

Clinical Assessment of Age by Clinical Eruption of 2nd Molar in 12-14 years for Medicolegal Investigation

Sathya Priya B¹, Lakshmanan P², Krishna Prasanth B³, Tamil Selvi R⁴, Jinu Merlin Koshy⁵, Roopavathy D⁶

¹Reader, Department of Anatomy, Sree Balaji Dental College & Hospital, Bharath University, Chennai, Tamilnadu,

²Consultant Orthodontist and Dentofacial Orthopaedician, Apollo White Dental, Chennai, Tamilnadu, ³Assistant professor, Department of Epidemiology, ⁴Reader, Department of Endodontics, ⁵Reader, Department of Anatomy,

Sree Balaji Dental College & Hospital, Bharath Medical University, Chennai, Tamilnadu, ⁶Consultant Periodontist & Implantologist, Private Practice, Chennai, Tamilnadu

ABSTRACT

Background: Human dentition starts to erupt from age 6 months to 2 years with appearance of temporary teeth followed by appearance of permanent set of teeth from 5 to 25 years. The assessment of age in school going children aged 12- 14 years by clinical eruption of 2nd molar teeth is very important in medico- legal work and comes up frequently in connection with the questions of criminal responsibility, rape, kidnapping, child labor, etc.

Materials & method: The subject for the present study were selected by random sampling and consists of 50 boys and 50 girls, studying in 7th to 10th standard in various higher secondary schools of Chennai city and were broadly classified in the 2 groups of equal strength and equal male to female ratio. The oral cavity was examined with the help of a torch light, mouth mirror, probe and a tongue depressor. For the conduction of the study, a proforma was devised to collect all relevant information like age, sex, socio- economic status, diet, habits, etc. from the subject. Dental charting was done as per the Federation Dentaire Internationale system (F.D.I). The subjects were also classified after assessing their socio-economic status as per the Modified B.G. Prasad classification for the year 2008.

Results: In age group 12- 13 years, more than 40% of the children had more or the other 2nd molar teeth not erupted whereas their countersex had 2nd molar in stage 2 or 3. In age group 13- 14 years the contrast in eruption stages between male and female was blurred. The dental eruption is quite earlier in females than males and the 2nd molars of the lower jaw appear earlier than the upper jaw. However there is no significant difference in eruption of 2nd molars of the right and left side in the same jaw.

Keywords: *Clinical eruption; second Molar; age estimation; medico legal investigations; socioeconomic status.*

INTRODUCTION

The assessment of age in school going children aged 12- 14 years by clinical eruption of 2nd molar teeth is an important activity and is commonly carried in medico legal area and hence dentists and medico

legal investigator work together to resolve numerous issues related to identification. One of the important and frequent requirements posed to the medico-legal fraternity by the investigating authorities is to estimate age of a child, which holds great importance from the point of view of Criminal responsibility, kidnapping, consent, child labor etc. [1-4] Assessment of age is often required while administering justice to an individual involved in civil and criminal litigation. The times of eruption of temporary and permanent teeth are fairly constant and assessment of age of an individual by examination of teeth is one of the accepted methods

Corresponding author:

Dr. P Lakshmanan

Consultant Orthodontist and Dentofacial Orthopaedician, Apollo White Dental, Chennai, Tamilnadu

of age determination. Eruption of teeth is one of the changes observed easily among the various dynamic changes that occur from formation of teeth to the final shedding of teeth. The process of gingival eruption of teeth is one of those that cannot be dated exactly but can readily be recorded as having occurred or not occurred in any individual. This fact can be made use of in ascertaining the average age of eruption of the tooth.^[5] The age estimation can also be carried out with the help of radiological assessment of various ossification centers. Numerous studies have been carried out to assess the age of a young individual by assessment of eruption of teeth.^[6-11] Regional variations due to nutritional, environmental, racial, genetic and numerous other factors exist.^[12,13]

AIMS & OBJECTIVES

- The assessment of age in school going children aged 12- 14 years by clinical eruption of 2nd molar teeth.
- To evaluate the factors that affects the eruption of teeth.

Materials & Methods

The subject for the present study consists of 50 boys and 50 girls, studying in 7th to 10th standard in various higher secondary schools of Chennai city. The subjects were selected by random sampling. The purpose and method of study was explained to all and those consenting and meeting the inclusion criteria of being native of this region with valid proof of birth(Birth certificate/School documents), good oral hygiene, no developmental malformations and absence of any acute/ chronic diseases were included in the study.

All the selected subjects were broadly classified in the 2 groups of equal strength and equal male to female ratio.(Table 1)

- Group I : Age between 12 years to 12 years + 364 days(25 males/25 females)
- Group II: Age between 13 years to 13 years + 364 days(25 males/25 females)

Table 1: Age & Sex wise distribution of study subjects

Age Group	Male (n = 25)		Female (n = 25)	
	Number	%	Number	%
12 – 13 years	25	50	25	50
13 – 14 years	25	50	25	50
Total	50	100	50	100

For the conduction of the study, a proforma was devised to collect all relevant information like age, sex, socio- economic status, diet, habits, etc. from the subject. The oral cavity was examined with the help of a torch light and a mouth mirror with mouth widely opened with the tongue depressor. After detailed dental examination, dental charting was done according to Federation Dentaire Internationale (FDI) system (Table 2) and the staging of tooth eruption was done as shown in table 3.

Table 2: Numbering of Tooth by Federation Dentaire Internationale

18 17 16 15 14 13 12 11	21 22 23 24 25 26 27 28
48 47 46 45 44 43 42 41	31 32 33 34 35 36 37 38

Table 3: Staging of Tooth Eruption

S.No	Stage	Characteristics
1	Stage 0	Non- eruption of temporary tooth / fall- out of temporary tooth and non- eruption of permanent tooth
2	Stage 1	When tip of crown of the teeth penetrated the gum margin.(Positive clinical eruption)
3	Stage 2	When this crown has grown into the oral cavity beyond the gum margins but not yet reached the occlusal surface.
4	Stage 3	When the occlusal surface comes in contact with its counterpart and the bite is complete.

The subjects were also classified after assessing their socio-economic status as per the Modified B.G. Prasad classification for the year 2013. The findings was tabulated and was statistically analyzed.

RESULTS

Age and sex wise distribution of the study subject. 25 males and 25 females in age group of 12- 13 years and 25 males and 25 females in age group of 13- 14 years were selected. After detailed dental examination, dental charting was done according to FDI (Federation Dentaire Internationale) system and stages of eruption of the 4 second molar teeth were evaluated as shown in Table 4.

Table 4: The stages of eruption of the 4 second molar teeth numbered as per the FDI system

12 – 13 Years					13 – 14 Years				
Male (n = 25)			Female (n = 25)		Male (n = 25)			Female (n = 25)	
Stage	Number	%	Number	%	Number	%	Number	%	
RIGHT UPPER JAW(17)									
0	13	52	3	12	3	12	6	24	
1	3	12	3	12	0	0	6	24	
2	3	12	13	52	22	88	6	24	
3	6	24	6	24	0	0	7	28	
RIGHT UPPER JAW (27)									
0	13	52	3	0	0	12	9	36	
1	0	0	3	12	3	0	0	0	
2	6	24	19	76	19	76	13	52	
3	6	24	3	12	3	12	3	12	
LEFT LOWER JAW (37)									
0	10	40	0	0	0	0	0	0	
1	3	12	6	24	0	0	7	28	
2	6	24	6	24	9	36	9	36	
3	6	24	13	52	16	64	9	36	
RIGHT LOWER JAW (47)									
0	9	36	6	24	0	0	3	12	
1	3	12	0	0	0	0	3	12	
2	6	24	9	36	6	24	3	12	
3	7	28	10	40	19	76	16	64	

www.IndianJournals.com
Members Copy, Not for Commercial Sale
Downloaded From IP - 44.220.247.152 on dated 16-Sep-2024

- In age group 12- 13 years, more than 40% of the children had more or the other 2nd molar teeth not erupted whereas their countersex had 2nd molar in stage 2 or 3.
- In age group 13- 14 years the contrast in eruption stages between male and female was blurred.
- Thus, it is evident from the table 4 that in females the dental eruption is quite earlier than males and the 2nd molars of the lower jaw appear earlier than the upper jaw. However there is no significant difference in eruption of 2nd molars of the right and left side in the same jaw.

Influence of external factors like diet, oral hygiene and socio- economic status on eruption of 2nd molar is shown in Table 5.

Table 5: Influence of external factors like diet, oral hygiene and socio- economic status on eruption of 2nd molar

Stage	Diet				Oral Hygiene				Socio-economic status			
	Vegetarian (n=78)	%	Mixed (n=22)	%	Good (n=91)	%	Poor (n=10)	%	Class I (n=38)	%	Class II (n=62)	%
RIGHT UPPER JAW (17)												
0	22	28.21	4	18.18	19	20.88	6	66.67	10	26.32	16	25.81
1	6	7.69	6	27.27	12	13.19	0	0	3	7.89	9	14.52
2	38	48.72	6	27.27	41	45.05	3	33.33	22	57.89	22	35.48
3	12	15.38	6	27.27	19	20.88	0	0	3	7.89	15	24.19
LEFT UPPER JAW (27)												
0	19	24.36	6	27.27	9	20.88	6	66.6	13	34.21	12	19.35
1	3	3.85	0	0	3	3.30	0	0	0	0	3	4.84
2	44	56.41	13	59.09	53	58.24	3	33.33	25	65.79	31	50
3	12	15.38	3	13.64	16	17.58	0	0	0	0	16	25.81
LEFT LOWER JAW (37)												
0	6	7.69	3	13.64	6	6.59	3	33.33	6	15.79	3	4.84
1	10	12.82	6	27.27	10	10.99	6	66.67	0	0	15	24.19
2	28	35.90	3	13.64	31	34.07	0	0	19	50	13	20.97
3	34	43.59	10	45.45	44	48.35	0	0	13	34.21	31	50
RIGHT LOWER JAW (47)												
0	12	15.38	6	27.27	16	17.58	3	33.33	6	15.79	12	19.35
1	6	7.69	0	0	3	3.30	3	33.33	0	0	7	11.29
2	19	24.36	6	27.27	22	24.18	3	33.33	13	34.21	12	19.35
3	41	52.56	10	45.45	50	54.95	0	0	19	50	31	50

It is evident from the table 5 that the mixed diet, good oral hygiene and the study subjects belonging to class II showed early eruption of 2nd molar.

DISCUSSION

The assessment of age in school going children aged 12- 14 years by clinical eruption of 2nd molar teeth is very important in medico- legal work and comes up frequently in connection with the questions of criminal responsibility, rape, kidnapping, child labor, etc.^[34]

The subject for the present study were selected by random sampling and consists of 50 boys and 50 girls, studying in 7th to 10th standard in various higher secondary schools of Chennai city and were broadly classified in the 2 groups of equal strength and equal male to female ratio. The oral cavity was examined with the help of a torch light, mouth mirror, probe and

a tongue depressor. For the conduction of the study, a proforma was devised to collect all relevant information like age, sex, socio- economic status, diet, habits, etc. from the subject. Dental charting was done as per the Federation Dentaire Internationale system (F.D.I). The subjects were also classified after assessing their socio-economic status as per the Modified B.G. Prasad classification for the year 2008.

In the present study the age of eruption of 2nd molar is 12 years 10 months to 13 years 4 months which was corroborative with the findings of the study conducted by Shourie et al and Kaul et al on the eruption of dentition.^(6,7) In the present study, it was observed that there was significant difference in eruption pattern of 2nd molar in both sexes, the females showing early eruption than boys by 4 months. This could be due to the hormonal effect that cause difference in steroid, adrenocortical and gonadotrophin levels between

the sexes. These findings were quite similar with the findings of Mishra et al and Agarwal et al.^(8,9) The mandibular 2nd molar erupts earlier than its counterpart in maxilla by 1 month in males and 1- 2 months in females in the present study which correlates with the study conducted by Knott et al.⁽¹¹⁾In the present study there is no significant difference between the eruption of 2nd molar of the right and left side in the same jaw which is corroborative with the findings of Carr et al.⁽¹⁰⁾The eruption of teeth is promoted by good oral hygiene and mixed diet. The eruption of teeth is also influenced by socio-economic status. The study subjects belonging to class II socio economic status(BG Prasad Classification of Socio economic status 2013) showed early eruption of 2nd molar than the study subjects belonging to class I socio economic status.

CONCLUSIONS

- The age eruption of 2nd molar is 12 years 10 months to 13 years 4 months.
- The 2nd molar erupts earlier in girls than boys by 4 months.
- The mandibular 2nd molar erupts earlier than its counterpart in maxilla by 1 month in males and 1- 2 months in females.
- There is no significant difference between the eruption of 2nd molar of the right and left side in the same jaw.
- Effect of nutrition, good oral hygiene and socio-economic status does exist. The mixed diet, good oral hygiene and the study subjects belonging to class II socio economic status showed early eruption of 2nd molar.

Appearance of 2nd molar by 14 years in most of the subjects helps in associating it with chronological assessment of age.

Conflict of Interest – NIL

Source of Funding – SELF

Ethical Clearance – From Institutional Ethical Committee (BIHER)

REFERENCES

1. K Mathiharan, Amrit K Patnaik, Personal Identity.In: Modi's Textbook of Medical Jurisprudence, 23rd edn. New Delhi: Lexis Nexis Butterworths, 2006: 263-287
2. Parikh C.K. Identification. In: Parikh's Text Book of Medical Jurisprudence and Toxicology, 5th edn, New Delhi: CBS publishers and Distributors, 1992: 30-49.
3. Vij K. Identification. Textbook of Forensic Medicine and Toxicology Principles and Practices, 4th edn. New Delhi: Elsevier, 2008: 48-57.
4. Dogra TD, Rudra A, Identification. In: Lyon's Medical Jurisprudence & Toxicology, 11th edn Delhi: Delhilaw house, 2004: 396-416
5. Kumar CL, Sridhar MS. Estimation of the age of an individual based on times of eruption of permanent teeth. Forensic Sci Int 1990;48(1):1-7.
6. Shourie KL. Eruption of teeth in India. Indian Journal of Medical Research. 1994; 34: 105-118.
7. Kaul S, Saini S, Saxena B. Emergence of permanent teeth in school children in Chandigarh, India. Archives of oral biology. 1950; 7 (182) : 24-28.
8. Mishra VK, Swami D, Rao CM. age & stage of dental eruption. Journal of Forensic Medicine and Toxicology. 1994; 11 (182) : 8-14.
9. Agarwal KN, Gupta R, Faridi MMA, Kalra N. permanent dentition I delhi Boys of age 5-14 years. Indian Pediatrics. 2004; 41 : 1031-1035.
10. Carr LM. Eruption ages of permanent teeth. Australian Dental journal. 1962; 7 : 367-373.
11. Knott VB, Meredith HV. Statistics on eruption of the permanent dentition from serial data for north American white children. The Anglo Orthodontist. 1966; 36 (1) : 68-79
12. Directorate General of Medical Services. Survey committee report on medicolegal practices in India. New Delhi: Manager of publications, 1964
13. A H Suryakantha. Assessment of socio-economic status by modified B.G.Prasad's classification. In Community medicine with Recent Advances. 1st edn. Delhi. Jaypee , 2009: 659-660