Validation of a physical anthropology methodology using mandibles for gender estimation in a Brazilian population

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Abstract (English): UNLABELLED

Validation studies of physical anthropology methods in the different population groups are extremely important, especially in cases in which the population variations may cause problems in the identification of a native individual by the application of norms developed for different communities.

OBJECTIVE

This study aimed to estimate the gender of skeletons by application of the method of Oliveira, et al. (1995), previously used in a population sample from Northeast Brazil.

MATERIAL AND METHODS

The accuracy of this method was assessed for a population from Southeast Brazil and validated by statistical tests. The method used two mandibular measurements, namely the bigonial distance and the mandibular ramus height. The sample was composed of 66 skulls and the method was applied by two examiners. The results were statistically analyzed by the paired t test, logistic discriminant analysis and logistic regression.

RESULTS

The results demonstrated that the application of the method of Oliveira, et al. (1995) in this population achieved very different outcomes between genders, with 100% for females and only 11% for males, which may be explained by ethnic differences. However, statistical adjustment of measurement data for the population analyzed allowed accuracy 6.47% for males and 78.13% for females, with the creation of a new discriminant formula.

CONCLUSION

It was concluded that methods involving physical anthropology present high rate of accuracy for human identification, easy application, low cost and simplicity; however, the methodologies must be validated for the different populations due to differences in ethnic patterns, which are directly related to the phenotypic aspects. In this specific case, the method of Oliveira, et al. (1995) presented good accuracy and may be used for gender estimation in Brazil in two geographic regions,
namely Northeast and Southeast; however, for other regions of the country (North, Central West and South), previous methodological adjustment is recommended as demonstrated in this study.


MeSH: Brazil -- ethnology; Discriminant Analysis; Female; Forensic Anthropology -- methods (major); Forensic Dentistry -- methods (major); Humans; Logistic Models; Male; Mandible -- anatomy & histology (major); Observer Variation; Reference Values; Reproducibility of Results; Sex Characteristics (major); Sex Determination by Skeleton -- methods (major); Sex Factors; Time Factors

Journal classification: Dental Journals; Index Medicus

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Accuracy of estimation of dental age in comparison with chronological age in Indian population--a comparative analysis of two formulas

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Abstract (English): UNLABELLED

Demirjian's 8-teeth method widens the assessment in a wider age group, in comparison with the original 7-teeth method.

AIM AND OBJECTIVE

Evaluate age in children, adolescents and young adults using Demirjian's 8-Teeth Method in an Indian population. Compare the effectiveness of existing Demirjian's formula with that of the Indian formula.

MATERIALS AND METHOD

Panoramic radiographs of 50 male and 50 female patients aged between 5 and 24 years were collected. The radiographs were interpreted using Demirjian's 8-teeth method and the dental age calculated using Demirjian's formula and the Indian formula. Both the formula's were compared using paired 't' test (SPSS Statistics 11.5).

RESULTS

Among the 100 samples the mean chronological age in 50 males was 13.44 years and mean chronological age in 50 females was 13.12 years. By using Demirjian's formula the mean dental age
in male was 11.81 years and that in female was 11.58 years. By using Indian Formula the mean
dental age in male was 13.54 years and that in female was 14.06 years. The mean dental age by both
the formulas were compared with the corresponding chronological age. It was evaluated that the
Demirjian's formula underestimated the mean dental age by 1.63 years in males and by 1.54 years in
females, whereas a variation of 0.10 years in male and 0.94 years in female was found with the
Indian formula. The mean dental age obtained using Indian formula was approximating with the
chronological age in the male and female by a margin of 0.94 years.

CONCLUSION

Acharya's Indian formula is more effective in evaluating the dental age closer to the chronological
age of an individual in an Indian population in comparison with the existing Demirjian's formula.

MeSH: Adolescent; Adult; Age Determination by Teeth -- methods (major); Child; Child, Preschool;
Female; Forensic Dentistry; Humans; India; Male; Mathematical Concepts (major); Radiography,
Panoramic; Tooth -- growth &development; Young Adult

Journal classification: Index Medicus

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Language: English

Language of abstract: English

Document type: Comparative Study, Journal Article

Publication title: Journal of forensic and legal medicine

Volume: 20

Issue: 4

Pagination: 230-3

ISSN: 1752-928X (ISSNLinking)

Electronic ISSN: 1878-7487

Publication type: Journal

Journal code: 101300022

Publisher location: ENGLAND

Notes: Publication model: Print-Electronic;; Cited medium:Internet

DOI: http://dx.doi.org/10.1016/j.jflm.2012.09.007

PII: S1752-928X(12)00204-1
Feasibility and validation of virtual autopsy for dental identification using the Interpol dental codes

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Abstract (English): Virtual autopsy is a medical imaging technique, using full body computed tomography (CT), allowing for a noninvasive and permanent observation of all body parts. For dental identification clinically and radiologically observed ante-mortem (AM) and post-mortem (PM) oral identifiers are compared. The study aimed to verify if a PM dental charting can be performed on virtual reconstructions of full-body CT's using the Interpol dental codes. A sample of 103 PM full-body CT's was collected from the forensic autopsy files of the Department of Forensic Medicine University Hospitals, KU Leuven, Belgium. For validation purposes, 3 of these bodies underwent a complete dental autopsy, a dental radiological and a full-body CT examination. The bodies were scanned in a Siemens Definition Flash CT Scanner (Siemens Medical Solutions, Germany). The images were examined on 8- and 12-bit screen resolution as three-dimensional (3D) reconstructions and as axial, coronal and sagittal slices. InSpace® (Siemens Medical Solutions, Germany) software was used for 3D reconstruction. The dental identifiers were charted on pink PM Interpol forms (F1, F2), using the related dental codes. Optimal dental charting was obtained by combining observations on 3D reconstructions and CT slices. It was not feasible to differentiate between different kinds of dental restoration materials. The 12-bit resolution enabled to collect more detailed evidences, mainly related to positions within a tooth. Oral identifiers, not implemented in the Interpol dental coding were observed. Amongst these, the observed (3D) morphological features of dental and maxillofacial structures are important identifiers. The latter can become particularly more relevant
towards the future, not only because of the inherent spatial features, yet also because of the increasing preventive dental treatment, and the decreasing application of dental restorations. In conclusion, PM full-body CT examinations need to be implemented in the PM dental charting protocols and the Interpol dental codes should be adapted accordingly.

MeSH: Autopsy -- methods (major); Clinical Coding (major); Dental Prosthesis; Dental Records; Feasibility Studies; Forensic Dentistry -- methods (major); Humans; Imaging, Three-Dimensional; Radiography, Dental, Digital (major); Tomography, X-Ray Computed; Whole Body Imaging (major)

Journal classification: Index Medicus

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Language: English

Language of abstract: English

Document type: Journal Article, Validation Studies

Publication title: Journal of forensic and legal medicine

Volume: 20

Issue: 4

Pagination: 248-54

ISSN: 1752-928X (ISSNLinking)

Electronic ISSN: 1878-7487

Publication type: Journal

Journal code: 101300022

Publisher location: ENGLAND

Notes: Publication model: Print-Electronic;; Cited medium:Internet

DOI: http://dx.doi.org/10.1016/j.jflm.2012.09.021

PII: S1752-928X(12)00218-1

Publication date: May 2013

Date created: 2013-04-29

Date completed: 2014-01-09

Medline document status: MEDLINE

Electronic publication date: 2012-10-10

Source attribution: Medline, © Publisher specific
Expert interpretation of bitemark injuries—a contemporary qualitative study

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Abstract (English): This study attempts to characterize the nature of disagreement among odontologists in determining the fundamental properties of suspected bitemark injuries. Fifteen odontologists were asked to freely comment on six images of supposed bitemarks. Qualitative analysis using a grounded theory approach revealed that practitioner agreement was at best fair, with wide-ranging opinions on the origin, circumstance, and characteristics of the wound given for all six images. More experienced practitioners (>10 years) tended to agree with each other less than those who had 10 years or less experience in forensic odontology. The differences in opinions can be at least partly accounted for by the inconsistent nature of approaches used by different practitioners in assessing bitemark evidence. The results of this study indicate that more definitive guidelines as to the assessment of bitemarks as patterned injuries should be developed to ensure the highest possible level of practitioner agreement.

MeSH: Bites, Human -- pathology (major); Dentists (major); Forensic Dentistry; Humans; Observer Variation (major); Reproducibility of Results

Journal classification: Index Medicus

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Language: English
Language of abstract: English
Document type: Journal Article
Publication title: Journal of forensic sciences
Volume: 58
Secular trend in the development of permanent teeth in a population of Istria and the littoral region of Croatia

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Abstract (English): The study evaluated secular trends in dental development during a period of 30 years, correlation between dental and chronological age in Istria and the littoral region of Croatia.
The sample consisted of 1000 panoramic radiographs of children, aged 6-16 years (mean 10.0±1.8), taken in the period 1977-1979 (N=500; 243 females) and 2007-2009 (N=500; 299 females). Dental age was assessed according to Demirjian's method. Correlation between chronological and dental age was linear, positive, high, and statistically significant in both periods and genders, ranging from 0.73 to 0.86. Dental age was underestimated when compared to chronological age by 1 year on average, more 30 years ago (-1.35±1.17) than today (-0.63±1.09), less for girls (-0.80±1.22) than boys (-1.21±1.10). A statistically significant positive secular trend in acceleration of dental development was present of 0.72 years during the 30-year period and was more significant in girls than boys (0.83- and 0.51-year acceleration).

MeSH: Adolescent; Age Determination by Teeth (major); Child; Croatia; Cross-Sectional Studies; Dentition, Permanent (major); Female; Forensic Dentistry; Humans; Linear Models; Male; Radiography, Panoramic; Sex Factors

Journal classification: Index Medicus

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Contrast enhancement of bite mark images using the grayscale mixer in ACR in Photoshop®

Author: Evans, Sam; Noorbhai, Suzanne; Lawson, Zoe; Stacey-Jones, Seren; Carabott, Romina

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Abstract (English): Enhanced images may improve bite mark edge definition, assisting forensic analysis. Current contrast enhancement involves color extraction, viewing layered images by channel. A novel technique, producing a single enhanced image using the grayscale mix panel within Adobe Camera Raw®, has been developed and assessed here, allowing adjustments of multiple color channels simultaneously. Stage 1 measured RGB values in 72 versions of a color chart image; eight sliders in Photoshop® were adjusted at 25% intervals, all corresponding colors affected. Stage 2 used a bite mark image, and found only red, orange, and yellow sliders had discernable effects. Stage 3 assessed modality preference between color, grayscale, and enhanced images; on average, the 22 survey participants chose the enhanced image as better defined for nine out of 10 bite marks. The study has shown potential benefits for this new technique. However, further research is needed before use in the analysis of bite marks.

MeSH: Bites, Human -- pathology (major); Forensic Dentistry -- methods; Humans; Image Enhancement -- methods (major); Image Processing, Computer-Assisted -- instrumentation; Image Processing, Computer-Assisted -- methods (major); Questionnaires; Software (major)

Journal classification: Index Medicus

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Language: English

Language of abstract: English

Document type: Journal Article
The role of military dental capabilities in mass fatality situations

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Abstract (English): Recent experience with the New Zealand Defence Force in supporting the national disaster victim identification operation following destructive earthquakes in Canterbury, New Zealand, highlights the important role military forensic odontology capabilities can provide in
supporting a national disaster response. Military dental personnel are well-trained, practiced, and prepared to support short-notice contingencies and can provide important immediate response augmentation to Disaster Victim Identification teams following a multiple-fatality event. The role of military forensic odontology capabilities in multiple-fatality incidents is reviewed.

MeSH: Disasters (major); Forensic Dentistry -- methods (major); Humans; Mass Casualty Incidents -- statistics & numerical data (major); Military Dentistry -- methods (major); Military Personnel (major); New Zealand; Societies, Medical

Journal classification: Index Medicus

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Language: English

Language of abstract: English

Document type: Journal Article, Research Support, Non-U.S. Gov't, Review

Publication title: Military medicine

Volume: 178

Issue: 5

Pagination: 523-8

ISSN: 0026-4075 (ISSNLinking)

Electronic ISSN: 1930-613X

Publication type: Journal

Journal code: 2984771R

Publisher location: UNITED STATES

Notes: Publication model: Print;; Cited medium: Internet

DOI: http://dx.doi.org/10.7205/MILMED-D-12-00399

Publication date: May 2013

Date created: 2013-06-12

Date completed: 2014-01-28

Medline document status: MEDLINE

Source attribution: Medline, © Publisher specific

Accession number: 23756011

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First available: 2013-06-13