Medicine at the University of Pretoria and Chief Specialist for the Gauteng Forensic Pathology Services; Prof Segaran Ramalu Naidoo, Head of Department of Forensic Medicine at the Nelson R. Mandela Medical School of the University of Natal; Prof Herman Bernitz the President of IOFOS and Manager of Forensic Dental Research at the University of Pretoria ; Prof Maryna Steyn, Head of Forensic Anthropology in the Dept of Anatomy, University of Pretoria; Dr Munro Peter Marx, Managing Director of Unistel Medical Laboratories, Faculty of Health Sciences, University of Stellenbosch; Dr Robert Wood, a Diplomate of the American Board of Forensic Odontology, member of the Canadian Society of Forensic Science and American Academy of Forensic Science; Prof Theunis Van Der Linde, Professor and Head of the Department of Zoology and Entomology, University of the Free State, South Africa and Prof Alan G. Morris from the Department of Human Biology at the University of Cape Town.

### **CRIMES AGAINST HUMANITY AND FORENSIC SCIENCES**

Helena Ranta<sup>1</sup> and Kari. T. Takamaa<sup>2</sup>

<sup>1</sup> *University of Helsinki, Finland*

<sup>2</sup> *Department of Leadership, National Defence University, Finland*

Forensic investigations of alleged human rights violations have become more frequent in internal armed conflicts. Most of the crimes are stated in international treaties and subsequently incorporated in national legislations. The crimes include war crimes, crimes against humanity and genocide (Statute of the International Criminal Court, ICC). The mandate of the Team has to be clearly defined. The host state must allow unhindered access, right to exhume, conduct autopsies and take appropriate samples. It also bears the primary responsibility for security and immunity of experts. Rules applied in international legal proceedings are often a mixture of rules from different legal traditions and may vary from one tribunal to other. Moral judgements are not based on scientific evidence and they do not fall within the sphere of professional conduct and expertise of the witness submitting evidence on forensic investigations concluded. Justice and legal consequences are important both for preventive reasons and for establishing the proper historic record.

### **THE BIOMECHANICAL MODELLING IF NON-BALLISTIC SKIN WOUNDING BLUNT FORCE INJURY**

Jules Kieser, Ionut Ichim, Michael Swain and Neil Waddell

*Department of Oral Sciences, Faculty of Dentistry, University of Otago, Dunedin, New Zealand*

Knowledge of the biomechanical dynamics of blunt force trauma is indispensable for forensic reconstruction a wounding events. In this study, we describe and interpret wound features on a synthetic skin model under defined laboratory conditions. To simulate skin and the subdermal tissues we used open celled polyurethane sponge (foam), covered by a silicone layer. A drop tube device with three tube lengths (300,400,and 500 mm), each secured to a weighted steel scaffold and into which a round, 5Kg Federal® dumbbell of 180mm length, with a diameter of 8cm was placed delivered blows of known impact. To calculate energy and velocity at impact the experimental set-up was replicated using a rigid-body dynamics and motion simulation software. We soaked each foam square in 500ml water, until fully saturated immediately before placing it beneath the drop tube. We then recorded and classified both external and internal lacerations. The association between external wounding rates and the explanatory variables sponge type, sponge thickness and height were investigated using Poisson regression. Tears (lacerations) of the silicone skin layer resembled linear lacerations seen in the clinical literature and resulted from only 48.6% of

impacts. Poisson regression showed that there was no significant difference in the rate of external wounding between the different sponge types ( $P=0.294$ ) nor between the different drop heights ( $P=0.276$ ). Most impacts produced 'internal wounds' or subsurface cavitation (96%). There were four internal 'wound' types; Y-shape (53%), linear (25%), stellate (16%) and double crescent (6%). The two-way interaction height by sponge type was statistically significant in the analysis of variance model ( $P = 0.035$ ). The other two-way interactions; height by thickness and sponge type by thickness were also bordering on statistical significance ( $P = 0.061$  and  $P = 0.071$  respectively). The observation that external wounds were only present in less than half of impacts, but that nearly all impacts resulted in internal wounds, might explain the observed haematoma formation and contusions so often associated with blunt force injuries. Our study also confirms the key role of hydrodynamic pressure changes in the actual tearing of subcutaneous tissue. At the moment and site of impact, transferred kinetic energy creates a region of high pressure on the fluid inside the tissue. As a result of the incompressibility of the fluid, this will be displaced away from the impact at a variable rate that depends mostly, but not only, on the amount of energy received.

## **DENTAL AGE ESTIMATION: TESTING STANDARD METHODS ON SOUTH AFRICAN CHILDREN.**

VM Phillips, TJ vW Kotze.  
*University of the Western Cape.*

Forensic dentists and anthropologists use dental age to estimate chronological age of skeletal remains. The standard dental age related charts of Moorrees et al and Demirjian et al have been tested by several authors and found either applicable or inappropriate for their population groups. The aim of this study was to test the age estimation charts of Moorrees et al. and Demirjian et al. against South African juvenile population samples. Three samples were used. Pantomographic radiographs of 916 children treated at Tygerberg dental school were collected. Sample 2 consisted of 90 black children from Kwa-Zulu Natal and the 3<sup>rd</sup> sample consisted of 157 Indian children. Dental age related tables were derived for each of the sample groups. All 3 samples were subjected to age estimation using both the method of Moorrees et al. and Demirjian et al. The degree of discrepancy in age estimation compared to the chronological age was depicted graphically. A new method of age estimation was derived by 50% weighting combination of Moorrees and Demirjian methods. Results obtained showed that the method of Moorrees et al. underestimated the age on average by 0.91 years and that of Demirjian et al over estimated the age on average by 0.89 years. The new method of 50% weighting combination of these two methods estimated the ages of the

child sample group to within 0.01 years of their chronological age. It is concluded that the age estimation methods of Moorrees et al and Demirjian et al are not suitable for estimating the chronological ages of the South African child. The combined 50% weighted method is more accurate for the South African juvenile population group.

### **AGE VARIATIONS IN DENTAL GROWTH AMONG TURKISH CHILDREN.**

Feryal Karaman<sup>1</sup>, M.Yasar Iscan<sup>1</sup>, Tamer Erdem<sup>1</sup>, Muzaffer Ates<sup>1</sup>, Kamer Gokhan<sup>2</sup> <sup>1</sup> *Istanbul University, Turkey,* <sup>2</sup> *Ministry of Justice, State Institute of Forensic Sciences, Istanbul - Turkey*

Assessment of growth and its speed provide an index for the well being of that populations. There have been numerous studies practically all of the populations around the world. These studies aimed at how factors such as health socio economic structure, environmental adaptation affect growth and development. Investigation of dental eruption has been one of the most practical methods to evaluate growth and age. The purpose of the present study is to determine how Turkish children show dental development in relation to age. Jointly carried out by in Istanbul University Institute of Forensic Sciences and Istanbul University Faculty of Dentistry this project studies children from age 3-30 years over 702 children both sexes. The anamnesis has been obtained from their dental health following the oral examination at the time of examination. The study used panoramic records and applied to Demirjian's 8 phases of dental growth phases in permanent teeth. Preliminary analysis suggests that dental growth in Turkish children follow a regular pattern. Age variation seems less in certain teeth and considerably greater in others such as I1. P2 is less varied M2 highly. Because younger children were few understanding of earlier stages of dental development should wait until were individuals are added to the study.

### **ESTIMATING AGE USING DEVELOPING TEETH**

H M Liversidge,

*Barts and The London School of Medicine and Dentistry, London, UK*

The timing of permanent tooth formation is quantified in 770 dental radiographs in Black children from Johannesburg/Pretoria and 720 Cape Coloured children from Cape Town. These results are compared to results from 5277 radiographs collected so far from other regions of the world (White and Bangladeshi from London UK, Australian Aborigine, New Zealand, Malaysia and Japan). Results show that the timing of permanent tooth formation in different world groups appears to be very similar. These results suggests that a well designed, accurate dental maturity reference (such as Willems *et al.* 2001 J. Forens. Sci. 46:893) is applicable worldwide to estimate age up to age 14. In addition, two key tooth

stages [M2 half root length and M3 initial root formation] will be presented as cut off points to determine if an individual is younger/older than 14 or 18 years of age.

## **PALEODEMOGRAPHY AND PALEOPATHOLOGY OF AN UNIDENTIFIED SKELETAL ASSEMBLAGE FROM A MASS GRAVE AND ITS CONNECTION WITH THE 1755 EARTHQUAKE OF LISBON.**

<sup>1,2</sup> Cristiana Pereira, <sup>1</sup>Mário Filipe Bernardo, <sup>2</sup>Maria Cristina de Mendonça, <sup>2</sup>Jorge Costa Santos, <sup>3</sup>Miguel Telles Antunes.

<sup>1</sup>*School of Dentistry - University of Lisbon;*

<sup>2</sup>*National Institute of Legal Medicine - Lisbon and Coimbra Departments;*

<sup>3</sup>*Academy of Sciences of Lisbon.*

Teeth are one of the most important anatomic elements used in reconstructive forensic identification. They are the most common structure present in excavated remains. In this study 1099 isolated teeth were analysed from a skeletal assemblage of commingled remains belonging to the 1755 earthquake victim count, excavated in 2004 at the Lisbon Academy of Sciences. The objective of this ongoing study is to contribute to the demographic characterization of one of the world's biggest catastrophic population by forensic dental qualitative methods – morphological teeth parameters. To reach the purpose of this study, after identification of the teeth, we analysed the following variables: demography, paleopathology, age determination, minimum number of individuals, trauma, fire and taphonomy. With this preliminary study of the Academy sample teeth, a contribution was made to increase the knowledge on this 1755 population. The study will continue with other samples from the excavations, including teeth still in the maxillas and mandibles, and crania.

## **THE RELIABILITY OF THE RADIOGRAPHIC METHOD IN DENTAL AGE ESTIMATION OF ADULTS**

Charles E. Berner<sup>1</sup>, Sigrid I.Kvaal<sup>2\*</sup>, Pourn Bana<sup>2</sup>, Nor Shahab<sup>2</sup>, Eileen Huseby<sup>2</sup>

<sup>1</sup>*Cleveland, Ohio, US,*

<sup>2</sup>*Faculty of Dentistry, University of Oslo, Norway.*

There are few methods presented which can be used for dental age estimation of adults without extraction and/destruction of teeth. One possibility is to measure secondary dentine formation on dental radiographs as has been presented by Kvaal et al (1995) So far this method has only been tested on OPGs (Bosmans et al 2005). The accuracy of the method has been questioned by colleagues and authorities. One hundred full mouth analogue dental radiographs were photographed on a standard view box with a Fuji Pro S2 digital camera. Adobe Photoshop CS software feature were used for enhancements, magnification and measurements. Six teeth were measured: maxillary central incisor, lateral incisor and second premolar and mandibular lateral incisor, canine and first premolar. The full length of each

tooth as well as the length of root and pulp was measured. The widths of the pulp and the tooth were measured at three different levels. All radiographs have been measured by one observer and repeated by one of three observers. The inter- and intra-observer reliability will be tested. The accuracy of the method to estimate age in adults when using digital radiographs will be examined. The applicability of methods for practical use will be discussed.

### **PROBLEMS WITH HUMAN BITE MARK ANALYSIS**

Sherie A Blackwell<sup>1</sup>, Ian Gordon<sup>1</sup>, Cliff L Ogleby<sup>1</sup>, Tanijiri Toyohisa<sup>2</sup>,  
Margaret R Donald, John G Clement,

<sup>1</sup>The University of Melbourne, Australia

<sup>2</sup>Medic Engineering, Japan

The central tenet of bite mark analysis is based upon two assumptions: that human teeth and their 3D grouping in functional dentitions are unique, and that sufficient detail of this uniqueness is rendered during the biting process to enable identification. Both of these assumptions have been challenged in recent years. Issues based on the current understanding of this difficult area of expertise will be discussed. The principal aim of this study was to develop novel, scientifically verifiable methods for 3D imaging and quantitative comparisons of human dentitions and simulated bite marks, in order to define the analytical requirements of bite mark analysis. Three independent empirical studies were brought to bear on key problem areas of bite mark analysis; scientific error, uniqueness of simulated bite marks and postural distortion. Each study utilised 3D imaging in order to eliminate perspective distortion, a problem that has also contributed to the complications experienced by those engaged in the discipline of bite mark analysis. These studies demonstrated that the use of bite mark analyses as evidence for the identification of the biter has been premature or, at the very least, the evidential weight attributed to bite mark testimony that has satisfied the tests of admissibility has been unjustifiably high.

### **IDENTIFICATION PROCEDURES OF DEAD BODIES BY DENTAL MEANS.**

Grundmann Duisburg, Kirsch Saarbruecken, Lessig Leipzig, and Roetzscher Speyer.

The identification of dead bodies in single cases and/or in mass disasters by dental means is based on the maceration of the jaws, photography, x-rays, x-ray examination and comparison with AM-documents. According to the DVI Guide - Draft odontology sections, March, 21th, 2007 the poster illustrates a biologic method of maceration, digital photographs, digital x-ray techniques and comparison with anatomic files. Remarks are made concerning individual methods of identification.

## **DISTINCTIVE' FEATURES IN THE ANTERIOR DENTITION - POSSIBLE APPLICATIONS IN BITE MARK ANALYSIS.**

GT Craig and RF Kouble,  
*University of Sheffield, UK*

Class & individual characteristics in anterior teeth are important in bite mark analysis. However, there is little information on the frequency with which such potentially 'distinctive' features occur or their exclusivity. The aim of this paper is determine the frequency of potentially 'distinctive' features in the anterior dentition and to identify those that may be inter-related. Casts from patients aged 16yrs+ with no history of orthodontics or missing anterior teeth are digitally scanned and examined using Adobe Photoshop Version 7™; tooth rotations, displacements, spacing and inter-canine distances are quantified; tooth - overlaps, wear & fractures are noted visually. An audit was also made of anterior tooth loss in 1010 adults. 20% of 1010 subjects presented with missing teeth that were either replaced with a denture (11%), not replaced (6%) or missing with the gap closed (2%). From 105 sets of casts analysed to date, tooth overlaps are very common (84%) but bilateral overlaps of upper laterals over canines (2%) are more exclusive; tooth fractures occurred in 10% but canines were rarely involved (0.24%); as expected inter-canine distances show considerable overlap between the genders. This approach can identify and quantify less frequently occurring and therefore potentially more 'distinctive' features that may be of value in bite mark analysis.

## **MIGRATORY FLOWS AND AGE ASSESSMENT OF UNACCOMPANIED MINORS IN SOUTH ITALY: CASES STUDIES**

Emilio Nuzzolese, Giancarlo Di Vella.  
*Sezione di Medicina Legale, Università degli Studi di Bari, Italy.*

The increasing volume and complexities of migratory flows, in the broader context of globalisation, has led to a range of problems such as protection, human rights, illnesses but also identification of people with the right to apply for refugee status and age assessment of unaccompanied minors. Italy is a Country of great appeal for immigration as the Mediterranean Countries can easily reach Italian costs, especially during the summer season. Asylum seekers deemed to be under 18 face a very different path through the immigration system in Italy as in other west world Countries. Generally adults are subject to immediate deportation or jail detection, while minors are sent through a juvenile system where detection is not mandatory and have often access to education programs and may be granted a residence permit. An agreement between Immigration Police authorities, Judges of Peace and a group of Forensic Pathologists and Odontologists was found in order to allow a

prompt age assessment of these young immigrants. The methods used rely on the skeletal maturation as seen on an X-ray of the wrist or the medial clavicle and on the dental maturation of third molars together with clinical dental findings.

Some case studies are presented.

### **THE TORGERSEN CASE – A REMARKABLE TOOTH MARK CASE**

Tore Solheim,  
*University of Oslo, Norway*

In the autumn of 1957 a 16 year old girl was murdered in Oslo. During autopsy tooth marks were found around the nipple of her left breast. The suspect Torgersen was arrested and his teeth matched the marks. He was found guilty of murdering the girl based also on other evidence, but he never admitted to have made the crime. His petition for reopening the case has been refused by 5 different Norwegian courts. Last year (2006) the Norwegian Criminal Cases Review Commission refused a reopening of the case. Six experts, including two British, appointed by the courts have examined the tooth marks and found varying degrees of strong evidence that the marks could have been made by Torgersen. The defence has presented 6 private “experts”, some of whom have been able to exclude Torgersen. This now famous case will be presented. The examination of the different experts and the bases for their conclusions will be presented. Especially will the reasons for exclusion be presented and discussed.

### **A MISSION IN BARBADOS AS PART OF A CRIMINAL CASE.**

Dr. Wencke Stene-Johansen  
*Oslo, Norway*

A small vessel was found by local fishermen drifting off the coast of Barbados. 11 dead men were found onboard. Who were they and where did they come from?

The Barbados government asked for assistance from Interpol, who in cooperation with the Scandinavian Identification Teams, set up a team consisting of team leader, forensic pathologist, fingerprint expert, computer expert, forensic odontologist, and a representative from Interpol. The task was to perform post mortem documentation of the 11 bodies. Interpol investigated the background of the vessel and the deceased men and found that they had suffered an unfortunate fate caused by the cynical business of illegal immigration. Who was responsible for the death of these men? This identification case has an unusual angle as the focus was also on finding evidence that connected the victims to the illegal organization of human trade into Europe and further to the criminal profiteers exploiting the desperate refugees of the poor countries of West Africa.



### **3D CRANIOFACIAL MORPHOLOGY**

Sherie Blackwell, Rebecca Taylor, Peter Claes, Norhayati Jaffar, John G Clement,  
*The University of Melbourne, Australia*

Craniofacial morphology, which has an individuality as distinctive as a fingerprint, is an essential and interesting source of information to answer a cohort of facial related questions. At the School of Dental Science, the University of Melbourne, computer-based 3D craniofacial research is being conducted to process and analyze differences in morphology within and between defined populations for a wide range of applications. This presentation highlights several key craniofacial related projects which are currently being undertaken: (1) Ancestral classification based on differences in facial morphology applied to Japanese and Australian populations; (2) Asymmetry in facial expression morphology as a lateralizing sign for the diagnosis of epilepsy; and (3) Facial approximation based on the skull morphology for forensic victim identification.

### **GREULICH AND PYLE IN COMPARISON WITH DENTAL AND OTHER SKELETAL X-RAY BASED AGE ASSESSMENT METHODS: IDENTIFICATION OF FINNISH VICTIMS OF THE ASIAN TSUNAMI OF 26 DECEMBER 2004.**

Olli Varkkola, Helena Ranta, Mari Metsäniitty, Antti Sajantila,  
*University of Helsinki, Finland*

The worldwide used "Radiographic Atlas of Skeletal Development of the Hand and Wrist" by William Greulich and S. Idell Pyle (1st edition 1950) is based on radiographs of one thousand Caucasian children studied in 1931-1942. The purpose of the study was to find out the reliability of this method in relation to chronological age, and various dental and other skeletal methods. We examined 47 Finnish children under 16 years, who perished in Thailand on 26 December 2004. Every victim repatriated to Finland underwent a forensic autopsy including dental examination for final identification. The age assessment was performed by dental and skeletal methods. The difference between the Greulich and Pyle values and chronological age was on the average 9.7 months. The other skeletal method, the TW2 of Tanner, Whitehouse and co-workers differed by 10.3 months. The dental age assessment methods were based either on the eruption (Nyström method, 8 cases, difference 6.3 months), or development of the crown and roots (Demirjian, 33 cases, difference 5.2 months). The dental methods proved to be most accurate in childhood until the teeth with the exception of wisdom teeth have erupted and developed. In adolescence, however, the validity of skeletal methods improved considerably.