Original Article

PREVALENCE AND ASSOCIATION OF ANTERIOR OPEN BITE SEVERITY WITH SAGITTAL MALOCCLUSION AMONG DRAVIDIAN SUBJECTS

Jagadheeswari Ramamoorthy[1], Dr. Ravindra Kumar Jain[2*], Dr. Arya S Prasad[3]

[1]Saveetha Dental College & Hospitals Saveetha Institute of Medical and Technical Sciences Saveetha University, Chennai 77.
[2*]Professor, Department of Orthodontics, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and technical Sciences, Saveetha University, Chennai 77.
[3]Senior Lecturer, Department of Orthodontics, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and technical Sciences, Saveetha University, Chennai 77.

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Abstract

Aim: To study the association of open bite severity with sagittal malocclusion in Dravidian subjects

Background: A developmental or acquired malocclusion in which there is no vertical overlap between the maxillary and mandibular anterior or posterior teeth is known as an open bite. Open bite severity can be influenced by the growth pattern and the type of malocclusion

Materials and methods: This is a cross-sectional retrospective study undertaken at a university. The data of patients with open bite was retrieved from the case sheets of patients.The necessary data such as Age, Gender, Severity of open bite as assessed on photographs and the type of malocclusion associated were collected and tabulated in Excel. For statistical analysis, the tabulated data from Excel was imported into SPSS version 23.0. (Descriptive statistics and chi square tests)

Results: 30% of patients had mild open bite, 36% of patients had moderate open bite and 34% of them had severe open bite. A significant association between severity of Anterior open bite and age group was noted. Children were more likely to have a severe anterior open bite, whereas adults had a moderate open bite. More females presented with anterior open bite and males presented with moderate open bite but no significant difference was noted. Severe anterior open bite was most prevalent among patients with Class 2 malocclusion.

Conclusion: We concluded that there was no significant relationship between open bite severity and sagittal malocclusion within the parameters of the study. However, a statistically significant relation was discovered between the severity of open bite and the age group of patients.

Keywords: Malocclusion, open bite, prevalence, gender

Introduction

Open bite malocclusion is defined by a lack of vertical overlap between the maxillary and mandibular teeth in a vertical plane (1). This space is usually visible between teeth and may affect the aesthetics and function of the patient. When the posterior teeth of maxillary and mandibular jaws are completely in contact, the maxillary and mandibular anterior teeth are not in occlusion then it is called an anterior open bite(2). The prevalence of open bite varies among different populations(3). In some patients, open bite may also affect speech and treatment for this condition restores speech of the patient(4). The etiology of anterior open bites, according to Dawson, includes

habits such as thumb sucking, pacifier use, tongue thrusting, lip biting, and any obstruction of the airway caused by swollen tonsils and adenoids, as well as skeletal growth anomalies (5). A dental or skeletal disparity, or a combination of the two, can cause an open bite (6). Open bite resulting from a skeletal discrepancy is referred to as skeletal open bite, long-face pattern, or vertical growth. Open bites and craniofacial malformations are far more difficult to treat, and they frequently recur (7).

One of the most challenging dentofacial abnormalities to correct is an open bite. Proper treatment planning and biomechanics is essential to achieve a stable result. The various treatment modalities for open bite include removable/fixed functional appliances, surgeries, head gears, bite blocks etc(8). Extrusion of the anterior teeth or intrusion of the posterior teeth are used to treat an anterior open bite (9).

According to some earlier studies, an open bite measuring more than 2 mm affects less than 1% of the population, with black people having a five-fold higher prevalence than white people (10). Anterior open bites were reported to be present in 1.5 percent to 11 percent of people. It also varies depending on dental age and race (10,11). The prevalence of anterior open bite can reach up to 18.5 percent during the mixed dentition phase, however it decreases with age.

Our team has a plethora of research and information that has resulted in high-quality publications (12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23) ,(24–28) (29),(30),(31) The aim of the study is to assess the prevalence of anterior open bite and study its relationship to the patient's sagittal skeletal malocclusion.

Materials and Methods

This is a cross-sectional retrospective study undertaken at a university. The current study received ethical approval from Saveetha University's Institutional Review Board. The data for patients with an open bite and the type of sagittal malocclusion were taken from their case sheets. The required data from September 2019 to March 2021 were collected and reviewed. The criteria for inclusion for the study were patients belonging to the age group 10-40 years with anterior open bite and those who had undergone previous treatments for open bite. Exclusion criteria include periodontally compromised patients, open bite due to missing teeth, trauma, pathology, subjects on prosthesis and subjects undergoing fixed appliance treatment. In this study, open bite was classified according to severity given by Proffit. 0 to -2mm open bite is classified as mild, -3mm to -4mm is classified as moderate and greater than -4mm is classified as severe open bite(32).

The necessary data about age, gender, open bite severity and the category of sagittal malocclusion among the patients with open bite were collected and tabulated in Excel. The data was cross verified by the first author. For statistical analysis, the collected data from Excel was imported into SPSS version 23.0. The data was represented by the means of bar graphs and the statistical tests used were Chi square and correlation analysis. The association of open bite severity and its association with type of sagittal malocclusion, age and gender was analyzed.

Results

A total of 1650 patient case documents were screened in this investigation. One-fifth of the patients had an anterior open bite. Prevalence of open bite in the population studied was found to be 3.09%. There were 46 percent men and 54 percent females among the 51 patients with anterior open bites 52 percent adults and 48 percent children . Based on severity of open bite, 30% of patients had mild open bite, 36% of patients had moderate open bite and 34% of them had severe open bite. 62% of patients had Class 1 malocclusion, 32% of patients had Class 2 malocclusion and 6% of patients had Class 3 malocclusion (Figure 1). A significant association between severity of AOB and age group was noted. More children presented with severe anterior open bite whereas adults presented with moderate open bite ($p=0.0$, p value< 0.05, statistically significant) (Figure 2). More females presented with anterior open bite and males presented with moderate open bite but no significant association was noted (p value >0.05, not significant) (Figure 3). Severe anterior open bite was most prevalent among patients with Class 2 malocclusion (p value >0.05, not significant) (Figure 4).

Figure 1 : Table showing the frequency distribution of males, females, age range and type of malocclusion

GENDER		AGE GROUP		TYPE OF MALOCCLUSION		
Male	Female	Children	Adult	Class 1	Class 2	Class 3
46%	54%	52%	48%	62%	32%	6%

Figure 2: Bar graph showing the association between severity of open bite and the age group of patients. A significant association is noted more number of children presented with severe AOB whereas adults had moderate AOB (chi square p value -0.0 , p value < 0.05 significant)

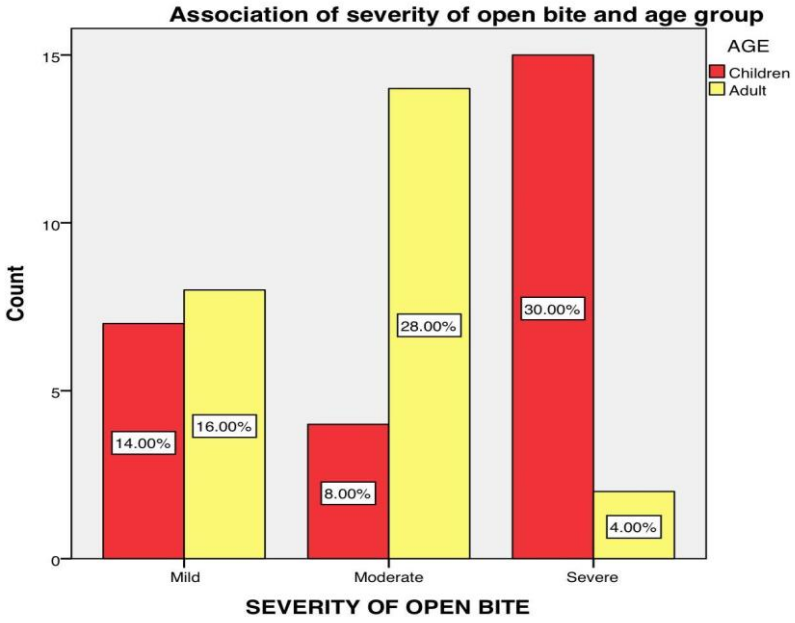


Figure 3: Bar graph showing the association of open bite severity and the gender of patients. (p value >0.05, not significant)

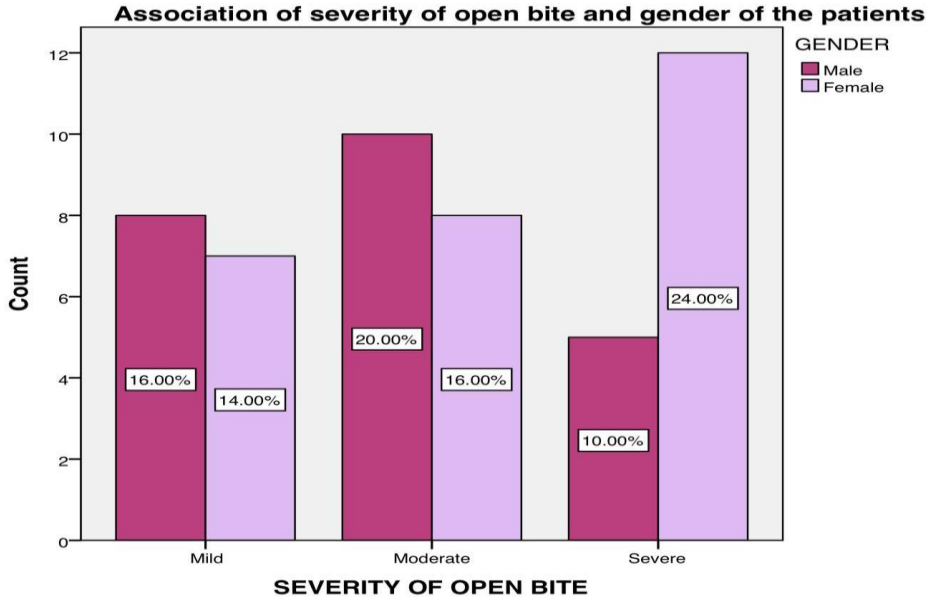
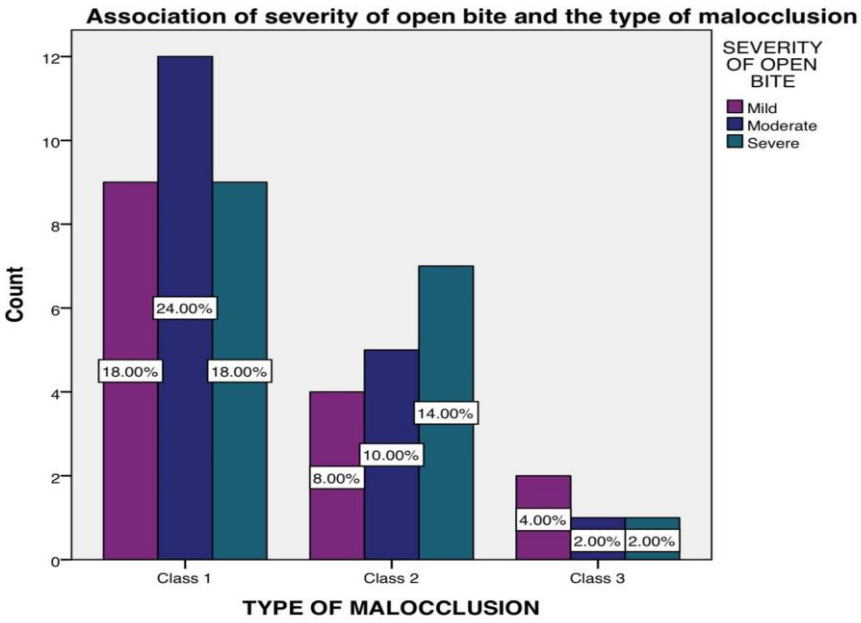


Figure 4: Bar graph showing the association between severity of open bite and the type of sagittal malocclusion in patients. (p value >0.05, not significant)



Discussion

Children were found to have a higher prevalence of open bites than adults in this study. Among children severe open bite was most prevalent and among adults moderate open bite was most prevalent. The prevalence of open bite was higher in females than in males. Among males moderate open bite was most prevalent and among females severe open bite was most prevalent. Class 1 malocclusion was found to be the most prevalent type of malocclusion in patients with open bite. The association between the severity of an open bite and the patient's age group was shown to be statistically significant (p value<0.05). However the association between severity of open bite and the type of sagittal malocclusion in patients was not statistically significant.

Previous research on open bites has solely looked at the skeletal and dental aspects of the condition, as well as its prevalence in various populations (33). Because our study focused on the association of open bite severity with the type of malocclusion, age, and gender, the functional perspective of open bite was not investigated, despite the fact that it was found to be an important etiological element in the development of open bite (33,34). Patients with an open bite should be treated early in their pubertal growth spurt, whereas patients with a deep bite should be treated later in their pubertal growth spurt (4).

One of the major dento-alveolar causative factors in the development of open bite malocclusion is premolar overeruption (35). Furthermore, interpreting the findings of this study would underline the need of treating open bite patients early, overcoming the development of skeletal deformity in a growing child, and changing extraction options in such circumstances (36)(37)

Limitations of the study

A few variables limit this research. The sample size can be expanded and it is also a short duration study. Some of the patients may be left undiagnosed. Because it is conducted in a hospital, the study has geographical restrictions. However, various difficulties were faced when studying the open bite severity , which includes doctors or clinicians with variations in levels of knowledge, skill and experience, inconsistencies in judgments and research bias.

Future scope of the study

The findings of this study would be improved if it included a big sample size of patients of various ethnicities. Other epidemiological studies spanning longer periods of time would aid in the collection of crucial data and the subsequent validation of the findings. The significance of assessment of bite and occlusion during the overall clinical examination of the patient, especially for children and adolescents should be considered. Further studies on open bite severity should have adequate sample size for an accurate determination of the association between open bite severity and sagittal malocclusion.

Conclusion

Within the limits of the study we conclude that there was no significant connection between open bite severity and sagittal malocclusion. Among children severe open bite was most prevalent and among adults moderate open bite was most prevalent. Moderate open bite was most prevalent in males and severe in females. Class 1 type of sagittal malocclusion was found to be the most prevalent type of malocclusion in patients with open bite.

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