Type of study: Original Research

Prevalence of Anterior Crossbite in Children Visiting A University Hospital in Chennai - A Retrospective Study

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Abstract

Anterior crossbite is a common malocclusion in early mixed dentition.Teeth with proper occlusion plays an important role in speech, mastication, deglutition. Determining its prevalence is important for early correction. The objective of the study was to assess prevalence of anterior crossbite in children visiting university hospital Chennai. A sample of 4355 patients of age 6-13 years visiting the hospital were taken. We reviewed patients records, analysed data of 7415 patients between June 2019 to March 2020 and clinical findings are recorded.The data is then tabulated in microsoft excel. Chi square test is used for comparison of groups. The data is analysed with the help of SPSS software.In this study we observed that 3.7% of the total patients showed incidence of anterior crossbite. Prevalence of anterior crossbite is observed to be more in age groups between 10-13 years followed by 6-9 years. Within the limitations of the study, 3% of the children visiting university hospital have anterior crossbite.

Key words: *Anterior crossbite , class I, Class II, Class III, Malocclusion, Children*

Introduction

Anterior crossbite is a typical malocclusion and it is generally evident in early mixed dentition. Salzman defined anterior cross bite as the lingual placement of maxillary incisors in relation to the opposing mandibular teeth when both arches are in centric occlusion [1]. Clinically anterior crossbite presents with reverse overjet, premature bite leading to displacement of anterior cross bite, gingival recession along with mobility of anterior tooth associated with crossbite [2].

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A crossbite can be of dental or skeletal origin or a combination of both [3]. Crossbite of all incisors is rare except the patients with class3 jaw relation [4]. Factors like lingual eruption of incisors, retained deciduous incisors ,crowding, trauma are reported as causes of anterior crossbite [5]. Previous studies show that prevalence of anterior crossbite is 7-10% in children with mixed dentition [6]. Survey in Iraq reported that prevalence of anterior crossbite is about 5.5% [7]. A recent study reported the prevalence of anterior cross bite is 7.09% in age group between 3-5 years.

Treating anterior crossbite is essential in primary and early mixed dentition,irrespective of skeletal or dentoalveolar origin [8]. Correcting anterior crossbite in the earliest will eliminate displacement of mandible ,further complications and centric relationship is obtained [9]. If anterior crossbite is neglected it leads to abrasion of labial surfaces of upper anteriors, causing damage to overall periodontal health [5,9].Therefore,early rectification of anterior crossbite will eliminate complications.

Anterior crossbite is the major esthetic concern which results in various skeletal and dental deformities, if left untreated. As a child grows their crossbite has an impact on social and emotional well-being. Children with anterior crossbite are prone to caries due to improper occlusion there is accumulation of food and bacteria, to minimise optimum concentration of fluoride is necessary to prevent caries, where as imbalance in the concentration of fluoride causes increased caries incidence and skeletal problems [10,11]. Chewable toothbrush can be used as an alternative to manual toothbrush to remove plaque especially in children [12]. Evaluation of malondialdehyde (MDA) level in saliva helps in detection of caries, it is known that children with caries have a high level of MDA in saliva [13] .

Anterior crossbite if left untreated it leads to abrasion of teeth which in turn leads to sensitivity and ultimately pulp exposure of teeth. Restorative treatment for caries should be advised before proceeding to orthodontic treatment. Pulpectomy is the commonly performed treatment to save the primary tooth in the cases of deep caries and pulp exposure [14]. Rotary instrumentation in primary teeth results in marked decrease in instrumentation time and improves obturation quality[15]. kedo-S paediatric rotary file is used for pulpectomy procedures in primary tooth due it's uniform and predictable quality of obturation [16,17,18].Obturation is more convenient with rotary than manual obturation [17,19]. There is a need to attain extensive knowledge on the use of rotary file to perform pulpectomy procedures in primary teeth [20].

Many studies were done on dental malocclusion in various communities. Ethnic,behavioural, and nutritional variations have likewise been assessed.There is extensive variation in figures acquired by researchers as different researches have followed different criteria for surveying the occlusal characteristics [5,9,21]. This laid emphasis on the need to standardize criteria for surveying malocclusion.The current study spread awareness and helped in Understanding prevalence of anterior crossbite in chennai population.

Management of dental traumatic injuries of primary tooth carry major importance in terms of preventing malocclusion in early stages [22]. Thorough examination of soft and hard tissues of oral cavity plays a vital role in treating malocclusion [23,24]. Dental negligence in children is the failure of a parent or guardian to meet the child's principal oral health care needs [25].Information on prevalence if anterior crossbite is necessary for early intervention and prevention of further skeletal discrepancies and the above stated dental diseases from occurring. The current study aims to assess the Prevalence of anterior crossbite in children visiting a university hospital in Chennai.

Materials and Methods

This retrospective study examined the records of patients from 01 june 2019 to 31st march 2020 who visited saveetha dental college and hospital. Ethical approval was taken from the institutional review board/ SDC/SIHEC/DIASDATA/0619-0320. The study population included patients with age ranging between 6-13 years. The study sample included both male and female gender, predominantly south indians.

The study population was 7415 pediatric patients who visited university hospital. Sample size was 4355 pediatric patients in which 187 patients in the hospital database were diagnosed with crossbite. The necessary data such as age, gender, type of cross bite, molar relation was recorded. Incomplete patient records were excluded.Data was recorded in Microsoft Excel and exported to the statistical package of social science for windows (SPSS) and subjected to statistical analysis. Chi square tests are used for comparison of groups.

Results and Discussion

The study sample consisted of 4355 patients, about 2070(47.5%) of children belonged to the age group between 6-9 years and 2285 (52.5%) of children belonged to the age group between 10-13 years (Graph -1). Among 4355, 2389(54.9%) of the children were boys and 1966(45.1%)of the children were girls (Graph -2).

Among patients 4355 patients one hundred twenty nine (2.96%) had anterior crossbite, 58 (1.3%) were anterior crossbite with posterior crossbite and 4168 (95.7%) with No crossbite (Graph -3).

Children in group 6-9 years showed incidence of anterior crossbite(1.17%), 0.39% were anterior and posterior crossbite and 45.97% no crossbite. In the

age group between 10-13 years incidence of anterior crossbite is 1.79% followed by anterior and posterior crossbite (0.94%) and 49.74% of children had no crossbite (Graph-4).

Anterior crossbite In relation to gender when analysed showed girls with incidence of 1.58% of anterior crossbite, 0.48% showed anterior crossbite along with posterior crossbite and 43.8% accounts for No crossbite. In males, 1.38% showed incidence of anterior crossbite, 0.85% showed both anterior and posterior crossbite, 52.63% with no crossbite (Graph -5).

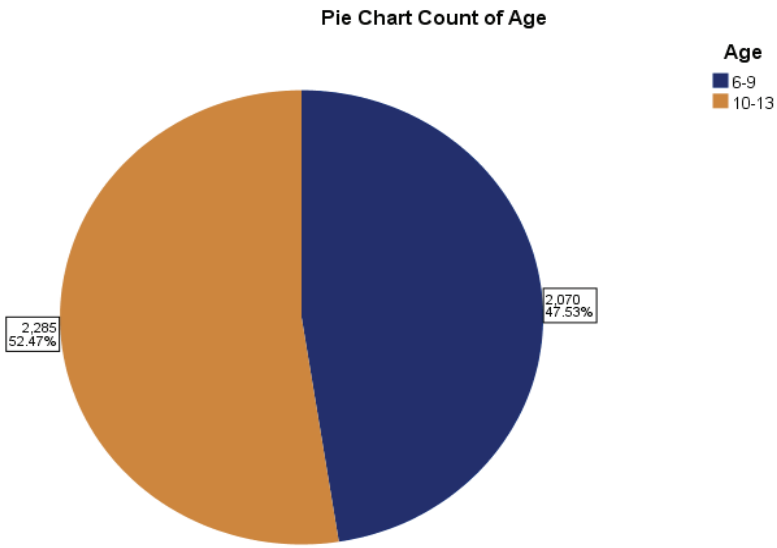
This study found that of 4355 patients attending the university hospital ,3.7% had anterior crossbite.The results of anterior crossbite are similar to the results of other studies conducted in Asian region[26],[27]among the anterior crossbite patients The percentage of males is 2.5% and females is 3.5% This findings were similar to that reported among school children in Brazil[28]. This shows contrast result with the study performed children in kerala[29]

Among the recorded crossbites,58(1.3%) were anterior cross with posterior crossbite and with a finding of 95.7% no crossbite cases. According to Dacosta et al.reported that 14.3% had coexisting of posterior crossbite which is not similar to the study it may be due to the small sample size of 85 and the patients with no crossbite is not included in the study[30]. The majority of the patients presenting with anterior crossbite have class 1 molar relation. This finding is in ag
of other studies [31] [32]

The present study showed that anterior crossbites were significantly more frequently occurring than posterior crossbites.These findings concur with findings of dacosta[30] Adegbite and Nnachetta[33,34] in prevalence studies on Nigerian school children.According to results of this study incidence of crossbite is prevalent.This study serves as a step for planning necessary preventive, interceptive measures and helps in early correction of the malocclusion. This study provides baseline data enabling the dental practitioners to plan their treatment to avoid compromising the prognosis for later orthodontic treatment and even encourages development of normal occlusion.

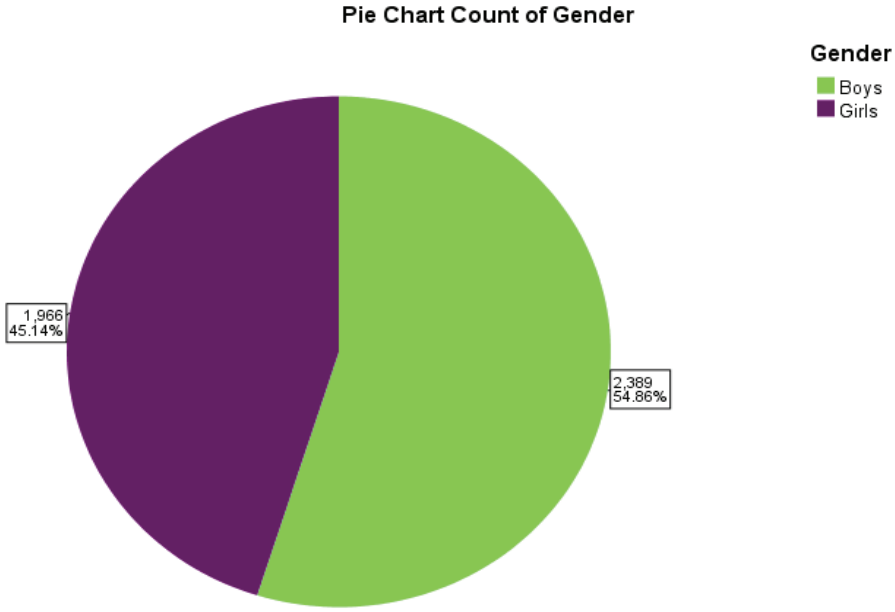
This study is limited as it has only recorded malocclusion in the age group of 6-13 years which cannot be generalized to the entire population. Besides, orthodontically treated cases were not included which can underestimate the commonness of occlusal characteristics. Subjects are not available for direct examination.The examination is fairly based on photographs and case sheets available in the DIAS.

Further research is needed as anterior crossbite is a major esthetic and functional concern. Study can be extended for further diagnosis and treatment planning. Proper counselling on awareness of early correction is required.Thus the study serves as an evidence and adds to the consensus that can be utilised for further studies at the larger population and clinical studies.

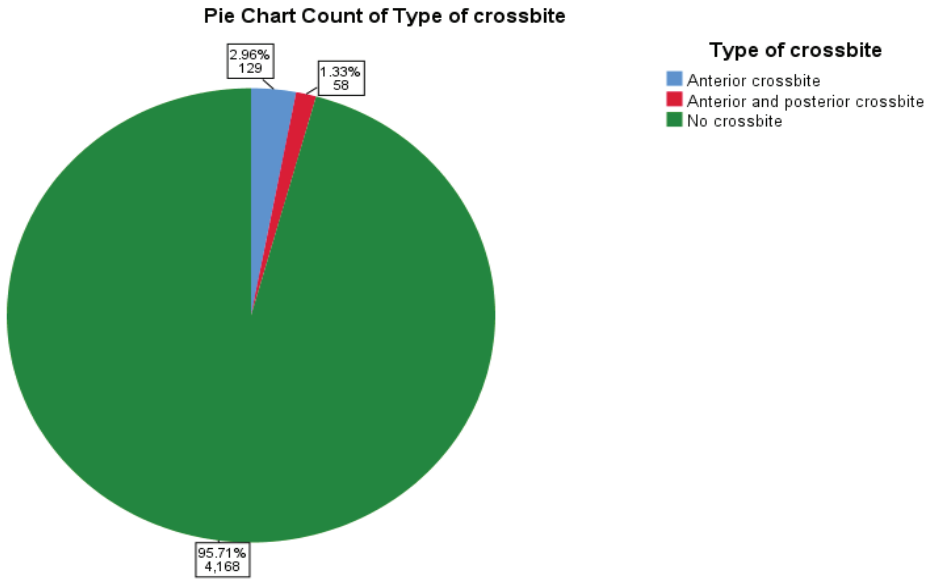


Graph 1 : Pie chart showing age distribution of

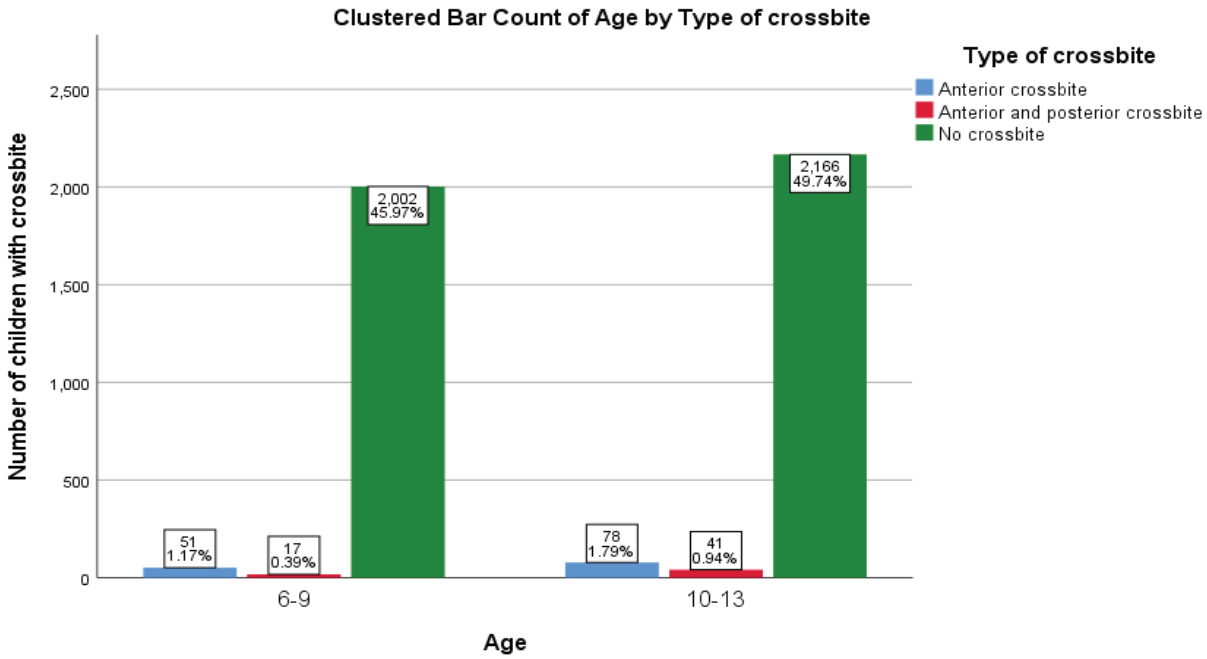
children in sample population. Dark blue colour denotes children of age group between 6 to 9 years and brown colour denotes children of age group between 10 to 13 years. 52.47% of the children belonged to the age group of 10 to 13 years and 47.53% of the children belonged to age group between 6 to 9 years.



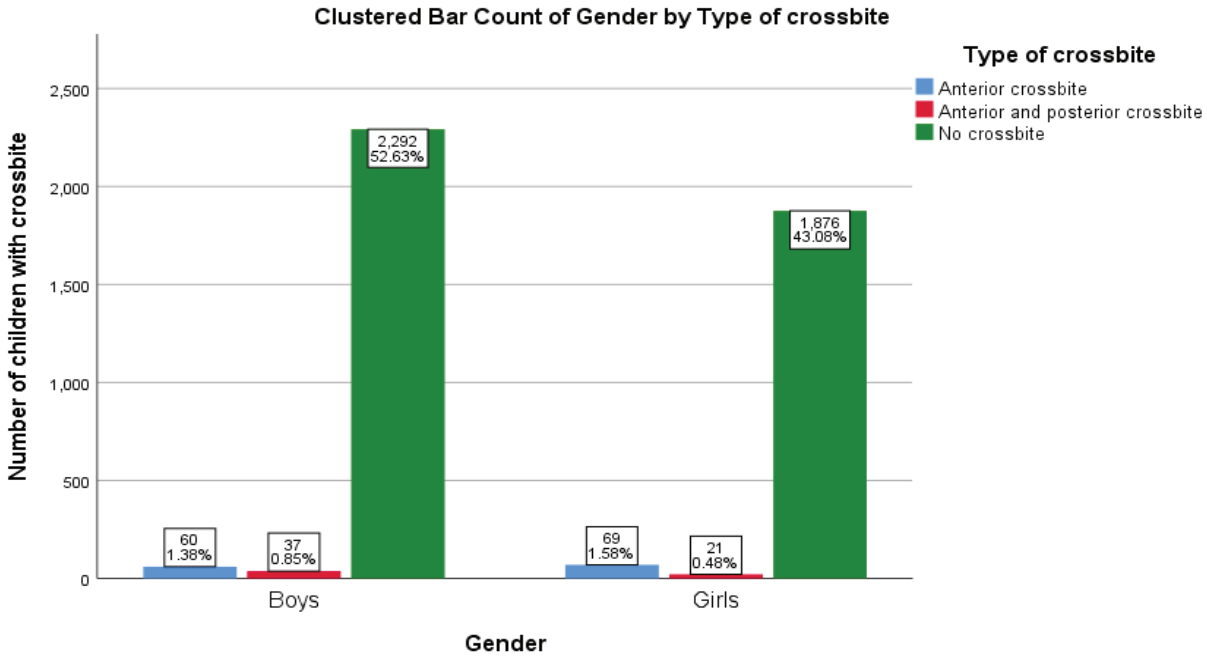
Graph 2 : Pie chart showing gender distribution of children in sample population. Light green colour denotes boys and purple colour denotes girls. 54.86% of the children were boys and 45.14% of the children were girls.



Graph -3 : Pie Chart showing prevalence of type of crossbite in study population where blue colour denotes anterior crossbite, red colour denotes anterior and posterior crossbite and green colour denotes no crossbite. Prevalence of anterior crossbite was 2.96%.



Graph 4: Barchart shows the association between various age groups and types of crossbite.X axis represents age group and Y axis represents frequency distribution of type of crossbite. Blue colour denotes anterior crossbite, red colour denotes anterior and posterior crossbite and green colour denotes no crossbite. The occurrence of anterior crossbite in children was more in age group between 10 to 13 years. Chi square test was done and the association was found to be significant. (p value = 0.003 <0.05 statistically significant).



Graph -5: Barchart showing association of types of crossbite with gender. X axis represents gender and Y axis represents frequency of type of crossbite. Blue colour denotes anterior crossbite, Red colour denotes anterior and posterior crossbite and green colour denotes no crossbite. There was no difference in the type of crossbite between boys and girls. Chi square test was done and the association was found to be not significant.(p value was =0.063 p>0.05 statistically not significant).

Conclusion

Within the limits of this study, we observed that 2.96% of the total patients showed prevalence of anterior crossbite. Anterior crossbite is observed to be more incident in the age group 10-13 years followed by 6-9 years. It is considerably significant to the dental specialist to examine the early signs of malocclusion particularly during developmental stage because of consistent occlusal changes that occur during the early growth of children.

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Ethical Clearance: It is taken from "Saveetha Institute Human Ethical Committee" (Ethical Approval Number- SDC/SIHEC/2020/DIASDATA/0619-0320)

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