Role of Orthodontists in Obstructive Sleep Apnea

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Many controversial theories, philosophies, and various approaches and treatments have been proposed regarding the role of orthodontists in treating patients with obstructive sleep apnea (OSA). These have not only left the dental profession perplexed, but additionally and perhaps most importantly lead to overdiagnosed, overserviced, and poorly managed sleep apnea patients.

Given this ongoing controversy, orthodontists' interest in OSA, and the lack of established guidelines designed for orthodontic practice, the American Association of Orthodontists (AAO) Board of Trustees appointed a task force in November 2017 to draft a document that would inform practicing orthodontists about the specialty's role in managing OSA. To examine this issue from every perspective, the task group brought together specialists from the fields of pediatric medicine, neurology, otolaryngology, pulmonology, sleep medicine, oral surgery, dentistry, and orthodontics. This team of objective experts produced a document after two years of work. The AAO published this as a white paper in May 2019, and it continues to be a reasonable guideline for clinicians worldwide.[1] The orthodontic specialty's first significant step to give specialists some structure and rules for learning more about sleep apnea and, ultimately, improving patient care was the creation of this paper. Kandasamy later provided a more comprehensive clinical perspective on this issue.[2]

OSA is a multi-factorial disease neither caused by any single factor nor is it recovered by a single strategy in every patient. Moreover, OSA is more than a basic physical problem that may be prevented or treated by changing the dentofacial complex's shape, size, or position. Rather, the oropharynx collapses due to a complex interplay of neurological, muscular, and physical factors.

Upper airway (UA) collapsibility cannot be strongly predicted by a single anatomical feature; nevertheless, there are many predictors of higher UA collapsibility, such as bigger tonsils, pterygomandibular fat, and tongue size.[3]

The shape of the craniofacial bones is crucial for maintaining the upper airway's patency.[4] OSA is also linked to decreased sagittal diameter of the oropharynx, increased gonial angle, hyoid position, decreased mandibular and maxillary lengths, and increased facial height.[5] A small maxilla and a high-arched palate are two more characteristics seen in OSA patients.[6] Increased nasal resistance and backward tongue movement are associated with these disorders.

OSA is a complex disease that requires mutlidisciplinary management. A wide range of professionals, including endocrinologists, psychiatrists, psychologists, dietitians, myofunctional therapists, neurologists, otolaryngologists, pulmonologists, and dentists often including orthodontists, make up the crucial team to manage OSA.[4]

In addition to their expertise in oral devices, orthodontists are regarded as experts in the science of facial growth and development. Furthermore, orthodontists usually treat a wide range of patients, including adults, adolescents, and children, with a long-term connection. To screen for and treat OSA, orthodontists are therefore well-suited to work in conjunction with physicians and other health care professionals.

While polysomnography (PSG) is the gold standard for diagnosing OSA, only a physician can provide a conclusive diagnosis. However, an orthodontist may be relied upon to screen for underlying dentofacial components and help a physician provide the best possible treatment for their patients.

Radiographs, medical history evaluation, and standardized questionnaires such as the Pediatric Sleep Questionnaire for children and the STOP-BANG for adults are the main methods utilized for screening for OSA in orthodontic settings.[7] The screening also includes the Modified Mallampati assessment for the palatine tonsils.[8] The idea that orthodontic extractions and OSA are causally related is not supported by any scientific data about orthodontic treatment modalities.[9]

The pathophysiology of OSA, the unique characteristics of each patient, and the intended course of treatment must all be taken into account when treating the

condition. Behavioral modifications, oropharyngeal exercises, intraoral appliances, positive air pressure (PAP) devices, surgeries, and electrical stimulation of the hypoglossal nerve are examples of therapeutic options.[10]

Positive and non-invasive treatments for OSA include losing weight, exercising, changing sleep position and practicing good sleep hygiene. It is crucial to remember that PAP therapy is an excellent method to cure OSA. Orthodontists can advise patients on how to lose weight and how important it is to change their sleeping posture because lateral placement helps prevent airway collapse.

Mandibular advancement devices (MADs) are intraoral appliances that push the jaw forward during sleep, widening the upper airway and reducing the likelihood of its collapse. The MAD must only be worn while the patient is asleep and taken off when they wake up. MAD therapy has the following effects:[10] 1) the soft palate, tongue, and hyoid bone are pulled forward; 2) the lateral dimension of the velopharyngeal airway increases; and 3) the upper airway dilator muscles are stimulated. Dental movement, typically a decrease in overjet, is a common side effect of MAD.

Prefabricated silicon-based appliances are known as tongue stabilizing devices (TSD). Suction is used by TSD to maintain the tongue forward, stretch the soft tissues of the upper airways, and enhance their structure and functionality. TSD has been suggested as a treatment option for people with fewer or no teeth or compromised dental health because they do not depend on the teeth for retention.

The nasal airway, oropharyngeal space, and minimal nasal cross-sectional area are all greatly increased by rapid maxillary expansion (RME).[11,12] The air passage through the airway is impacted by changes in dynamic airway parameters, such as nasal airflow and resistance, which are often caused by this volumetric expansion.[13]

One of the best anatomic surgical treatments for OSA is surgical maxillomandibular advancement (MMA). MMA restructures the airway, making it less collapsible and/or more volumetric. This advice is usually given when a patient is unable to or will not use CPAP or a mandibular advancement device. The skeletal alterations brought on by MMA usually alter the dental relationship, requiring orthodontic treatment to correct the occlusal relationship.[14]

Research that explicitly compares different orthodontic approaches for managing OSA is noticeably lacking. More research is required to create standardized procedures, investigate orthodontic treatments, and determine their long-term effectiveness in treating OSA.

Recently, several groups and/or self-appointed specialists have begun advocating more for early orthodontic intervention for OSA. For children as young as two to three years old, early interventions include encouraging nasal breathing, correcting posture, advancing the midface, slow or quick maxillary expansion, releasing deep overbites and expanding mandibles, adenotonsillectomy, and myofunctional therapy.[15] However, according to Kandasamy, there is currently insufficient data to even entertain adopting this novel approach to early interventions.[16] Furthermore, there is little to no high-quality data to support the routine use of myofunctional therapy, postural correction, and nasal versus mouth breathing for treating OSA in children as young as three years old.

OSA has significant consequences and affects quality of life if untreated. Working in the area around the upper airway, orthodontists should be aware of how to recognize patients who have OSA and, when necessary, adopt a multidisciplinary approach to treat them. Comprehensive screening methods should be used by orthodontists. To confirm the diagnosis, a follow-up referral to a sleep medicine specialist is necessary. Following confirmation of the diagnosis, treatment choices should be decided in consultation with a sleep medicine professional, giving priority to the least dangerous and most effective evidence-based treatments. This strategy minimizes risks and maximizes results while ensuring that patients receive comprehensive care.

Each treatment modality's possible advantages and disadvantages should be thoroughly explained to patients. Furthermore, as artificial intelligence advances, new technologies like smart watches and smartphone apps are appearing. Therefore, to diagnose and treat individuals with sleep disorders, we need to be aware of this development.

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