Age Estimation using Orthopantomographs by DEMIRJIAN'S METHOD

Authors : Soni et al.
Presenting Author Dr. Unnati D. Soni, B.D.S (Bachelors of dental surgery)
Government Dental college and Hospital, Siddhpur, Gujarat, India

ABSTRACT

• Age is one of the essential factors which plays an important role in every aspect of life. Age estimation is a scientific process that estimates an individual's true chronological age (CA); in addition, it plays vital role in several situations in forensic odontology.
• The aim of this study was to pursue a survey on age estimation of dental patients using Orthopantomographs by Demirjian's method to evaluate the reliability of age estimation.
• Study shows this method is used to make a significant percentage of forecasts in areas of forensic dentistry and orthodontic treatment planning, especially in young patients. though this study will only consider reliability this method in forensic odontology.
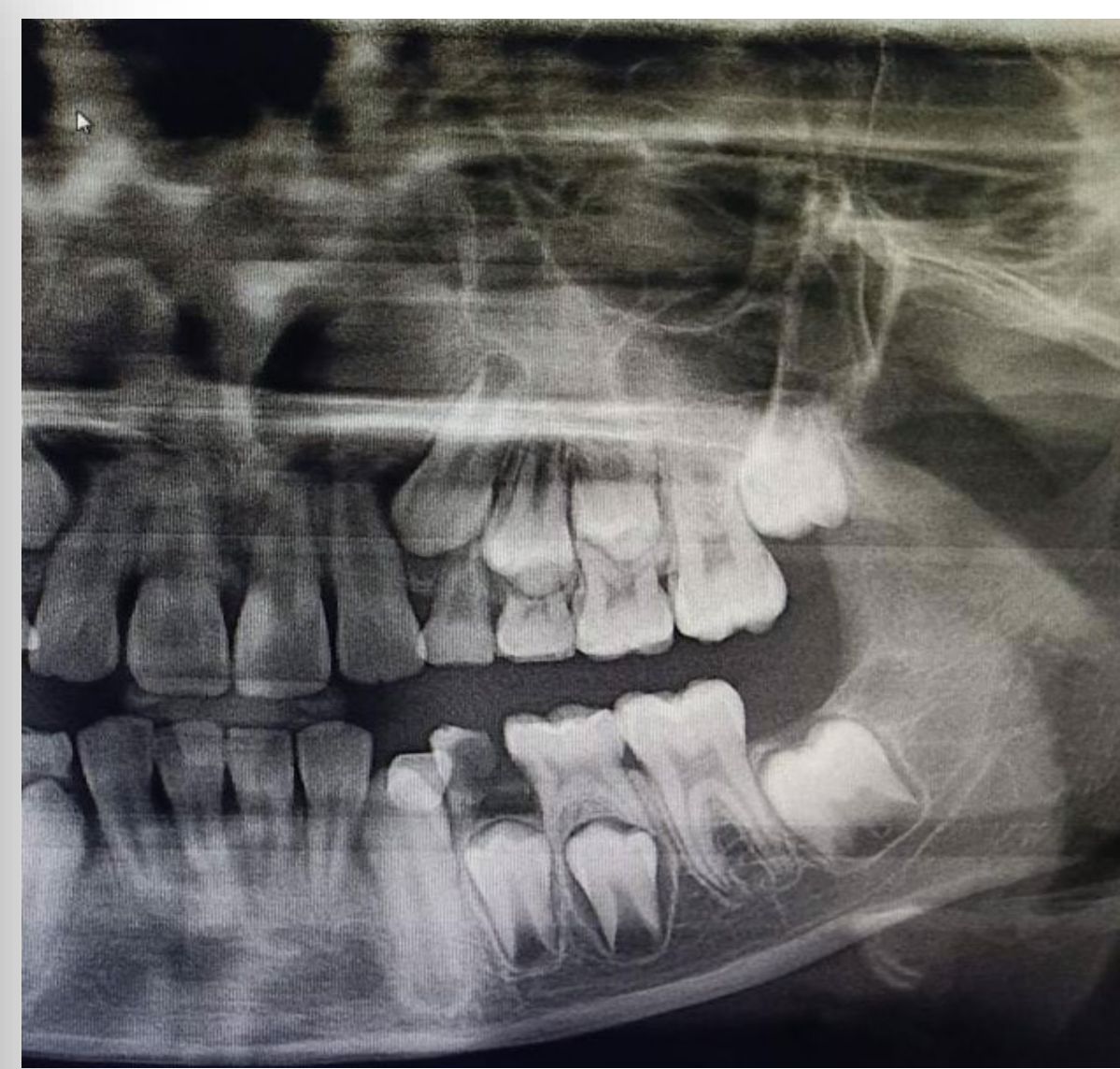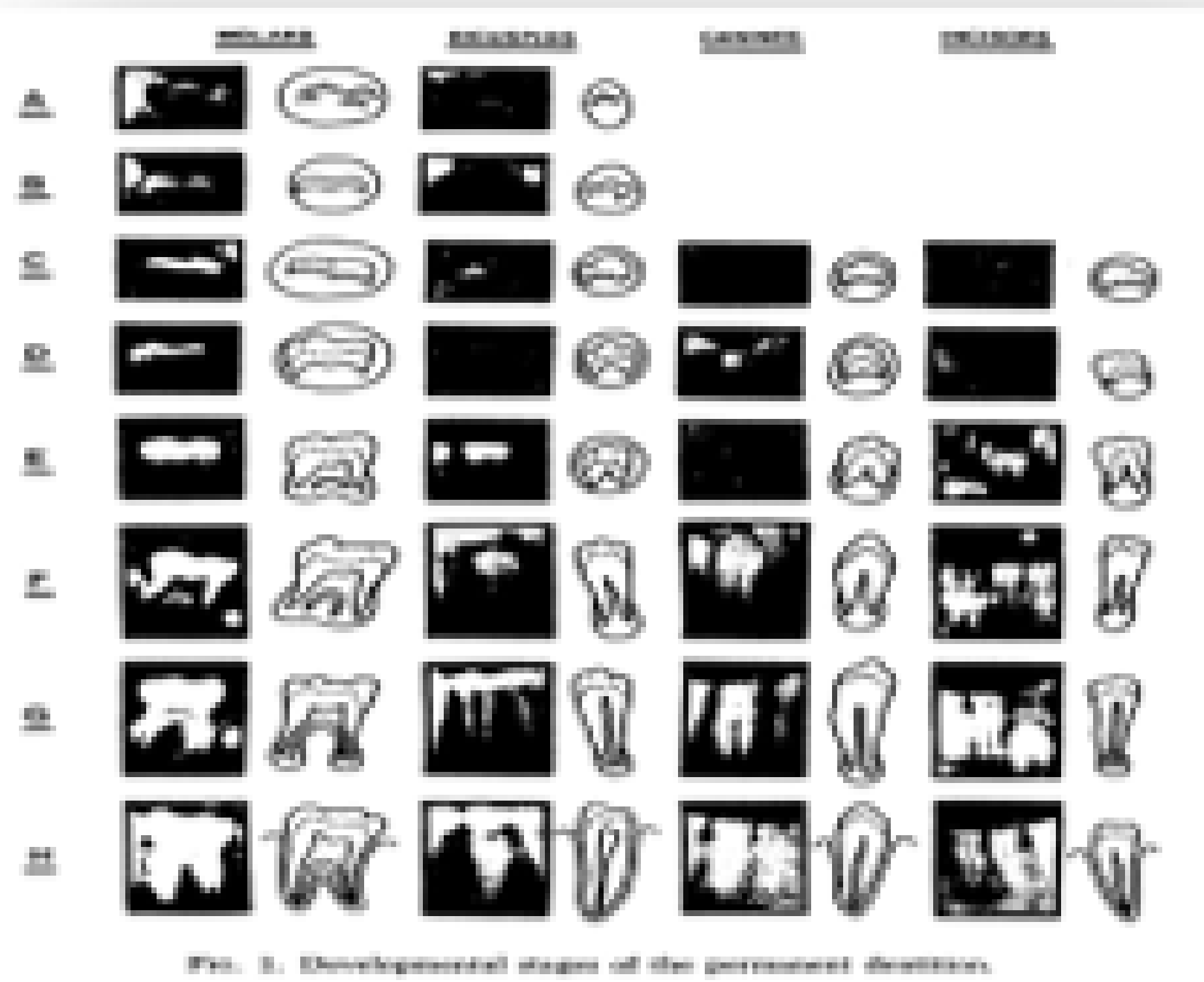
Key Words: Age estimation, Orthopantomographs, Demirjian's method

INTRODUCTION

• **What is Dental Age estimation?** A scientific process/method that estimates and individual's True chronological age (CA) by evaluating skeletal and dental development and maturation.
• Age estimations one of the essential factors in human identification.
• In archeology and forensic odontology this method can aids the estimation of age of Unknown deceased child.
• Nowadays, the radiographic method of age estimation on basis of tooth development has been found to be an accurate method.
• Objective: In this article, The study was aimed to determine possibility of age estimation with OPGs.

METHODS & MATERIAL

• The study was done retrospectively at the 'oral medicine and radiology dept.,siddhpur, Gujarat, India. In this study ,OPGS of 30 individual children between age 3-16 years of known CA were measured by Demirjian's method based on **development stages of 7 mandibular teeth on the left side** using Radiographs. Findings made and About 20% of the patients were randomly selected and the tooth developmental stages were re-evaluated to test the inter and intra examiner reliability.

• Each Tooth has been rated on a Scale of A-H based on their stages of development following Demirjian's given scale and score was noted accordingly.
• **Reproducibility**: About 20% of patient randomly selected and tooth developmental stages were Re-evaluated 2 weeks later to test inter and intra-Examiner reliability.

FIG. 1. Developmental stages of the permanent dentition.

Ideal case Example

Self-Weighted Scores for Dental Stages 7 Teeth (Mandibular Left Side)

RESULTS

➢ The statistic evaluation using *t*-Test suggest that the Demirjian's method is most accurate, Simple, Non-invasive method for Radiographic age estimation. There is no significant difference between Chronological age (CA) and Dental age (DA)
➢ Null Hypothesis: OPGs cannot be used for age estimation.
➢ Statistic evaluation suggests that OPGs can be used for age estimation ,so that Null hypothesis can be rejected.

Graph showing gender distribution of the sample
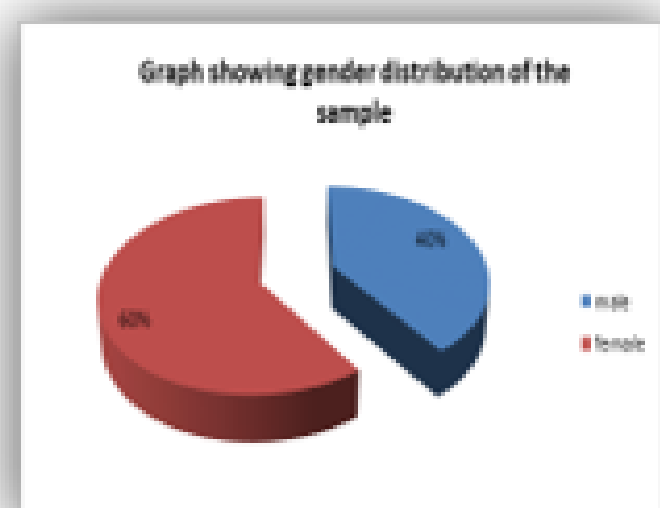
Variable	Males (mean)	(n=15) Standard deviation	females (mean)	(n=15) Standard deviation	P value
Chronological age	10.64	3.70	9.75	1.82	0.05*
Dental age	10.92	3.42	10.03	2.09	0.02*
P value	0.01*		0.003*		

*indicates statistically significance at p≤0.05

Stages of tooth maturation

Stage	Radiographic appearance	Description of stage
Stage 0		Crypt outline visible. No calcification
Stage A		Calcification of single occlusal points without fusion of different calcifications
Stage B		Fusion of mineralization points; the contour of the occlusal surface is recognizable
Stage C		Enamel formation has been completed at the occlusal surface and dentine formation has commenced. The pulp chamber is curved and no pulp horns are visible
Stage D		Crown formation has been completed to the level of the Enamelocemental junction. Root formation has commenced. The pulp horns are beginning to differentiate, but the walls of the pulp chamber remain curved
Stage E		The root length remains shorter than the crown height. The walls of the pulp chamber are straight and the pulp horns have become more differentiated than in the previous stage. In molars, the radicular bifurcation has commenced to calcify
Stage F		The walls of the pulp chamber now form an isosceles triangle and the root length is equal to or greater than the crown height. In molars the bifurcation has developed sufficiently to give the roots a distinct form
Stage G		The walls of the root canal are now parallel, but the apical end is partially open. In molars only the distal root is rated
Stage H		The root apex is completely closed (distal root in molars). The periodontal membrane surrounding the root and apex is uniform in width throughout

CONCLUSION

✓ Age determination through the evaluation of OPGs revealed the most reliable results for the first decade of life based on stages of tooth development. This method also plays an important role in Medico-legal, Forensic medicine, Forensic dentistry for Evalution of age of unknown victim along with other method, especially in young patients. In conclusion of study the Demirjian's method for Age estimation has found suitable and reliable method for children in Siddhpur, Gujarat, India

Reference:
1.Demirjian A, Goldstein H, Tanner JM. A new system of dental age assessment. Hum Biol 1973; 45:211-27.
2.Lewiss JM, Senn DR. Forensics dental age estimation: An overview J Calif Dent Assoc 2015;43:315-9.
3.Verma M, Verma N, Sharma R, Sharma A. Dental age estimation methods in adult dentitions: An overview. J Forensic Dent Sci 2019; 11:57-63
4.Prathap DK. Age determination in forensic odontology. Int Prosthodont Restor Dent 2017; 7:21-4.
5.Willems G, van Olmen A, Spiessens B, Carels C. Dental age estimation in Belgian children: Demirjian's technique revisited. J Forensic Sci 2001; 46:893-5.