The comparison of dental morphology and restorative work for human identification has been well documented. This case study involved documentation of osseointegrated and clinically restored dental implants following cremation.

METHODS

The mandible and the maxilla were excised from a head containing implants and cremated. The remains were retrieved, digital and radiographic images were taken and elemental analysis undertaken. The brand of implants was identified utilizing web based search engines. A prosthodontist, known to commonly use this implant system, was approached to ascertain possibilities that matched the data given.

RESULTS

Following cremation the implants were identified and a prosthodontist was able to identify the deceased. Two implants in the maxilla had dehiscences on their buccal surfaces, which could not be detected by periapical radiographs.

CONCLUSIONS
Dental implants osseointegrated and restored with a prosthetic superstructure were recognizable following severe incineration. It was possible to trace back the identity of the unknown victim to a prosthodontist. Bone dehiscences discovered in this study highlighted how two-dimensional radiographs may not reveal lack of bone support.

MeSH: Cremation (major); Dental Implantation, Endosseous (major); Dental Implants (major); Forensic Anthropology -- methods (major); Forensic Dentistry -- methods (major); Hot Temperature; Humans; Mandible; Maxilla

Journal classification: Dental Journals; Index Medicus

Substance: Substance: Dental Implants; CAS: 0;

Identifier (keyword): Forensic identification, cremation, dehiscence, implants

Correspondence author: Berketa, J W Forensic Odontology Unit, The University of Adelaide, South Australia.

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**Odontometric sex variation in Malaysians with application to sex prediction**

Author: Khamis, Mohd F1; Taylor, Jane A2; Malik, Shan N3; Townsend, Grant C4

1School of Dentistry, The University of Adelaide, SA 5005, Australia; School of Dental Sciences, Health Campus, Universiti Sains Malaysia, 16150 Kota Bharu, Malaysia.

Electronic address: fadhi@kb.usm.my2School of Dentistry, The University of Adelaide, SA 5005, Australia; School of Health Sciences, Faculty of Health, The University of Newcastle, University Drive, Callaghan, NSW 2308, Australia. Electronic address:
Abstract (English): Information about the sex of individuals is important for human identification. This study was conducted to quantify classification rates of sex prediction models for Malaysians using odontometric profiles. Mesiodistal (MD) and buccolingual (BL) crown dimensions of the permanent dentition were studied in 400 young adult Malaysians, giving a total of 28 tooth size variables. The sample consisted of three major ethnic groups, the Malays, Chinese and Tamils, since the aim was to assess sex dimorphism in Malaysians as a whole. Results showed that the mesiodistal diameter of the lower canine was the most sexually dimorphic dimension in Malaysian Malays and Tamils. Univariate analyses showed that the magnitude and pattern of sex dimorphism varies between these three ethnic groups, with Malaysian Chinese and Tamils being more dimorphic than the Malaysian Malays. Stepwise discriminant functions were generated bearing in mind their application in practical forensic situations. The range of classification rates was from 70.2% to 78.5% for the composite Malaysian group, and 83.8%, 77.9%, 72.4% for Malaysian Chinese, Malays and Tamils, respectively. The 'Area Under the Receiver Operating Characteristic Curve statistics' indicated good classification rates for three prediction models obtained using a combination of all tooth size variables, mandibular teeth, and mesiodistal dimensions in the composite Malaysian group, and for all tooth size variables in each ethnic group. The present study provides strong support for the value of odontometry as an adjunct scientific method for sex prediction in human identification.
Accuracy of age estimation methods from orthopantomograph in forensic odontology: a comparative study

Author: Khorate, Manisha M1; Dinkar, A D2; Ahmed, Junaid3

1Oral Medicine, Diagnosis &Radiology Department, Goa Dental College &Hospital, Bambolim 403 202, Goa, India. Electronic address: khoratemanisha@rediffmail.com2Oral Medicine, Diagnosis &Radiology Department, Goa Dental College &Hospital, Bambolim 403 202, Goa, India3Department of Oral Medicine &Radiology, Manipal College of Dental Sciences, Mangalore, India


Abstract (English): Changes related to chronological age are seen in both hard and soft tissue. A number of methods for age estimation have been proposed which can be classified in four categories, namely, clinical, radiological, histological and chemical analysis. In forensic odontology, age estimation based on tooth development is universally accepted method. The panoramic radiographs of 500 healthy Goan, Indian children (250 boys and 250 girls) aged between 4 and 22.1 years were selected. Modified Demirjian's method (1973/2004), Acharya AB formula (2011), Dr Ajit D. Dinkar (1984) regression equation, Foti and coworkers (2003) formula (clinical and radiological) were applied for estimation of age. The result of our study has shown that Dr Ajit D. Dinkar method is more accurate followed by Acharya Indian-specific formula. Furthermore, in this study by applying all these methods to one regional population, we have attempted to present dental age estimation methodology best suited for the Goan Indian population.

MeSH: Adolescent; Adult; Age Determination by Teeth -- methods (major); Child; Child, Preschool; Female; Forensic Dentistry -- methods; Humans; India; Male; Radiography, Panoramic (major); Regression Analysis; Sex Characteristics; Tooth Calcification (major); Young Adult

Identifier (keyword): Age estimation, Dental age, Forensic anthropology population data, Forensic odontology, Methods, Orthopantomograph
Dental age estimation using Demirjian and Willems methods: cross sectional study on children from the Former Yugoslav Republic of Macedonia

Author: Ambarkova, Vesna1; Galić, Ivan2; Vodanović, Marin3; Biočina-Lukenda, Dolores4; Brkić, Hrvoje5

1Department of Pediatric and Preventive Dentistry, Faculty of Dentistry, The Saints Cyril and Methodius University of Skopje, Vodnjanska 17, 91000 Skopje, Former Yugoslav Republic of Macedonia. Electronic address: ambveki@yahoo.com
2University Department of Health Studies, University of Split, Ruđera Boškovića 31, 21000 Split, Croatia; Department of Dental Medicine, School of Medicine, University of Split, Ruđera Boškovića 31, 21000 Split, Croatia. Electronic address: igalic@mefst.hr
3Department for Dental Anthropology, School of Dental Medicine, University of Zagreb, Gundulićeva 5, 10000 Zagreb, Croatia. Electronic address: vodanovic@sfzg.hr
4Department of Dental Medicine, School of Medicine, University of Split, Ruđera Boškovića 31, 21000 Split, Croatia. Electronic address: dlukenda@mefst.hr
5Department for Dental Anthropology, School of Dental Medicine, University of Zagreb, Gundulićeva 5, 10000 Zagreb, Croatia; University Hospital Centre Zagreb, Gundulićeva 5, 10000, Croatia. Electronic address: brkic@sfzg.hr


Abstract (English): To evaluate applicability of Demirjian and Willems methods for calculating dental age of children in the Former Yugoslav Republic of Macedonia we analyzed panoramic radiographs of 966 children (485 female and 481 male, aged 6-13 years) treated at the University and Community Dental Clinics in Skopje using four Demirjian methods and a Willems method for determining dental ages. Intra-rater and inter-rater
agreement of mineralization stages were 0.86 and 0.82, respectively. All methods significantly overestimated dental age when compared to the chronological age (p<0.001). In males, the lowest overestimation was shown using Willems method (0.52±0.87 years), followed by Demirjian methods from 1976 using PM1, PM2, M1, M2 teeth (0.69±0.92 years) and using I2, PM1, PM2, M2 teeth (0.80±0.98 years). The greatest overestimation were shown using Demirjian methods using 7 teeth from 1976 (0.92±0.99 years) and method from 1973 (1.06±1.07 years). In females, the lowest overestimation was shown using Willems method (0.33±0.83 years) than the Demirjian method using PM1, PM2, M1, M2 teeth (1.00±1.01 years), following methods from 1976 using 7 teeth (1.03±1.01 years) and I2, PM1, PM2, M2 teeth (1.12±0.96 years). The greatest overestimation was for method from 1973 using 7 teeth (1.17±0.98 years). Willems method was the most accurate while Demirjian's methods for dental age calculation are not suitable on children from the Former Yugoslav Republic of Macedonia.

MeSH: Adolescent; Age Determination by Teeth -- methods (major); Child; Cross-Sectional Studies; Female; Forensic Dentistry -- methods; Humans; Macedonia (Republic); Male; Radiography, Panoramic (major); Sex Characteristics; Tooth -- anatomy & histology; Tooth -- radiography (major); Tooth Calcification (major)

Identifier (keyword): Age calculation, Demirjian methods, Dental age, Forensic odontology, Former Yugoslav Republic of Macedonia, Willems method

Correspondence author: Ambarkova, Vesna Department of Pediatric and Preventive Dentistry, Faculty of Dentistry, The Saints Cyril and Methodius University of Skopje, Vodnjanska 17, 91000 Skopje, Former Yugoslav Republic of Macedonia. Electronic address: ambveki@yahoo.com.

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Thermal modifications of root transparency and implications for aging: a pilot study
Abstract (English): Root transparency has proven to be related to age and has been considered by different odontological methods for age estimation. Very little is known concerning possible variations of root transparency with heat, although the applicability of the method to burnt remains depends on the possible modifications of this specific variable. This pilot study presents the results of an experiment performed on 105 teeth obtained from dental patients and autopsy material, heated in an industrial oven at 50°C, 100°C, 150°C and 200°C. Root transparency was measured before and after the charring experiment. The heating process proved to radically modify root transparency, which decreased in 20% of samples at 50°C, in 34.6% at 100°C, in 50% at 150°C, in 77% at 200°C. The overall correlation index (CI) between decrease in root transparency and increase in temperature amounted to 0.96. These results show that heat may modify root transparency and suggest caution in using methods based on root transparency for age estimation.

MeSH: Age Determination by Teeth -- methods (major); Dental Enamel -- pathology; Forensic Dentistry; Hot Temperature (major); Humans; Pilot Projects; Tooth Crown -- pathology; Tooth Root -- pathology (major)

Identifier (keyword): Lamendin, age estimation, forensic anthropology, forensic odontology, forensic sciences, heating, root transparency

Correspondence author: Gibelli, Daniele LABANOF, Laboratorio di Antropologia e Odontologia Forense, Sezione di Medicina Legale, DMU - Dipartimento di Scienze Biomediche per la Salute, Università degli Studi di Milano, Milan, Italy.
Example of human individual identification from World War II gravesite

Author: Ossowski, Andrzej1; Kuś, Marta; Brzeziński, Piotr; Prüffer, Jakub; Piątek, Jarosław; Zielińska, Grażyna; Bykowska, Milena; Jałowinska, Katarzyna; Torgashev, Anton; Skoryukov, Antoliy; Parafiniuk, Mirosław

1Pomeranian Medical University in Szczecin, Department of Forensic Medicine, Poland; Association "Pomorze1945", Poland; Institute of National Remembrance, Branch Office in Szczecin, Poland


Abstract (English): This paper presents the procedure elaborated by our team which was applied to the mode of identification of Red Army soldiers who were taken as prisoners by the German Army during World War II and deceased in captivity. In the course of our search the unmarked burial of ten Soviet prisoners of war was found. Historical, anthropological and genetic research conducted by us led to the personal identification of nine of them, including two by means of DNA analysis.

MeSH: Adolescent; Adult; Burial; DNA -- isolation & purification (major); DNA Fingerprinting -- methods (major); Exhumation (major); Finger Phalanges -- chemistry; Finger Phalanges -- pathology; Forensic Anthropology; Forensic Dentistry; History, 20th Century; Humans; Microsatellite Repeats; Military Personnel -- history; Multiplex Polymerase Chain Reaction; Poland; Prisoners -- history; Real-Time Polymerase Chain Reaction; Specimen Handling; Toe Phalanges -- chemistry; Toe Phalanges -- pathology; Tooth -- chemistry; Tooth -- pathology; World War II; Young Adult

Journal classification: Index Medicus

Substance: Substance: DNA; CAS: 9007-49-2;

Identifier (keyword): DNA, DVI, Exhumation, Prisoners of war, STR, War graves

Correspondence author: Ossowski, Andrzej Pomeranian Medical University in Szczecin, Department of Forensic Medicine, Poland; Association "Pomorze1945", Poland; Institute of National Remembrance, Branch Office in Szczecin, Poland.

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Difficulties in personal identification caused by unreliable dental records

Author: Lorkiewicz-Muszyńska, Dorota1; Przystańska, Agnieszka; Glapiński, Mariusz; Kociemba, Wojciech; Żaba, Czesław

1Department of Forensic Medicine, Poznań University of Medical Sciences, ul. Święcieckiego 6, 60-781 Poznań, Poland. Electronic address: dlorkiew@ump.edu.pl

Abstract (English): This paper demonstrates a case of personal identification that initially seemed straightforward, mainly because complete and comprehensive antemortem dental records of a missing person were made available for analysis. Skeletal remains were found and the skull (most crucial for human identification) was delivered for analysis. Comparative analysis of antemortem and postmortem dental records excluded identification, while the results of superimposition (simultaneously performed by another team member) revealed sufficient concordant points to establish identity. The results caused confusion and additional information was required. The need for more evidence resulted in delivery of elements of the postcranial skeleton. Identification was finally achieved when concordant points were established in a comparison of antemortem X-rays and the humerus. Team members concluded that the dental records were in fact not adequate and that mistakes in numbering the teeth (superior canine instead inferior canine and right and left premolars) were considered to be the initial reason a positive identification had not been made. The authors conclude that a multidisciplinary approach is crucial to making a positive identification and that caution should be exercised when carrying out personal identification from dental records alone. The need to adequately train police officers to collect and preserve dental evidence is also emphasized.

MeSH: Adult; Dental Records (major); Forensic Anthropology; Forensic Dentistry; Humans; Humerus -- pathology (major); Humerus -- radiography; Image Processing, Computer-Assisted; Male; Mandible -- pathology; Mandible -- radiography; Photography; Sex Determination by Skeleton; Skull -- pathology (major); Skull -- radiography; Software Identifier (keyword): Dental records, Forensic odontology, Superimposition
Detection of composite resin restorations using an ultraviolet light-emitting diode flashlight during forensic dental identification

Author: Guzy, Gerald1; Clayton, Mary Ann
1Bergen County Medical Examiner's Office, Paramus, NJ, USA. tobytibe@optonline.net

Abstract (English): With the increased use of composite resin and the decreased use of amalgam as a dental restorative material, the forensic dental identification of unidentified human remains has become more difficult. Various methods have been used to detect the presence of composite resin restorations including dyes, forensic alternative light sources, quantitative light-induced fluorescence, and ultraviolet lights. Although these methods may be helpful, the expense of the equipment, the electrical requirements, and the need for water to wash the dye from the mouth may make these methods impractical especially in a temporary morgue situation during a mass disaster. The fluorescent properties of composite resins, when exposed to ultraviolet light, are well documented. Standard tube ultraviolet lights have been used to detect the presence of composite resin, but these lights are large and bulky, and the tubes are fragile. The development of ultraviolet light emitting diode flashlights has provided forensic odontologists with a tool that is small, inexpensive, and battery operated. The two forensic dental identification cases described here demonstrate the value of ultraviolet light emitting diode flashlights as an adjunct to a careful clinical and radiographic examination.