



I-O-F-O-S

NEWSLETTER

INTERNATIONAL ORGANISATION FOR FORENSIC ODONTO-STOMATOLOGY

July 2010



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Editor's page



Dear Colleagues

At long last a Newsletter from the soccer World Cup Country! Prof Bernitz has been involved in numerous post mortem police investigations in our country and abroad, some of which we have included in our Newsletters over the years. In this issue, he wrote a short piece on the Congo air disaster (p16) he was involved in during the past few weeks.

An update on the activities of the Standing Committee on DVI was also submitted by the executive of the Forensic Odontology Working Group (p8) following their 2010 meetings at INTERPOL (IPSG) headquarters in Lyon, France. We have written much on the common agreement by many members that standardised protocol should be followed in order to facilitate DVI team outcomes. Documents such as these confirm this need with actual agreement on thirty one points of discussion!

Included for your convenience and interest is the preliminary program as well as contact information of the IOFOS meeting on Forensic Odontology to be held later this year in Belgium (p11). Feedback on the meeting will be given in the next Newsletter. Please send as much of this as possible.

A special thank you goes to the Argentinean Society of Legal Odontology and Forensic Odontologist Association of South America as well as the British Association for Forensic Odontology for their activity reports included in this issue.

The spectacular photos on the front page and p17 was sent by dr Frits Hoogendijk, a Maxillo-Facial and Oral Surgeon in South Africa with great passion for nature photography. Africa might be a criminal's paradise but that also goes for photographers and pathologists - all kinds!

Regards to all

President's Page



Dear Colleagues,

As the soccer world cup reaches the three quarter way mark, all indications are that it is a huge success with little in the line of hiccups or loss of life. The stadiums all seem to be well designed, with easy access and departure routes. The air traffic has been well controlled and soccer fans have all arrived safely from every corner of the planet and left the terrorists at their home bases. This may sound like a sports report of the soccer world cup and not an IOFOS newsletter report, but believe me things could have been very different. Any country hosting an event of this magnitude needs to be prepared for the worst. During the event there were two air accidents, none of which caused any fatalities.

The next exciting event on the IOFOS calendar is the Leuven (Belgium) meeting which will be held from Sept 2-4 this year. The preliminary program is included in this newsletter. Members are encouraged to attend this event, as it gives you the chance to meet other forensic dental colleagues and keep abreast of the newest trends in the discipline. You can contact the convenor Prof Guy Willems at guy.willems@med.kuleuven.be or visit the web site at www.mfo.be

I have just returned from the Congo where I assisted Chris Griffiths with the identification of the 11 victims of the disaster which claimed the lives of the top officials of Australian Sundance mining company, see report.

DVI issues have received some attention over the past few months. As the need for identification of individuals in mass disasters increases, many questions are being asked regarding the role of forensic dentists. I personally feel that the time has come to establish an international code of best practice which needs to be accepted by all our members and strictly adhered to. The INTERPOL team is doing great work in this regard. A report is also included in the newsletter.

Hoping to see many of you in Belgium,

Herman Bernitz

From the National Societies

Argentinean Society of Legal Odontology and Forensic Odontologist Association of South America

By Oscar Heit

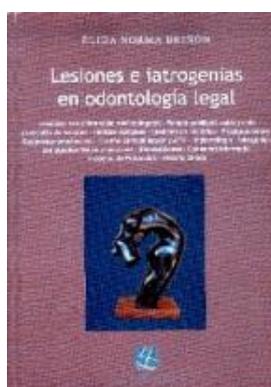


The Argentinian Society of Legal Odontology (S.A.D.O.L.) was founded in year 1977 in the city of Rosario, province of Santa Fe, Argentina. Its first president was a physician called Oscar Sanchez and his secretary the odontologist called Héctor Ceppi.

Due to the political situation of the country at that time, SADOL stop developing. In 1995 however, Odontologist School of Tucuman's State University presented the first specialist course approved by The National Commission of The Evaluation and Certification Universities, awarding "The Legal Expert Odontologist" degree, the first in South America. Rosario's Odontology State University followed. In the year 2001 Health State Ministry recognized Legal Odontology as a specialty and published this in the Official Bulletin of November 2001. Ceppi therefore started the legacy and today SADOL is a successful society with members all around Argentina having annual meetings scheduled since 2005. Our sixth meeting was in Buenos Aires in may 2010 at which time we will also paid tribute to Elida N. Briñón, a pioneer of Legal Odontology in Argentina.



Dr Elida N. Briñón



She has been an expert in the courts of Buenos Aires for many years. She has published two books, the first in 1983 entitled "Legal Odontology and Forensic Practice" and its final publication in the year 2006 "Iatrogenic and injuries in Legal Odontology".

Countries represented at the Buenos Aires meeting constituted Argentina, Bolivia, Brazil, Paraguay, Peru and Uruguay.

At our meeting of May 2009 the Managerial Commission of SADOL for 2009 – 2011 was constituted. The members are:

Carlos Marcelo Gonzalez (President), Roberto Rivarola (Vice-President), Judith Prado Pagniez (Secretary), Oscar Heit (Treasurer) and Marcelo Luzi (Minutes Secretary and Interinstitutional Relationships)

The Forensic Odontologists Association of South America (A.O.F.S.) was recently created and consists of: Carlos Marcelo Gonzalez (Argentina) (President); Rosario Rovira Gómez (Bolivia) (Secretary); Celia Mármol (Paraguay)(Treasurer); Ana María Carlos Erazo (Perú) (First Vocal); Rhonan Ferreira da Silva (Brazil) (Second Vocal);- Alicia Picapedra (Uruguay) (First Accounting Manager) and Manuel Maurelia (Chile) (Second Accounting Manager). AOFOS will have its first meeting during the 8th International Congress of Odontologist of Paraguay, 9-11 September 2010 in Asuncion, the Capital of Paraguay's Republic. The main aim of this meeting will be the creation of a DVI team for South America.

Cordial regards to all members and authorities of IOFOS!



Photo taken during the Sixth Meeting of the Argentinian Society of Legal Odontology, in Buenos Aires. From the left Drs. Marta Maldonado (Argentina), Juan Carlos Zarate Rodríguez (Paraguay), Mauro Machado do Prado (Brazil), Rhonan Ferreira da Silva (Brazil), Elida Briñón (Argentina), Carlos Marcelo González (Argentina), Oscar Heit (Argentina), Alicia Picapedra (Uruguay), Judith Prado Pagniez (Argentina) and Elisandro García (Argentina).



Picture taken at the hearing to the Judicial Morgue of Buenos Aires City.

British Association for Forensic Odontology

By Paul Phillips

This year BAFO has had to meet some new challenges to transform it from an association of professionals into a Professional Association. Following the demise, last year, of the Council for the Registration of Forensic Practitioners in UK the roles of overseeing training, mentoring, and accrediting Forensic Odontologists have been accepted by BAFO. BAFO has also introduced a system of peer review for those Forensic Odontologists who are accredited by the Association. The committee have worked hard during the year to successfully introduce protocols and standards for all UK Forensic Odontologists, although there is still some fine detail to be completed. The administration, training and provision of Odontologists for the UK DVI team have also been taken on by BAFO.

The annual conference this year took place in Edinburgh; only the second time that BAFO has ventured north of the border. The Friday afternoon is a closed session for members only where we were entertained and informed by Judy Hinchliffe on the Australian bush fires, Roland Koube on an unusual identification, Sakher AiQahtani with his revolutionary atlas for age assessment in children and Prof Graham Roberts' challenging discussion on censoring stage H for developing third molars.

The Saturday session started with the Principal Depute Fiscal Angus Reith describing the work of the Procurator Fiscal who is part prosecutor and part coroner in Scotland. Mr Reith was followed by Dr Howard Moody who updated his research into aging individuals using analysis of amino acid racemisation in dentine. Prof John Clement continued the session by describing the work taking place in Melbourne on 3D computer facial mapping.

Continuing the theme of mapping, Helen Meadows, from the University of Dundee, talked about her research in the field of identification using the mapping of veins with infra red light scans. She illustrated her account with a case report involving the abuse of a child. Helen was followed by Prof Sue Black, Professor of Anatomy and Anthropology at Dundee, who having opened by declaring that medicine is merely applied anatomy, continued with her usual ebullient and entertaining style to describe the history and future of teaching Anatomy in medicine. Dr Xanthe Mallett, also from Dundee, then described her research on using the morphology of the hand in identification and described two cases where the technique had been used.

Xanthe Mallett was followed by Dr Caroline Wilkinson, again from Dundee, describing her work using three dimensional computer technology in craniofacial analysis. This had resulted in a virtual modelling system that did not rely on the intuitive skills of an artist to recreate a face from a skull. The academic part of the conference was concluded by Prof Tony Busuttil who spoke about the differences between the English and Scottish legal systems.

The annual dinner commenced with the top table being piped to their seats and the traditional exchange of a dram between the President Bill Shardlow and Piper (and BAFO member) Brian Chiddick.

The work of transforming BAFO continues and we now look forward to the next conference to be held in Stratford-upon Avon in November.

Report of INTERPOL DVI Working Group 2010

By: David Sweet, Alain Middleton, Eddy de Valck, June 2010

Since 2006 following the INTERPOL (IPSG)-administered response to the SE Asian tsunami (Dec. 2004–Feb. 2006), police and science disciplines have been working to establish best-practice standards and increase DVI response capacity. All scientists are considering lessons learned from the tsunami response and other recent large events to provide a common approach and improved competence. For the past four years, at least six committees of the IPSG DVI FOD WG have been working to gain international consensus on important issues. Last year's meeting was cancelled because of the H1N2 influenza scare in Europe. Now, at the most recent meetings in May 2010, significant progress was made. Nations represented at the meetings included: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, New Zealand, Norway, Spain and Sweden with last minute regrets submitted by China and the United Kingdom. It is our pleasure to share the following outcomes from the meeting:

1. Expertise

Tore Solheim (*NO*) and Michel Perrier (*CH*) submitted a comprehensive report to summarize the FOD qualifications, skill and training that are necessary during a multi-national deployment. IPSG has no jurisdiction with respect to training standards within national DVI teams, but it is hoped that the international standards will form the basis for member selection at the national level to ensure that members have international qualifications, skills and competence whenever large-scale events occur.

2. Forms, F1 and F2 Pages

Following two years of input from this, the largest of the FOD sub-working groups (SWG), Tore Solheim (*NO*) and Irena Dawidson (*SE*) submitted separate reports with recommended updates to the IPSG DVI Forms. The Solheim report focussed on input from the Nordic countries only. The Dawidson report included this input plus important input from the other members of the SWG. Her report was in two parts: a) points agreed upon during SWG discussions since 2008, and b) points not yet agreed upon by the SWG. (The SWG expended considerable time and effort in the previous two years to reach this consensus on the agreed-upon points, which was followed by additional detailed discussion by FOD WG members during the May meeting focussed

on the agreed upon points that were raised by Tore Solheim for extraordinary discussion.)

The readers will know of the strong opinions and passion of forensic odontologists and how difficult it sometimes can be to gain international acceptance, but consensus was reached on each of 31 points from the Forms reports. It should be emphasized that this consensus was reached after two years of deliberations and many hours of debate. Such was the enthusiasm of the discussions in May that time did not allow for further consideration of the not-agreed-upon points. These were carried over to next year's meeting. The FOd WG is pleased with the momentum that has been generated by these outcomes. A SWG will consider the remaining points now and seek a decision on these in May 2011.

3. *DVI System International Dental Codes*

The large numbers of codes for dental traits that are currently present in the IPSPG databases that are designed and administered by Plass Data Software A/S, Denmark, are under review. Irena Dawidson (*SE*), Dorthe Arenholt Bindslev (*DK*) and Alain Middleton (*AU*) will consider the options discussed this year and report to the FOd WG in May 2011 for a decision.

4. FOd DVI Equipment

As a general principle, so that FODs in multi-national events are familiar with the necessary equipment and supplies and will be adequately prepared for deployment, the WG is constructing a template of basic FOd DVI tools and resources. Alain Middleton (*AU*) has received input from many national teams and is collating the data for final presentation in 2011. If anyone has not submitted example lists for consideration yet, please do so by September 1, 2010.

5. Agreements, Insurance

Howard Mace (*NZ*) has received input from many national teams about contracts between the national DVI team and the scientists in order to establish a model agreement that can be used to set out the roles and responsibilities of each party, as well as for ensuring that adequate and comprehensive insurance is available to deployed scientists. Final work on the template is being completed now and a decision on this as an international standard will be made in May 2011.

6. International awareness

Eddy de Valck (*BE*) and Irena Dawidson (*SE*) reported that members have presented 40 talks covering almost all regions of the world since the last FOD WG meeting. These talks disperse information and knowledge about IPSPG DVI standards and lessons learned from recent deployments. Members are increasing awareness of the IPSPG DVI Guide, DVI Forms and evidence-based DVI practice. Stephen Knott (*AU*) is chairing a new SWG to establish DVI-training curriculum, a list of qualified instructors, and specimens that can be used during training exercises to simulate DVI events.

7. Virtual Autopsy

Considerable interest has been generated in forensic science about CT images and their potential use for medical and dental autopsy. Ari-Pekka Parviainen (*FI*) and Rüdiger Lessig (*DE*) will represent the FOD WG on an IPSPG joint SWG (police, odontology, and pathology) to evaluate this technology in detail prior to May 2011. Chemical Biological, Radiological, Nuclear and Explosive (CBRNE) terrorism threats pose considerable challenges to postmortem examination. Thus, CT imaging might play a special role in response to CBRNE DVI events. Klaus-Peter Benedix (*DE*) represents the FOD WG on an IPSPG joint SWG for CBRNE.

8. Presentations

Presentations to the Standing Committee on DVI at this year's three-day meeting included summaries of responses to and lessons learned from events in Australia, Brazil, Haiti, Philippines, Spain, Thailand, United Kingdom and USA. FOD presentations covered events in Australia, Brazil, and Spain.

9. FOD WG Elections

David Sweet O.C. (*CA*) was re-elected Chair; Alain Middleton (*AU*) and Eddy de Valck (*BE*) were elected Deputy Chairs by majority vote with the candidates absent from the room.

In Lyon this year, an interesting, stimulating and productive meeting took place with much enthusiasm and commitment demonstrated by the dedicated members of the Working Group. In fact, the Group will meet on the day prior to the regular IPSPG DVI meetings next year to enable additional time for discussion of the coming year's work.

Courses in Forensic Odontology

I.O.F.O.S. MEETING ON FORENSIC ODONTOLOGY

SEPTEMBER 2-3, 2010

Venue: Auditorium W. van Croy
Convent of Chièvres
Groot Begijnhof 14
BE-3000 Leuven (Belgium)

PROVISIONAL PROGRAM

THURSDAY, SEPTEMBER 2, 2010

07:30-08:00 Walking breakfast and Registration

08:00-08:15 Welcome and opening of the meeting Guy Willems

SESSION 1: IDENTIFICATION

Chair Patrick Thevissen

- 08:15-08:45 35 years of DVI: what have we learned and what has changed?
J.G. Clement
- 08:45-09:15 In the absence of dental records, do we need forensic odontologists at mass grave sites?
D.Alempijevic
- 09:15-09:45 Dental radiology considerations in disaster victim identification (DVI) incidents: a review.
B. Wood
- 09:45-10:00 Image quality assessment and medical physics evaluation of different portable dental X-ray
units. P. Pittayapat
- 10:00-10:30 *Break*

Chair: Bob Wood

- 10:30 – 14:45 Problems of DVI missions in failed states. H.-P. Kirsch
- 10:45-11:00 The Use of DVI-program as a repository of missing persons and unidentified bodies.
I. Dawidson
- 11:00 – 11:15 Dental identification of the victims of the cold storage warehouse fire in Icheon, Korea.
S.-S. Lee
- 11:15 – 11:30 Australian bushfires. J. Hinchliffe
- 11:30 – 12:00 Dental implant changes following incineration. J. W. Berketa
- 11:45 – 12:00 Jaw resection: tricks, tips & pitfalls. J.P. Werquin
- 12:00 – 12:15 The accreditation of the medico-legal autopsy process: “a paper tiger”. W. Develter
- 12:15 – 12:30 Lessons learned from the Buizingen train disaster. E. De Valck

12:30 – 14:00 *Lunch break*

Chair: Eddy De Valck

- 14:00 – 14:30 Ascertaining year of birth/age at death in forensic cases. A review of conventional methods and methods allowing for absolute chronology. N. Lynnerup
- 14:30 – 15:15 Genetic identification in the 21st century – current status and future developments. R. Decorte
- 15:15 – 15:30 Guidelines for the procurement of teeth for DNA analysis. S. Knott
- 15:30 – 15:45 Tooth and genetic identification – an approach in forensic situations. A.T. Corte-Real
- 15:45 – 16:00 Primary teeth as a source of DNA – an alternative approach for victim identification? M. Xavier
- 16:00 – 16:30 *Break*

SESSION 2: DENTAL AGE ESTIMATION

Chair: Guy Willems

- 16:30 – 17:00 Age estimation on third molars development: comparison of country specific data. P. Thevissen
- 17:00 – 17:20 Dental age estimation utilizing third molar development: a review of principles, methods, and population studies used in the United States. J.M. Lewis
- 17:20 – 17:30 A comparative study of two age categories and two different regression methods in Polish youngsters for radiographically estimating chronological age on third molars. M. Van Vlierberghe
- 17:30 – 17:40 Age determination of uniradicular teeth using SEM microanalysis determinations. M. Lopez-Nicolas
- 17:40 – 18:00 The application of permanent tooth formation reference data to estimate age for a single individual. H. Liversidge
- 18:00 – 18:10 Preliminary results of accuracy of dental age estimation using three atlases of dental development. S. AlQahtani
- 18:10 – 18:20 Age estimation from coronal displacement of cementum in impacted teeth: A Napalase Formula. B. Rai
- 18:20 – 18:30 No influence of pathological lesions and/or restoring works on the evaluation of age at death with tooth cement annulations: forensic interest. F. Tilotta

19:30 – 22:00 WALKING DINER AT THE FACULTY CLUB, GROOT BEGIJNHOF 14, LEUVEN

FRIDAY, SEPTEMBER 3, 2010

SESSION 3: BITE MARK ANALYSIS

Chair: Tore Solheim

- 08:00 – 08:30 Is current bite mark analysis a misnomer? J.G. Clement

- 08:30 – 09:00 Error rates in bitemark analysis in an in vivo animal model. R.E. Wood
- 09:00 – 09:20 The application of affine transformations in matching distorted forensic samples. H. Bernitz
- 09:20 – 09:30 The potential value in bite mark analysis of quantifying variations in the arrangement and biting edge status of anterior teeth: Part 1- Developing a suitable dataset. R. Kouble.
- 09:30 – 09:40 Variations in the arrangement and biting edge status of the anterior teeth: Part 2 - Application of the dataset to selected historical bite mark cases. G. Craig
- 09:40 – 09:50 Objective and reproducible bite mark analysis. A. Al-Ali
- 09:50 – 10:00 Individual variability study of angles of the upper incisors to the intercanine axis. Legal medical applications for identification. A. Luna
- 10:00 – 10:30 *Break*

Chair: Helen Liversidge

- 10:30 – 11:15 The use of full spectrum digital photography for evidence collection and preservation in cases involving forensic odontology. F. Wright

SESSION 4: GENERAL

- 11:15 – 11:45 The role of the forensic expert in criminal procedures according to Belgian law. Y. Vermylen
- 11:45 – 12:15 What do our conclusion mean in terms of probability? T. Solheim
- 12:30 – 14:00 *Lunch break*

Chair: John Clement

- 14:00 – 14:30 The reproducibility of facial approximation accuracy results generated from photo-spread tests. C. Stephan
- 14:30 – 14:45 Exploring the facial soft tissue depths by Principal Component Analysis. S. De Greef
- 14:45 – 15:15 Computerized craniofacial reconstruction: conceptual framework and review. D. Vandermeulen
- 15:15 – 15:45 Objective 3D Face Recognition: Evolution, Approaches and Challenges. D. Smeets
- 15:45 – 16:15 *Break*

Chair: Dirk Vandermeulen

- 16:15 – 16:45 The human Masseter muscle and its biological correlates: a review of published data pertinent to face prediction. C. Stephan
- 16:45 – 17:00 Facial soft tissue measurements using holography and low-dose CT. F. Prieels
- 17:00 – 17:15 Forensic facial reconstruction: nasal projection. S. Virginia Tedeschi-Oliveira
- 17:15 – 18:00 Focus on assistance for troubled children. From protected object to lawful subject: towards a confidential dentist model? P. Adriaenssens

19:00 – 20:00 CONCERT: *HIGH FLYING AND ADORED* BY THE VOCAL AND INSTRUMENTAL ENSEMBLE CAPPELLA VOCE IN THE ST-JOHN-THE-BAPTIST CHURCH, GROOT BEGIJNHOF, LEUVEN

WORKSHOP DENTAL AGE ESTIMATION

SATURDAY, SEPTEMBER 4, 2010

Venue: Skills Training Centre
Dept. Dentistry, Oral Pathology and Maxillo-Facial Surgery
Kapucijnenvoer 7, Leuven

Patrick Thevissen

Patrick Thevissen finished his dental studies in 1980 at the Rijksuniversiteit Gent, Belgium and started a private dental practice in 1981. In 2005 he obtained his master's degree (Msc) in forensic odontology at the Katholieke Universiteit Leuven. Since 2007 he has worked in the Department of Forensic Odontology at the Dept. of Dentistry, Oral Pathology and Maxillofacial Surgery of the Katholieke Universiteit Leuven and teaches forensic odontology to international post graduate students. In 2009 he started his Phd thesis at the Katholieke Universiteit Leuven on the research topic: Non-destructive forensic odontological age estimations revisited.

An overview of the most commonly used dental age calculation techniques will be given. Focus is put on the different commonly used techniques of dental age calculation in children: both atlas techniques and scoring systems will be addressed. Particular interest will also go to the group of young adults between 16 and 22 years of age. In criminal law, there is a great need to separate the juvenile status from the adult status and in this age group the only developing teeth are the third molars. Are these possible developmental markers or are they just not suitable for dental age calculation as may be read in literature? Finally, the age calculation procedure in adults will be discussed and reviewed. Especially morphological and radiological techniques will be explained and discussed.

The participants will have the opportunity to perform age calculation procedures themselves. In order to obtain a more reliable and reproducible age calculation the forensic odontologist should use several of these available methods whenever an age calculation in the living or the dead is required. At that time it will be more than useful to operate computer software that takes the calculating into account. This will not only reduce calculating errors but will also speed up the age calculating procedure. Finally, the structure and content of a forensic report will be taught, with special interest to the main conclusions related to the findings obtained.

At the end of this one day workshop the participants will actually know which age calculating techniques are commonly used in each of the specific age ranges. They will also be able to tackle age calculating techniques themselves. Participants will also have been instructed on the writing of forensic reports and will realize the huge impact of their conclusions.

09:00 Session 1 - Overview of commonly used dental age estimation (DAE) techniques in children and subadults: theory and hands on training

10:30 *Break*

11:00 Session 2: Overview of commonly used DAE techniques in adults: theory and hands-on training

12 :30 *Lunchbreak*

14 :00 Session 3: Workshop on destructive DAE techniques – part 1

15:30 *Break*

16:00 Session 4: Workshop on destructive DAE techniques – part 2

17:30 End

Congo Air Crash

By Herman Bernitz

On the 19th of June 2010 a private air charter out of Douala in the Cameroon went down in the northern regions of the Congo. The passengers were top officials of the Australian Sundance mining company including billionaire Ken Talbot and company chairman Geoff Wedlock. All eleven occupants including two crew members were killed. The remoteness of the crash site delayed evacuation of the remains to Brazzaville for several days. A DVI team was deployed from Australia which included one forensic odontologist, Chris Griffiths and several AFP members. He was joined by his South African colleague Herman Bernitz who came to assist him at the request of the Australian government.

Ten of the eleven victims were identified by dental means. Although the small number of victims did not justify a plasdata analysis, it was done to test the system and sharpen the skills of the two operators. All credit must go the Australian dentists who supplied detailed ante-mortem records for the victims.

International co-operation in matters of this nature are becoming increasingly necessary as air traffic and natural disasters occur around the globe.



*Herman Bernitz and
Chris Griffiths slogging
away with Plasdate in
Brassaville*

Atlas of Tooth Development and Eruption

By Helen Liversidge

After the 2004 Tsumani, I received an email asking which method was best at estimating dental age. This focussed my research to address several practical issues, including a comparison of dental age estimation methods and the development of an evidence-based atlas of tooth formation. The idea of a new atlas was taken up by one of our postgraduate students in Paediatric Dentistry at the Institute of Dentistry, Queen Mary University of London, Barts and The London School of Medicine and Dentistry. Dr Sakher Alqahtani, together with myself and Professor Mark Hector, has developed the London Atlas and is completing a PhD on the subject. Usually an image published by a peer reviewed scientific journal remains the copyright of the publisher and cannot be reproduced without permission. For this reason, Sakher has copyright of the image which is available for personal use and can be reproduced for teaching by anyone with access to the internet. The Atlas has been translated into various languages including Arabic, French, German, Japanese, Portuguese, Spanish with Chinese, Greek and Urdu in preparation (see website detailed below).

The atlas is a comprehensive evidence-based map to estimate age using tooth development and alveolar eruption for individuals between 28 weeks *in utero* to 23 years. It shows a sequence of diagrams representing a continuum of development ages. Data was collected from developing teeth of 72 prenatal and 104 postnatal skeletal remains of known age-at-death individuals, (from Maurice Stack's Collection at the Royal College of Surgeons of England and Spitalfields Collection at the Natural History Museum in London). Data was also collected from the archived dental radiographs of 528 living individuals.

Each drawing represents the midpoint of an age interval with median stages of tooth formation /resorption and eruption relative to the alveolar bone. Stages are also illustrated and detailed by tooth type. Prenatal tooth formation is represented by one-month age categories while Birth includes a two week time

period. The first post-natal year is represented by three-month age categories. From 1 to 23 years, the age categories are annual.

The image is available on public access on the Institute of Dentistry website at <http://www.dentistry.qmul.ac.uk/atlas%20of%20tooth%20development%20and%20eruption/index.html> or Google 'Dental atlas'.

Further details are in AlQahtani SJ, Liversidge HM, Hector MP. 2010. The London atlas of human tooth development and eruption. *American Journal of Physical Anthropology* 142:481-490. <http://www.ncbi.nlm.nih.gov/pubmed/20310064>

This is available on request from h.m.liversidge@qmul.ac.uk

A further electronic interactive software package has been developed which we plan to make available through the [dentistry.qmul.ac.uk](http://www.dentistry.qmul.ac.uk) website in the near future.

