

## Occlusal Traits of Primary Dentition in Preschool Children Of Gandhinagar, India

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**Abstract:** Objectives: Aim of our study was to assess the occlusal traits of 3-5 year-old preschool children of India in primary dentition and the differences in traits with age. Methods: In present cross-sectional study primary dentition of 662 preschool children aged 3-5 years from preschool of Gandhinagar, India, using a stratified random sampling technique were examined. The study group was assessed for primary molar relationship, primary canine relationship, degree of over jet, degree of overbite and the presence of anterior crossbite, posterior crossbite and scissor bite. Results: The data that were collected was analysed using chi-square test. Results of our study showed that flush terminal plane was more common in age group of 3-4 years old children; mesial step was more common in age group of 4-5 years old children. Majority of children in both the age groups showed the presence of class I primary canine relationship. Both the age group showed the predominance of normal overjet and overbite. 0.2% of children showed presence of anterior crossbite, while no children showed the evidence of posterior crossbite or scissor bite. Conclusion: Mesial step molar relationship is most common molar relationship and it also increases with age. Deciduous molar relationship changes as the age increases. Lower prevalence of anterior open bite and anterior crossbite may be suggestive of lower prevalence of sucking habits. [Tithi A NJIRM 2016; 7(6):101-105]

**Key Words:** Occlusal traits, primary occlusion, primary dentition

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**Introduction:** Each child is different. No similarities are found in children even from the same family, which includes orofacial growth patterns, spacing or crowding of the teeth apart from general growth patterns. Developing occlusion is continuous process rather than static one.

Traits of primary dentition consist of terminal molar relationship, primary canine relationship, physiologic spacing, crowding, overjet and overbite. These key features of occlusion in primary dentition can predict the traits of the permanent dentition<sup>1</sup>. The primate spaces are usually presented in the maxilla, mesial to canine and in mandible distal to canine. These spaces play an important role while aligning the erupting permanent teeth and establishment of occlusion, absence of these spaces may lead to crowding in the anterior region. At time of eruption of the permanent molars their position is depended on the terminal plane relationship of the primary molars<sup>2</sup>. These set of occlusal traits in primary dentition to a large extent may lay the foundation for the succeeding dentition. The occlusion of the succeeding permanent dentition is majorly prejudiced by the preceding primary dentition, although sometimes its features vary among different ethnic groups.

Limited data is available on occlusal traits of the preschool children in India. Thus the present study was carried out to assess the occlusion traits in primary dentition of preschool children with age

group of 3-5 years of Gandhinagar city, Gujarat and to determine the age wise difference with various parameters.

**Methods:** Six hundred and sixty two (662) children with age group of 3-5 years were included in this study. Ethical clearance was obtained from the ethical committee. Prior consent from the parents of the children was obtained through the school. A letter for the consent was sent to parents through the school, and children with signed consent letter from parents were only included in the study. Age of the children was obtained from the school records. All the children of 3 -5 year age group with the complete set of primary teeth and devoid of any systemic diseases were included in the study. Child with grossly decayed teeth, missing teeth or any permanent erupted were excluded from the study. The children were divided into two groups, Group I - those between 3 and 4 years of age and Group II consisted of those children between the age of 4 and 5 years. They were divided in to two groups to determine if any significant difference is seen in development of occlusion age wise. Examination was carried out in a natural day light and the findings were recorded on specially prepared profoma. The following occlusal characteristics were recorded using standardized definitions<sup>3</sup>:

### 1. Molar relationship

- a. Flush terminal plane was recorded when the distal surfaces of primary maxillary and mandibular second molars lied in the same vertical plane.
- b. Distal-step molar relationship was recorded when the distal surface of primary mandibular second molar was distal to distal surface of primary maxillary second molar.
- c. Mesial-step molar relationship was recorded when the distal surface of primary mandibular second molar was mesial to distal surface of primary maxillary second molar.

### 2. Primary canine relationship

- a. Class I primary canine relationship was recorded when the cusp tip of the maxillary canine was in the similar vertical plane as that of the distal surface of primary mandibular canine.
- b. Class II primary canine relationship was recorded when tip of the maxillary canine was anteriorly placed to the distal surface of the primary mandibular canine.
- c. Class III primary canine relationship was recorded when the tip of the maxillary canine was posteriorly placed to the distal surface of the primary mandibular canine.

3. The degree of overjet was recorded from the palatal surface of the most protruded maxillary incisor to the labial surface of the mandibular incisor (fully erupted).

4. The degree of overbite was recorded by measuring the coverage of mandibular incisor by the maxillary incisor (fully erupted).

- a. Maxillary incisors cover half of the mandibular incisors.
- b. Maxillary incisors cover more than half of the mandibular incisors.
- c. Edge-to-edge relation.
- d. Anterior open bite.

5. Anterior crossbite was recorded when one or more of the maxillary incisors occluded lingual to the mandibular incisors.

6. Posterior crossbite was recorded when the buccal cusps of the upper molars lie in the opposing central fossa of the mandibular molars.

7. Scissor bite was recorded when the palatal surface of one or more upper molars rest laterally from the buccal surface of the mandibular.

The oral assessments were carried out by two independent examiners. Kappa value for inter-examiner reliability was 0.89%.

**Statistics:** All the data that were collected was analysed using SPSS (Software Statistical Package for Social Science) version 17 software (SPSS Inc., Chicago, USA). The proportions of occlusal traits among the group were compared by using the chi-square test. The p value of less than 0.05 was considered to be significant.

**Results:** Total 66 children were examined, out of which there were 373 children in group I and 289 children in group II.

Out of all the children, flush terminal plane was seen in 46.3% children on right side and 46.2% on left side.

Mesial step was seen in 50.4% children on right side and 50.6% on left side. Distal step was seen 3.17% children on both right and left side (Table 1). Mesial step molar relationship was found to be increasing with the age; however the age wise changes in molar relationship were not statistically significant.

Class I canine relation was seen in 78.8% children on right side and 78.2% on left side. Class II canine relation was seen in 20.3% children on right side and 20.6% on left side. Class III canine relation was seen in 0.7% children on both side. The difference between the groups was not significant statistically (Table 2).

Overjet was measured in millimetres. 42.7% children had overjet less than 1 mm, 47.7% children exhibited overjet between 1-3 mm and 9.2% children had overjet of more than 3 mm (Table 3).

The degree of overbite when analysed, it was seen that 51.6% children had normal overbite, 46.9% had increased over-bite, 1.2% had edge-to-edge relationship and 0.1% had open bite (Table 3).

The anterior crossbite was seen in 0.6% of children. Out of 373 children of group I cross bite was found in only 0.2% of children, while 1.03% children in group II exhibited anterior crossbite. The age wise changes were statistically insignificant (Table 3).

Posterior cross bite and scissor bite were assessed in both the groups however no positive findings were recorded in any of the group (Table 3).

**Table 1: Terminal molar relation in both the groups**

Group	Flush terminal		Mesial Step		Distal Step		Total
	Right	Left	Right	Left	Right	Left	
Group I	187 (50.1%)	185 (49.5%)	171 (45.8%)	173 (46.3%)	15 (4.02%)	15 (4.02%)	373 (100%)
Group II	120 (41.5%)	121 (41.8%)	163 (56.4%)	162 (56.05%)	6 (2.07%)	6 (2.07%)	289 (100%)
Total	307 (46.3%)	306 (46.2%)	334 (50.4%)	335 (50.6%)	21 (3.17%)	21 (3.17%)	662 (100%)

p value = 0.07(Not Significant)

**Table 2: Canine relation in both the groups**

Group	Class I		Class II		Class III		Total
	Right	Left	Right	Left	Right	Left	
Group I	283 (75.8%)	281 (75.3%)	88 (23.5%)	90 (24.1%)	2 (0.53%)	2 (0.53%)	373 (100%)
Group II	239 (82.6%)	237 (82.0%)	47 (16.26%)	47 (16.26%)	3 (1.03%)	3 (1.03%)	289 (100%)
Total	522 (78.8%)	518 (78.2%)	135 (20.3%)	137 (20.6%)	5 (0.70%)	5 (0.70%)	662 (100%)

p value = 0.08 (Not Significant)

**Table 3: Other occlusal traits relation in both the groups**

Occlusal Traits	Features	Group I (n = 373)	Group II (n = 289)	Total (n = 662)
Overjet	Less than 1 mm	42.0%	43.9%	42.7%
	1-3 mm	49.0%	46.0%	47.7%
	More than 3 mm	8.0%	10.0%	9.2%
Overbite	Overbite	51.4%	51.9%	51.6%
	Increased Overbite	46.1%	48.0%	46.9%
	Edge to edge	2.1%	0.0%	1.2%
	Open bite	0.2%	0.0%	0.1%
Anterior crossbite	present	0.2%	1.03%	0.6%
Posterior crossbite	present	0%	0%	0%
Scissor bite	present	0%	0%	0%

**Discussion:** Occlusal characteristics in primary dentition act as a predictor for permanent dentition<sup>1</sup>. The understanding of the changes that occur from primary to permanent dentition plays vital role in treatment planning.

In our study on population of Gujarati children it was seen that most of the children in group I exhibited the flush terminal plane (54.1%), while in group II mesial step was most commonly seen (56.1%). Flush terminal plane was seen in 46.3% children on right side and 46.2% on left side. Mesial step was seen in 50.4% children on right side and 50.6% on left side. Distal step was seen 3.17% of children on both right and left side. The results of our study was in accordance to study done by Hegde et al where mesial step was most

common, while least commonly observed molar relationship was distal step molar relationship<sup>4</sup>. Also Bahadure et al reported that 57.3% of children exhibited mesial step and 31.1% children showed flush terminal plane<sup>5</sup>. In a study done on Jordanian children of age group 2.5 to 6 years mesial step was more prevalent compared to flush terminal plane<sup>6</sup>. Contrary to results of our study, Nanda et al reported that 72% children exhibited flush terminal plane rather than mesial step<sup>7</sup>. Otuyemi et al also reported that 74.5% Nigerian children had flush terminal<sup>8</sup>. Findings in our study showed that there was increase in mesial step molar relationship with the increase in age which could be ascribed to forward growth of the mandible. Most of the children (78.5%) had class I primary canine relationship, while 20.5% had class II canine

relationship and 0.7% of children had class III canine relationship. Class II relationship was more prevalent in children with 3 years of age group than in the 5 year age group. However the difference was not statistically significant. The result of our study was in accordance to study done by Abu Alhaija and Qudeimat on Jordanian children<sup>6</sup> and by Hedgeet al<sup>4</sup> on Indian children where majority of children showed class I canine relationship. Prevalence of class II canine relationship was higher in English children (31.6%)<sup>9</sup> and Danish children (45%)<sup>10</sup>. Decrease in class II canine relationship with an increase in age could be due to termination of sucking habits which may be more prevalent in younger age group.

Overjet less than 1 mm was recorded in 42.7% of children. 47.7% children reported the normal overjet. 9.2% of children showed more than 3 mm of over jet, which was consistent with study done by Hedgeet al<sup>4</sup>. Normal overbite was recorded in 51.6% of the children. Anterior open bite was observed in only one (0.1%) child, which was similar to study done on preschool children of Mangalore by Bhatt et al<sup>11</sup>. Contradictory to the results of our study, 5.3% of Nigerian children reported anterior open bite as reported by Otuyemiet al<sup>8</sup>. Also 5% of black African children<sup>12</sup>, 11% of Finnish<sup>13</sup>, 8-11% of Saudi Arabian children<sup>3</sup>, and 5.7% of Jordanian children<sup>6</sup> reported anterior open bite. Reason that can be offered to explain this difference could be that sucking habits like pacifier sucking are more prevalent in western population compared to Indian population.

The prevalence of anterior crossbite in present study is 0.6%. Saudi<sup>3</sup> and English<sup>9</sup> population recorded anterior cross bite in 1.7% and 1.0% of population respectively. However it is lower than that reported in Finnish<sup>13</sup> and African-Americans<sup>14</sup>.

The prevalence of posterior crossbite was not found in present study. However it has been reported that Caucasian population exhibited higher prevalence of posterior crossbite than African and Asian populations<sup>3,8,10</sup>. However greater sample size may be needed to weigh the prevalence of posterior crossbite on Gujarati population.

Scissor bite was not recorded in any of the group examined. No cases were reported in study done by Farsi et al<sup>3</sup> on Saudi population.

**Conclusion:** The present cross sectional study concluded that flush terminal plane was more common in age group of 3-4 year, however with the increase in age the mesial step molar relationship was more dominant occlusal pattern. The study confirms that Class I primary canine relationship was most prevalent canine relationship. Also prevalence of anterior open bite is comparatively less as compared to other reported studies. Lower prevalence of anterior cross bite is suggestive of lesser sucking habits in Indian population. Also larger samples are required to assess the prevalence of posterior crossbite and scissor bite on Indian population.

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