

ORIGINAL RESEARCH

Combined Surgical and Orthodontic Treatments in Children with OSA

¹Dr. Dinesh Solanki, ²Dr. Akanksha Sharma¹Associate Professor, JIET Medical College and Hospital, Rajasthan, India²Associate Professor, Rajasthan Dental College & Hospital, Jaipur, India**Corresponding author**

Dr. Dinesh Solanki

Associate Professor, JIET Medical College and Hospital, Rajasthan, India

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Abstract**Background:** This study was conducted to assess the Combined Surgical and Orthodontic Treatments in Children with OSA.**Material and methods:** The adenotonsillectomy procedure, along with pre- and post-operative polysomnography, was performed on the children who participated in the study. Before polysomnography and within six months of surgery, caregivers also filled out an OSA-18 quality of life survey. For the purpose of comparing pre- and post-operative scores, student's t-tests were utilized.**Results:** The study population included 100 children out of which 50 were females and 50 were males. The age of the average person was 8 years. Obesity, asthma, and allergy diseases were the three co-morbidities that occurred most frequently. The average RDI (Respiratory Disturbance Index) prior to surgery was 68.9, but it dropped to 11.3 after surgery (P .0001). Before surgery, patients had a mean total OSA-18 score of 74.98, but after surgery, their scores were 37.53. There was a statistically significant difference between the overall scores and domain scores on the OSA-18 before and after surgery (P .0001).**Conclusion:** Following one or both of the treatments, there was a significant improvement in the patient's respiratory disturbance index (RDI). However, obstructive sleep apnea may return even after satisfactory treatment has been reported, even after a period of several years. Myofunctional therapy, often known as MT, could be suggested as a follow-up treatment in order to reduce the risk of a relapse. Nevertheless, additional research supported by strong clinical evidence are required to validate these findings.**Keywords:** OSA, children, surgical, orthodontic treatment.

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Introduction

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.¹ This disturbance results in fragmented, nonrestorative sleep. Other symptoms include loud, disruptive snoring, witnessed apneas during sleep, and excessive daytime sleepiness.²⁻⁴ OSA has significant implications for cardiovascular health, mental illness, quality of life, and driving safety.⁵ OSA has also been associated with frequent snoring, disturbed sleep, daytime neurobehavioral problems, neurocognitive impairments, academic underperformance, hypertension, cardiac dysfunction and systemic inflammation. Daytime sleepiness may occur but is uncommon in young children. Etiological factors include any condition that reduces the caliber of the upper airways, such as craniofacial dysmorphism,

hypertrophy of lymphoid tissues, obesity, hypotonic neuromuscular diseases and neuromotor control alterations during sleep. However, adenotonsillar hypertrophy remains the main anatomical risk factor.⁶⁻⁹ Therefore, adenotonsillectomy (AT) is the recommended first-line treatment for pediatric OSA in children with adenotonsillar hypertrophy.¹⁰ Hence, study was conducted to assess the Combined Surgical and Orthodontic Treatments in Children with OSA.

Material and methods

The adenotonsillectomy procedure, along with pre- and post-operative polysomnography, was performed on the children who participated in the study. Before polysomnography and within six months of surgery, caregivers also filled out an OSA-18 quality of life survey. For the purpose of comparing pre- and post-operative scores, student's t-tests were utilized.

Results

Table 1: Gender-wise distribution of subjects.

Gender	Number of subjects
Males	50
Females	50
Total	100

The study population included 100 children out of which 50 were females and 50 were males.

The age of the average person was 8 years. Obesity, asthma, and allergy diseases were the three comorbidities that occurred most frequently. The average RDI (Respiratory Disturbance Index) prior to surgery was 68.9, but it dropped to 11.3 after surgery (P .0001). Before surgery, patients had a mean total OSA-18 score of 74.98, but after surgery, their scores were 37.53. There was a statistically significant difference between the overall scores and domain scores on the OSA-18 before and after surgery (P .0001).

Discussion

Any adult patient with unexplained daytime or sleep-related symptoms such as excessive sleepiness, fatigue, or unrefreshing sleep should be evaluated for sleep apnea. However, universal screening for OSA is not recommended in asymptomatic patients except for those who are at risk of occupational hazards such as driving or those who are pilots.^{11,12} In addition, due to the high prevalence of OSA and disease burden, patients with specific comorbidities such as refractory atrial fibrillation, resistant hypertension, and a history of stroke can be screened for sleep apnea regardless of symptoms.¹³ There is now little doubt that hypertrophy of upper airway lymphadenoid tissues constitutes the most common factor underlying the presence of obstructive sleep apnea (OSA) in children, a condition that was formally identified as a singular disease only in 1976 by Guilleminault and colleagues.¹⁴ As corollary of such repeatedly confirmed fact, adenotonsillectomy (T&A) has become the initial treatment recommended by the American Academy of Pediatrics (AAP) consensus guidelines for pediatric OSA in 2002 and subsequently in 2012, and other guidelines around the world echo such recommendations.¹⁵⁻¹⁷ In more recent years, and particularly since 2006 when we initially described the relatively high prevalence of residual OSA after T&A, confirmation and realization that, although the severity of OSA will routinely improve after surgery, it can persist in a significant proportion of patients has definitely settled in.^{18,19} Hence, study was conducted to assess the Combined Surgical and Orthodontic Treatments in Children with OSA. The current study population included 100 children out of which 50 were females and 50 were males. The age of the average person was 8 years. Obesity, asthma, and allergy diseases were the three co-morbidities that occurred most frequently. The average RDI (Respiratory Disturbance Index) prior to surgery was 68.9, but it dropped to 11.3 after surgery (P .0001).

Before surgery, patients had a mean total OSA-18 score of 74.98, but after surgery, their scores were 37.53. There was a statistically significant difference between the overall scores and domain scores on the OSA-18 before and after surgery (P .0001). The recurrence of OSA after AT and RME were reported in two retrospective case-control studies.^{20,21} In the first one, characterized to be of good clinical relevance, Guilleminault et al. highlighted a reoccurrence of OSA in 20 of the 29 patients treated in their childhood by AT and RME. Thus, they suggested that the reappearance of OSA could occur several years after reporting an adequate treatment, following adequate surgical and orthodontic treatment. Interestingly, they assessed that 12 of the 20 teenagers with sleep-related complaints had the same Friedman scale score of 4, and 16 of the 20 children with OSA recurrence had “high and narrow hard palates” and 14 of the 20 children had “an overjet of more than 2.5 mm”, suggesting that these patients presented skeletal relapse despite prior maxillary expansion. In the same way, the second case-control study²⁰, which related the recurrence of OSA, was evaluated as having a moderate risk of bias. It showed the follow-up of 24 children with (n = 11) or without MT (n = 13). All the children were cured (AHI 0.4 ± 0.3) by the combination of AT and palatal expansion.

Conclusion

Following one or both of the treatments, there was a significant improvement in the patient's respiratory disturbance index (RDI). However, obstructive sleep apnea may return even after satisfactory treatment has been reported, even after a period of several years. Myofunctional therapy, often known as MT, could be suggested as a follow-up treatment in order to reduce the risk of a relapse. Nevertheless, additional research supported by strong clinical evidence are required to validate these findings.

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