

Effectiveness of Orthodontic Treatment With Prefabricated Myofunctional Appliances In Children With Sleep Related Breathing Disorders And Obstructive Sleep Apnoea

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ABSTRACT

Background: This study was conducted to assess the effectiveness of orthodontic treatment with prefabricated myofunctional appliances in children with sleep related breathing disorders and obstructive sleep apnoea.

Material and methods: This study comprised of 50 children with obstructive sleep apnoea who were given myofunctional appliances for orthodontic treatment. The purpose of this study was to assess the effectiveness of the orthodontic treatment with these appliances in children with obstructive sleep apnoea. This was checked by estimating the Apnoea-Hypopnea Index (AHI) Score in subjects after receiving the orthodontic treatment. Mean age of the children was 12.5 years. All the subjects had been asked for consent after explaining the procedure of the study. The parents of the children provided consent for the study.

Results: In this study, 10 subjects belonged to the age group of 5-8 years. 33 subjects belonged to the age group of 9-12 years and 7 subjects belonged to the age group of 13-16 years. There were 39 boys and 11 girls in this study. Before treatment, zero AHI score was not seen in any patient but after treatment, 0 score was seen in 34 children. Mild apnoea was seen in 11 cases before treatment. The count shifted to 7 after treatment. 26 cases showed moderate degree of OSA before treatment, and after treatment, 5 cases showed moderate OSA. Among 13 cases, severe OS was seen. After treatment, only 4 cases showed severe OSA.

Conclusion: The findings of this study suggest that orthodontic treatment is effective among children suffering from obstructive sleep apnoea and breathing disorders.

Keywords: OSA, Orthodontic, Treatment, AHI Score

1. INTRODUCTION

Pediatric obstructive sleep apnea (OSA) is a childhood disorder in which there is upper airway dysfunction causing complete or partial airway obstruction during sleep leading to decreased oxygen saturation or arousals from sleep. It can have dramatic effects on childhood behavior, neurodevelopment, metabolism, and overall health. Early recognition, evaluation, and treatment are important to prevent long-term consequences.¹

Sleep apnea is classified into two main categories based on its underlying causes: central and obstructive. Central sleep apnea arises from issues within the central nervous system, leading to a disruption in the neurological control of respiratory drive,

which occurs without any accompanying respiratory effort. In contrast, obstructive sleep apnea (OSA), which accounts for 95% of all diagnosed cases, is characterized by a complete or partial obstruction of the upper airway.²

This obstruction can lead to awakenings during sleep or a drop in oxygen saturation of 3% or more. Various factors that can reduce the diameter or structural integrity of the airway contribute to OSA, including anatomical, genetic, and neuromuscular conditions. The upper airway is particularly susceptible to abnormal collapse due to both intrinsic and extrinsic influences. Intrinsic factors pertain to the critical pressure required to keep the airway open, while extrinsic factors include fat accumulation, tissue hypertrophy, and craniofacial abnormalities that deviate from typical anatomical structures, all of which heighten the likelihood of airway collapse.³

This study was conducted to assess the effectiveness of orthodontic treatment with prefabricated myofunctional appliances in children with sleep related breathing disorders and obstructive sleep apnoea.

2. MATERIAL AND METHODS

This study comprised of 50 children with obstructive sleep apnoea who were given myofunctional appliances for orthodontic treatment. The purpose of this study was to assess the effectiveness of the orthodontic treatment with these appliances in children with obstructive sleep apnoea. This was checked by estimating the Apnoea-Hypopnea Index (AHI) Score in subjects after receiving the orthodontic treatment. Mean age of the children was 12.5 years. All the subjects had been asked for consent after explaining the procedure of the study. The parents of the children provided consent for the study.

3. RESULTS

Table 1: Age-wise distribution of subjects

Age group	Number of subjects	Percentage
5-8 years	10	20
9-12 years	33	66
13-16 years	07	14
Total	50	100

In this study, 10 subjects belonged to the age group of 5-8 years. 33 subjects belonged to the age group of 9-12 years and 7 subjects belonged to the age group of 13-16 years.

Table 2: Gender-wise distribution of subjects

Gender	Number of patients	Percentage
Males	39	78
Females	11	22
Total	50	100

There were 39 boys and 11 girls in this study.

Table 3: Apnoea-Hypopnea Index Score among patients before and after orthodontic treatment

Apnoea-Hypopnea Index Score	Number of cases before treatment	Number of cases after treatment
0 (None)	0	34
1-5 (Mild)	11	07
5-10 (Moderate)	26	05
>10 (Severe)	13	04

Before treatment, zero AHI score was not seen in any patient but after treatment, 0 score was seen in 34 children. Mild apnoea was seen in 11 cases before treatment. The count shifted to 7 after treatment. 26 cases showed moderate degree of OSA before treatment, and after treatment, 5 cases showed moderate OSA. Among 13 cases, severe OS was seen. After

treatment, only 4 cases showed severe OSA.

4. DISCUSSION

Early recognition and treatment of SDB is required in children, in order to achieve maximal resolution of symptoms and prevention of SDB in adulthood. It has been established that adenotonsillectomy can result in substantial improvement of SDB in children in which the condition is related to adenoid or tonsillar hypertrophy.⁴ However, some patients continue to exhibit abnormal breathing and other symptoms during sleep after surgery.⁵ Therefore, it is necessary to investigate other modes of treatment for SDB. Myofunctional therapy (MFT) has been proposed as a multidisciplinary SDB treatment.^{6,7}

The therapy aims to correct tongue position and improve functions of orofacial muscles in order to facilitate better nasal breathing and lip competence. However, it is difficult for young children to follow complex myofunctional exercises. Oral appliances designed for MFT may help children to perform orofacial exercises.⁷

This study was conducted to assess the effectiveness of orthodontic treatment with prefabricated myofunctional appliances in children with sleep related breathing disorders and obstructive sleep apnoea.

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5. CONCLUSION

The findings of this study suggest that orthodontic treatment is effective among children suffering from obstructive sleep apnoea and breathing disorders.

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