Original Article

Applicability of Demirjian's Method for Dental Age Estimation.

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ABSTRACT
The study was conducted to investigate applicability of Demirjian method for estimation of dental age in rural and urban female children. The sample for the study consisted of 80girls between 8-14 yrs. When age estimation was done by Demirjian's method, dental maturation in girls of Meerut district was found to be faster than, girls of French Canadian population. An overestimation of 0.45 years (164 days) was found in female children of Meerut district. Demirjian's method was more applicable in 11-14 years urban female when compared to other groups.

Key words
Occlusal Lesion. Diagnodent. Visual Inspection .Intraoral Camera.

INTRODUCTION

The developmental status of a child can be assessed from various parameters as height, weight, chronological age, secondary sexual characteristics, skeletal age and dental age.

Dental age is of particular interest to the pedodontist and orthodontist in the management of different types of malocclusions in relation to maxillofacial growth.1

Demirjian2 et al. formulated the method of dental age assessment by reference to the radiological appearances of the seven teeth on the left side of the mandible.

The present study aims to test the applicability of Demirjian's method for dental age estimation in urban and rural female children.

METHODOLOGY

80 subjects of 8-14 years of age from various schools of rural and urban areas coming to department of Pedodontist and Preventive Dentistry, Subharti Dental College Meerut were randomly selected. All subjects taken were free from any type of illness. Brief history of the child was taken. Chronological age was calculated from date of birth. Dental age was calculated from O.P.G. by using Demirjian's method. The state of calcification of 7 left permanent mandibular teeth was seen and dental age was calculated according to Demirjian's method and recorded on the Performa.

DENTAL AGE ASSESSMENT – DEMIRJIAN'S METHOD

Method: A new method was given for estimating dental age, by reference to the radiological appearances of the seven teeth on the left side of the mandible. Eight stages, A to H, have been defined from the first appearance of calcified points to the

closure of the apex (Fig-1). The summed scores on all seven teeth give a dental maturity score which can be converted directly into a dental age, as shown in Table -A and Table -B.

Fig-1: Tooth Calcification Stages From A-H

Tooth	0	A	B	C	D	E	F	G	H
M2	0.0	2.7	3.9	6.9	11.1	13.5	14.2	14.5	15.6
M1				0.0	4.5	6.2	9.0	14.0	16.2
PM2	0.0	1.8	3.4	6.5	10.6	12.7	13.5	13.8	14.6
PM1			0.0	3.7	7.5	11.8	13.1	13.4	14.1
C				0.0	3.8	7.3	10.3	11.6	12.4
I2				0.0	3.2	5.6	8.0	12.2	14.2
I1					0.0	2.4	5.1	9.3	12.9

N.B: stage 0 is no calcification.

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Table -B : Conversion of maturity score to dental age: seven-teeth. (Mandibular left side

age	score	age	score	age	score	age	score
3.0	13.7	7.0	51.0	11.0	94.5	15.0	99.2
.1	14.4	.1	52.9	.1	94.7	.1	99.3
.2	15.1	.2	55.5	.2	94.9	.2	99.4
.3	15.8	.3	57.8	.3	95.1	.3	99.4
.4	16.6	.4	61.0	.4	95.3	.4	99.5
.5	17.3	.5	65.0	.5	95.4	.5	99.6
.6	18.0	.6	68.0	.6	95.6	.6	99.6
.7	18.8	.7	71.8	.7	95.8	.7	99.7
.8	19.5	.8	75.0	.8	96.0	.8	99.8
.9	20.3	.9	77.0	.9	96.2	.9	99.9
4.0	21	8.0	78.8	12.0	96.3	16.0	100.0
.1	21.8	.1	80.2	.1	96.4		
.2	22.5	.2	81.2	.2	96.5		
.3	23.2	.3	82.2	.3	96.6		
.4	24.0	.4	83.1	.4	96.7		
.5	24.8	.5	84.0	.5	96.8		
.6	25.6	.6	84.8	.6	96.9		
.7	26.4	.7	85.3	.7	97.0		
.8	27.2	.8	86.1	.8	97.1		
.9	28.0	.9	86.7	.9	97.2		
5.0	28.9	9.0	87.2	13.0	97.3		
.1	29.7	.1	87.8	.1	97.4		
.2	30.5	.2	88.3	.2	97.5		
.3	31.3	.3	88.8	.3	97.6		
.4	32.1	.4	89.3	.4	97.7		
.5	33.0	.5	89.8	.5	97.8		
.6	34.0	.6	90.2	.6	98.0		
.7	35.1	.7	90.7	.7	98.1		
.8	36.8	.8	91.1	.8	98.2		
.9	37.0	.9	91.4	.9	98.3		
6.0	38.0	10.0	91.8	14.0	98.3		
.1	39.1	.1	92.1	.1	98.4		
.2	40.2	.2	92.3	.2	98.5		
.3	41.3	.3	92.6	.3	98.6		
.4	42.5	.4	92.9	.4	98.7		
.5	43.9	.5	93.2	.5	98.8		
.6	45.2	.6	93.5	.6	98.9		
.7	46.7	.7	93.7	.7	99.0		
.8	48.0	.8	94.0	.8	99.1		
.9	49.5	.9	94.2	.9	99.1		

Chronological age :

Chronologic age of an individual was calculated by subtracting the birth date from the date on which the radiographs were exposed for that particular individual. Decimal age was taken for simplicity of statistical calculation and ages were estimated on yearly basis e. g. 11 years 6 months as 11.5 years and it was included in 11-14 years age group.)

Data was collected and divided in 4 groups for statistical analysis.

Group I   - Rural 8-11 years
Group II - Rural 11-14 years
Group III - Urban 8-11 years
Group IV - Urban 11-14 years

RESULTS: Results showed that when age estimation was done by Demirjian's method in Meerut district, dental maturation was faster than, girls of French Canadian population. An overestimation of 0.45 years (164 days) was found in female children. It was also shown that Demirjian's method is more applicable in 11-14 years urban female children with the minimum difference of 18 days only.
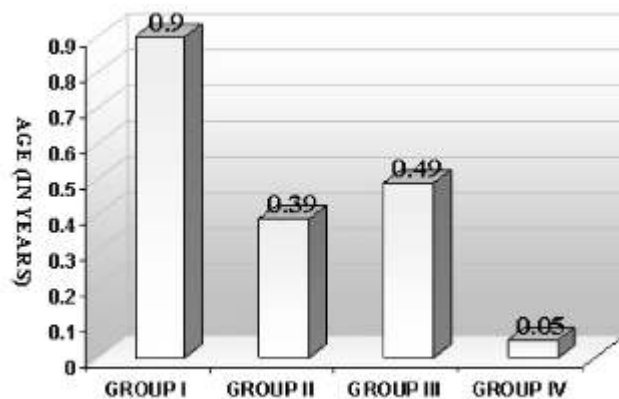
DISCUSSION

Demirjian's method was used for dental age assessment. The calculated dental age in this study was found to be higher than the chronological age in both rural and urban females. An average overestimation of 0.46 ± 1.44 years was found in total sample.

Hagg and Matsson (1985)3 Compared the reliability of three different methods for the assessment of dental maturity and Concluded that the method described by Demirjian and Goldstein affords a high degree of reliability and precision. Nystrom, M. et al (1998)4 Suggested that differences in overall dental maturity exist not only between nations but also between groups of children in a nation with a relatively homogenous population. Serene Koshy , Shobha Tandon (1998)1Tested the applicability of Demirjian's method in South Indian children. Dcmirjian's method gave an overestimation of 3.04 and 2.82 years in males and females respectively.Prabhakar AR, Panda AK, Raju OS. (2002)5 Studied the applicability of Demirjian's method of age assessment in children of Davangere. Demirjian's method of dental maturation is not applicable to the children of Davangere. Hegde R. J., Sood P.B. (2002)6To determine applicability of Demirjian's method for estimation of chronological age in children of Belgaum. Males showed overestimation of 0.14 years (51 days) and females showed overestimation of 0.04 years (15days). Demirjian method showed high accuracy when applied to Belgaum children.

In our study Maximum difference between chronological age and dental age (Demirjian's method) was found in Group I i.e. rural 8-11 years, which has affected the whole sample.

The probable cause of increased difference between two ages in urban and rural areas may be
- The difference in education level,
- Lack of knowledge of exact date of birth in rural group.
- The French Canadian origin of the reference population may explain the difference.
- Other causes may be the environmental factors such as the socio-economic status, nutrition and dietary habits that vary in different population groups.

CONCLUSION

Demirjian's method was not applicable in female children of Meerut district. However, when considering individually for each age group method is applicable to group II, III, and IV (all urban girls and 11-14 years rural girls), whereas not applicable in group I (8-11 years rural girls).
Applicability of Demirjian's method for dental age estimation should be further checked in rural children with much larger sample. Generation of new standard curves, specific to the Indian population should be formulated.

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