

Prevalence of crossbite in primary dentition

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ABSTRACT

Introduction: Malocclusion, dental injuries, and dental anomalies in the primary dentition are conditions to take into account when considering the need for oral health care in young children. Occlusion means intercuspation of the upper and lower teeth when the jaws are not moving. Proper occlusion of teeth plays an important role in mastication, deglutition, speech, and respiration. **Materials and Methods:** This study includes a total population of 1481 children at age 3–6 years from 6 private schools and 5 government schools of Chennai. Examination of occlusion, molar relationship is done and data are recorded. The collected data are evaluated and analyzed. **Results:** A total of 1481 children from 6 private schools and 5 government schools from Chennai participated in this study. Among this population, 890 are males and 591 are females. Among total population, 67.5% were reported with malocclusion. Among the malocclusions, the following transverse problems were diagnosed: Unilateral posterior crossbite (20%), anterior open bite associated with posterior crossbite (7.79%), bilateral posterior crossbite (6.79%), unilateral posterior crossbite associated with anterior crossbite (7.09%), and full crossbite (5.99%). The mandibular functional deviation was observed in 59% of children with unilateral posterior crossbite. **Conclusion:** Dentofacial disorders that can cause esthetic and functional problems for the child and affect dentofacial growth and development can be detected during routine dental visits. Parents should be instructed to help their children to prevent the potential development of transverse malocclusions.

KEY WORDS: Eruption, Growth spurts, Habits, Malocclusion, Skeletal

INTRODUCTION

The primary dentition in children should be ideal in order so that during future adulthood, the children may exhibit normal dental features such as normal appearance, space, masticatory movements, and occlusion for the proper and healthy functioning of the permanent dentition.^[1] Primary teeth start to erupt at 6 months of age and complete their eruption at the age of 3 years. Eruption time of primary teeth is affected by several factors. Occlusion means intercuspation of the upper and lower teeth when the jaws are not moving. Proper occlusion of teeth plays an important role in mastication, deglutition, speech, and respiration.^[2]

Primary molar relationship (terminal plane) is the relationship of the maxillary and mandibular second primary molars in the vertical plane.

- Flush terminal plane: The distal surfaces of mandibular and maxillary primary second molars lie in the same vertical plane.

- Distal step: The distal surface of mandibular primary second molar is distal to that of the primary maxillary second molar.
- Mesial step: The distal surface of mandibular primary second molar is mesial to that of the maxillary primary second molar.^[3]

Crossbites are defined as any abnormal buccolingual relationship between opposing incisors, molar, or premolar in centric relation.^[4] A crossbite can be of dental or skeletal origin or a combination of both.^[5] Many factors may be implicated in the etiology of crossbite in children.^[6] The causative factors can be related to congenital, environmental, genetic, functional, or from oral habits.^[7] The early treatment aimed at promoting a better tooth/skeletal relationship, thus improving masticatory function and establishing a symmetrical condyle/fossa relationship.^[8] Habits and crossbites should be diagnosed and, if predicted not likely to be self-correcting, they should be addressed as early as feasible to facilitate normal occlusal relationships. Parents should be informed about the findings of adverse growth and developing malocclusions. Interventions/treatment can be recommended if the diagnosis can be made, treatment

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is appropriate and possible, and parents are supportive and desire to have the treatment done.^[9] Once the growth spurt completes, the mid-palatal suture progressively becomes more fused, heavier forces across the suture are required to produce maxillary skeletal expansion and may sometimes require surgical interventions thus earliest possible treatment would be favorable.^[10]

MATERIALS AND METHODS

Sample Characteristics

This study was carried out involving a random sample of 890 male and 591 female children aged 3–5 years enrolled at private and public schools in the city of Chennai, Tamil Nadu. The participants were selected from a total population of 1481 children in this age group. 18 of the 6 private schools and 5 government schools were randomly selected.

Eligibility Criteria

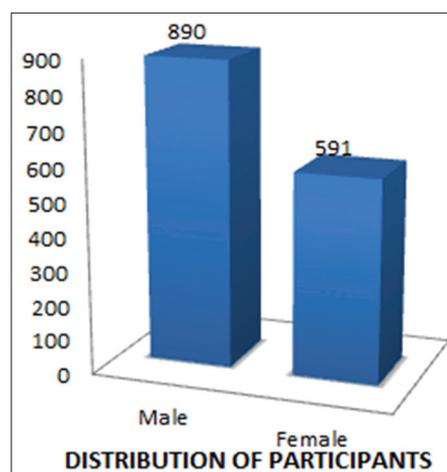
Inclusion criteria: Age 3–5 years; exclusively in the primary dentition phase; and agreement to participate in the clinical exam were included in the study. Exclusion criteria: Presence of at least one permanent tooth; loss of mesiodistal diameter due to caries; previous orthodontic treatment; and refusal to participate in the clinical exam were excluded from the study.

Data Collection

Clinical examination was performed. Packaged and sterilized disposable dental mirrors and dental gauze (to dry the teeth) were used for the examination. Aspects of crossbite were recorded. Radiography was not used for the diagnosis. The collected data were analyzed and tabulated in the form of a graph.

RESULTS

A total of 1481 children from 6 private schools and 5 government schools participated in this study. Among the total participants, 890 were male and 591 were female [Graph 1]. Of these 480 children were recorded with normal occlusion. Among these 480 children with normal occlusion, almost 310 were male and 170 were female. Almost 1001 children were recorded to be with some kind of malocclusion among the total participants [Chart 1]. Among the malocclusions, the following transverse problems were diagnosed: Unilateral posterior crossbite (20%), anterior open bite associated with posterior crossbite (7.79%), bilateral posterior crossbite (6.79%), unilateral posterior crossbite associate with anterior crossbite (7.09%), and full crossbite (5.99%). The mandibular functional deviation was observed to be 59% of children with unilateral posterior crossbite, characterizing the functional unilateral posterior crossbite [Table 1 and Graph 2].



Graph 1: Distribution of participants

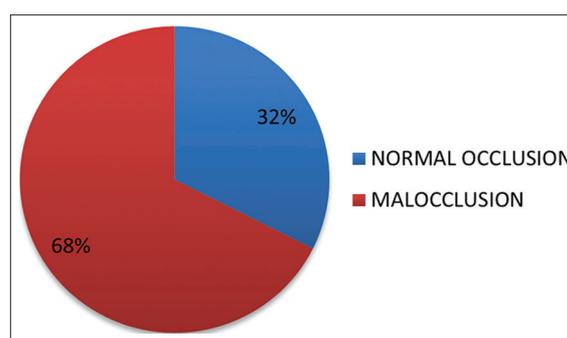


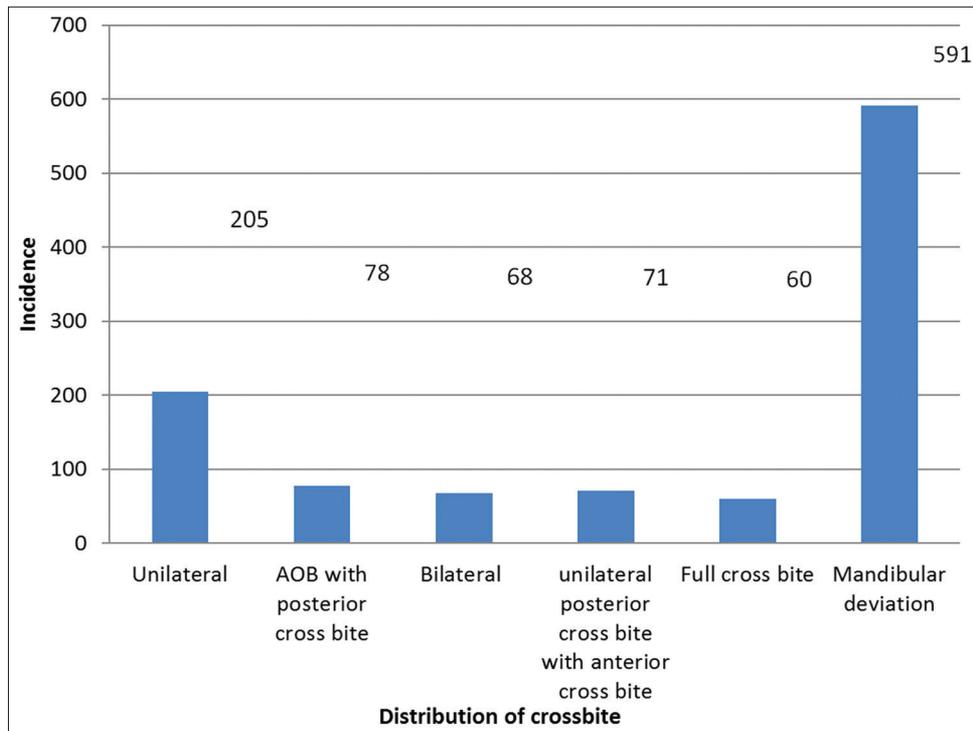
Chart 1: Distribution of malocclusion

Table 1: Percentage of the distribution of crossbite

Distribution of crossbite	Incidence (%)
Unilateral	205 (20)
AOB with posterior crossbite	78 (7.79)
Bilateral	68 (6.79)
unilateral posterior crossbite with anterior crossbite	71 (7.09)
Full crossbite	60 (5.99)
Mandibular deviation	591 (59)

DISCUSSION

This study was conducted to evaluate the prevalence of crossbite in primary dentition involving children of age 3–6 years. In this study, it is determined that normal occlusion was observed in 32.41% of the sample, 67.58% of children presented some type of malocclusion. Among the malocclusions, the following transverse problems were diagnosed: Unilateral posterior crossbite (20%), anterior open bite associated with posterior crossbite (7.79%), bilateral posterior crossbite (6.79%), unilateral posterior crossbite associate with anterior crossbite (7.09%), and full crossbite (5.99%). The mandibular functional deviation was observed to be 59% of children with unilateral posterior crossbite, characterizing the functional unilateral posterior crossbite.



Graph 2: Distribution of crossbite

The incidence of different types of crossbite such as unilateral crossbite, bilateral crossbite, unilateral posterior crossbite with anterior crossbite and full crossbite were higher than a study done by da Silva *et al.* in which normal occlusion was observed in 26.74% of the sample; thus, 73.26% of children presented some type of malocclusion. Among the malocclusions, the following transverse problems were diagnosed: Unilateral posterior crossbite (11.65%), anterior open bite associated with posterior crossbite (6.99%), bilateral posterior crossbite (1.19%), unilateral posterior crossbite associate with anterior crossbite (0.79%), and full crossbite (0.19%) totalizing 20.81% of the transverse problems. The incidence of mandibular deviation was observed less than da Silva *et al.* in which the incidence of mandibular functional deviation was observed in 91.91% of children with unilateral posterior crossbite, characterizing the functional unilateral posterior crossbite.^[11] More importantly from a clinical perspective, the present study reported a relatively high prevalence of crossbite among children than Miotto *et al.* in which the prevalence of crossbite was of 16.2%.^[12] AOB and PC may require professional assistance during the primary dentition stage in the form of counseling which may or may not be combined with interceptive orthodontic treatment. Some form of intervention is often required to prevent dentoskeletal alterations and eliminate perpetuating factors that affect swallowing and speech, such as interposition of the tongue between the incisors.^[13]

In a study done in Iran, the posterior crossbite percentage recorded was 2.3 which is comparatively

less than our study and the study showed that it was female gender predominantly.^[14] In another study, the crossbite was noted to be 11.7% of the overall subjects they examined. This study has also noted various other forms of malocclusion possible among primary dentition.^[15] A study done to correlate the habits with malocclusion showed that digit sucking was most reported habit that commonly causes malocclusion.^[16] A study done in Saudi Arabia showed that the prevalence of posterior crossbite was 4%.^[17] The prevalence of posterior crossbite between many cultures might be due to the differences in the prevalence of sucking habits to some extent and which was found to be lower among Saudi children^[18] than among children in Western nations.^[19] Correction of functional posterior crossbite in the mixed dentition as early as possible after diagnosis has been recommended. If left untreated can have deleterious effects on the development and functions of the TMJ's.^[20]

CONCLUSION

Many studies were conducted on dental occlusion in different communities. Ethnic, behavioral, and nutritional differences have also been assessed. Our study showed that many malocclusions need to be treated at early ages such as crossbite, mandibular functional deviation, and anterior open bite. Special attention should be paid to occlusion of primary dentition since timely diagnosis and treatment may obviate future complications. Habits and crossbites should be diagnosed and, if predicted not likely to

be self-correcting, they should be addressed as early as feasible to facilitate normal occlusal relationships. Parents should be informed about the findings of adverse growth and developing malocclusions. Interventions/treatment can be recommended if the diagnosis can be made, treatment is appropriate and possible, and parents are supportive and desire to have the treatment done.

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