

The relation of eruption of third molar teeth and the development of individual in Bikaner population

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Abstract

Forensic science deals with estimation of age of an individual and identification of a person in medicolegal purpose. Identification of person by two method one is complete and another is incomplete or partial method. The hard tissues are able to resist to decay and degradation in the human dentition. This knowledge is utilized by dentist's is relatively a new science is known as "Forensic Odontology". Socioeconomic status, religion physical characters such as built, secondary sexual characters (pubic hair, axillary hair, facial hair & breast development) and teeth are also helpful for development and estimation of age of the individuals. The present study show the relation of the development of individual and eruption of third molar teeth in various age groups in both sexes by radiograph in Bikaner population.

Keywords: Eruptions, third molar, Development, age estimation, stages

Introduction

Forensic science is a subtle discipline for age estimation and it should be an important part of every identification process, especially when information which is related to the deceased is unavailable. The hard tissues of the human dentition are able to resist decay and degradation, long after other tissues are lost. This resistance has made teeth useful indicators for assessing variations in diet, expression of metabolic diseases, and calculation of age at the time of death¹. The determination of age of individual is necessary for the law enforcement agencies in field of medical and legal professions².

There are three periods in life, each differing in relation to tooth development. The first

period is from utero to the time of eruption of the first tooth. The second phase is from age of eruption of the first tooth to about 12 years, the third follows when almost all permanent teeth are already present in the mouth³.

It is generally considered that one can estimate age with accurate result from some months in utero upto the age of twenty. This may be the case upto twelve years, but between that age and twenty years of age estimations are based only on the development of the root of the third molars. NOLLA (1960)² observed ten stages of development of teeth as follow as:

Stage (0) – Absence of crypt.

Stage (1) – Presence of crypt.

Stage (2) – Initial Calcification.
Stage (3) – 1/3 Crown Completed.
Stage (4) – 2/3 Crown Completed.
Stage (5) – crown almost completed.
Stage (6) – Crown completed.
Stage (7) – 1/3 Root Completed.
Stage (8) – 2/3 Root Completed.
Stage (9) – Root almost completed apex open.
Stage (10) – Apical ends of roots completed.
Schour and massler (1941)⁴ stated that the age of calcification and of teeth are distinct process and may not correspond to those of chronological age.
Lagan and kronfeld (1954)⁵ observed that the crown of lower third molar completely develops between the age of 12 to 16 years. But further observed that the root of this tooth is completed at the age of 18 to 25 years.
This study is attempt to highlight the relation of the development of individual and eruption of third molar teeth in various age groups in both sexes by radiograph in Bikaner population.

Materials and methods

The randomized controlled trial study was conducted in the department of forensic medicine & toxicology and radio-diagnosis department in P.B.M hospital, Bikaner, Rajasthan. Total number of cases 250 (105 girls and 145 boys) both sexes, bearing age group between 13- 25 years.

The candidate were chosen from different schools, colleges and outdoor in P.B.M hospital, in Bikaner city. Only those cases were selected whose exact date of birth was verified by the school / college authority subjects residing for more than 10 years in Bikaner city were included in the study. The subjects for the study were divided into following groups:

13-14 years,14-15 years.15-16 years, 16-17 years,17-18 years.18-19 years,19-20 years,20-21 years,21-22 years,22-23 years, 23-24 years & 24-25 years.

The subjects were examined clinically for recording physical parameters like height, weight, and general body development. Ages of onset of menarche along with development of breast were recorded in girls. Presence of hair in pubic, axillary, in both sexes and hair on face in cases of males were recorded.

The dental examination of the subjects were done with the aid of mirror, probe and counting of teeth were recorded by palmer's notation. The intra-oral periapical radiograph of upper and lower third molar teeth of all subjects were taken and observed regarding various stages by Nolla's stages of development of teeth.

Results and observations

Table no. 1 shows different socioeconomic status (Upper class, Middle class & Low class) in relation to different age groups (13-14 years to 24-25 years) in boys & girls. Table no. 2 shows religion wise distribution of total number of cases.

Table no. 3 show onset of menarche in respective age such as 12-13 years, 13-14 years and 14-15 years and 13.3%, 69.5% & 17.1% respectively. Table no. 4 show the stages of eruption of third molar teeth in different age group.

Discussion

Present study included 250 cases out of which 145 were boys & 105 were girls. Observation of present study indicates that Socio-economic status have no effect on the eruption and development of various stages of third molar teeth. The findings are not consistent with Rose (1909)⁶ who commented that the teeth in well to do families erupt earlier as compared to those from poor families. The findings are also inconsistent with Brauer et al (1942)⁷ who observed nutrition play a part in the calcification and eruption of the teeth. The possible reason for this contradiction is that above cited authors have studied the teeth of children.

Table 1: Showing different socioeconomic status in relation to different age groups in boys & girls.

Age groups (in year)	Total no. of girls	Total no of boys	Upper Class		Middle Class		Lower Class	
			Girls	Boys	Girls	Boys	Girls	Boys
13-14	5	7	1	1	3	4	1	2
14-15	6	9	1	2	3	5	2	2
15-16	8	10	3	2	3	8	2	0
16-17	11	15	3	3	7	8	1	4
17-18	14	20	2	3	9	14	3	3
18-19	13	16	2	1	7	11	4	4
19-20	10	14	3	2	5	4	2	8
20-21	9	12	2	1	4	8	3	3
21-22	8	11	2	2	4	4	2	5
22-23	9	13	3	1	4	8	2	4
23-24	7	10	1	0	4	8	1	2
24-25	5	8	2	1	2	4	1	3

Table 2: Showing religion wise distribution of cases examined.

Age groups (in year)	Total no. of cases	Hindu		Muslim	
		Girls	Boys	Girls	Boys
13-14	12	4	5	1	2
14-15	15	4	8	2	1
15-16	18	7	8	1	2
16-17	26	8	11	3	4
17-18	34	10	18	4	2
18-19	29	11	16	2	0
19-20	24	9	13	1	1
20-21	21	5	10	3	3
21-22	19	7	8	2	2
22-23	22	7	12	0	3
23-24	17	4	10	1	2
24-25	13	5	7	0	1

Table 3: Showing onset of menarche in respective age.

No .of Girls	Age of onset of menarche	Percentage (%)
14	12-13 Years	13.33 %
73	13-14Years	69.52 %
18	14-15Years	17.14 %

Table 4: Showing development stages of third molar in various age groups.

Age group in year	No. Of Cases		Developmental stage of teeth			
	Girls	Boys	Mandibular		Maxillary	
			Girls	Boys	Girls	Boys
13-14	5	7	-	-	-	-
14-15	6	9	-	-	-	-
15-16	8	10	3	3	3	3
16-17	11	15	7	7	7	7
17-18	14	20	8	8	8	8
18-19	13	16	8	8	8	8
19-20	10	14	9	9	9	9
20-21	9	12	9	9	9	9
21-22	8	11	10	10	10	10
22-23	9	13	10	10	10	10
23-24	7	10	10	10	10	10
24-25	5	8	10	10	10	10

Table no.2 show the distribution of cases according to religion & observation of present study show that the religion of an individual does not show any difference in the eruption and development of third molar teeth. Breast development commences prior to the age of 13 years but in present study earlier stages of development of breast could not be observed because the limit of age in this study is 13 years to 25 years of age groups. Pubic hair appeared at the age of 13-14 years in both sexes and axillary hair at the 13-14 years in girls and 14-15 years in boys in majority of cases. Observations are similar to those observed in Modi⁸, Parikh⁹ and Nandi¹⁰. In the age group of 13-14 years crown completion of the third molar was found in most of the cases and at the age of 14-15 years crown completion stage was observed in 100% cases in both sexes. Demirjaner et al (1985)¹¹ who given the opinion that dental development are independent of somatic and or sexual maturity.

The present study showed that the age of menarche in majority of cases is 13-14 years. The crown of third molar teeth was seen completed in most of the cases at these age groups.

The observation of present study shows that the eruption of third molar is seen in age group of 17-18 years. The findings of eruptions of third molar are consistent with Modi⁸ (1991) but not consistent with observation of Powell¹² (1953), who while working as police surgeon of Bombay give the upper limit 14 years for third molar teeth in Indian children. As soon as second molar teeth erupts the space for the third molar teeth start to form and it was seen well marked at the age 16-17 years in most of cases in present study.

Third molar teeth in mandible have reflected earlier eruption in comparison to maxilla. The tipoff crown of third molar tooth was seen in most of the cases and the finding are consistent with Schranz¹³ (1959) but not consistent with Koski¹⁴ et al (1957) who concluded that molars do not cut the gums until they have almost reached the occlusal level. The findings are also similar to Adler (1959) who observed that eruption is not bilaterally symmetrical. These finding are not inconsistent with observations of Schranz¹³ (1959). The 2/3rd of root completion stage of third molar teeth was seen in most of case and usually erupts at this stage. These finding are consistent with Orban (1928) that eruptions of the teeth is

intimately related to elongation of the roots of teeth but not consistent with Carison¹⁵ (1944) who observed that elongation of the root and movement of the crown towards the oral cavity do not necessarily occur together.

Conclusion

Socio-economic status, racial and physical characters have no effect on the eruption and development of various stages of third molar teeth. No significant difference was observed in the development stage of third molar teeth in girls and boys. Third molar teeth eruption alone should not be used for age estimation. Agenesis of third molar is more in case of girls than in boys.

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