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Clinical Dentistry Advisor

Oral Appliance Therapy For Obstructive Sleep Apnea

Prepared by:

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Dentists hold a unique position within the health care system due to their ability to see patients on a frequent and regular basis for "cleanings and recall". This translates to the ability of a dentist to act as a major integral part of the health care provider team in the prevention, assessment and management of many oral and systemic conditions afflicting patients of all ages and needs. Dentists are trained to examine head, neck and oropharyngeal areas in addition to the masticatory structures and are recognized as being part of the multidisciplinary therapeutic team for the management of obstructive sleep apnea by helping to identify possible risk factors for the development of a narrow upper airway.[1]

Obstructive Sleep Apnea is characterized by episodes of airway obstruction during sleep periods resulting in a drop in blood oxygen saturation and subsequent arousals from sleep. Obstructive sleep apnea is a common disorder in the general population, with an estimated prevalence of 4% in men and 2% in women between 30 and 60 years of age.[2-3] It is a common disease that is largely under-diagnosed and untreated resulting in significant implications for cognitive and neurobehavioral impairment, vehicular accidents, cardiovascular disease,[4] diabetes, and mortality,[5] resulting in significant economic impact. [6]

The most common symptoms of Obstructive Sleep Apnea include loud snoring, gastro-esophageal reflux and excessive daytime sleepiness.

The updated practice parameters from the American Academy of Sleep Medicine recommend the use of oral appliances for mild to moderate obstructive sleep apnea and in patients with severe obstructive sleep apnea who do not tolerate CPAP therapy.[7] Current guidelines also recommend face-to-face evaluation with a sleep physician, as part of diagnostic process, which must take place, and a failure of the patient to be able to accept CPAP therapy prior to initiation of oral appliance therapy.

Common Symptoms

- Loud Snoring
- Witnessed apnea episodes
- Excessive daytime sleepiness
- Gastro-esophageal reflux syndrome
- Erectile dysfunction

Common Anatomical Features

Retro positioning of the tongue is one of the most common features of patients with OSA, the dimension of pharyngeal lumen and the elongation of the uvula and soft palatal drape also seem to play important roles in the partial or complete obstruction of the upper airway.[8] Other common anatomical features seen with obstructive sleep apnea include a narrow maxillary arch with a deep palatal vault, mandibular retrognathism, inferiorly positioned hyoid bone, tonsillar hypertrophy, deviated septum, and nasal polyps.[8-12]

Narrow maxillary arches normally accompanied by a high palatal vault, in many cases can result in reduction of nasal passages (Figure 1). The shape and size of the maxilla play an important role during growth and development as it acts as a fence within which the mandible can be trapped or remain neuromuscularly free. Mehta et al[28] described the occlusal fencing concept in which the maxilla dictates the boundaries of the mandible in final closure. If the maxilla is constricted, then the mandibular teeth will crowd to accommodate to the space allowed by the maxillary teeth or the mandible will need to exist in a retruded maxillomandibular position thus impinging on the posterior tissues of the oral cavity.

The throat and airway space are the posterior tissues of this "fence". Anything that restricts and displaces the mandible posteriorly will affect the airway space and change the head position of the patient[13] so as to facilitate breathing simulating a CPR maneuver (Figure 2).

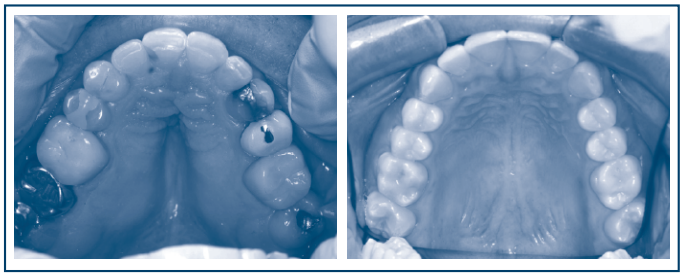


Figure 1: (L) A patient with narrow maxillary arch. (R) A patient with a well expanded maxillary arch.

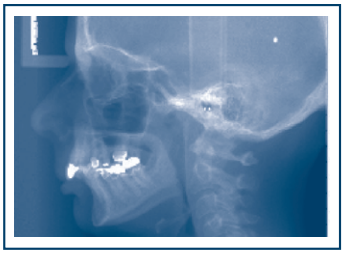


Figure 2: A patient with retrusive positioned jaw and narrow airway.

Oral Appliances

Oral appliances for the management of obstructive sleep apnea, (OSA) are used by dentists as alternative therapy for patients with mild to moderate OSA or in selective cases of severe sleep apnea where patients are non-compliant or unable to use CPAP therapy. Oral appliances function by repositioning the lower jaw forward during sleep which advances the tongue and soft palate resulting in increased upper airway size (figure 3).

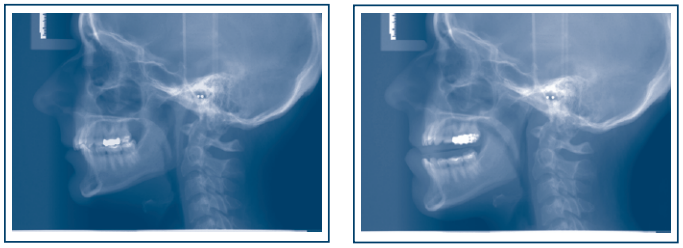


Figure 3: A lateral x-ray of a patient with narrow airway and wearing an oral appliance respectively

Mandibular advancement devices (MAD) are commonly known as "oral appliances" the following pictures show different oral appliances all designed to hold the mandible forward or to hold the tongue forward thereby keeping the airway space open, pictured below, (A-F), shows different types of oral appliances.

Efficacy and Side Effects

Studies have shown the efficacy of oral appliances on reducing apnea severity. MAD oral appliances appear to be preferred by more patients over CPAP when the treatments were compared.[14-17] Several studies have shown that oral appliances are more effective in patients with the following characteristics; younger age, lower body mass index, small neck size, positional obstructive sleep apnea, female gender, retrognatic mandible.[18-22]

Common side effects reported are excessive salivation, bite discomfort, occlusal change, teeth pain, and temporomandibular disorders symptoms (TMD). Discomfort from the appliance is the major cause for discontinuation of treatment or poor compliance.[23-27]

Practice parameters recommend the fitting of sleep oral device by dental personnel trained in temporomandibular joint (TMJ), dental occlusion and associated oral structures.[7] Side effects occur with the use of oral appliances, in most cases they are minor and the importance must be balanced against the efficacy in treating obstructive sleep apnea. Patients must be informed of these potential side effects prior to initiate oral appliance therapy, and constant monitoring is required.

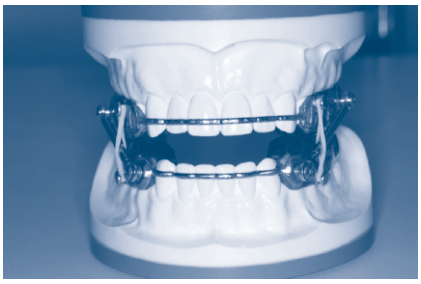
Five Recommended Screening Questions

(Noah Siegel, MD. Personal communication 2012)

1. What prevents you from getting a good night's sleep?

Screens for:

- Insomnia
- Restless Legs Syndrome
- Circadian rhythm disorders
- Sleep disordered breathing
- Poor sleep hygiene or environmental problems
- Substance use or abuse

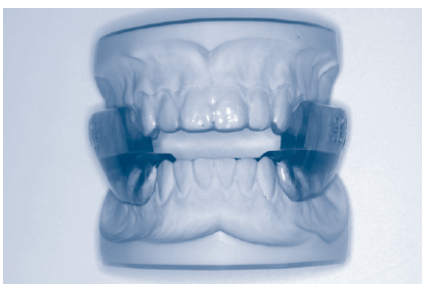


A. Suad Ultra Elite

B. Somnomed

C. Tongue Retainer Device

D. Narval



E. Moses

F. Klearway

2. Are you excessively sleepy during the day?
Screens for:
- Insufficient sleep/sleep deprivation
- Most sleep disorders
- Mood disorders
- Substance use or abuse

3. How many hours do you normally sleep?
Screens for:
- Insufficient sleep
- Poor sleep hygiene
- Insomnia
- Circadian rhythm disorder (shift work)

4. Have you been told that you snore or stop breathing?
Screens for:
- Sleep disordered breathing (obstructive sleep apnea)
- Snoring

5. What medications (and other substances) do you take?
- Antidepressants
- Anti-seizure medications
- Narcotics
- Cardiac medications
- Alcohol
- Caffeine

Commonly Asked Questions Regarding OSA

1. How is OSA diagnosed?

The American Academy of Sleep Medicine requires that diagnosis be made only by a sleep physician. The gold standard is an overnight polysomnograph which is an attended overnight sleep study done in the sleep lab. **Dentists cannot diagnose sleep apnea but can screen for them and refer to the PCP or a sleep physician for the diagnosis.**

2. If I think a patient has snoring or sleep apnea can I go directly to the use of a sleep appliance?

No. You still need to follow the step above.

3. Can I use a portable sleep monitor for the diagnosis of sleep apnea?

Portable sleep monitors are not yet completely accepted for full assessment of sleep disorders but can be used as a screen to test for sleep apnea with a follow-up by a PSG and sleep physician diagnose to verify before the diagnosis can be officially made.

4. Who reads the sleep studies?

Studies are recorded by a certified PSG technologist, read and interpreted by a certified sleep physician.

5. Once I insert the Oral Appliance what is my follow-up?

Once you insert an Oral Appliance, you need to follow-up with either a portable sleep monitor or another PSG to assure the effectiveness of the jaw position when you think you have reached your end point in the jaw protrusion. In either case, follow-up is a must and patient's report is not enough to verify that your treatment is succeeding.

6. Do I need to send the patient back to the physician even though the treatment is appliance therapy?

Yes. The PCP or the sleep physician must see the patient for follow-up care.

7. Do I need a six-month and a one-year follow-up visit with the patient?

Yes. This is a must so that you can continue to monitor the appliances effectiveness and either avoid or manage common side effects.

Conclusion

Dentists are increasingly being asked by their patients regarding the use of oral appliances for snoring. In addition oral appliances are increasingly used in dental practices and are indicated for the management of mild to moderate OSA and some severe cases in patients who cannot tolerate CPAP therapy. Short and long-term follow-up is necessary to assess the efficacy of the device from subjective and objective measurements. A multidisciplinary team approach involving a sleep physician, a dentist, ENTs and a primary care physician is imperative for a better treatment outcome. Short and long-term side effects may occur while using appliance therapy and it is recommended for dentists offering sleep oral appliance therapy to be educated in and gain knowledge about the diagnosis, prevention and management of common side effects including temporomandibular disorders occurring with the use of oral devices.

It is important to understand that Obstructive Sleep Apnea is a serious health risk for patients and does not always exist in a vacuum. Frequently, it is accompanied by underlying systemic conditions that manifest in a sleep disorder. It is imperative that those choosing to involve themselves in this field need to take appropriate courses and learn the various aspects of sleep in general to have a better understanding of this complicated but rewarding area of dental practice. ■

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Dr. Noshir Mehta has been instrumental in developing one of the first University based interdisciplinary Craniofacial Pain Centers in the country. As a clinician over the past 29 years, he has overseen the growth of the largest clinical center to successfully treat head, neck and face pain in the United States. In 1990, he started the first University based Orofacial Pain certificate program leading to a MS degree and has taught his concepts to over 100 graduate students.

Dr. Mehta was instrumental in developing the first University based teaching program in dental sleep medicine for both the pre-doctoral and postdoctoral dental students and in helping set up the Dental Sleep Medicine Clinical Center at Tufts.

Mehta continues to develop new ideas and programs in these fields and lectures nationally and internationally on his treatment philosophies. He is the primary author of a major text entitled **Head, Face and Neck Pain** *and has contributed chapters in many other well known medical textbooks in the areas of Pain and Sleep Medicine. He has published over 60 articles in multiple peer-reviewed journals and continues to be active in the field of Occlusion, TMD and sleep research.*

Dr. Mehta is a Diplomate of the American Board of Orofacial Pain as well as a Diplomate of the American Board of Dental Sleep Medicine. He has received numerous awards from various dental organizations including the prestigious Hayden Stack award from the American Academy of Craniofacial Pain.

Mehta is a member of various organizations and a Fellow of the American College of dentists, Fellow of the International College of Dentists and Fellow of the Pierre Fauchard Academy.

Recently Dr. Mehta has been named Associate Dean for Global Relations for Tufts Dental School and is actively working towards expanding the influence of Tufts in the global arena.

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Dr. Leopoldo Correa received his M.S. degree in orofacial pain and temporomandibular disorders under the mentorship of Dr. Noshir Mehta. He helped to develop and incorporate the teaching of Dental Sleep Medicine into the pre- and postgraduate programs at Tufts University, resulting in Tufts becoming the first dental school in the U.S. incorporating this field into its curriculum. In addition, he recently helped to incorporate the teaching of Dental Sleep Medicine into the Dental School at University of Monterrey in Mexico.

Dr. Correa has published chapters in textbooks and articles in journals. He lectures extensively nationally and internationally.

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