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Association Between Tongue Thrusting Habit And Malocclusion: A Retrospective Study

Research Article

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Abstract

Background: Oral habits, particularly if they continue beyond the preschool age, have been associated as an essential environmental determinant correlated with the development of malocclusion. Tongue thrusting habit is a state in which the tongue comes between with any teeth when swallowing. The knowledge of prevalence and etiology of malocclusion can help form strategies for prevention, interception, and corrective treatment. The study aimed to assess the prevalence of tongue thrusting and malocclusion and to find, if any correlation exists between the presence of tongue thrusting oral habits and the malocclusion status.
Materials and Method: This study association between tongue thrust and malocclusion, was done at a private dental college and hospital. The cast sheets of patients were obtained from the patient record system. The data of each patient was obtained and tabulated.
Results: In this study, we infer that there is a significant association between tongue thrusting habit and malocclusion, in which open bite was found to be the most commonly seen malocclusion with a p value of 0.001 done using Chi square test.
Conclusion: There was a high predominance of malocclusion in patients with tongue thrusting habits, in which open bite was found to be the most commonly seen malocclusion. Other significant malocclusion included crowding, spacing and proclination in some cases. Hence adequate care should be taken from the younger age to stop the parafunctional oral habits from resulting into a severe malocclusion.

Keywords: Incidence; Malocclusion; Oral Habits; Tongue Thrusting.

Introduction

A number of epidemiological studies on malocclusion and orthodontic treatment need have been performed worldwide which have reported wide variations in the incidence of malocclusion. The lack of suitable universal methods for recording and grading malocclusion and the different criteria used to define malocclusion have been a considerable factor that has influenced such extreme of variation [14, 29].

Development of malocclusion is determined by a combination of genetic and environmental influences. In recent years, the etiological importance of genetic factors has been reduced, considering that many malocclusions recognize a post-natal origin [21]. Oral habits, particularly if they continue beyond the preschool age, have been associated as an essential environmental determinant correlated with the development of malocclusion [14]. The role of continued digital sucking habit on the progress of malocclusion has been reviewed by many researchers. Furthermore the effect of abnormal swallowing patterns has been notably documented in the literature [30, 32].

Malocclusion has a tremendous physical, social and psychological influence on people and society; consequently, epidemiological studies are vital to achieving comprehensive data for building public health strategies for orthodontic prevention [17]. During the last three decades, a striking increment in orthodontic therapy demand has occurred as a result of the high understanding rate of malocclusions, along with greater application to aesthetics. Many

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studies have been published on the prevalence of malocclusion and the need for orthodontic treatment in different ethnic groups. Oral habits like finger and thumb sucking, lip sucking, mouth breathing, nail-biting and so on can happen transitorily; however, these habits, when extreme or maintained, can lead to poor dental well-being or malocclusion. A study the prevalence of malocclusions, oral habits and the need for orthodontic treatment in a sample of 7- to 15-year-old Albanese schoolchildren and stated that oral habits were present in 80.6% of their subjects [16]. A previous study done in 2008 also confirmed that there was a positive association between deleterious oral habits and malocclusion. However, Luzzi et al. in 2011 reported that no statistically significant associations could be detected between the non-nutritive sucking habits and malocclusion [3].

The tongue plays an essential role in respiration, mastication, deglutition, and speech. In normal deglutition, the tip of the tongue rests on the lingual part of the maxillary anterior dentoalveolar area; the teeth come in temporary contact and there is a least contraction of the perioral muscles, is least during deglutition, during swallowing, and there is neither a tongue thrust nor a constant forward posture. Tongue thrusting is a potent swallowing pattern in infants. By age 2-4 years, functionally mature swallows emerge [11].

Tongue thrusting habit is a condition in which the tongue makes contact with any teeth anterior to the molars during swallowing [23]. Most frequent signs of tongue thrusting are said to be forward tongue posture and tongue thrusting during swallowing, contraction of the perioral muscles, excessive buccinator hyperactivity, and swallowing without the momentary tooth contact normally required.

The knowledge of the prevalence and resultant malocclusion can help form strategies for prevention, interception, and corrective treatment. Given fiscal restraints due to high expenses of orthodontic services and lack of publicly financed dental treatment plans in developing countries, such as India, it becomes more important to understand orthodontic treatment demand according to the severity and to recognize modifiable factors that can be targeted by preventive and interceptive orthodontics.

Previously our team had conducted numerous studies which include clinical trials [31, 27, 15, 33, 34, 7, 26, 12, 22, 25, 9, 5, 8], in vitro studies [13] and case reports [6] and hence the present study was designed, to assess and quantify the prevalence of tongue thrusting and malocclusion and to find, if any correlation exists between the presence of tongue thrusting oral habits and the malocclusion status.

Materials and Methods

The present retrospective study was carried out in the Department of Orthodontics of Saveetha Dental College and Hospital, Chennai, Tamil Nadu. The study was of university setting and carried out using data collected from patient records from June 2019-April 2020. The advantage of using a university setting is that data is readily available and patients are of similar ethnicity. The disadvantage of this type of setting is that it covers a specific geographic area and trends in other locations are not assessed. Ethical approval was obtained from the institution. The data was reviewed by 2 reviewers. Case verification was done by 2 reviewers. Non probability sampling of the available data was done. The sample size consisted of 500 patients who had tongue thrusting habits. Inclusion criteria included all the patients who had tongue thrusting habits.

Data collection was carried out using dental details obtained from the patient records. Data verification was carried out. The data was tabulated using Microsoft Excel. Censored or incomplete data was excluded from the study.

Statistical Analysis

The data was imported to SPSS software developed by IBM for statistical analysis. Frequency, percentage of parameters was employed in the analysis. Chi square test was used to detect the significance between gender, age, habit, and malocclusion. p value less than to 0.05 was considered statistically significant.

Result And Discussion

In our study, we conclude that there was a significant association between tongue thrusting habit and malocclusion, in which open bite was found to be the most commonly seen malocclusion- p – value 0.001< 0.05 [Chi square test]

Figure 1 shows the age distribution, in which 63% belonged to the age group of less than 20 years, 28 % in the age group 21 to 40 years and 9 % in the age group 41 to 60 years.

Figure 2 shows the gender distribution, 52 % male population and 48 % female population.

Figure 3 shows the association between age and malocclusion, less than 20 years had proclination 76 %, 21 to 40 years had open bite of 72 % and 41 to 60 years had crowding 21 %. Thus from graph 3 we infer that open bite is highly prevalent in the 21 to 40 years age group.

Figure 4 shows association between gender and malocclusion in which the female population 37% had open bite and male population 60 % had open bite. Thus from graph 4 we infer that open bite is the highly prevalent malocclusion in the male population than in the female population.

Malocclusion is established close to its full expression in an individual with the eruption of all permanent teeth, thereby young adolescents at the late mixed dentition and early permanent dentition stage provide a much clearer prevalence of malocclusion and orthodontic treatment needs than younger children. The study by Giugliano et determined the prevalence of malocclusion, orthodontic treatment need, and the relationship of malocclusion with associated factors, such as deleterious oral habits, in a North Indian school going population of 12 and 15-year-old children in Shimla city [10].

Results of the regression models revealed that mouth breathing and thumb-sucking habits had a significant impact on malocclusion, significantly affecting the presence of crowding and irregularities in anterior segments, and increased maxillary overjet. Also, tongue thrusters significantly developed a reverse overjet, spacing

Figure 1. Age distribution in patients with tongue thrusting habits. Of the overall 500 patients, pink colour denotes patients in the age group of less than 20 years is 63%, black colour denotes patients in age group 21-40 years is 28% and brown denotes patients in age group 41-60 years is 9%. The presence of tongue thrusting was seen to be increased in the younger age groups, indicating the need for strict measures to avoid the habit to prevent the occurrence of severe dental deformity.

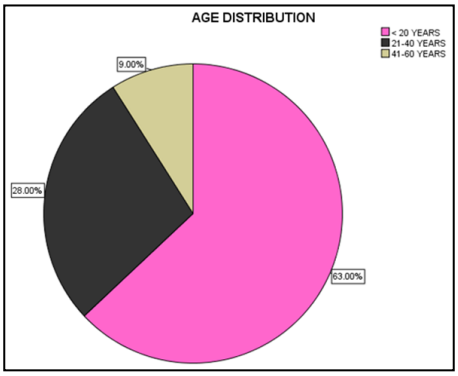


Figure 2. Gender distribution in patients with tongue thrusting habits. Of the overall 500 patients, grey colour denotes the male population of the study is 51.60% and purple colour denotes the female population of the study is 48.40%. The gender distribution in the prevalence of malocclusion showed comparative increase in the male population.

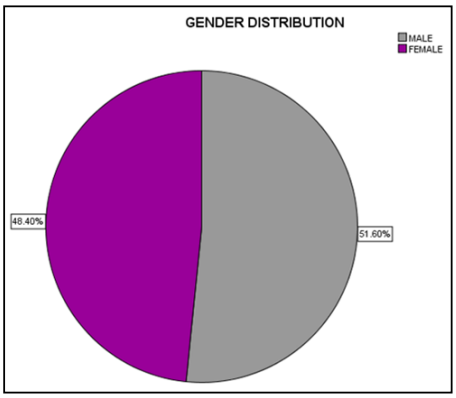
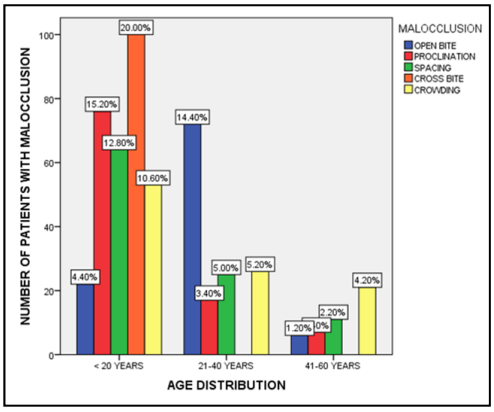


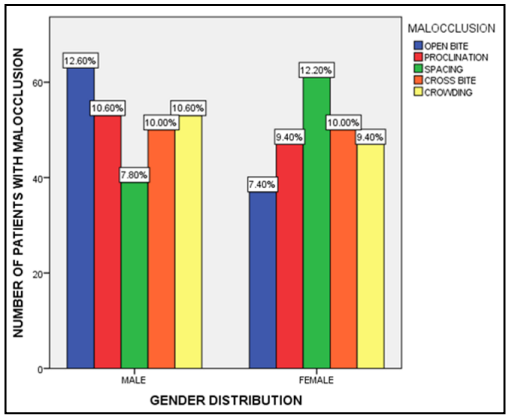
Figure 3. The graph represents the association between age and malocclusion in patients with tongue thrusting habits. Blue denotes open bite, red denotes proclination, green denotes spacing, orange denotes cross bite and yellow denotes crowding. X axis represents the age distribution and the Y axis represents the number of patients with malocclusion. In the age group of less than 20 years, cross bite was the most common and open bite was the least occurring malocclusion. In the age group 21-40 years, open bite was the most and cross bite was the least occurring malocclusion and in the age group of 41-60 years, crowding was the most and cross bite was the least occurring malocclusion. (Pearson Chi-Square value-181.516 , p value-0.001 , <0.05) Chi- square test was used p<0.001, association between the two parameters age group and type of malocclusion were statistically significant.



in incisal segments, and anterior open-bite. Abundant reports in the literature have stated that malocclusion in relation to these traits is observed with a higher prevalence amongst those with habits than without. Shetty et al found that when tongue thrusting, mouth breathing, and thumb sucking were taken into consideration, about 28.95% had malocclusion with a higher prevalence in relation to anterior maxillary protrusion [28]. Melson et al, stated that both tongue-thrust swallow and teeth apart swallow favor development of disto-occlusion, extreme maxillary overjet, and open bite [20].

Oral habits like mouth breathing, abnormal swallowing, thumb sucking, lip sucking, and nail-biting can have a primary influence on the essence of life and can affect the stomatognathic system

Figure 4. The graph represents the association between gender and malocclusion in patients with tongue thrusting habit, where blue denotes open bite, red denotes proclination, green denotes spacing, orange denotes cross bite and yellow denotes crowding. X axis represents the gender distribution and the Y axis represents the number of patients with malocclusion. In the male population, open bite was the most and spacing was the least occurring malocclusion and in the female population, spacing was the most and open bite was the least occurring malocclusion. (Pearson Chi-Square value-11.820, p value-0.019 , <0.05) Chi- square test was used-p<0.019, association between the two parameters gender and type of malocclusion were statistically significant.



of the body [1]. This study showed that notable relationships existed between harmful oral habits and malocclusions. In a similar study, evaluated the relationship between arch width and certain oral habits in 3 to 6-year-old children and found that a model habit leads to a decrease in maxillary arch width and mouth breathing causes a decrease in the size of both arches [2].

An association exists amidst the etiology of an anterior open bite, harmful oral habits, and a few orofacial defects. A connection between the history of deleterious habits and the existence of lingual interposition when swallowing, and with speech disturbances were recognized. These results highlight the significant interplay between orthodontists and speech-language pathologists throughout the treatment of patients. The recovery role of speech-language therapy stands out, through the oral myofunctional therapy, indicating the positioning of the tongue during swallowing, speech and when in habitual position [10, 4].

In a previous study, it was observed that tongue thrusting is the most common oral habit constituting 29.5%. It can be defined because tongue tip function during swallowing is directly related to the variations in the contiguous anterior dentoskeletal circumstances. The changing patterns of tongue tip movement seem to describe a functional adaptation to the variations in the arrangement of the anterior malocclusion. Reasonably this functional adaptation describes an effort to obtain an anterior oral seal during swallowing and benefit to the difference in the anterior oral environment [19].

Thus, an alteration to an existing environment may yet be another expression for the possible predominance of tongue thrusting in young age groups. Several critics have noted that the intermolar distance was statistically shorter in mouth-breathing subjects while contrasted with that of nasal breathers, which symbolizes a larger narrowing of the maxillary arch in the second molar area [18, 24].

Conclusion

Within the limitations of the study, there was a high predominance of malocclusion in patients with tongue thrusting habits, in which open bite was found to be the most commonly seen malocclusion. Other significant malocclusion included crowding, spacing, and proclination in some cases. Hence adequate care should be taken from a younger age to stop the parafunctional oral habits from resulting in a severe malocclusion that would involve more cost as well time for its correction when it persists in adulthood.

Author's Contribution

First author (Pavithra H Dave) performed the analysis, interpretation and wrote the manuscript. Second author (Dr.Nivethigaa B.) contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Third author (Dr.Mahesh) participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

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