

Determination of Cameriere Regression Equation Accuracy in Haryana Population

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Abstract

Age estimation in children is important in clinical as well as forensic dentistry. The orthopantomograph samples of 50 healthy children (25 boys: 25 girls) aged between 5-15 years was selected and Cameriere regression equation was applied. We observed underestimation of estimated age in boys and overestimation in girls as compared to their chronological age.

Keywords: Forensic dentistry, Cameriere regression equation, Haryana population OPG, Age estimation.

Introduction

Tooth formation is widely used to assess maturity and predict age. In clinical dentistry, this information aids in diagnosis and treatment planning.¹ The continuous patterns of tooth development can be observed on a longitudinal series of radiographs and various mineralization stages.²⁻⁶ Previously number of methods have been proposed to determine dental age,⁷⁻¹⁵ but, the system developed by Demirjian has gained wide acceptance.⁹ During developmental stages particularly in root formation, a notable difference between sexes arises with females being advanced when compared with males.⁹⁻¹⁹ Previously Cameriere et al proposed a regression equation for age determination from Open and closed apices in children 16-17. It has been reported that teeth development depend upon number of factors such as genetic, environmental, nutritional and geographical factors⁴⁻⁷. Since these factors play major role in tooth formation, they may have effect on dental age estimation. Hence the aim of this study was to determine the accuracy of Cameriere equation for age estimation from open and closed apices on Haryana sub

Population.

Material and Methods

The orthopantomographs sample of 50 healthy children (25 boys: 25 girls) aged between 5-15 years taken during the course of diagnosis and treatment was selected. Panoramic radiographs that were unclear or that showed hypodontia, gross pathology and previous orthodontic treatment were excluded.

The chronological age for each subject was calculated by subtracting the date radiograph was taken from the date of birth.

Orthopantomographs were digitized using a scanner (HP) at 150dpi. Images obtained were imported to Adobe Photoshop 7.

The number of teeth with closed apices (N₀) and open apices (S), were calculated. The length of left and right permanent mandibular teeth were measured, measurement was done twice and mean value was taken.

Age estimation was done by applying Cameriere regression equation,

$$\text{Age} = 8.387g - 1.692x + 0.835N_0 - 0.116s - 0.139s^2 \times N_0$$

The variable g is 1 for male and 0 for female.

.. Results

The estimated age obtained was compared with chronological age using student paired t test.

when the whole data is consider (i.e. male and

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female) there is no significant difference between chronological age and estimated age ($P= 0.6954$) but when male and female data were considered separately there is a significant difference between chronological age and estimated age. (Male $Pr = 0.0001$, Female = 0.0001) We observed an underestimation of age in boys and overestimation in girls as compared to their chronological age.

Table a

Sr.No	Chronological age	Estimated age
1	4.5	3.8
2	6.8	5.7
3	8.7	7.6
4	8.9	8.2
5	11.2	10.9
6	6.7	5.6
7	7.8	6.7
8	12.7	11.6
9	15.3	13.2
10	13.2	12.7
11	10.6	9.8
12	7.8	6.9
13	11.8	11.5
14	15.9	14.9
15	16.9	15.9
16	12.5	12.1
17	14.6	13.9
18	15.6	15.4
19	8.9	8.7
20	5.1	4.9
21	5.9	5.1
22	9.1	8.3
23	7.5	6.9
24	6.3	6.1
25	8.5	8.1

Table a showing chronological and estimated age years in boys .

Table b

Sr.No	Chronological age	Estimated age
1	8.3	8.6
2	11.9	12.3
3	10.4	10.7
4	14.5	14.8
5	8.8	9.6
6	7.9	8.1
7	11.9	13.8
8	11.2	12.2
9	6.5	8.8
10	9.7	10.2
11	11.9	12.9
12	7.3	8.8
13	11.2	13.9
14	9.6	10.2
15	8.5	9.6
16	5.6	5.7
17	5.9	6.3
18	6.1	6.9
19	11.5	12.9
20	11.8	12.6
21	13.5	14.2
22	14.9	15.6
23	11.3	11.6
24	11.6	12.1
25	13.5	13.9

Table b showing chronological and estimated age(years) in girls

Discussions

The need to estimate the age of living individuals is becoming increasingly important in forensic odontology since there are increasing numbers of illegal immigrants without any documents of birthday. We observed that underestimation of age in boys and overestimation in girls as compared to their chronological age (Table 1,p) .While there is no significant difference data were analysed without taking gender into consideration.This may be due to overestimation in girls same as underestimation for boys .From this finding we concluded that we have to add some correction factor for applying this equation. It may be due to different in geographical ,genetic and environment factors 4-6. So this equation various from population to population, hence it should be required more study on different population. As the results did show statistically significant

difference between European countries, one regression equation could not be applied to Indian populations. So new equation will be required for Indian population on this concept or adding some correction factor to apply on Indian populations.

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