26 July 2011

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Medline

Chronological age estimation based on third molar development in a Portuguese population.


Dental Medicine Faculty of Porto University, Faculdade de Medicina Dentaria da Universidade do Porto, Rua Dr. Manuel Pereira da Silva, 4200-393, Porto, Portugal. icaldas@fmd.up.pt.

Third molar development was assessed using a sample of 1,131 orthopantomograms from a Portuguese population. The methodology applied was the eight stages (A-H) method described by Demirjian et al. The final sample was made of 739 orthopantomograms, 387 (52.5%) of which belonging to females; age ranged between 6.1 and 22.5 years old (mean age=14.49, S.D.=4.37). For each developmental stage, mean age, standard deviation, and minimal and maximal age was assessed; evaluation of the rate formation of each tooth, according to sex, was calculated and data distribution expressed in percentiles for each stage; the probability of an individual being 16 was also evaluated.

The relationship between tooth development and chronological age had a statistical significance for all teeth and both sexes (p<0.0001).

The data described may provide reference for forensic application and agree with the thesis that each population need specific data.

English.

2011.
Accuracy of predicting 18 years of age from mandibular third molar development in an Indian sample using Demirjian's ten-stage criteria.


Acharya-Ashit-B.

Department of Forensic Odontology, S.D.M. College of Dental Sciences and Hospital, Sattur, 580009, Dharwad, India. ashith.acharya@sdmcds.edu.

Predicting 18 years of age can be crucial in forensic contexts. The third molar is the only tooth developing during this chronological period and has been used to estimate minority/majority status (\( \geq 18 \) years). Conventionally, Demirjian's grading has been used to assess third molar development although the method was not originally intended for evaluating this tooth. Demirjian incorporated third molar assessment in a recent modification and replaced the alphabetical grading (A to H) with a numerical scale (0 to 9). The new grading system is untested on third molars and this study assessed the tooth's development on orthopantomograms of 221 Indian subjects (68 males, 153 females; age range 15-21 years). The tendency to correctly determine majority/minority status was assessed using three different statistical approaches, viz. traditional regression analysis, logistic regression analysis and Bayesian prediction. The sample was divided into a reference sample of 180 cases and a test group of 41 subjects. All three statistical methods correctly predicted an individual as being \( \geq 18 \) years in 73.2% of test subjects. Their ability to correctly identify a minor/juvenile was higher (85.7%) than their capacity to properly identify a major/adult (60%). Using the revised grading system, and irrespective of the statistical method applied, over one quarter of Indian subjects requiring identification as a major/minor were categorised in to the wrong age group. This level of accuracy may be inadequate for courts.
of law to rule with sufficient levels of certainty about the juvenile/adult status of an individual using third molar development.

English.

2011.

Accuracy of Camerie, Haavikko, and Willems radiographic methods on age estimation on Bosnian-Herzegovian children age groups 6-13.


Galic-Ivan, Vodanovic-Marin, Cameriere-Roberto, Nakas-Enita, Galic-Elizabeta, Selimovic-Edin, Brkic-Hrvoje.

Department of Dental Anthropology, School of Dental Medicine, University of Zagreb, Zagreb, Croatia. i_galic@yahoo.com.

The aim of this cross-sectional study was to compare the accuracy of the Cameriere European formula (Cameriere), adopted Haavikko method from 1974 (Haavikko), and revisited Demirjian method by Willems (Willems) for age estimation on orthopantomograms (OPGs) of Bosnian-Herzegovian (BH) children age groups 6-13 years. The accuracy was determined as difference between estimated dental age (DA) and chronological age (CA) and the absolute accuracy (absolute difference) was assessed by analyzing OPGs of 591 girls and 498 boys.

The Cameriere method overestimated the mean age by 0.09 year for girls and underestimated by -0.02 year for boys. The Haavikko method underestimated the mean age by -0.29 year for girls and -0.09 year for boys. The Willems method overestimated the mean age by 0.24 year in girls and by 0.42 year in boys. The absolute accuracies were 0.53 year for girls and 0.55 year for boys for Cameriere method; for Haavikko method, 0.59 year for girls and 0.62 year for boys; and for Willems method 0.69 year for girls and 0.67 year for boys. In conclusion, Cameriere method is the most accurate for estimating the age of BH children age groups 6-13 years using OPGs, following adopted Haavikko
method and Willems method.

English.

2011.

The role of the forensic odontologist in disaster victim identification: lessons for management.


Hill-Anthony-J, Hewson-Ian, Lain-Russell.

Victorian Institute of Forensic Medicine and the Department of Forensic Medicine, Monash University, 57-83 Kavanagh Street, Southbank, Victoria 3006, Australia. anthonyh@vifm.org.

Forensic odontologists are involved in all phases of disaster victim identification (DVI). The failure of DVI management to embed odontology teams within all phases of the investigation and to include them in management decisions throughout the operation may lead to delays in the reconciliation process and could possibly compromise the integrity of the DVI investigation. In the case study presented, trained and experienced teams of forensic odontologists were not utilised to full capacity in all phases of the investigation. The complexity of the initial scene investigation was not identified resulting in the incomplete recovery of all remains. The scene had to be re-examined on three subsequent occasions. The post-mortem examination of the remains had to be deferred until all subsequent material had been collected. The collection of all ante-mortem dental records was not undertaken, resulting in transcription information that was incomplete and compromised. As a result, the reconciliation (formal identification) of the deceased became problematic because of the compounded errors in all phases of this DVI investigation and the resulting odontological report of identification could have jeopardized the integrity of the entire DVI
The use of computed tomography (CT) to estimate age in the 2009 Victorian Bushfire Victims: a case report.


Bassed-Richard-B, Hill-Anthony-J.

Victorian Institute of Forensic Medicine and the Department of Forensic Medicine, Monash University, 57-83 Kavanagh St, Southbank, Melbourne, Australia. richardb@vifm.org.

The development of new imaging technologies is beginning to have an impact upon medico-legal death investigation in an increasing number of jurisdictions. Computed tomography (CT) is an imaging modality which is able to provide information to investigators without the need for a physically invasive autopsy in certain circumstances. The use of post-mortem CT as an aid to the identification of the victims of the Black Saturday bushfires is discussed with particular reference to dental age estimation. A case report is presented which demonstrates the ability of this imaging modality to separate individuals based upon dental development. Whilst CT is not yet able to adequately discriminate between differing restoration types and shapes, and therefore cannot be used for dental identification in the classic sense, the ability of this imaging modality to assess dental and skeletal development for the purpose of age estimation is valid.

English.

2011.
Preservation of dental evidence following exposure to high temperatures.


Victorian Institute of Forensic Medicine and the Department of Forensic Medicine, Monash University, 57-83 Kavanagh Street, Southbank, Vic. 3006, Australia. anthonyh@vifm.org.

The success of the Disaster Victim Identification (DVI) process relies upon sufficient post-mortem data being recovered to allow for a meaningful comparison with ante-mortem records of the missing person. Human bodies subjected to prolonged high temperatures, as experienced during the Black Saturday bushfires in Victoria, are often reduced to fragile skeletal elements. The dental structures, however, are the most durable tissues of the body and often survive these prolonged high temperatures. Without protecting the fragile remains at the scene and during transportation to the mortuary, disruption of the skeletal and dental elements may occur. This disruption will result in difficulties in obtaining post-mortem evidence and lead to problems during the reconciliation (formal identification) phase of the investigation. In the two case reports presented to illustrate these problems, there was significant loss and degradation of dental structures at the scene and during transportation to the mortuary. In the first case described, where no protection was afforded to the remains, total loss of all anatomical dental structures occurred. In the second case, where protection of the structures was undertaken, vital dental evidence was preserved. As a result of the experience in this particular DVI incident, where remains were exposed to prolonged high temperature and physical damage, new protocols have been formulated. Adherence to these protocols will maximise the recovery and preservation of dental
Evidence at the scene and during transportation to the mortuary.

Comparative dental anatomy in Disaster Victim Identification: Lessons from the 2009 Victorian Bushfires.


Lain-Russell, Taylor-Jane, Croker-Sarah, Craig-Pamela, Graham-Jeremy. Oral Surgery and Diagnostic Imaging Department, Sydney Dental Hospital, Chalmers Street, Surry Hills, Australia; Department of Forensic Medicine, Parramatta Road, Glebe, Australia. r lain@usyd.edu.au.

In the Disaster Victim Identification (DVI) response to the recent bushfire disasters in rural Victoria, Australia, forensic odontology played a significant role in the identification process. Particular features of this disaster were challenging to the odontologists. A characteristic of house fires is the extended time period during which the remains may be subject to heat, and their subsequent disruption as buildings collapse. This can result in dislodgement of teeth from sockets, loss of tooth crowns from roots, disruption of anatomical location of teeth and damage to bony features. Commingling of human remains also is often a feature, as is commingling of animal remains with human. Two cases which illustrate these features are described. A strategy for improving familiarity with comparative dental anatomy and improving skills in dental anatomy is suggested.

English.

Matching simulated antemortem and post-mortem dental radiographs from human skulls by dental students and experts: testing skills for
The aim of this study was to evaluate the ability of undergraduate dental students to match simulated ante- and post-mortem radiographs in human skulls with experts as controls for the 1) number of post-mortem images needed for a match, 2) accuracy of the matches, and 3) time spent for a match. A film bitewing was recorded in each side of 51 dentate dry human skulls (a.m.-images) and digital images of the teeth were recorded using a sensor (p.m.-images). 102 correctly matching and 102 non-matching image pairs were constructed. Ten students and three experts scored the image pairs as: certain match, certain non-match, or uncertain. None of the experts but half of the students made false positive scores. Half of the students performed just as accurately as the experts. All students (except one who made 8 FPs) asked for more p.m.-images than did the experts before deciding on a match, however, all students, but one, also spent less time per image pair than did the experts before deciding on a match (P<0.001). This simulated test sample may identify dental students and dentists with abilities for pattern recognition and thus help in the decision on who might be included as part of a forensic dental team when extra help is needed.

English.

2010.

Dental anomalies and their value in human identification: a case report.


Department of Forensic Odontology, State University of Campinas, SP, Brazil. racheltinoco@live.com.

Forensic odontology and anthropology provide valuable support with regard to human identification. In some cases, when soft tissue is destroyed, carbonized or absent for whatever reason, bones and teeth become the only source of information about the identity of the deceased. In human identification, anything different, such as variation from normality, becomes an important tool when trying to establish the identity of the deceased. This paper illustrates a positive identification case achieved by the diagnosis of an anomaly of tooth position, with confirmation using skull-photo superimposition. Even though forensic science presents modern techniques, in this particular case, the anomalous position of the canine played a key role on the identification, showing that the presence of a forensic dentist on the forensic team can be of great value.

English.

2010.

Dental age estimation based on third molar eruption in First Nation people of Canada.


Forensic age estimation of living subjects has become an increasing focus of interest in modern society. One main criterion for dental age estimation in the relevant age group is the evaluation of third molar eruption. The importance of ethnic variation in dental development requires population specific data for dental age evaluation. In the present study, we determined the stages of third molar eruption in 347 female and 258 male First Nations people of Canada aged 11 to 29 years based on radiological evidence from 605 conventional orthopantomograms. The results presented here provide data on the age of alveolar, gingival, and complete eruption of the third molars in the occlusal plane that can be used for forensic estimation of the minimum and most probable ages of investigated individuals.

Sex discrimination potential of permanent maxillary molar cusp diameters.


Macaluso-P-Jr.

Department of Anthropology, Binghamton University (SUNY), NY, USA.
p.james.macaluso@hotmail.com.

The purpose of the present investigation was to assess the potential usefulness of permanent maxillary molar cusp diameters for sex discrimination of poorly preserved skeletal remains. Cusp diameters were measured from standardized occlusal view photographs in a sample of black South Africans consisting of 130 males and 105 females.
Results demonstrated that all cusp dimensions for both first and second maxillary molars exhibited significant sexual dimorphism (p < 0.001). Univariate and multivariate discriminant function equations permitted low to moderate classification accuracy in discriminating sex (58.3%-73.6%). The allocation accuracies for cusp diameter measurements were as high as, and even surpassed, those observed for conventional crown length and breadth dimensions of the same teeth. The most accurate result (73.6%, with a sex bias of only 0.5%) was obtained when all cusp diameters from both maxillary molars were used concurrently. However, only slightly less accurate results (~70.0%) were achieved when selected dimensions from only one of the molars, or even a single cusp, were utilized. Although not as reliable at predicting sex as other skeletal elements in black South Africans, the derived odontometric standards can be used with highly fragmentary skeletal material, as well as immature remains in which crown formation of the maxillary molars is complete.

English.

2010.

Survival of batch numbers within dental implants following incineration as an aid to identification.


Berketa-J, James-H, Marino-V.

Forensic Odontology Unit, School of Dentistry, University of Adelaide, Adelaide, South Australia 5005, Australia. john.berketa@adelaide.edu.au.

Dental implants have become a popular choice of treatment in replacing individual lost teeth or entire dentitions. The physical properties of high corrosion resistance, high structural strength and
high melting point, suggest the retention of intact implants following most physical assaults. As the implants are machine made, they lack the individualisation required for their use as identifiers of the deceased, however the Straumann(TM) Company (Waldenburg, Switzerland) has recently released information that within the chamber of their implants they have laser etched batch numbers. The number of implants with the same batch number varies from 24 to 2400. The purpose of this study was to ascertain if the batch number was still identifiable following intense heat exposure in a furnace. A Straumann(TM) Standard Plus 3.3 x 8 mm implant, with no healing cap nor abutment attached was incinerated to 1125 degrees Celsius. Another Straumann(TM) Standard Plus 3.3 x 8 mm implant was also incinerated in the same way as the first implant but with an abutment attached. The results indicated that the first implant had totally oxidised within the internal chamber whilst the second implant following the removal of the abutment revealed an intact identifiable batch number. If the companies constructing implants were to place individual serial numbers rather than batch numbers on these implants then the potential exists for a new approach to be established for the identification of the deceased.

English.

2010.