Determining dental sex dimorphism in South Indians using discriminant function analysis.

Anuthama, Krishnamurthy; Shankar, S; Ilayaraja, Vadivel; Kumar, Gopal Shiva; Rajmohan, M; et al.

ABSTRACT

Dental forensics forms a vital branch of forensic science which deals with proper handling, examination and evaluation of dental evidences for identification of victims of crime, accidents or calamities. Therefore skull and teeth often provide the identification material. The aim of the study was to investigate the accuracy of odontometric methods in sex determination of permanent teeth and to compute new formula to differentiate male and female teeth using discriminant function analysis for South Indian population. A total of 100 subjects were selected for the study from a parent population of 4800 students by simple random sampling method. Alginate impressions of the upper dental arch were made and casts were poured immediately. A digital vernier calliper was used for the measurement of all upper anteriors. Twelve different tooth measurements were recorded and from those two indexes have been computed. Statistical analysis was performed using the SPSS version 17.0 software. All the predictor variables were subjected to stepwise discriminant function analysis which optimally separates the genders and a best discriminant function was generated. In all the observed mean dimensions, male values exceed the female values. Students t test for the different predictor variables of all teeth selected between male and female were found significant (p < 0.05). Very high significance was found in mean MD of 11, 12 and 13 and |c| of 23. The variables exhibiting best discriminant powers were mesiodistal width of both upper central incisors, DB-ML of 13 and canine crown module of 13. Sexual dimorphism in the size of permanent teeth differs from one population to the other and hence the standards set for one population could not be applied for another population. Hence this technique would be a simple, quick, cost effective, reliable and accurate for sex determination.

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Author Anuthama, Krishnamurthy; Shankar, S; Ilayaraja, Vadivel; Kumar, Gopal Shiva; Rajmohan, M;
Vignesh Language English Language of abstract English Publication title Forensic science international Volume 212 Issue 1-3 Pages 86-9 Publication type Journal ISSN 0379-0738 (ISSNLinking) Journal code 7902034 Publisher IRELAND Publisher location IRELAND Subfile Index Medicus Publication date Oct 10, 2011 Date created 2011-09-06 Date completed 2012-02-02 Document type Comparative Study, Journal Article Accession number 21664775 Copyright Copyright © 2011 Elsevier Ireland Ltd. All rights reserved. Database MEDLINE®
Age estimation in Indians from extracted unsectioned teeth.

Acharya, Ashith B; Kumar, Kiran K. Forensic science international 212. 1-3: 275.e1-5. (Oct 10, 2011)

Found in: MEDLINE®

ABSTRACT

Teeth are useful indicators of age-at-death and non-destructive methods ensure preservation of dental evidentiary material which could be used for court presentation. No previous data exists on estimating age from extracted teeth per se in Indians. This paper examined four parameters—dental attrition, periodontal ligament (PDL) attachment level, root dentin translucency and root color—on a heterogeneous sample of 106 teeth extracted from as many subjects (age range = 20-78 years). A number of well-established methods that used both visual grading and measurements were utilized in assessing these changes. Linear and stepwise regression analyses revealed low correlation (r/R = 0.05-0.46) and high standard errors of estimate (± 13.1-4.6 years). PDL attachment level graded using the visual criteria showed the strongest correlation (r = 0.45), possibly owing to dietary habits in Indians contributing to consistent gingival recession with aging; dentinal translucency irrespective of whether they were visually graded or measured exhibited the lowest correlation (r = 0.05-0.09; p > 0.05), probably due to its diffused appearance on extracted unsectioned teeth, undermining proper delineation. PDL attachment level and attrition entered the stepwise regression analysis (R = 0.46; p < 0.01), implying that age may be estimated clinically without the necessity for tooth extraction; however, low correlation and high error rates preclude its routine usage in forensic cases.

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Title Age estimation in Indians from extracted unsectioned teeth. Author Acharya, Ashith B; Kumar, Kiran K Language English Language of abstract English Publication title Forensic science international Volume 212 Issue 1-3 Pages 275.e1-5 Publication type Journal ISSN 0379-0738 (ISSN Linking) Journal code 7902034 Publisher IRELAND Publisher location IRELAND Subfile Index Medicus Publication date Oct 10, 2011 Date created 2011-09-06 Date completed 2012-02-02 Document type Journal Article Accession number 21764231 Copyright Copyright © 2011 Elsevier Ireland Ltd. All rights reserved. Database MEDLINE®

Morphological study of the palatal rugae in western Indian population.

Gondivkar, Shailesh M; Patel, Swetal; Gadbail, Amol R; Gaikwad, Rahul N; Chole, Revant; et al. Journal of forensic and legal medicine 18. 7: 310-2. (Oct 2011)

Found in: MEDLINE®
ABSTRACT
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The aim of this study was to identify and compare the different morphological rugae patterns in males and females of western Indian population, which may be an additional method of identification in cases of crimes or aircraft accidents. A total of 108 plaster casts, equally distributed between the sexes and belonging to similar age-group, were examined for different biometric characteristics of the palatal rugae including number, shape, length, direction and unification and their incidence recorded. Association between these rugae biometric characteristics and sex were tested using chi-square analysis and statistical descriptors were identified for each of these parameters using the SPSS 15.0. The study revealed a statistically significant difference in the total number of rugae between the two sexes (P = 0.000). The different types of rugae between the males and females were statistically compared. The female showed a highly significant difference in the sinuous (P = 0.002) and primary type (P = 0.000) while the male had a significant difference in the unification (P = 0.005). The predominant direction of the rugae was found to be forward relative to backward. It may be concluded that the rugae pattern can be an additional method of differentiation between the male and female in conjunction with the other methods such as visual, fingerprints, and dental characteristics in forensic sciences.

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Title Morphological study of the palatal rugae in western Indian population. Author Gondivkar, Shailesh M; Patel, Swetal; Gadbail, Amol R; Gaikwad, Rahul N; Chole, Revant; Parikh, Rima V Language English Language of abstract English Publication title Journal of forensic and legal medicine Volume 18 Issue 7 Pages 310-2 Publication type Journal ISSN 1752-928X (ISSN) Journal code 101300022 Publisher ENGLAND Publisher location ENGLAND Subfile Index Medicus DOI 10.1016/j.jflm.2011.06.007 Publication date Oct 2011 Date created 2011-09-12 Date completed 2012-01-26 Document type Journal Article Accession number 21907934 Copyright © 2011 Elsevier Ltd and Faculty of Forensic and Legal Medicine. All rights reserved. Database MEDLINE®

Choumps.

Hans, M Kumar; Nagpal, A; Shetty, S. British dental journal 211. 5: 194. (Sep 9, 2011)
Found in: MEDLINE®
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Title Choumps. Author Hans, M Kumar; Nagpal, A; Shetty, S Language English Publication title British dental journal Volume 211 Issue 5 Pages 194 Publication type Journal ISSN 0007-0610 (ISSN) Journal code 7513219 Publisher ENGLAND Publisher location ENGLAND Subfile Dental Journals, Index Medicus DOI 10.1038/sj.bdj.2011.730 Publication date Sep 9, 2011 Date created 2011-09-09
Investigation on the utility of permanent maxillary molar cusp areas for sex estimation.

Macaluso, P James. Forensic science, medicine, and pathology 7. 3: 233-47. (Sep 2011)

ABSTRACT

Digital photogrammetric methods were employed to assess the level of sexual dimorphism present in permanent maxillary molar cusp areas of black South Africans (130 males, 105 females). Odontometric standards were then developed for diagnosing sex, based on the cusp area data derived for these teeth. Results demonstrated that all cusp area measurements of both the first and second maxillary molars were significantly dimorphic (P < 0.0001) in this group. Univariate and multivariate discriminant function analyses yielded overall sex prediction accuracy rates between 59.6 and 74.5%. Comparable allocation results were also obtained for binary logistic regression analyses, but with larger classification sex biases. The highest classification accuracies were observed for different combinations of just two cusp areas for the first molar. Allocation rates of formulae derived for second molar dimensions were on average 4.3% lower than those obtained for the first molar. Analyses incorporating cusp areas of both maxillary molars did not improve classification accuracies achieved when only using first molar measurements. The classification rates are below the suggested minimum accuracy of 75-80% for reliable forensic application of a method; however, the derived formulae may provide a useful statistical indication as to the sex of fragmentary remains in which complete or even partial tooth crowns are the only materials available for examination. Furthermore, the formulae can be applied not only to adults but also to subadults (above the age of 3 years) in which the more accurate sex discriminating features of the pelvis and skull are yet to develop.

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Title Investigation on the utility of permanent maxillary molar cusp areas for sex estimation. Author Macaluso, P James Language English Language of abstract English Publication title Forensic science, medicine, and pathology Volume 7 Issue 3 Pages 233-47 Publication type Journal ISSN 1547-769X (ISSNLinking) Journal code 101236111 Publisher UNITED STATES Publisher location UNITED STATES Subfile Index Medicus Publication date Sep 2011 Date created 2011-07-29 Date completed 2011-12-29 Document type Journal Article Accession number MEDLINE-21080110 Database MEDLINE®

Forensic dentistry and bitemark analysis: sound science or junk science?

Bush, Mary A. Journal of the American Dental Association (1939) 142. 9: 997-9. (Sep 2011)