

Dental Development and Onset of Menarche in Jat Sikh Girls

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ABSTRACT Physiological maturity of Jat Sikh girls have been assessed using two measures of maturity-Dental age and Secondary sex character age-menarche. Data were collected on 253 Jat Sikh girls ranging in age 6-16 years. Dental age, the measure of maturity through eruption of permanent teeth, has been studied in Jat Sikh girls pertaining to sequence and time of eruption, bilateral symmetry and maxillo-mandibular variation. The secondary sex character age has been studied through age at menarche. Dental eruption is earlier in Jat Sikh girls in most of the teeth as compared to Brahmin, Khatri and Balmiki girls. The occurrence of menarche is also earlier in Jat Sikh girls as compared to Brahmin, Khatri and Balmiki girls, however, the differences are statistically non-significant.

INTRODUCTION

Dental development is an important measure of physiological maturity. The eruption of deciduous dentition ranges from age 6 months to 2 years and permanent teeth from age 6-13 years. The last molar M_3 erupts on an average between 18 and 25 years. The dental maturity is studied by simply counting the number of permanent teeth erupted or stage of calcification of teeth as seen in radiograph. Alder (1960) studied eruption of the permanent teeth.

In recent year much work has been done to study dental maturity as an indicator of physiological maturity in India. Some studies on emergence of teeth have been reported from India (Sidhu and Gupta, 1973; Kaul et al., 1975; Singh, 1980; Bhatnagar et al., 1981; Kumar, 1985; Mitra et al., 1986; Singal et al., 1987; Kaul and Prakash, 1989; Kumar, 1989; Kaur, 1990; Bajaj, 1991; Chhabra et al., 1993; Gaur and Singh, 1994; Purewal, 1999).

Secondary sex characters such as genitalia maturity, facial hair development, pubic and axillary hair stages, breast development and onset of menarche in females are taken as maturity indicators in study of physiological maturity

(Singh et al., 1998; Bains, 1999; Purewal, 1999).

In the present paper an attempt has been made to study the dental development and onset of menarche in Jat-Sikh girls.

MATERIAL AND METHODS

The present study is based on the cross-sectional data of 253 Jat Sikh girls ranging from 6-16 years of age with 23 subjects in each age group. The age and caste of the subjects have been verified from the school records.

The two measures of maturity were taken into consideration i.e. Dental age and onset of menarche.

A tooth was considered to be erupted only when a portion of the crown of the tooth, however, small had penetrated the gingiva. Thus gingival emergence was used as the criteria of eruption.

To study the age of onset of menarche the subjects were asked about their having experienced menarche or not and recorded on the performa. The median age of eruption of each tooth and age at menarche have been computed through probit analysis. The results have been compared with other endogamous groups through t-test.

OBSERVATIONS

Dental Development

In the present study, the age and sequence of eruption, bilateral symmetry and the maxillo-mandibular differences of the permanent dentition have been studied (Tables 1, 2).

The sequence of eruption of the permanent teeth in Jat Sikh girls is M_1 , I_1 , I_2 , C, P_1 , P_2 and M_2 . As the present study has been conducted on girls ranging from 6-16 years, so none of them have shown eruption of M_3 tooth.

The M_1 tooth appears first at the mean age

of 5-6 years. The lower right M_1 appears first, followed by upper left and then lower left and upper right.

Table 1: Sequence of eruption and bilateral symmetry in permanent dentition

Teeth	Median age $\pm$ S.E.M.		Test of significance (t-test)
	Right	Left	
Maxillary			
First Molar	5.66 $\pm$ 1.87	5.32 $\pm$ 0.90	0.20
Central Incisor	6.381 $\pm$ 1.95	6.87 $\pm$ 1.38	-0.23
Lateral Incisor	7.05 $\pm$ 1.71	7.57 $\pm$ 0.93	-0.26
Canine	10.72 $\pm$ 1.62	10.36 $\pm$ 1.55	-0.16
First Premolar	10.65 $\pm$ 1.33	10.02 $\pm$ 1.65	0.29
Second Premolar	11.04 $\pm$ 0.82	11.39 $\pm$ 0.98	-0.27
Second Molar	11.76 $\pm$ 0.55	11.67 $\pm$ 1.23	-0.06
Mandibular			
First Molar	5.11 $\pm$ 0.93	5.59 $\pm$ 0.78	0.39
Central Incisor	6.01 $\pm$ 1.26	6.13 $\pm$ 1.01	-0.07
Lateral Incisor	7.04 $\pm$ 1.25	6.98 $\pm$ 0.78	0.04
Canine	10.07 $\pm$ 0.94	9.21 $\pm$ 1.37	0.62
First Premolar	11.03 $\pm$ 1.17	11.50 $\pm$ 0.92	-0.06
Second Premolar	11.45 $\pm$ 0.99	11.36 $\pm$ 1.00	-0.13
Second Molar	11.62 $\pm$ 0.56	11.72 $\pm$ 0.69	-0.11

Table 2: Maxillo mandibular differences of dentition

Teeth	Median age $\pm$ S.E.M.		Test of significance (t-test)
	Maxilla	Mandible	
Right Side			
First Molar	5.66 $\pm$ 1.87	5.11 $\pm$ 0.93	0.33
Central Incisor	6.381 $\pm$ 1.95	6.01 $\pm$ 1.26	-0.12
Lateral Incisor	7.05 $\pm$ 1.71	7.04 $\pm$ 1.25	-0.26
Canine	10.72 $\pm$ 1.62	10.07 $\pm$ 0.94	0.34
First Premolar	10.65 $\pm$ 1.33	11.30 $\pm$ 1.17	-0.36
Second Premolar	11.04 $\pm$ 0.82	11.45 $\pm$ 0.99	-0.32
Second Molar	11.76 $\pm$ 0.55	11.62 $\pm$ 0.56	0.17
Left Side			
First Molar	5.32 $\pm$ 0.90	5.59 $\pm$ 0.78	-0.22
Central Incisor	6.87 $\pm$ 1.38	6.13 $\pm$ 1.01	0.39
Lateral Incisor	7.57 $\pm$ 0.93	6.98 $\pm$ 0.78	0.04
Canine	10.36 $\pm$ 1.55	9.21 $\pm$ 1.37	0.62
First Premolar	10.02 $\pm$ 1.65	11.50 $\pm$ 0.92	-0.78
Second Premolar	11.39 $\pm$ 0.98	11.36 $\pm$ 1.00	0.02
Second Molar	11.67 $\pm$ 1.23	11.72 $\pm$ 0.69	-0.03

The I_1 tooth appears in age ranging from 6-7 years and I_2 appears at the age of 7. Canine followed I_2 and then P_1 , P_2 , M_2 followed.

Canine of upper jaw erupts in the age of 10.72 in right side and at 10.36 years in left side, where as P_1 appears at the age of 10.65 in right side and at 10.02 years in left side. The P_2 ap-

pears after the age of 11, M_2 is the last to appear. M_1 , I_1 , I_2 , C and M_2 appears earlier in right side of mandible where as M_1 , M_2 erupts early in left maxilla.

Menarche

The criteria for secondary sex character taken is the onset of menarche. Table 5 shows the percentage of menstruating girls in the various age groups. The menarcheal stage have been observed to start from age group 11 to 12. The percentage of menarcheal in age group 12, 13, 14, 15 and 16 are 8.69%, 39.13%, 60.86%, 86.95% and 95.65%, respectively. The median age of occurrence of menarche is 13.05 years with standard error of median age $\pm$ 0.77.

DISCUSSION

1. Dental Development

Dental age is another widely used parameter for assessing physiological maturity or developmental age of an individual.

a) *Sequence and Time of Eruption*: The comparison of sequence of teeth in both upper and lower jaws of Jat Sikh, Brahmin, Khatri and Balmiki girls have been presented in table 3. When compared with Brahmins of Punjab the sequence of eruption in Brahmin girls is M_1 , I_1 , I_2 , P_1 , C, P_2 , M_2 . The I_1 , I_2 , C, P_2 , M_1 and M_2 in right maxilla appear early in Jat Sikh girls, I_2 and P_2 appear early in left maxilla of Jat Sikh. All the teeth except P_1 , P_2 and M_2 appears earlier in mandible of Jat Sikh girls.

When compared with Khatri girls of Punjab (Bajaj, 1991) the sequence of eruption is M_1 , I_1 , I_2 , P_1 , P_2 , C, M_2 it is found that in case of maxillary teeth, the M_1 , I_1 , C, P_1 , M_2 appear early in Jat Sikh girls. In case of right side M_1 , I_1 , I_2 , C, and M_2 appears in Jat Sikh girls at early stage. In mandibular, M_1 , I_1 , I_2 , P_2 , and M_2 appears at early stages in Jat Sikh girls than Khatri girls. Only right and left P_1 of mandible appears first in Khatri girls.

On comparison with Balmiki girls of Patiala city, it is observed that age sequence of eruption of teeth is M_1 , I_1 , I_2 , C, P_1 , P_2 and M_2 . M_1 , I_1 , P_1 (upper right) appears early in Jat Sikh girls. Rest of teeth appear early in Balmiki girls. Similar observations had been made in the lower jaw

Table 3: Comparison of median age and S.E.M. in four groups

Teeth	Jat-Sikh Girls		Brahmin Girls		Khatri Girls		Balmiki Girls	
	Right	Left	Right	Left	Right	Left	Right	Left
Maxillary								
Central Incisor	6.31 ± 1.95	6.87 ± 1.38	6.71 ± 0.72	6.76 ± 0.70	7.11 ± 0.88	6.95 ± 0.68	6.86 ± 0.41	7.12 ± 0.11
Lateral Incisor	7.05 ± 1.72	7.57 ± 0.93	7.72 ± 1.46	7.07 ± 0.89	7.82 ± 0.81	7.22 ± 0.62	6.92 ± 0.08	7.18 ± 0.57
Canine	10.72 ± 1.62	10.36 ± 1.55	10.83 ± 2.56	10.83 ± 0.63	11.45 ± 1.06	11.03 ± 1.03	9.53 ± 1.55	9.64 ± 1.29
First Premolar	10.65 ± 1.33	10.02 ± 1.65	9.47 ± 1.08	10.20 ± 1.20	10.51 ± 1.00	10.36 ± 0.99	10.93 ± 1.37	10.96 ± 1.02
Second Premolar	11.04 ± 0.82	11.39 ± 0.98	11.94 ± 0.71	10.25 ± 2.11	11.28 ± 0.83	10.85 ± 0.85	10.93 ± 1.45	10.96 ± 1.02
First Molar	5.66 ± 1.87	5.32 ± 0.90	5.79 ± 0.91	5.79 ± 0.91	5.92 ± 0.52	5.82 ± 0.54	5.97 ± 0.23	5.99 ± 0.74
Second Molar	11.76 ± 0.55	11.67 ± 1.23	11.88 ± 1.42	11.99 ± 1.26	12.01 ± 0.41	12.00 ± 0.72	11.35 ± 1.14	11.32 ± 1.21
Mandibular								
Central Incisor	6.01 ± 1.26	6.13 ± 1.01	6.36 ± 0.61	6.31 ± 0.49	6.42 ± 0.71	6.38 ± 0.73	6.48 ± 0.97	6.79 ± 0.96
Lateral Incisor	7.04 ± 1.25	6.98 ± 0.78	7.12 ± 1.34	7.34 ± 1.09	7.58 ± 0.57	7.48 ± 0.71	6.88 ± 0.11	6.79 ± 0.96
Canine	10.07 ± 0.94	9.21 ± 1.37	10.39 ± 0.91	10.38 ± 1.06	11.49 ± 1.04	11.32 ± 0.75	9.01 ± 0.27	9.08 ± 1.66
First Premolar	11.30 ± 1.17	11.50 ± 0.92	9.87 ± 1.07	10.43 ± 1.15	10.04 ± 1.02	10.03 ± 1.08	10.62 ± 0.38	10.71 ± 0.45
Second Premolar	11.45 ± 0.99	11.36 ± 1.00	10.99 ± 1.97	11.12 ± 1.49	11.09 ± 0.86	11.12 ± 1.09	10.83 ± 0.13	10.71 ± 1.30
First Molar	5.11 ± 0.93	5.59 ± 0.78	5.77 ± 1.52	5.73 ± 0.54	5.99 ± 0.62	5.82 ± 0.66	5.92 ± 0.13	5.77 ± 1.57
Second Molar	11.62 ± 0.56	11.72 ± 0.69	11.08 ± 1.05	11.24 ± 0.92	11.73 ± 0.73	11.80 ± 0.95	11.57 ± 1.24	11.41 ± 1.48

teeth.

However, the differences between the eruption of permanent teeth in Jat Sikh girls have been found to be non-significant when compared with Brahmin, Khatri and Balmiki girls (Table 4). The sequence of eruption is the same in four endogamous groups for all the teeth; except for canine which has shown early emergence than premolars in Jat Sikh and Balmiki girls whereas in Brahmin girls it has shown its emergence after first premolar and in Khatri girls even after 2nd premolar.

b) Bilateral Symmetry: Table 1 shows the bilateral differences in the eruption of permanent dentition in Jat Sikh girls. It has been observed that C, P₁, M₁ and M₂ of the left maxilla erupts earlier than the right maxilla. Similarly M₁, I₁, P₁ and M₂ of left mandible appear earlier than that of right side. However statistically non-significant differences have been observed between the two sides.

c) Maxillo-Mandibular Differences: The result have been studied pertaining to maxillo-mandibular difference both in right and left sides of the jaw. Table 2 shows right all the teeth except P₁ and P₂ appear earlier in mandible. In left mandible M₁, P₁, M₂ teeth appear late. Statistically non-significant maxillo-mandibular differences have been observed in all the teeth (Table 2).

Table 4: Test of significance (t-test)

Teeth	Jat Sikh girls vs Brahmin girls		Jat Sikh girls vs Khatri girls		Jat Sikh girls vs Balmiki girls	
	Right	Left	Right	Left	Right	Left
Maxillary						
Central Incisor	-0.19	-0.07	-0.37	-0.05	-0.27	-0.18
Lateral Incisor	-0.29	0.39	-0.40	0.31	0.07	0.35
Canine	-0.03	-0.28	-0.37	-0.36	0.53	0.35
First Premolar	0.69	-0.08	0.08	-0.18	-0.14	-0.48
Second Premolar	-0.81	0.06	-0.20	0.41	0.06	0.25
First Molar	-0.06	-0.46	-0.13	-0.48	-0.16	-0.57
Second Molar	-0.07	-0.18	-0.36	-0.23	0.32	0.20
Mandibular						
Central Incisor	-0.25	-0.16	-0.28	-0.20	-0.29	-0.47
Lateral Incisor	-0.04	-0.26	-0.39	-0.45	0.12	0.15
Canine	-0.24	-0.67	-1.36	-1.35	1.08	0.06
First Premolar	0.90	0.72	0.81	1.04	-0.55	-0.77
Second Premolar	0.20	0.13	0.27	0.16	0.62	0.39
First Molar	-0.37	-0.12	-0.79	-0.22	-0.86	-0.08
Second Molar	0.45	0.41	-0.11	-0.06	0.03	0.19

II. Menarche

An important aspect of physiological maturity is to study secondary sex character age. In the present study onset of menarche has been studied in Jat Sikh girls.

Table 5 shows the percentage of menstruating girls in various age groups. In case of Jat Sikh girls, the onset of menarche have been observed to start at 12. The median value for menarche is 13.05 years with standard deviation of median age ± 0.77 years.

Table 5: Percentage of menarche in different age groups among Jat Sikh girls

S.No.	Mean age	Age Group	%age of menarche
1.	5.99	6	0
2.	6.79	7	0
3.	8.02	8	0
4.	9.09	9	0
5.	9.92	10	0
6.	11.08	11	0
7.	12.08	12	8.69
8.	12.46	13	30.4
9.	14.07	14	65.2
10.	14.96	15	78.6
11.	16.01	16	95.6

Table 6 shows comparison of mean value of menarche with other endogamous groups. When compared with Brahmin, Khatri and Balmiki girls, it has been observed that the Jat Sikh girls are early maturers.

Table 6: Comparison of median age at menarche of various populations

	Jat Sikh of Patiala	Brahmins of Punjab	Khatri of Punjab	Balmiki of Patiala
Menar-	13.05 $\pm$ 0.77	14.10 $\pm$ 0.55	13.08 $\pm$ 0.93	13.23 $\pm$ 0.02
che				

Table 7: Test of significance (t-test)

	Jat Sikh girls vs Brahmin girls	Jat Sikh girls vs Khatri girls	Jat Sikh girls vs Balmiki girls
t-test	-0.10	-0.20	-0.62

On applying t-test, statistically non-significant differences have been obtained when com-

pared with Brahmin, Khatri and Balmiki girls (Table 7).

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