Radiographic method evaluation of teeth development in, north Indian children and young people

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Abstract

The aim of the present study to evaluate the applicability of the methods proposed by Nolla for estimation of dental age and its compared with chronological age. Orthopantograms of 200 patients, aged 70-195 months were selected to estimate the correlation between dental and chronological age. When the Nolla method were applied, the mean difference between chronological and estimated age for both genders were more than chronological age in girls while opposite in boys. There were significant correlation between chronological age and estimated dental age in bath genders.

Keywords: Orthopantograms, Nolla Method, dental age.

Introduction

Teeth represent useful material for age estimation. In childhood, the observation of the dentition status results in highly accurate age assessment. However, this accuracy decreases simultaneously with the completion of a person's dental development.[1] The development of each individual can be affected by genetic, facial, nutritional, climate, hormonal and environmental actors.[2-3] It has been reported that dental mineralization is less affected by external factors as compared to bone mineralization.[4] In addition to its clinical importance, the radiographic diagnosis may have possible medicolegal implications, because it is one of the parameters proposed for helping to determine the age of undocumented youths.[5-6] Numerous studies have been developed to estimate dental age. [3,7-9] Although this variability may mostly relate to population differences, other factors, such as gender, age, and degree of dental maturation of the individual in different samples, may also play a major role. Hence, the present study was to determine the dental age of children in North Indian. In addition, the use of correction factors will assessed for allowing the clinical application of the study results.

Material and methods

We examined 200 orthopantomographs corresponding to same number of patients from the Bhagwan dental clinic, Jind and Jain Diagnostic Centre, New Delhi (India), 103 males and 97 females between 6 to 16 years of age. The criteria for inclusion in the sample were the availability in their clinical records of an orthopantomography of adequate quality, and no history of medical or surgical disease that could affect the presence and development of permanent teeth, including third molars. The children were assigned to 21 groups (at least n=24, 12M : 12 F) according to the chronological age. At time of radiograph examination, the chronological age of each child was calculated on the basis of the child is reported date of birth. The statistical analysis was applied when the result of the intra examiner test was considered as adequate (by Dalberg's formula error was 0.50 months). Dental age was assessed by orthopantomographs according to the methods proposed by Nolla[7] . Data were tabulated and submitted to statistical analysis using SPSS version 11.0 and student 't' test was performed.

Results

Table 1 shows that the mean chronological age for boys was 143.20 months and for girls was

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141.80 months. The mean dental ages were overestimated in girls while underestimated in boys compared to chronological ages (Table I, P<0.01) and due differences were quite marked for the older groups. Difference between chronological age and dental age for Nolla method and for male and female subgroups using student 't' tests and pearson correlation coefficient, which revealed high and the statistically significant (P <0.01) values. Thus a high correlation between dental age and chronological age can be estimated.

Discussion

Age estimation for medicological purposes (age at death, criminal cases etc) and clinically represents a fundamental problem, and various methods have been established for age determination. It has been shown that dental development relates more closely to chronological age than skeletal, somatic or sexual maturity indicators[2]. Tooth formation has been more widely used than tooth eruption for assessing dental maturation because it is a continuous and progressive process that can be followed Radiographically, and most teeth can be evaluated at each examination. There are several methods for estimating dental age, among them, the method proposed by Nolla [7] and Nicodemo et al[9] which has been developed taking into consideration because it is easily to use, accurate, almost used by every pedodontist etc. It has been reported that development of each individual can be affected by genetic, racial, nutritional, climate, hormonal and environmental factors [2,6,7]. Hence, considering the regional difference in country region like India, establishing specific parameters for each would be very significant. In the present study, the applicability of method was applied for age estimation for North Indian population. The 70-195 month age range was chosen because most maturity occur during this period. In present study, in boys, the mean dental ages were underestimated in method and differences were significant for older groups (P <0.01, table 1) which aggerament with previous study[10].

This may be due to difference in geographical factor and other factors. It has been reported that overestimation in younger children and an underestimation in older age children of

southeast Brazil using Nolla method.[11] While in another study showed the dental age was significantly higher than chronological age among Chinese children.[12] Some authors observed that the methods of conversion to dental ages depend on the population at issue [10,12] Hence, correlation factors must be established to make the methods (Nolla) applicable to Indian population.

Groups	Age ranges (in months)	Boys (mean±SD)		Girls (mean ± SD)	
		Chronological age	Nolla	Chronological age	Nolla
1.	70 – 75	73.40±02.11	74.80±08.80	74.30±02.10	82.40±12.44
2.	76 – 81	79.20 ± 01.93	80.30±09.70	78.90±02.93	82.30±20.30
3.	82 – 87	84.90 ± 01.73	85.60±15.80	85.60±01.69	90.84±21.34
4.	88 – 93	91.10 ± 02.21	93.10±07.50	90.20±01.87	88.40±19.32
5.	94 – 99	95.50 ± 01.70	96.00±08.00	96.60±02.70	92.31±17.34
6.	100 – 105	103.10±01.85	94.90±03.80	102.80±2.85	114.36±18.70
7.	106 – 111	107.90±01.83	104.30±06.32	108.70±2.87	115.41±21.62
8.	112 – 117	114.00±02.13	101.70±08.59	113.80±2.63	116.32±21.34
9.	118 – 123	121.51±01.70	113.70±12.43	122.61±1.95	118.41±20.42
10.	124 – 129	127.80±01.69	112.84±11.08	128.20±1.53	119.32±09.54
11.	130 – 135	131.91±01.12	119.80±12.21	132.92±1.32	117.41±08.99
12.	136 – 141	136.10±01.83	128.50±11.79	139.20±2.34	116.32±09.32
13.	142 – 147	143.90±01.86	133.90±16.63	142.80±2.87	135.80±09.74
14.	148 – 153	150.50±01.10	133.82±21.32	149.40±1.89	138.60±11.87
15.	154 – 159	156.20±01.85	144.90±26.43	157.10±1.86	140.70±12.89
16.	160 – 165	163.20±01.87	161.80±12.83	162.30±1.88	143.87±13.79
17.	166 – 171	169.20±01.83	157.49±15.80	170.30±1.87	151.69±14.20
18.	172 – 177	175.30±01.69	156.50±12.30	176.40±1.70	167.82±09.63
19.	178 – 183	178.30±01.65	164.30±18.70	179.40±1.66	188.32±10.53
20.	184 – 189	187.40±01.70	171.80±19.23	188.50±1.75	192.76±11.89
21.	190 – 195	192.30±02.80	186.80±28.73	191.21±2.81	193.83±10.23
	TOTAL	143.20±01.89	139.89±29.62	141.88±3.29	143.63±21.32

Table 1. Mean (in months) and standard deviation (SD) of chronological age and estimated dental age using the methods proposed by Nolla l for north Indian (Boys & Girls)

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