

Eruption of Permanent Teeth among the Gowda Girls of Kodagahalli Village of Mysore District of Karnataka

Chunthuiliu Kamei* and D. K. Limbu

North-Eastern Hill University (NEHU), Permanent Campus, Shillong 793 022
Meghalaya, India

*E-mail: kameiathuina@yahoo.com

KEYWORDS Dental Eruption. Probit Transformation. Jaws. Quadrant. Median Age

ABSTRACT In this paper an attempt has been made to describe the eruption time of permanent teeth among the Gowda girls of Mysore district, Karnataka, India. A total of 447 Gowda girls were orally examined. Median age at eruption for each tooth is calculated using Probit transformation. Permanent teeth start erupting at the median age of 5.8 years and completes by 11.6 years. The earliest tooth to erupt is the first medial mandibular incisor followed by the first molar in both the jaws. The last tooth to erupt is the second maxillary molar. An overall comparison of the Gowda girls with other Indian populations shows that, apart from the similarity in the emergence time with regard to certain teeth, some other teeth appear to show high variation as well as moderate differences as evident from the median age results of the teeth.

INTRODUCTION

Tooth eruption is generally defined as the time when any part of the crown of the tooth has emerged through the gingival surface. The age and order of eruption of teeth shows variation among the different racial groups. As the appearance of the tooth defines accurate forecast, one can establish a trend or a constant if a large sample is studied from a racial group.

Eruption of teeth, which is a biological phenomenon, is found to be influenced by several factors which are partly genetical and partly environmental. Studies have shown that there is a marked difference in the eruption time and the sequence of eruption of permanent teeth among the different populations of the world (Dahlberg and Maunsbach 1948; Eveleth and Tanner 1976). The changes in the living habits, food habits, and oral hygiene habits may have its influence on the eruption of teeth in human race (Mugonzibwa et al. 2002). Studies have also reported differences in eruption of permanent teeth between ethnic groups, gender, socio-economic and nutritional factors, carious condition, fluorides, congenital abnormalities such as supernumer-

ary teeth, Down's syndrome, cleidocranial dysplasia, and environmental and secular trends (Baccetti 2000; Leroy et al. 2003; Rousset et al. 2003). The present study was carried out in order to determine the eruption time and the sequence of eruption of permanent teeth among the Gowda girls and to compare them with other Indian girl population.

MATERIAL AND METHODS

The present study was conducted at Kodagahalli village, Mysore district of Karnataka. The data were collected in the month of January, 2008. The data was based on the cross-sectional sample of 447 Gowda girls varying in age group between 5.5 and 15.5 years. The age of the subjects were recorded from the school register and those girls, whose exact age was not available, were excluded from the present sample. The dental status of each subject was examined orally in sufficient daylight. If any part of the crown had pierced the gum to become visible, the tooth was considered erupted. Some missing permanent teeth were counted as erupted when the subject would recall their emergence and/or extraction. Age of an individual was calculated according to the decimal age calendar given by Weiner and Lourie (1969) from her birthday to the date of examination.

The median age of eruption for each tooth is calculated by using Probit transformation method of Fisher and Yates (1948).

Address for correspondence:

Dr. D. K. Limbu,
Associate Professor
Department of Anthropology,
North-Eastern Hill University (NEHU)
Permanent Campus, Shillong 793 022
Meghalaya, India
E-mail: dhruba_limbu@yahoo.co.in

RESULTS AND DISCUSSION

Tables 1 and 2 show the median age ($\pm$ SE) of eruption of permanent teeth in the right and left quadrants of both the jaws. In both the quadrants of mandible, eruption of most of the teeth is either similar or very close to the eruption timing of the maxillary teeth. The earliest tooth to erupt is the first molar of the right quadrant (5.9 years), followed by the mandibular medial incisors of both the quadrants and the mandibular first molars of the left quadrant (6.0 years). The maxillary medial incisor of the right quadrant and the mandibular lateral incisor of the left quadrant erupt at 7 years of age. Lateral incisors of both the jaws of right quadrant and left quadrant erupt at 7.6 years and 7.7 years respectively except for the mandibular lateral incisor of the left quadrant which erupts at 7 years of age. After the incisors, the maxillary canine in right quadrant erupts at the median age of 9 years followed by the mandibular canine (9.2 years). The eruption time of the mandibular canine of the left quadrant and the maxillary first premolar of the right quadrant is same (9.3 years), whereas the canine and the first premolar of upper jaw of the left quadrant emerge at the same time (9.7 years). The maxillary second premolar of the right quadrant erupt later than its mandibular counterpart. Both the second molars of the right quadrant erupt at the same time (11.5 years). Excepting the third molars, the last tooth to erupt in the maxilla of the Gowda girls is second molar (11.7 years).

Table 3 shows the median age ($\pm$ S.D.) of tooth eruption, when both the quadrants are combined.

Most of the teeth in the mandible erupt earlier than that of their maxillary counterpart. The earliest tooth to erupt is the mandibular central incisor (5.8 years) followed by the first molar of both the jaws (6 years). The second mandibular incisor erupts at 7.3 years followed by its maxillary teeth (7.7 years). The time of eruption of the canine and the first premolar of the upper jaw is same (9.4 years). Canine erupts earlier in the lower jaw. The median age of eruption of the maxillary second premolar is 9.7 years, followed by its mandibular teeth (10 years). The last tooth to erupt among the Gowda girls is the second maxillary molar (11.6 years) followed by its mandibular counterpart (11.1 years).

The sequence of eruption of permanent teeth in the Gowda girls is as follows:

Right quadrant:

Maxilla: $M^1 > I^1 > I^2 > C^0 > P^1 > P^2 > M^2$

Mandible: $M_1 > I_1 > I_2 > C_0 > P_1 > P_2 > M_2$

In the right quadrant, both the jaws show similar sequence of eruption. The first tooth to erupt is the first molars, followed by the incisors. Canine occupies intermediate position in the sequence of eruption. Second molar is the last tooth to emerge in the entire sequence of this jaw.

Left quadrant:

Maxilla: $M^1 > I^1 > I^2 > P^2 > P^1 = C^0 > M^2$

Mandible: $I_1 = M_1 > I_2 > C_0 > P_1 > P_2 > M_2$

Unlike the right quadrant, the left quadrant do not show similar sequence of eruption in both the jaws. Here, the first maxillary tooth to erupt is the first molar, whereas, in the mandible it is the medial incisor.

Both the jaws combined:

Table 1: Median age ($\pm$ S.D.) of tooth eruption in Gowda girls (right quadrant)

Jaws	I1	I2	C0	P1	P2	M1	M2
Maxillary	7.0($\pm$ 0.20)	7.6($\pm$ 0.50)	9.0($\pm$ 0.50)	9.3($\pm$ 0.35)	10.2($\pm$ 0.40)	5.9($\pm$ 0.20)	11.5($\pm$ 0.55)
Mandibular	6.0($\pm$ 0.60)	7.6($\pm$ 0.45)	9.2($\pm$ 0.3)	9.4($\pm$ 0.3)	10.1($\pm$ 0.45)	5.9($\pm$ 0.15)	11.5($\pm$ 0.50)

Table 2: Median age ($\pm$ S.D.) of tooth emergence in Gowda girls (left quadrant)

Jaws	I1	I2	C0	P1	P2	M1	M2
Maxillary	7.0($\pm$ 0.50)	7.7($\pm$ 0.055)	9.7($\pm$ 0.50)	9.7($\pm$ 0.25)	9.6($\pm$ 0.70)	6.0($\pm$ 0.10)	11.7($\pm$ 0.55)
Mandibular	6.0($\pm$ 0.55)	7.0($\pm$ 0.50)	9.3($\pm$ 0.35)	9.6($\pm$ 0.25)	9.9($\pm$ 0.60)	6.0($\pm$ 0.10)	11.3($\pm$ 0.45)

Table 3: Median age ($\pm$ S.D.) of tooth eruption in Gowda girls (both quadrants combined)

Jaws	I1	I2	C0	P1	P2	M1	M2
Maxillary	6.9($\pm$ 0.35)	7.7($\pm$ 0.40)	9.4($\pm$ 0.20)	9.4($\pm$ 0.35)	9.7($\pm$ 0.60)	6.0($\pm$ 0.10)	11.6($\pm$ 0.50)
Mandibular	5.8($\pm$ 0.60)	7.3($\pm$ 0.45)	9.3($\pm$ 0.30)	9.2($\pm$ 0.45)	10.0($\pm$ 0.60)	6.0($\pm$ 0.10)	11.1($\pm$ 0.55)

$$I_1 > M^1 = M_1 > I^1 > I_2 > I^2 > P_1 > C^0 > C^1 > P^2 > P_2 > M_2 > M^2$$

The first tooth to erupt in the Gowda girls is the mandibular medial incisor, followed by the first molars of both the jaws. Both the maxillary and the mandibular incisors erupt before the eruption of the canines, premolars and molars. The last tooth to erupt in the present population is the second maxillary molar teeth.

Several studies have reported that the mandibular teeth erupt earlier than their maxillary counterparts (Lee et al. 1965; Hoffding et al. 1984; Sharma et al. 2001; Lakshmappa et al. 2011). The present study shows conformity with the above studies except for the second premolar and second molar which erupted earlier in the maxilla. It is also reported that the fourth tooth to commonly erupt in the maxilla is the first premolar and the canine in the mandible (Knott and Mederith 1966). However, the present study do not show conformity with the above study in the eruption of canine. It also differs in the maxilla as

the canine and second premolar are the fourth to erupt in the right and left quadrant respectively.

Table 4 shows a comparison of the eruption time of permanent teeth of Gowda girls with that of other Indian populations.

The data were chosen from various parts of India to compare with the Gowda girls of the Kodagahalli village of Mysore. In most of the populations, the first mandibular molar is the first tooth to erupt, followed by the maxillary first molar. This is again followed by the eruption of the central and lateral incisors. However, canine and premolar do not occupy a specific position in the sequence of tooth emergence time. Among the Gowda girls, the mandibular central incisor is the first tooth to erupt followed by the maxillary and mandibular first molars which show same eruption timing.

In the Gowda girls, the mandibular second molar erupts earlier than its maxillary counterparts. The mandibular second premolar emerges

Table 4: Permanent tooth emergence time among some Indian populations

Population	Maxilla							Mandible						
	I^1	I^2	C^0	P^1	P^2	M^1	M^2	I_1	I_2	C_0	P_1	P_2	M_1	M_2
Gulbarga girls (Karnataka) Rami Reddy (1981)	6.50	8.00	10.88	10.13	11.00	5.75	11.00	6.75	6.88	10.00	10.00	11.00	5.50	10.63
Bengalee girls of Calcutta Banerjee et al. (1992)	7.25	8.25	10.75	11.25	11.75	5.75	11.75	6.25	7.75	10.25	11.25	11.75	5.75	11.75
Chandigarh girls Kaul et al. (1975))	6.92	8.13	10.47	10.23	11.22	6.03	11.22	6.46	7.59	9.77	10.47	11.22	5.62	10.72
Patiala Punjabi girls Sidhu and Gupta (1973)	6.82	7.75	10.63	10.10	11.35	5.72	12.05	6.35	7.30	10.42	10.05	11.12	5.50	11.20
South Indian girls Shourie (1946)	7.27	7.51	10.87	10.55	11.47	6.91	11.86	7.23	7.54	10.52	10.07	11.42	6.81	11.59
Gowda girls Present study	6.90	7.70	9.40	9.40	9.70	6.00	11.60	5.80	7.30	9.30	9.20	10.00	6.00	11.10

later than the maxillary canine, which shows divergence from the order of eruption of teeth given by Wheeler (1988) in which the mandibular second premolar and the maxillary canine have the same emergence timing.

The eruption time of most of the teeth in the upper jaw of the Gowda girls is closer to the Patiala Punjabi girls than that of the other populations compared. The Gulbarga and the Bengalee girls of Calcutta also show some similarity with the Gowda girls in eruption timing of some permanent teeth.

CONCLUSION

An overall comparison of the Gowda girls with other Indian populations shows that the mandibular central incisor and the second premolar erupt earlier than the other Indian populations compared. Apart from the similarity in the emergence time with regard to certain teeth, some other teeth appear to show high variation as well as moderate differences as evident from the median age results of the teeth. The study also shows that there is similarity in the sequence of eruption of permanent teeth of the Gowda girls with other populations of the world with slight variations.

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