

PREVALENCE OF POSTERIOR CROSSBITES IN SUBJECTS WITH CLASS II MALOCCLUSION

Baala vignesh.A¹, Ravindra Kumar Jain²

¹Undergraduate student, Saveetha Dental college and hospitals, Poonamallee, Chennai-600077

²Department of Orthodontics, Saveetha Dental college and hospitals, Poonamallee, Chennai-600077

[¹ravindrakumar@saveetha.com](mailto:ravindrakumar@saveetha.com)

[²baalavignesh9@gmail.com](mailto:baalavignesh9@gmail.com)

ABSTRACT

Crossbite is the discrepancy in buccolingual relationship between the upper and lower teeth involving skeletal or dental components. Cross bites can be anterior or Posterior and skeletal or dental and unilaterally present or bilaterally present. Posterior crossbites as and when identified should be corrected since they are known to cause growth impairment. This study was done to report the prevalence of posterior crossbites and gender association in class II malocclusions. This retrospective study was done on case records of the patients who had reported to the orthodontic department, saveetha dental college, in the past 8 months. 1016 class II malocclusion case records in the age range 12-40 yrs were selected for the study, presence of posterior crossbites was evaluated in them and the frequency of crossbites was tabulated and statistical analysis was done in SPSS. The study showed that the overall prevalence of posterior crossbite in class II malocclusions was 3.8 %. single tooth crossbites(73.7%) were more common than multiple teeth crossbite(26.3%). No gender association for posterior crossbites was noted. In conclusion the present study reports a prevalence of 3.8% for posterior crossbites in class II malocclusion and there was no significant gender association.

Key words: Age; Class II Malocclusion; Crossbite; Overjet; Overbite.

INTRODUCTION

Crossbite is defined as any discrepancy in buccolingual relationship between upper and lower teeth. (Gossman, Palla and N, 2020) Posterior crossbites are buccal crossbites and they can be either unilateral or bilateral. Posterior crossbites are inadequate transversal relationships in the maxillary and mandibular teeth. (DaCosta and Utomi, 2011) This malocclusion should be corrected at a younger age as it might affect the facial development and the treatment involves expansion of the arches and movement of arches. (Sollenius, no date) The etiological factors that are seen in posterior crossbites are presence of a narrow palate, lingually tipped molars and vertical growth pattern. (Rubika, Sumathi Felicita and Sivambiga, 2015) Posterior crossbites are sometimes associated with narrow transverse dimensions of the face. (Felicita, Chandrasekar and Shanthasundari, 2012; Krishnan, Pandian and Kumar, 2018) The treatment for crossbites involves improving the tooth or skeletal relationship with the arches. (Almeida *et al.*, 2012) (Felicita and Sumathi Felicita, 2018) The evaluation of posterior crossbites involves dental, functional, profile and cephalometric analysis and evaluation. (Chibinski and Czlusniak, 2011) Following the evaluation the treatment involves the usage of various correction appliances like the use of coffin springs, quad helix, maxillary expansion, fixed orthodontic appliance and cross elastics. (Cameron *et al.*, 2002) The treatment protocol and various factors make it difficult for the dentists to determine the indications of crossbite and class 2 malocclusions has shown high

prevalence of posterior crossbites.(Agostino *et al.*, 2014) Posterior crossbites were mainly corrected by arch expansion methods and the surgical alteration of the mid palatine suture.(Viswanath *et al.*, 2015; Krishnan, Pandian and Kumar, 2018) Posterior crossbites can also be corrected with mini-implant anchorage.(Jain, Kumar and Manjula, 2014; Sivamurthy and Sundari, 2016; Felicita, 2017b; Vikram and Raj Vikram, 2017) The prevalence of class II malocclusions is high and the treatment protocol should be aimed at attainment of adequate overbite and overjet .(Harrison and Ashby, 2001) Thus, this study was done to report the prevalence of crossbite in class II malocclusions.

MATERIALS AND METHODS

The study was done using the case records of patients who visited saveetha dental college in the last 8 months. The large pooled data was a flexible form of data that was retrieved from the patient data retrieval software of saveetha dental college. 1016 class II malocclusion case records in the age range 12-40 yrs were selected for the study, presence or absence of posterior crossbites, number of teeth involved in crossbite was evaluated in them and the frequency of posterior crossbites was tabulated and statistical analysis was done in SPSS. The study was not a randomised study and has been approved by the institutional ethical committee board, saveetha dental college. Internal and external validity was applicable to this study. Cross verification of data was done with the help of photographs taken while examination of patients.

The collected data was tabulated with the help of the statistical software IBM SPSS version 20.0. The dependent variables for the study were crossbite prevalence and number of teeth involved in cross bite and the independent variables were age and gender. The type of analysis used for the study was descriptive and chi square association test was performed.

RESULTS AND DISCUSSION

The study showed that the overall prevalence of posterior crossbite in class II malocclusions was 3.8%.(fig1) The study also showed that the posterior crossbites was more prevalent in the males when compared to women. Males showed 63.2% incidence whereas females showed only 36.8% incidence.(fig 2) Most of the population showed prevalence of single tooth crossbite with a frequency of 73.7% to multiple teeth crossbite which had a frequency of 26.3%.(fig 3) correlation studies between gender and the involvement of crossbites showed that single tooth crossbites in males was the most prevalent($p>0.5$), but there was statistical significance.

Discussion

According to the present study males had a higher prevalence of crossbites and single tooth crossbites were more common in the population studied but these findings were not statistically significant.. Crossbites are a major burden in the younger population that requires immediate correction once identified in the dental arch. Thus it is important to understand and acquire knowledge about the prevalence of crossbites in the population studied. The study was conducted in a hospital set up in a metro city where people of different ethnicity report for treatment. The study reported a higher prevalence of posterior crossbites in males and single tooth crossbites were more common than multiple tooth crossbites but there was no statistical significance as the p value was >0.05 .

Ciuffolo, et al, stated that class II malocclusions have a good prevalence rate for the of crossbites.(Ciuffolo *et al.*, 2005) The incidence of posterior crossbites showed increased prevalence and incidence in the male population. This evidence was correlated and taken into account for clinical practice. Mutlu, et al in his study stated that, it is evident that crossbite was prevalent in adolescents and children because of personal habits like thumb sucking, tongue thrusting, etc.(Mutlu *et al.*, 2019) This results in the formation of asymmetric dental arches in children. Kamisetty,et al said that, the correction of the cases involves the stopping of the habit with the help of habit breaking appliances, and interceptive treatment involving correction of the crossbite using appliances.(Kamisetty, 2015) Limerira, et al stated that the breastfeeding of children until the age of 18

months is also a reason for the reduced incidence of crossbites in children.(Limeira *et al.*, 2014) Akthar, et al the prevalence of crossbites was present in the developing period of tooth and in primary dentition with a prevalence rate of 8-22%. (Akther and Hossain, 2019)

The incidence of single tooth in crossbite was more prevalent (29.8%) to the involvement of multiple teeth in crossbites, this correlates with our study. This study showed that single teeth crossbite was more prevalent in the buccal posterior crossbites.(Dinesh and Saravana Dinesh, 2013) Kumar, et al stated that crossbites was mostly prevalent due to the nutritive habits and personal sucking habit and orofacial functions of the individual.(Kumar *et al.*, 2011) felicita, et al stated that there are various factors like genetics, habits and nutrition that control the prevalence of crossbites in an individual.(Felicita, 2017a)(Samantha, 2017) Also 79.4% of malocclusion defects occur in children during their mixed dentition period.(Akther and Hossain, 2019) Gois, et al stated that the eruption time of the first molar plays an important role in the occlusive status of the oral cavity and was also more prevalent in the male population than the female population.(Góis *et al.*, 2012)(Pandian, Krishnan and Kumar, 2018).

The overall consensus agrees with the present study, and the evidence from these studies are adopted in clinical practice. This study was a single centre study and the difference in correlation in the ethnicity can lead to unclear data and thus a different set of population was included. The further scope of this study involves larger sampling size and the improvements in knowledge and better methods for the identification of malocclusions. The identification is to be made easier leading to better diagnosis of posterior crossbites and their associated temporomandibular joint disorders. They are diagnosed and the easier and effective mode for diagnosis is adopted in clinical practice. This can lead to better orthodontic rehabilitation with the correction of crossbite and malocclusion, achieving adequate arch width, overjet, overbite and jaw and dental relations are adopted.

CONCLUSION

Within the limits of the study, the prevalence of posterior crossbite was 3.8% and there was no gender predilection for the prevalence of posterior crossbites in class II malocclusion .

AUTHOR CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTEREST: nil

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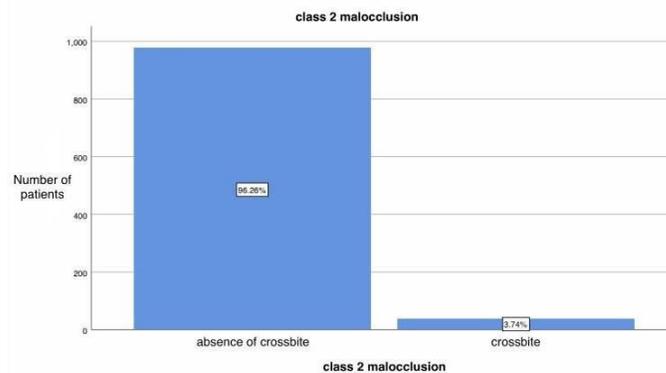


Figure 1- represents the bar chart of overall prevalence of posterior crossbite in class II malocclusions. X axis- describes the frequency of crossbites in class II malocclusions. Y axis- describes the presence or absence of crossbite. Absence of crossbite was reported in 96.26% patients with class II malocclusion and presence of crossbite was reported in 3.74% patients with class II malocclusion.

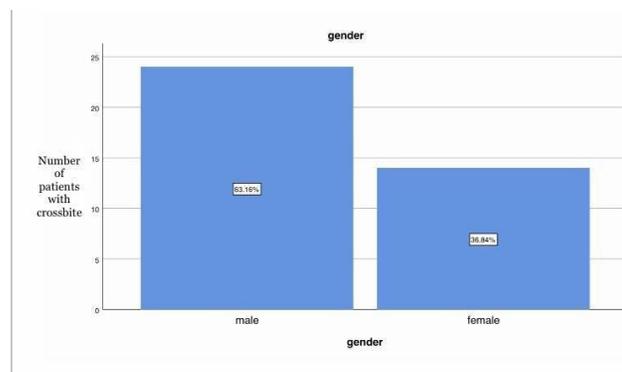


Figure 2- bar chart representing gender frequency of posterior crossbites in class II malocclusions. Y axis describes the number of patients with crossbite. X axis describes the gender. Males reported a frequency of 63.16% and females reported 36.84% for the incidence of posterior crossbites in class II malocclusion.

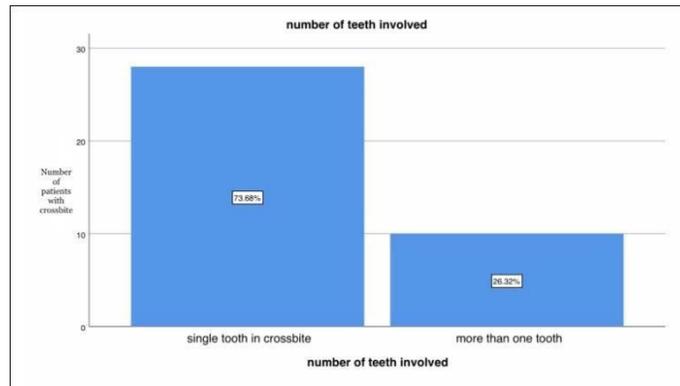


Figure 3- Describes the frequencies of the number of teeth involved in crossbite. X axis describes the number of teeth in cross bite. Y axis describes the number of patients with crossbite. 73.68% of the patients reported with single tooth crossbites and 26.32% reposted with multiple teeth crossbites.

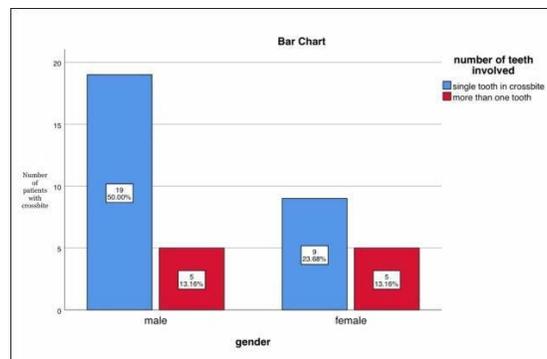


Figure 4- Bar chart representing the association of gender with the number of teeth involved in crossbite. X axis- describes the gender and the number of teeth involved in crossbite. Y axis- shows the number of patients with crossbite. Males had more prevalence for single tooth crossbites. Chi square test was done and there was no statistical significance. Pearson chi square value-1.01 $p=0.315(p>0.05)$ not significant. Hence gender is not associated with the number of teeth involved in crossbite.