



Exploring different types of treatment of Obstructive Sleep Apnea Syndrome: a review

Peer review status:

No

Corresponding Author:

Dr. Cinzia Carreri,
Doctor in Dentistry, Sapienza University of Rome, Department of Oral and Maxillofacial Sciences - Italy

Submitting Author:

Dr. Chiara Vompi,
Doctor in dentistry , Sapienza university of Rome, Via Caserta 6 , 00161 - Italy

Other Authors:

Mr. Maria Teresa Filetici,
Student of Dentistry, Sapienza University of Rome, Department of Oral and Maxillofacial Sciences - Italy
Dr. Francesca Germanò ,
Doctor in Dentistry, Sapienza University of Rome, Department of Oral and Maxillofacial Sciences - Italy
Mrs. Linda Da Mommio,
Student of Dentistry, Sapienza University of Rome, Department of Oral and Maxillofacial Sciences - Italy
Mrs. Ludovica Musone,
Student of Dentistry, Sapienza University of Rome, Department of Oral and Maxillofacial Sciences - Italy

Article ID: WMC005582

Article Type: Review articles

Submitted on: 15-Jun-2019, 09:25:31 AM GMT **Published on:** 27-Jun-2019, 12:03:54 PM GMT

Article URL: http://www.webmedcentral.com/article_view/5582

Subject Categories: ORTHODONTICS

Keywords: Osas, Orthodontic, treatment, Maxillo facial

How to cite the article: Filetici M, Carreri C, Vompi C, Germanò F, Da Mommio L, Musone L. Exploring different types of treatment of Obstructive Sleep Apnea Syndrome: a review. WebmedCentral ORTHODONTICS 2019;10(6):WMC005582

Copyright: This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC-BY\)](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Source(s) of Funding:

None

Competing Interests:

We don't have any competing interest.

Exploring different types of treatment of Obstructive Sleep Apnea Syndrome: a review

Author(s): Filetici M, Carreri C, Vompri C, Germanò F, Da Mommio L, Musone L

Abstract

Obstructive sleep apnea syndrome (OSAS) is a complete or partial airway obstruction that can cause significant impacts on patient's life in aspects as craniofacial diseases, cognitive performance and quality of life. The variety of intervention for treatment of pediatric obstructive sleep apnea syndrome are complex, varied and multidisciplinary. They include: lifestyle changes (as weight reduction programs, adequate sleep hygiene and alteration of the sleeping position), surgical approaches (adenotonsillectomy, tracheostomy for tube placement, maxillomandibular advancement, uvulopalatopharyngoplasty and others) and non surgical approaches (CPAP, continuous positive airways pressure, oral appliances, rapid maxillary expansion, and anti inflammatory treatments). From this review it can conclude that not all patients with OSAS find benefit from the same therapy, due to the complex relationship between anatomical factors and neuromuscular mechanism at the base of this syndrome. A multidisciplinary approach involving orthodontists at the same level as otorhinolaryngologist and pediatric specialists in the diagnosis and treatment of OSAS in children is fundamental to recognize which type of treatment may be the best for each patient.

Introduction

Obstructive sleep apnea syndrome (OSAS) is a complete or partial airway obstruction that can cause significant physiologic disturbance with various clinical impacts. The etiology is multifactorial. OSAS arises when the balance between the factors maintaining airway patency and those promoting airway collapse is perturbed. This balance is determined by the interactions of central ventilatory responses to hypoxia, hypercapnia and airway occlusion, upper airway neuromuscular tone, the effects of sleep state and arousal, and the anatomic size and resistance of the upper airway. Obstruction of the upper airway by tonsils and adenoids is a principle factor in the development of childhood OSAS. OSAS affects between 1.2% and 5.7% of the pediatric population,

and the risks as high as 36% in obese children. In children, risk factors include: adenotonsillar hypertrophy, obesity, neuromuscular disorders and craniofacial anomalies. Its clinical manifestations are mouth breathing, night snoring, cardiovascular abnormalities, headache when patient wakes up, day time sleepiness and decrease of cognitive performance. Some craniofacial diseases are highly related to OSAS: midface hypoplasia, high arched palate, retrognathia/micrognathia, unilateral or bilateral cross bite and open bite. Chronic mouth breathing that is seen in children with upper airway obstruction often results in a mandibular retroposition can predispose patients to a displacement of the tongue at a low position in the mouth, increasing lower facial height. The clinical aspects previously described are commonly related to the adenoidian face prototype.

Materials and Methods

The scientific research was conducted by using Pubmed database. Articles published in the last 7 years were selected. A combination of the following search terms was used: osas, treatment, and orthodontics. Original articles, literature reviews and randomized studies were included. All the articles concerning the role of otorhinolaryngologists and pediatricians were excluded. A focused approach on the role of the orthodontist was used in the selection of the articles.

Results

As results, 8 articles were considered valid.

The variety of intervention for treatment of paediatric obstructive sleep apnea syndrome are complex, varied and multidisciplinary. They include: lifestyle changes (as weight reduction programs, adequate sleep hygiene and alteration of the sleeping position), surgical approaches (adenotonsillectomy, tracheostomy for tube placement, maxillomandibular advancement, uvulopalatopharyngoplasty and others) and non surgical approaches (as the use of CPAP continuous positive airways pressure, oral appliances, rapid maxillary expansion, and anti inflammatory

treatments).

The most common treatment for OSAS in patients who have no contraindication to surgery is adenotonsillectomy (AT). However, post operative persistence of this syndrome in pediatric population is more frequent than expected and it has many risks (1).

The study conducted in 2016 by Ida Gillberg Andersen et. al (3) concluded that obese children benefit less from adenotonsillectomy than normal weight children. OSA was significantly more likely to persist in obese children after adenotonsillectomy. They concluded also that weight loss improves OSA significantly, but more research is needed to clarify its role as treatment for OSA. If AT is not performed or if OSAS persists postoperatively in pediatric population CPAP is recommended an alternative treatment. Several studies have confirmed that CPAP is effective in the treatment of OSAS. However, adherence can be a main barrier to effective CPAP use and for this reason, CPAP is not recommended as first line therapy for OSAS when AT is an option.

But surgical approach is not always successful in controlling obstructive sleep apnea (OSA) in children, and orthodontic treatment may be a helpful adjunction and sometime an important alternative. The role of the orthodontist may be fundamental for an early interception of the syndrome and the setting of an early therapeutic plan. Rapid maxillary expansion (RME) is a technique in which orthodontic appliances are used to widen the palate and cause flattening of the palatal arch. The modifications induced by RME are an increase of the upper intermolar distance and the inter incisive space (typical midpalatal suture opening). Through the expansion of the midpalatal suture, RME produces an expansion that occurs not only in the maxillary arch but also in the nasal cavities width (NC CN) with an average increase of the pyriform opening. The widening of the nasal fossa can restore normal airflow. This skeletal change leads to an increased patency of the upper airways and, as a consequence, to a clear improvement of obstructive sleep apnea syndrome (4).

Regarding the use of oral appliances add a therapy for OSAS Cossellu G. and his team (8) in 2015 have concluded that despite these devices have been extensively studied in adults, at present there is not enough evidence to affirm that oral appliances and functional orthopedic appliances are effective in the treatment of obstructive sleep apnea in children.

Oral appliances therapy consists in a removable mandibular positioning device during sleep that acts to protrude the mandible and open the airway. In

practical application, oral appliances or functional orthopedic appliances may be considered for adolescents and adults with mild to moderate OSAS and inspecified cases as an auxiliary in the treatment of children who have craniofacial anomalies which are risk factors for apnea (2). In fact, the use of oral devices as first line treatment is contraindicated in patients with grave OSAS with excessive day-time sleepiness and marked oxygen desaturation in the night.

A relatively new and promising alternative therapeutic modality are oropharyngeal exercises normally used in myofunctional therapy. Only few studies have recognized the effectiveness of oropharyngeal exercises in children with OSAS, but there is still an open question of possibility of using these exercises as a simple method for treatment with mild to moderate obstructive sleep apnea syndrome, and also for the residual OSAS in pediatric population.

In the end, the pharmacological therapy (leukotriene antagonists, topical nasal steroids) is usually use for mild forms of OSAS and in children with associated allergic diseases (7).

Conclusion

Although not all patients with OSAS find benefit from the same therapy, due to the complex relationship between anatomical factors and neuromuscular mechanism at the base of this syndrome, the good results obtained underline the opportunity to suggest to patients a trial of non surgical treatment, reserving surgical approaches for those who reject or undergo unsuccessful non surgical interventions. We underline the importance of a multidisciplinary approach involving orthodontists at the same level as otorhinolaryngologist and pediatricspecialists in the diagnosis and treatment of OSAS in children. The challenge will be to recognize which type of treatment may be the best for each patient.

References

1. Marcus CL, Brooks LJ, Draper KA, et al. Diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics* 2012.
2. Carvalho FR, Lentini-Oliveira DA, Prado LBF, Prado GF, Carvalho LBC. Oral appliances and functional orthopaedic appliances for obstructive sleep apnoea in children.
3. Ida Gillberg Andersen, Jens-Christian Holm, Preben

HomÃ©e.Â Obstructive sleep apnea in obese children and adolescents, treatment methods and outcome of treatmentÂ eÂ A systematic review.

4. P. Pirelli,Â M. Saponara,Â C. Guilleminault.Â Rapid maxillary expansion before and after adenotonsillectomy in children with obstructive sleep apnea.Â

5. Å ujanskÃ; A., ?urdÃk P., Rabasco J., Vitelli O., Pietropaoli N., Villa MP.Â Surgical and non-surgical therapy of obstructive sleep apnea syndrome in children.Â

6. C. Maspero, L. Giannini, G. Galbiati, G. Rosso, G. Farronato.Â Obstructive sleep apnea syndrome: a literature review.

7. Justin C. Brockbank.Â Update on pathophysiology and treatment of childhood obstructive sleep apnea syndrome.

8. Biagi R., Sarcina M., Mortellaro C., Cossellu G, and Farronato G.Â Three-Dimensional Evaluation of Upper Airway in Patients With Obstructive Sleep Apnea Syndrome During Oral Appliance Therapy.