Sleep apnea and orthodontics: An interdisciplinary approach to treating a chronic sleep condition

Interdisciplinary treatment planning is a concept that’s gaining relevance among oral health professionals. It’s one of the chief tenets of the popular Seattle Study Club, and many find it extremely rewarding to work with a group of like-minded professionals when treating their patients. This evolving holistic approach to oral health is exemplified in the evolving role that the orthodontist can play in addressing sleep apnea.

The notion that people should see an orthodontist about the sleeping problems they or their children endure might come as a surprise to the general public, but more and more medical and orthodontic experts are pointing toward a future that heads in that direction.

Consider, for example, the most common type of sleep-disordered breathing: obsessive sleep apnea syndrome (OSAS). It’s quite common among both children and adults, though precisely how common can be difficult to say because the condition is significantly under-diagnosed.

A 2012 paper in the journal Pediatrics placed sleep apnea numbers among children within the broad range of 1 to 5 percent of the population. The nonprofit Sleep Foundation estimates that at least 18 million adults have OSAS.

The syndrome can affect patients in a range from mild to severe, with the more serious cases being quite dangerous to long-term health. Among children, OSAS has been linked with poor school performance, learning disabilities, behavior problems and even some cardiac abnormalities. In adults, it can boost the risk of hypertension, cardiovascular disease, coronary artery disease and insulin-dependent diabetes.

What causes sleep apnea?

The word apnea comes from the Greek apnoia, which means “breathless.” That’s exactly what happens in OSAS, as sufferers stop breathing for brief intervals in their sleep, and they do this over and over again throughout the night.

Such breathing gaps create wide variations in the heart rate and in levels of oxygen saturation.

In the simplest sense, this happens because either the upper airway collapses or it’s obstructed. Why that happens is a more complicated question.

• Excessive weight can cause upper airway complications. An estimated two out of three OSAS patients are obese. People with big necks are at higher risk as well; size 17 in men and 16 in women seem to be a cutoff point for medical professionals.
when it comes to asking patients about possible OSAS issues.

- Some sleep apnea is linked with aging. The natural loss of muscle tone that happens as the years go by can lead to the development of airway obstructions.
- Smoking and alcohol use may not cause sleep apnea, but both can aggravate the condition.
- In recent decades, increasing attention has been paid to OSAS cases linked with abnormalities in oral-facial development among non-obese children.

A review of the evidence supporting this hypothesis was published last year in Frontiers in Neurology. Co-author Christian Guilleminault is a pioneering sleep scientist at the Stanford School of Medicine who helped to discover and name the syndrome back in the 1970s.

The paper identifies several facial characteristics associated with OSAS in non-obese patients, including the narrowing of dental arches, a decrease in maxillary arch length and an increase in anterior facial height.

What causes these developmental abnormalities is uncertain; the paper speculates that they are sparked by something that happens in utero. They are also common among premature births.

Harry Legan, the chairman of orthodontics at the Vanderbilt University School of Medicine, noted these characteristics in a 2008 presentation before the Pacific Coast Society of Orthodontics and added a couple of others to the mix, including a large tongue and an inferiorly positioned hyoid bone.

The list made it clear, Legan said, that “the orthodontist is uniquely suited to recognize the symptoms of obsessive sleep apnea, make a tentative diagnosis and make the necessary referral to coordinate treatment options.”

_The orthodontist and pediatric OSAS_

Early diagnosis and successful treatment can make a huge difference in the lives of young sleep apnea patients. Among the outcomes cited in an August 2013 paper in the journal JSM Dentistry by developmental dentist Zheng Xu of the University of Texas Health Science Center are improved cognitive development, better academic outcomes and improved social skills.

The treatment of pediatric OSAS generally involves a multidisciplinary team that can include sleep specialists, weight-loss experts and pediatricians, as well as dentists and orthodontists.

The participation of orthodontists seems poised to increase, given a growing body of evidence that rapid maxillary expansion (RME) is an effective treatment.

RME has been around for more than a century now, but its usage in disordered sleep patterns is a relatively recent phenomenon. The treatment involves the placement of an expandable brace on the
The orthodontist and adult OSAS

Formal diagnosis of sleep apnea is made by a sleep specialist after an overnight polysomnography exam. Once adult OSAS is identified, first steps tend to be of the common sense variety — weight loss for obese patients, as well as changes in sleeping habits. Many patients do better if they sleep on the side rather than on the back.

Another popular treatment, continuous positive airway pressure (CPAP), involves sleeping with a breathing mask that’s attached to a machine that helps generate more air pressure in the throat. CPAP is highly effective when used properly, but patient compliance is a big problem. Many people find the device so uncomfortable they simply stop using it.

At this point, various surgical interventions may come into play, including tonsillectomy and adenoidectomy, cranofacial operations or tracheostomy. These can be successful on occasion, but they are far from sure-fire and lasting solutions in all cases.

Here is where the orthodontist comes in. Various types of oral appliances offer partial relief to OSAS patients, especially in cases that fall in the mild to moderate range. The American Academy of Sleep Medicine recommends two different types of devices — tongue-retaining appliances that hold the tongue in a forward position and mandibular-repositioning appliances that keep the lower jaw in a protruded position while sleeping.

California-based orthodontist Robert G. Keim discussed the difference such devices can make in a 2011 article in the Journal of Clinical Orthodontics: “Even a few millimeters of mandibular advancement during sleep may be enough ... to produce relatively normal breathing patterns,” he wrote.

Keim also noted that sleep apnea is now receiving significant attention in both dental and orthodontic graduate schools — a sure sign that the trend of increased orthodontic involvement in OSAS is likely to continue.

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