Evaluating and managing temporomandibular injuries

Author: Abdel-Fattah, Reda


MeSH: Documentation; Expert Testimony; Forensic Dentistry (major) -- legislation & jurisprudence; Forensic Dentistry (major) -- methods; Humans; Medical History Taking; Physical Examination; Temporomandibular Joint -- injuries (major)

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Aspects of dento/medico-legal report writing

Author: Wood, Geoff D


Abstract (English): This paper offers some guidance on aspects of dento/medico-legal report writing, citing anonymized examples from the author’s caseload for clarification of the points made, and also serves to illustrate that sometimes not everything is as straightforward as it may initially appear. It provides reference to the current Civil Procedure Rules in England and Wales and its relevance in report writing. Clinical Relevance: To provide guidance on aspects of dento/medico-legal report writing.

MeSH: Chronology as Topic; Dental Records -- legislation & jurisprudence; Documentation; England; Expert Testimony (major) -- legislation & jurisprudence; Forensic Dentistry (major) -- legislation & jurisprudence; Humans; Medical Records -- legislation & jurisprudence; Physical Examination; Radiography, Dental; Research Report; Standard of Care -- legislation & jurisprudence; Truth Disclosure; Wales; Writing (major)

Journal classification: Dental Journals

Language: English

Language of abstract: English

Document type: Journal Article

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Radiographic evaluation of third-molar development in relation to the chronological age of Turkish children in the southwest Eastern Anatolia region

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Abstract (English): To study the chronological age of third-molar mineralisation of Turkish children from the southwest Eastern Anatolia region, the Demirjian staging method was used to determine the stage of the mineralisation of four third molars (18, 28, 38 and 48) and to compare third-molar development by sex and age with the results of previous studies. The study comprised 832 Turkish children from the southwest Eastern Anatolia region aged 6-16 years based on radiological evidence from digital orthopantomograms. The mean age of the 832 patients was 11.03±1.98 years, with 424 males (mean age, 10.97±1.97) and 408 females (mean age, 11.09±2.00). The orthopantomograms were scored by two observers. The Wilcoxon matched-pairs signed-rank test used to assess intra- and inter-observer assessment revealed strong agreement between both observers’ measurements. Statistical analysis of the association between sex and age was performed with the Mann-Whitney U-test and the Wilcoxon test. Regression analysis was performed to obtain regression formulae for calculating the dental and the chronological age. The statistical analysis showed a strong correlation between age and third-molar development in males (R(2)=0.61) and females (R(2)=0.63). New equations (age=7.49+0.69, development stage (DS) 38+0.70, DS18) were derived for estimation of the chronological age. The results showed that there was no significant difference in mineralisation between 18 and 28 and 38 and 48 in males or females. For both sexes, the dental age was lower than the chronological age. Males reached the developmental stages earlier than females. In the whole population, the boys' and the girls' dental ages were 0.84 years and 0.16 years earlier, respectively, than their chronological ages. The use of third-molar teeth as a developmental marker is suitable, particularly when comparing the obtained standard deviation with other skeletal-age calculation techniques.

MeSH: Adolescent; Age Determination by Teeth -- methods (major); Child; Female; Forensic Dentistry; Humans; Male; Molar, Third -- growth &development (major); Molar, Third -- radiography (major); Radiography, Panoramic; Regression Analysis; Sex Characteristics; Tooth Calcification (major); Turkey

Journal classification: Index Medicus
Two new oro-cervical radiographic indexes for chronological age estimation: a pilot study on an Italian population

Author: Lajolo, Carlo; Giuliani, Michele; Cordaro, Massimo; Marigo, Luca; Marcelli, Antonio; Fiorillo, Fabio; Pascali, Vincenzo L; Oliva, Antonio

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Abstract (English): Chronological age (CA) plays a fundamental role in forensic dentistry (i.e. personal identification and evaluation of imputability). Even though several studies outlined the association between biological and chronological age, there is still great variability in the estimates. The aim of this study was to determine the possible correlation between biological and CA age through the use of two new radiographic indexes (Oro-Cervical Radiographic Simplified Score - OCRSS and Oro-Cervical Radiographic Simplified Score Without Wisdom Teeth - OCRSSWWT) that are based on the oro-cervical area. Sixty Italian Caucasian individuals were divided into 3 groups according to their CA: Group 1: CAG 1 = 8-14 yr; Group 2: CAG 2 = 14-18 yr; Group 3: CAG 3 = 18-25 yr; panorexes and standardised cephalograms were evaluated according Demirjian's Method for dental age calculation (DM), Cervical Vertebral Maturation method for skeletal age calculation (CVMS) and Third Molar Development for age estimation (TMD). The stages of each method were simplified in order to generate OCRSS, which summarized the simplified scores of the three methods, and OCRSSWWT, which summarized the simplified DM and CVMS scores. There was a significant correlation between OCRSS and CAGs (Slope = 0.954, p < 0.001, R-squared = 0.79) and between OCRSSWWT and CAGs (Slope = 0.863, p < 0.001, R-squared = 0.776). Even though the indexes, especially OCRSS, appear to be highly reliable, growth variability among individuals can deeply influence the anatomical changes from childhood to adulthood. A multi-disciplinary approach that considers many different biomarkers could help make radiological age determination more reliable when it is used to predict CA.

MeSH: Adolescent; Adult; Age Determination by Skeleton -- methods (major); Age Determination by Teeth -- methods (major); Cervical Vertebrae -- growth & development; Cervical Vertebrae -- radiography (major); Child; European Continental Ancestry Group; Female; Forensic Anthropology; Forensic Dentistry; Humans; Italy; Linear Models; Male; Models, Biological; Molar, Third -- growth & development; Molar, Third -- radiography (major); Odontometry; Pilot Projects; Retrospective Studies; Tooth -- growth & development; Tooth -- radiography (major); Young Adult

Journal classification: Index Medicus

Identifier (keyword): Cervical Vertebrae skeletal age calculation, Chronological age, Dental age determination, Imputability, Third molar development

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Language: English
A comparison of Demirjian’s four dental development methods for forensic age estimation in South Australian sub-adults

Author: Flood, Sara J1; Franklin, Daniel; Turlach, Berwin A; McGeachie, John
Abstract (English): The aim of this study was to compare the accuracy of Demirjian’s four dental development methods for forensic age assessment in a South Australian population. The sample comprised orthopantomograms (OPGs) of 408 sub-adult individuals (211 male; 197 female) with an age range of 4.9-14.5 years. The OPGs were obtained from various dental schools and clinics in urban Adelaide. The following Demirjian methods were evaluated: the original 7-tooth technique; the revised 7-tooth system; the 4-tooth method; and the alternate 4-tooth approach. The left mandibular teeth in each OPG were assessed and rated according to the eight stages (A-H) defined and illustrated in Demirjian et al. (5) Differences between chronological and estimated ages were calculated for males and females separately; 95% confidence intervals of mean age differences were calculated and ANOVA used to assess the significance of mean differences. When comparing all four methods there were significant differences overall (and in individual age groups) between mean chronological and estimated age in both sexes. In addition, each method consistently overestimated chronological age. We also demonstrate that the accuracy of the dental age methods evaluated varies in different subsets of an Australian population, a finding that parallels previous research in other global populations. Based on our analyses we conclude that population-specific standards based on dental maturity curves, as opposed to estimated ages, would provide more accurate and statistically robust age estimations.

MeSH: Adolescent; Age Determination by Teeth -- methods (major); Analysis of Variance; Australia; Child; Child, Preschool; Female; Forensic Dentistry; Humans; Male; Radiography, Panoramic; Tooth -- growth & development (major); Tooth -- radiography

Journal classification: Index Medicus

Identifier (keyword): Age estimation, Dental development, Forensic odontology, Population standards, South Australia

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Language: English

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Dental fluorescence: potential forensic use

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Abstract (English): In cases of identification of bones, skeletal segments or isolated bones, searching for biotypologic diagnostic data to estimate an individual’s age enables comparing these data with those of missing individuals. Enamel, dentin and pulp undergo remarkable changes during an individual’s life. The enamel becomes more mineralized, smoother and thinner, and deteriorates
because of physiological and pathological factors. Dental pulp decreases in volume due to the deposition of secondary dentin; thus, the dentin becomes thicker with time. In natural teeth, the fluorescence phenomenon occurs in dentin and enamel and changes in those tissues may alter the expression of the natural tooth color. The aim of this study was to assess the correlation between age and teeth fluorescence for individuals from different age groups. The sample consisted of 66 randomly selected Brazilians of both genders aged 7-63 years old. They were divided into 6 groups: Group 1 - aged 7-12 years, Group 2 - aged 13-20 years, Group 3 - aged 21-30 years, Group 4 - aged 31-40 years, Group 5 - aged 41-50 years and Group 6 - aged between 51 and 63 years. Upper right or left central incisors were used for the study. Restored and aesthetic rehabilitated teeth were excluded from the sample. The measurement of tooth fluorescence was carried out via computer analysis of digital images using the software ScanWhite DMC/Darwin Systems - Brazil. It was observed that dental fluorescence decreases when comparing the age groups 21-30, 31-40, 41-50 and 51-63 years. The results also showed that there is a statistically significant difference between the groups 41-50 years and 21-30 years (p=0.005) and also among the group 51-63 years and all other groups (p<0.005). It can be concluded that dental fluorescence is correlated with age and has a similar and stable behavior from 7 to 20 years of age. It reaches its maximum expected value at the age of 26.5 years and thereafter decreases.

MeSH: Adolescent; Adult; Age Determination by Teeth -- methods (major); Child; Dental Enamel -- anatomy & histology; Dental Enamel -- radiation effects (major); Dentin -- anatomy & histology; Dentin -- radiation effects (major); Female; Fluorescence (major); Forensic Dentistry -- methods; Humans; Image Processing, Computer-Assisted; Incisor; Male; Middle Aged; Photography, Dental; Software; Ultraviolet Rays (major); Young Adult

Journal classification: Index Medicus

Identifier (keyword): Age estimation, Fluorescence, Forensic dentistry, Human identification

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Publication type: Journal
Dental age assessment validity of radiographic methods on Serbian children population

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Publication info: Forensic science international 231.1-3 (Sep 10, 2013): 398.e1-5.

Abstract (English): In order to establish reliable age estimation method based on dental development, various correlations between chronological age and real growth were tested. Demirjian’s scheme was mostly used, but lately the Willems’ method has been found to be more reliable. The aim of this study was to evaluate the accuracy of Demirjian’s and Willems’ methods for dental age estimation in Serbian children population. The study sample encompassed panoramic radiographs of 686 children (322 boys and 364 girls) with age range from 4 to 15 years. The dental age was assessed using Demirjian’s and Willems’ maturity scores. Statistical analysis was performed to test the accuracy of investigated methods by comparing the mean chronological and mean estimated age in total sample, as well as in each group comprising individuals within one-year-age-interval. Both methods showed discrepancy between obtained and chronological age. The Demirjian’s method overestimated age with a mean accuracy of 0.45 in boys and 0.42 in girls, while
Willems' method showed lower discrepancy (0.12 and 0.16 in boys and girls, respectively). Overall, both methods were unsatisfactory in some age groups, however, Willems' method provided more accurate age estimation in majority of categories. In summary, our results suggest that Willems' method was more accurate for estimating dental age in contemporary Serbian children population.

MeSH: Adolescent; Age Determination by Teeth -- methods (major); Child; Feasibility Studies; Female; Forensic Dentistry; Humans; Linear Models; Male; Radiography, Dental, Digital; Radiography, Panoramic; Reproducibility of Results; Retrospective Studies; Serbia

Journal classification: Index Medicus

Identifier (keyword): Age estimation, Demirjian method, Forensic dentistry, Serbia, Willems method

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Language of abstract: English

Document type: Evaluation Studies, Journal Article

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Age estimation standards for a Western Australian population using the coronal pulp cavity index

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Abstract (English): Age estimation is a vital aspect in creating a biological profile and aids investigators by narrowing down potentially matching identities from the available pool. In addition to routine casework, in the present global political scenario, age estimation in living individuals is required in cases of refugees, asylum seekers, human trafficking and to ascertain age of criminal responsibility. Thus robust methods that are simple, non-invasive and ethically viable are required. The aim of the present study is, therefore, to test the reliability and applicability of the coronal pulp cavity index method, for the purpose of developing age estimation standards for an adult Western Australian population. A total of 450 orthopantomograms (220 females and 230 males) of Australian individuals were analyzed. Crown and coronal pulp chamber heights were measured in the mandibular left and right premolars, and the first and second molars. These measurements were then used to calculate the tooth coronal index. Data was analyzed using paired sample t-tests to assess bilateral asymmetry followed by simple linear and multiple regressions to develop age estimation models. The most accurate age estimation based on simple linear regression model was with mandibular right first molar (SEE ±8.271 years). Multiple regression models improved age prediction accuracy considerably and the most accurate model was with bilateral first and second molars (SEE ±6.692 years). This study represents the first investigation of this method in a Western Australian population and our results indicate that the method is suitable for forensic application.

MeSH: Adolescent; Adult; Age Determination by Teeth -- methods (major); Australia; Bicuspid -- anatomy & histology (major); Bicuspid -- radiography; Child; Dental Pulp -- anatomy & histology (major); Dental Pulp -- radiography; Dentition, Permanent; Female; Forensic Dentistry; Humans; Linear Models; Male; Middle Aged; Molar -- anatomy & histology (major); Molar -- radiography; Odontometry; Radiography, Panoramic; Reproducibility of Results; Tooth Crown -- anatomy & histology (major); Tooth Crown -- radiography; Young Adult