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Obstructive Sleep Apnea in Pediatric Patients with Class II Malocclusion- an Orthodontic Perspective

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KEYWORDS
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Abstract

Background: This study was conducted to assess Obstructive sleep apnoea in pediatric patients with Class II malocclusion.

Material and methods: The study took into account 150 subjects who were sent to an otorhinolaryngology department. The final sample included 50 kids with OSA and 50 kids from the control group.

Results: There were total 100 individuals out of which 50 had OSA while remaining 50 were controls. Out of 50 subjects having OSA, 35 were males and 15 were females. Among controls, malocclusion was present in 30 out of 50 subjects. Among subjects having OSA, malocclusion was discovered in 44 out of 50 subjects. Posterior crossbite was the most common factor associated with OSA (78%)() , followed by reduced overbite (12%) should not be written as you have already mentioned this , increased overbite (6%) and increased overjet (2%). Should be more(means maxillary jaw is placed ahead, narrow maxillary arch and short mandibular length)

Conclusion: In contrast to the control group, this study revealed that children with OSA had a significant prevalence of malocclusion. Significant correlations between OSA and the posterior crossbite were found narrow upper arch and maxillary proclination and short mandibular length.

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Introduction

Malocclusion is defined as any mal-relationship of dental arches with or without an irregularity of the teeth.[1] Malocclusion is considered as a developmental disorder and a public dental health problem having high prevalence and treatment needs.[2] Altered oral functions like mastication, speech, swallowing, etc may lead to oro-facial adaptability which may result in malocclusion. This ultimately disturbs the individual's social wellbeing.[3]

Obstructive sleep apnea (OSA) is characterized by episodes of a complete (apnea) or partial collapse (hypopnea) of the upper airway with an associated decrease in oxygen saturation or arousal from sleep.[4] This disturbance results in fragmented, nonrestorative sleep. Other symptoms include loud, disruptive snoring, witnessed apneas during sleep, and excessive daytime sleepiness.[5-7] OSA has significant implications for cardiovascular health, mental illness, quality of life, and driving safety.[8]

Hence, this study was conducted to assess Obstructive sleep apnoea in pediatric patients with Class II malocclusion.

Material and methods

This study was conducted to assess Obstructive sleep apnoea in pediatric patients with Class II malocclusion. A total of 150 consecutive patients referred to an otorhinolaryngology unit were considered for the study. The final sample consisted of 50 children suffering from OSA and a control group of 50 children. To register the essential occlusal variables—existence of a posterior crossbite, overjet, as well as overbite—all study participants received a clinical orthodontic evaluation what evaluation was taken The factors which were independently associated with OSA were also evaluated.How many cases were classII is not mentioned(inclusion and exclusion is not mentioned. Pediatric age is not mentioned How to identify OSA cephalometric values were written so which values were taken

Statistical analysis was carried out using SPSS software.

Results

Table 1: number of subjects in control group and OSA group

Groups	Number of subjects	Percentage
OSA group	50	50%
Control group	50	50%
Total	100	100%

There were total 100 individuals out of which 50 had OSA while remaining 50 were controls.

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Table 2: gender-wise distribution of subjects of OSA

Gender	Number of subjects	Percentage
Males	35	70%
Females	15	30%
Total	50	100%

Out of 50 subjects having OSA, 35 were males and 15 were females

Table 3: prevalence of malocclusion among control group

Prevalence of malocclusion	Number of subjects	Percentage
Present	30	60%
Absent	20	40%
Total	50	100%

Among controls, malocclusion was present in 30 out of 50 subjects.

Table 4: prevalence of malocclusion among OSA group

Prevalence of malocclusion	Number of subjects	Percentage
Present	44	88%
Absent	06	12%
Total	50	100%

Among subjects having OSA, malocclusion was discovered in 44 out of 50 subjects.

Table 5: Factors independently associated with OSA

Factors associated with OSA	Number of subjects	Percentage
Posterior crossbite	39	78%
Reduced overbite	06	12%
Increased overbite	03	06%
Increased overjet	02	04%
Total	50	100%

Posterior crossbite was the most common factor associated with OSA (78%), followed by reduced

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overbite (12%), increased overbite (6%) and increased overjet (2%). Constricted arch, short mandibular length need to be mentioned??

Discussion

Obstructive sleep apnea (OSA) is a chronic disorder of multifactorial origin with age, gender and body mass index having been identified as some of the predisposing factors.[9] While, globally the prevalence of OSA has been reported around 2-4% among the adult population, it varies greatly among different age groups, ranging from 4% in the middle aged, up to 80% in the geriatric population (aged 65 years and above).[10] Similarly, the prevalence of OSA is reported to be as high as 78% among obese individuals.[11] Based on a study in Saudi population, it has been reported that nearly 4.0% of adult males and 1.8% of adult females are affected by OSA.[12] Evaluating the risk of OSA among Saudi population, not only was it found to be similar to that reported in Western societies, but also one out of 3 Saudi males and 4 out of 10 Saudi females are at high risk of developing OSA.[13,14]

In this study, there were total 100 individuals out of which 50 had OSA while remaining 50 were controls. Out of 50 subjects having OSA, 35 were males and 15 were females. Among controls, malocclusion was present in 30 out of 50 subjects. Among subjects having OSA, malocclusion was discovered in 44 out of 50 subjects. Posterior crossbite was the most common factor associated with OSA (78%), followed by reduced overbite (12%), increased overbite (6%) and increased overjet (2%).

Zhao et al[15] determined if the presence of obstructive sleep apnea (OSA) influences the orthodontic treatment outcome of Class II hyperdivergent patients receiving comprehensive orthodontic treatment. Patients between the ages of 12 and 14 who received orthodontic treatment at the Hospital of Stomatology, Wuhan University, China, were included in this study. Patients were divided into two groups: the OSA group and the control group, based on the outcome of pretreatment polysomnography findings and lateral cephalometric radiograph examination. Patients in the control group were matched with the OSA group for age, sex, ethnicity, weight, and height. Cephalometric measurements were used to record the skeletal and dental changes from before to after treatment. Data were analyzed using the t-test. Twenty three OSA patients and 23 control patients were included. After comprehensive orthodontic treatment, the mandibular plane angle (SN-GoMe), articular angle (SArGo), sum of Jarabak angles (SUM) and the lower gonial angle (NGoMe) were found to increase significantly in the OSA group but remained unchanged or decreased slightly in the control group ($P < .05$). In the non-OSA group, the growth pattern became more horizontal. In contrast, in the OSA group the growth pattern became more vertical. Otherwise, similar treatment results were obtained for both groups in terms of sagittal change and occlusion. It was concluded that the presence of OSA in pediatric patients has a deleterious effect on the development of hyperdivergent malocclusions.

Miyao et al[16] investigated malocclusion in patients with OSAS using cephalometric and dental analysis. Cephalometric and dental analyses were performed to evaluate malocclusion in 97 male patients with OSAS (49.7+/-11.7 years). The number of apnea and hypopnea episodes per hour (apnea-hypopnea index: AHI) was determined by standard polysomnography. The overall prevalence of

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severe overjet (the horizontal distance between the upper and lower incisors of >or=6 mm) was 43.3%. AHI was significantly correlated with body mass index (BMI) in obese OSAS patients (r=0.385, p=0.010), whereas it was significantly correlated with overjet in non-obese OSAS patients (BMI<25 kg/m2) (r=0.313, p=0.022). Multiple regression analysis revealed that BMI was the significant factor contributing to increased AHI in all patients, and overjet was in non-obese OSAS patients. There were no significant differences between non-obese and obese OSAS patients in the angle of protrusion of the superior alveolar base (SNA) or in the angle of protrusion between the superior and inferior alveolar bases (ANB). The angle of protrusion of the inferior alveolar base (SNB) was significantly smaller in non-obese than in obese OSAS patients. It was concluded that overjet was associated with the severity of OSAS in non-obese patients. Their findings suggested that malocclusion might play an important role in the development of sleep apnea/hypopnea. So Discussion will change accordingly

Conclusion

In contrast to the control group, this study revealed that children with OSA had a significant prevalence of malocclusion. Significant correlations between OSA and the posterior crossbite were found.

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