

# Eruption status of permanent first molar in five-to-eight-year Gujarati children, Vadodara city, Gujarat

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## Abstract

**Aim:** To check the eruption status of permanent first molar in five-to-eight-year Gujarati children of Vadodara city, Gujarat. **Objectives:** To determine the eruption status of Permanent First Molars, their eruption according to age, and compare the eruption in maxillary and mandibular arch according to gender. **Materials and Methods:** This is a cross sectional descriptive survey using random sampling in a sample size of 1328 Gujarati children between five or eight years of age attending public and private primary schools of Vadodara city. **Statistical Analysis:** Inferential statistics was implemented using SPSS 18.0 version for Microsoft Windows. Chi square test was executed with the Fisher's exact test, and based on the data generated, any other non-parametric test. **Results:** According to the present study, teeth were seen to erupt earlier in the females than the males and mandibular teeth earlier than maxillary. No difference was noted in the eruption timings in left and right side of the jaws. **Conclusion:** The mean ages of eruption obtained from our study could be used as a standard value when assessing the permanent tooth eruption in Indian children as compared to the global scenario.

**Key words:** Eruption, Permanent First Molars, Gujarati Children, Mandibular teeth, Maxillary teeth.

## Introduction

Teeth are an important part of the maxillofacial complex. They are considered biological markers of maturity, and their eruption into the oral cavity is an important milestone in an individual's life.<sup>1</sup> The tooth eruption is a long and varied physiological process, during which a tooth moves from the jawbone, and comes into occlusion and becomes functional. Tooth eruption and development of occlusion occurs in 13

-15 years of life, except for the 3rd molars. Both deciduous and permanent teeth erupt at a specific age. However, there can be a difference, especially for the permanent teeth. It is therefore useful to know the age range of eruption.<sup>2</sup>

The studies have reported differences in eruption of permanent teeth with ethnic groups, genders, socioeconomic and nutritional factors, carious condition, fluorides, congenital abnormalities

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such as supernumerary teeth, Down's syndrome, cleidocranial dysplasia, and environmental and secular trends.<sup>1, 3, 4</sup> A variation of six months on either side of the usual eruption date may be considered normal for a given child.<sup>5</sup>

"Thorough understanding of the timing and pattern of tooth eruption is necessary for monitoring the growth of children especially during treatment planning in pediatric dentistry, orthodontics and public health dentistry.<sup>6</sup> This is also helpful in diagnosing growth disturbances and also in forensic dentistry to know the chronological age of children with unknown birth records.<sup>7</sup>

Hence, this study was conducted to check the eruption status of the permanent first molar in five-to-eight-year-old Gujarati children of Vadodara city, Gujarat.

## Methodology

The study was carried out in Vadodara city, Gujarat, India. A sample of 1328 subjects was collected based on a simple random technique. Five-to-eight-year-old children from primary schools located in four different zones geographically viz. North, South, East, and West of Vadodara city, who fulfilled the inclusion criteria were included in the study. The sample size was determined using the base article via a statistical analysis. The ethical clearance was obtained from the institutional Ethical Committee Review Board. Former permission was obtained from the school authorities, and the day of examination was planned. The children were informed briefly about the procedure involved and the examinations were carried out after they were assured. The specially designed proformas were assigned to each child individually. The ages of the children were recorded as the age at their last birthday, and were confirmed from the school records. The Gujarati children in school, the children present in the school on the day of examination, the children free of any systemic diseases and syndromes, and the children whose parents gave consent were included in the study.

A single trained examiner, with the help of a trained assistant, examined all the children. A maximum of 100 children per day were examined over a period of six months. A mouth mirror and probe with natural illumination was used for examination. (Type III examination)<sup>8</sup> The number of permanent teeth in each quadrant was then assessed starting from the maxillary right quadrant, to maxillary left quadrant, followed by mandibular left and then the mandibular right quadrant. A tooth was considered erupted if any of its parts emerged through the gingiva. In case of doubt, the area was dried with cotton to confirm eruption.<sup>9</sup> A similar procedure was carried out for all the 1328 children. Intra-examiner validity was done by re-examining the first 25 children again after a week.

The mean age of emergence of individual permanent teeth was calculated. For each tooth, the percentages of the subjects in whom the tooth was present at the specific age levels were determined. Student's t-test was used for comparing the two means and 95% upper and lower confidence intervals were taken as the significant values.

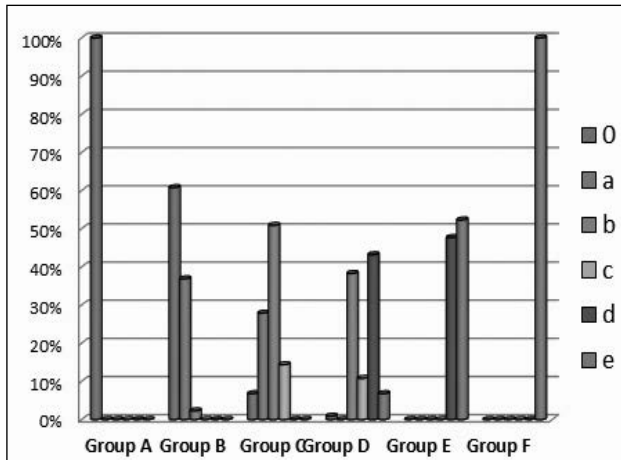
## Results

The study population consisted of 1328 subjects in the age group of five to eight years from four different primary schools, located in four different geographic zones across Vadodara city. The total subjects were divided into three groups according to their age. Each group had 444 children out of which 222 were boys and 222 girls [Table 1].

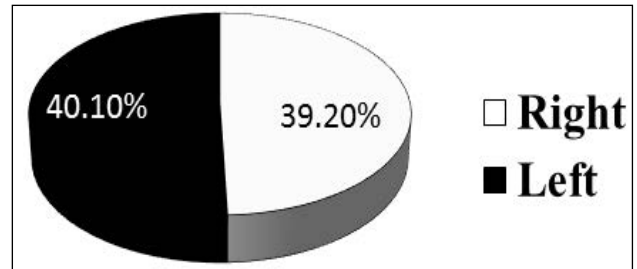
**Table 1:** Sample distribution

Age	Boys	Girls	Total
5-6 years	222	222	444
6-7 years	222	222	444
7-8 years	222	222	444

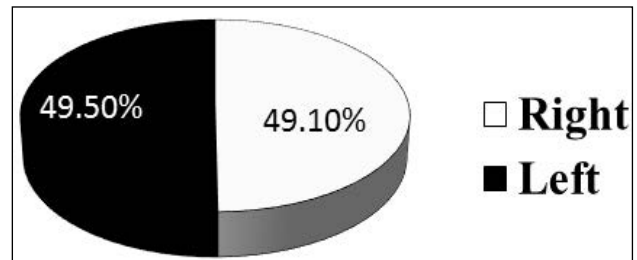
According to this study, the mean eruption age of the permanent first molar obtained was five and a half years (66-71 months) as the first sign of eruption i.e. stage **a** is observed at this age (Table 2).(Graph 1,2,3)



**Graph 1:** Age wise result



**Graph 2:** Maxillary First Permanent Molar 66-71 Months



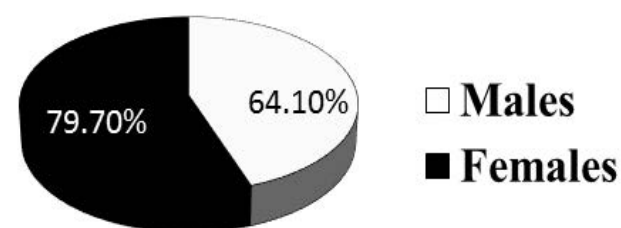
**Graph 3:** Mandibular First Permanent Molar 66-71 Months

**Table 2 :** Age wise

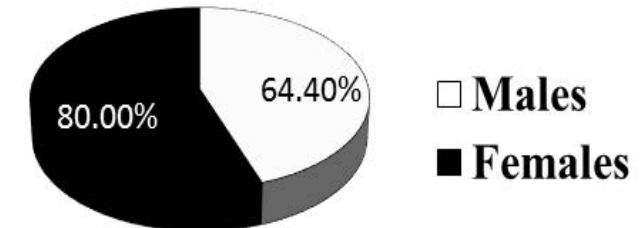
		0	1 cusp tip visible a	1/3rd crown visible b	2/3rd crown visible c	Complete crown visible d	Crown at occlusal level e	Total
Age	60-65 months	222	0	0	0	0	0	222
	66-71 months	135	82	5	0	0	0	222
	72-77 months	15	62	113	32	0	0	222
	78-83 months	2	0	85	24	96	15	222
	84-89 months	0	0	0	0	106	116	222
	90-95 months	0	0	0	0	0	222	222
Total		374	144	203	56	202	353	1,332

Chi square test			
	Value	Df	P value
Pearson Chi-square	2,635.874	25	<0.001

According to this study, the mean eruption age of the permanent first molar was at five and a half years (66-71 months) of age in 12.3% girls out of the total number of girls, and in 9.3% boys out of the total number of boys.(Graph 4,5)



**Graph 4:** Maxillary Right First Permanent Molar 66-71 Months



**Graph 5:** Maxillary Left First Permanent Molar 66-71 Months

**Table 3:** Sex wise

			o	1 cusp tip visible a	1/3rd crown visible b	2/3rd crown visible c	Complete crown visible d	Crown at occlusal level e	Total
Sex	Male	Count	239	62	118	25	106	116	666
	Female	Count	135	82	85	31	96	237	666
Total		Count	374	144	203	56	202	353	1,332

Chi square test			
	Value	Df	P value
Pearson Chi-Square	79.676	5	<0.001

In the five-year age group (60-65 months), none of the subjects had his/her first permanent tooth erupted among both the boys and the girls. In the age group of eight years (90-95 months), all the first permanent molars had erupted. The first permanent molar was erupted earlier in girls than in boys.<sup>10, 11, 12</sup> The mandibular first permanent molar erupted earlier than its maxillary counterpart did. There was no significant difference seen in the eruption of permanent first molar on right and left side.

## Discussion

Tooth eruption is considered an important event in a child's development, and hence parents are often anxious and concerned about the timing and sequence of eruption.<sup>13</sup> The permanent first molar is often mistaken to be a deciduous tooth, as it is the first permanent tooth to erupt, and there are high chances of neglect from the parents. In addition, a caries free, or a minimal caries environment should precede it to perform effectively the preventive measures in order to avoid the harbouring of oral microorganisms on the deciduous teeth.

As the literature suggests, the ideal age of eruption of the first permanent molar is considered six years. However, with evolution, a variation in the same is observed. From the conducted study, which investigated the mean eruption timings of the first permanent molar in Gujarati children in Vadodara city, 66-71 months of age, showed the first sign of eruption. In this study, the mandibular first permanent molar, erupted earlier than its maxillary counterpart did, which was similar to several studies<sup>14</sup>. There was no significant difference seen in

sides according to the study conducted by Mayhall et al 1978 and Heikkinen et al; 1999.<sup>15</sup>

Although all the children examined belonged to a similar socio-economic class, they showed variation. The eruption time of the first permanent molar is of importance, because at this age, a child undergoes change of personality, moves to primary school and an increased interaction with peers takes place. Moreover, the child is introduced to inculcate a habit of tooth brushing by himself/ herself by six years of age. In addition, if the eruption time of the first permanent molar is known for a particular population, parent counselling, as well as patient education can be done likewise to prevent the rapidly progressing involvement of the first permanent molar in the biosocial disease i.e. dental caries.

## Conclusion

According to the study done among Gujarati children in Vadodara city, the mean ages of eruption obtained show similar results to that of the results stated in the American Academy of Paediatric Dentistry. On comparison with different populations across the country, the results were similar with respect to sex and the arch. Other determinant factors of eruption were eliminated by including the children of same socioeconomic status. Since the current study involved a small sample of children, further research should be considered to positively conclude the results. However, the data reported in this study could be used as a baseline while assessing the permanent tooth eruption in Indian children and can pave the path for further studies across the world.

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