Identifying A Sleeping

Millions of undiagnosed sleep apnea patients and an ADA

Giant

recommendation puts dentists on the front line of diagnosis

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According to the American Sleep Apnea Association, an estimated 22 million Americans suffer from sleep apnea, and 80 percent of them are undiagnosed. This common disorder occurs during sleep, in which a person struggles to breathe because of an obstructed airway. The airway could be blocked in the nose, the mouth or the throat.

The most common blockings occur in the throat at the base of the tongue when the muscles relax and the airway collapses. This collapse occurs more often in patients with underdeveloped mandibles (Class II skeletal patients); when they sleep supine, the tongue falls back and obstructs the airway. One out of every four adults sitting in our dental reception rooms suffers from sleep apnea.

In October 2017, the American Dental Association passed a resolution that dentists must screen for sleep apnea. I must admit I find this surprising—after all, the diagnosis and treatment of sleep apnea is not taught in most dental schools in the U.S. Therefore, in order to follow the guidelines set out by the ADA, dentists must take courses in sleep dentistry to be able to screen these patients properly.

Snoring occurs when the tongue partially blocks the airway, and is more common if people sleep on their backs or have alcoholic beverages before bed, because alcohol collapses the pharyngeal airway. Although snoring can be a relationship destroyer, it also can be the very symptom that saves a life: Patients who snore and also who have extreme daytime fatigue are the most likely to have obstructive sleep apnea (Fig. 1).

Years ago, people didn't worry about secondhand smoke until research pointed out the dangers it posed to their health. Today I use the term "secondhand snoring" in a similar vein. Loud snoring is not only irritating to the bed partner but also terrible for their long-term health. In one study that monitored a couple's nighttime sleep, the husband's snoring drew the wife out of sleep more than eight times per hour. The divorce rate is higher in couples where snoring persists.

Sleep cycles

Stage 1: Falling asleep.

Stage 2: Light sleep.

Stage 3: Deep, restorative sleep

Stage 4: REM sleep, dreaming stage.

The most important stage is Stage 3, deep sleep, where a person's immune system and the memory are both active. Obviously, if a bed partner is being awakened constantly by someone's snoring, he or she rarely gets the restorative sleep, which is detrimental to health.

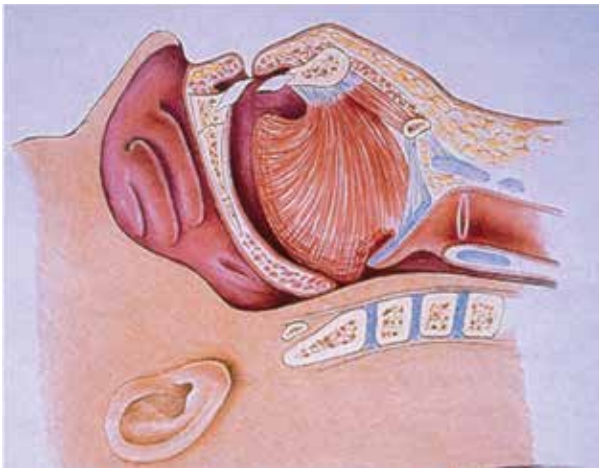

Fig. 1: With sleep apnea, the tongue completely blocks the airway.

Patients with sleep apnea can stop breathing completely for measurable periods of time, causing oxygen levels in the blood to plummet to dangerous levels. The oxygen-starved person will awaken repeatedly throughout the night, each time the brain signals that he must take a breath to survive. This disruption of slumber repeats all night, which results in a poor quality of sleep; when sleep apnea patients wake up, they feel unrefreshed and suffer from extreme daytime fatigue. These patients often rely on their morning fix of caffeine to help them make it through the morning.

Staging

The diagnosis for OSA is made using an apnea–hypopnea index (AHI). This is made during an overnight sleep study in a hospital or private sleep clinic. (The sleep study is known as a polysomnogram, or PSG.) The diagnosis can also be made using a home sleep study where the patient sleeps in their own bed, which patients much prefer.

Dentists are permitted to treat sleep apnea with oral appliances, but the diagnosis of sleep apnea must be made by sleep specialists who evaluate the various sleep studies. The number of apneic and hypopneic events are recorded as follows:

Hypopnea: Blood oxygen level decreases 4 percent or more; there's a 30 percent reduction in airflow for more than 10 seconds.

Apnea: A cessation of breath for more than 10 seconds.

Mild sleep apnea: 5–15 of these events per hour.

Moderate sleep apnea: 16–30 events per hour.

Severe sleep apnea: More than 30 events per hour.

The number of times the patient stops breathing every hour determines whether he has mild, moderate or severe sleep apnea. OSA can also cause weight gain, memory loss, impaired concentration, morning headaches, irritability, depression, decreased sex drive and erectile dysfunction.

Associated medical risks

Left untreated, sleep apnea can lead to more serious health conditions such as hypertension, heart attacks, strokes, Type 2 diabetes, kidney problems, dementia, Alzheimer's disease, and a five times greater chance of cancer. Extreme daytime fatigue can also lead to an increase in motor vehicle and other work-related accidents.

Clinically, I find a high correlation between patients with high blood pressure and gastroesophageal reflux disease (GERD).

Extensive apneic events affect the production of insulin, which encourages the onset of Type 2 diabetes.[2] These apneic events also affect the permeability of the endothelial lining of the arteries, which increases the buildup of plaque in the arteries and the chance of cardiovascular complications such as heart attack. The weakening of the walls of the arteries increases the susceptibility of rupturing these vessels, which occurs during strokes.[3–5]

Studies have indicated that a patient with severe OSA, left untreated, will die 8–10 years earlier than a patient without OSA. Many patients we see on a regular basis have sleep apnea and spend many years in poor health with cardiovascular disease, GERD/acid reflux, Type 2 diabetes or other serious medical concerns.

Screening

Patients diagnosed with mild to moderate sleep apnea by a sleep specialist are recommended to use an oral appliance. Patients diagnosed with severe sleep apnea are recommended to use a CPAP (continuous positive air pressure) device. Oral appliance therapy has shown to increase slow-wave Stage 3 (non-REM restorative sleep) and rapid eye movement (REM dreaming sleep).[6,7]

To conform with the ADA recommendations, all patients should be screened for sleep apnea. Symptoms to ask about when screening for sleep apnea include:

1. Snoring at night.
2. Witnessed apneic events, such as gasping for breath at night.
3. Wake feeling unrested.
4. Excessive daytime sleepiness.
5. Problems staying awake, especially when driving.
6. Compensating for these symptoms with caffeinated or sugary foods for more energy.
7. Acid reflux from airway obstruction.
8. High blood pressure. (When oxygen levels decrease at night, the body raises blood pressure to deliver blood faster to the organs and doesn't return to normal pressure during the daytime.)
9. Large neck size: More than 17 inches for men, 16 inches for women.

Download this form for free use in your practice!

We've created a printer-friendly version of the Epworth Sleepiness Scale form pictured here, which you can download for use with your patients. Find it in the digital version of this article at **dentaltown.com/magazine**.

EPWORTH SLEEPINESS SCALE

The Epworth Sleepiness Scale was developed and validated by Dr. Murray Johns of Melbourne, Australia. It is a simple, self-administered questionnaire and widely used by sleep professionals in quantifying the level of daytime sleepiness.

Name_____Date_____

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling "just tired"? This refers to your usual way of life at present and in the recent past. Even if you haven't done some of these things *recently*, try to work out how they would have affected you.

Use the following scale to choose the most appropriate number for each situation:

0=Would never doze
1=Slight chance of dozing
2=Moderate chance of dozing
3=High chance of dozing

SITUATION	CHANCE OF DOZING
Sitting and reading	____
Watching television	____
Sitting, inactive, in a public place (e.g., theater, meeting)	____
As a passenger in a car for an hour without a break	____
Lying down to rest in the afternoon, when circumstances permit	____
Sitting and talking to someone	____
Sitting quietly after lunch without alcohol	____
In a car, while stopped for a few minutes in traffic	____
TOTAL SCORE	____

(Johns, M.W. "A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale." Sleep 14 (1991): 540-545.)

In our office, we ask all our patients two questions: "Do you snore at night?" and "Are you excessively tired during the daytime?"

If they answer yes to both questions, we ask them to fill out the Epworth Sleepiness Scale (p. XX), in which they rank how likely they are to get tired or fall asleep in certain situations, on a scale of 0–3.

0: Would never doze off.

1: Slight chance of dozing.

2: Moderate chance of dozing.

3: High chance of dozing.

I recommend filling out the form to any patient who snores and is sleepy during the daytime. It's also advisable to have the bed partner complete it as well; in our experience, many patients—particularly men—underestimate the extent of their daytime sleepiness, and the report from the bed partners are usually more accurate.

If the total score is higher than an 8, it's recommended to seek medical attention to obtain a sleep study for diagnosing the presence or absence of OSA.[8]

Our office offers the Ares Home Sleep Study, though all studies must be analyzed by a sleep specialist to start treatment of sleep apnea.

The number of patients who suffer from sleep apnea—especially those who are 50 or older and overweight—is astounding.

Testing

In a common PSG (Fig. 2), patients will have 16 wires attached to their face, chest and legs, and will be encouraged to sleep on their backs. When patients sleep supine, it increases the number of apneic events. Many patients complain that they did not sleep well and wonder how the diagnosis could be accurate when they slept so poorly.

The recurrent apneic events of OSA and consequential elevations in nocturnal blood pressure has been implicated in the development of sustained hypertension.[9–12]

One study involving 61 patients treated

Fig. 2: *A hospital/private sleep clinic study.*

Fig. 3: *In a home sleep study, patients sleep in their own beds with only a headband and two small attachments on their noses. Patients can sleep on their side, which reduces the number of apneic events.*

with mandibular advancing oral appliances resulted in a reduction in blood pressure similar to that achieved with CPAP. The reduction in blood pressure was apparent in the early morning, which is the time of peak risk of acute myocardial infraction[13] and stroke.[14] Therefore, both the timing and the magnitude of blood pressure reduction with oral appliances is likely to be beneficial in terms of reducing excess cardiovascular morbidity reported with OSA.

Since heart disease is the No. 1 cause of death in the U.S., it's imperative that a significant effort be made by the dental and medical professions to prevent heart attacks by screening and treating patients who have obstructive sleep apnea.

Treatment options

1. Oral appliance
2. CPAP
3. Surgical intervention

The CPAP device delivers oxygen under pressure via an air compressor and a hose attached to a mask, which fits over the nose or mouth. The air pressure displaces the tongue, uvula and soft palate, and allows the air to enter the lungs.

Possible side effects include claustrophobia; headaches from the head straps; air in the stomach; dry nose and mouth; and pressure on the nose and mouth from using the mask. Because of this, the failure rate is more than 60 percent with patients who have mild to moderate sleep apnea. Regrettably, some sleep specialists still recommend CPAP for mild to moderate OSA despite the guidelines to the contrary.

Diagnosis

To assist with the diagnosis of sleep apnea we need to focus on airway obstructions in three areas: the nasopharynx, the oropharynx and the hypopharynx.

1. **Nasal obstruction.** Before treatment, clinicians must determine whether any nasal obstructions could interfere with a patient's ability to breathe through the nose. Patients who are chronic mouth-breathers should be referred to an ear, nose and throat specialist to check for a deviated septum, enlarged turbinates, polyps or other nasal obstructions. Also, evaluate whether allergies are causing swollen nasal mucosa, which could be blocking the nasal airway.
2. **Oropharyngeal obstruction.** Before fabricating an oral appliance, an evaluation of the oral cavity must be done to check for obstructions. Areas of concern include an enlarged tonsils or adenoids; large tongue; enlarged uvula; large mandibular tori (moves tongue back); and excessive tissue at the back of the throat. Any oropharyngeal obstructions must be corrected surgically before fabricating an oral appliance. Patients with narrow maxillary arches and high palates could also be susceptible to snoring and sleep apnea.
3. **Hypopharyngeal obstructions.** Oral appliances are most effective when there are no nasal or oropharyngeal obstructions, and the problem lies behind the tongue in the area of the throat. Class II skeletal patients with retrognathic mandibles (Fig. 4) are more likely to have hypopharyngeal obstructions; their lower jaws are already retruded, which subsequently causes their tongues to be retruded. This is particularly serious if patients

Fig. 4: Retrognathic mandible.

sleep on their backs—the tongue falls back further and blocks the airway. If the tongue partially blocks the airway, the patient only snores; if it completely blocks the airway for 10 seconds or more, more than six times an hour, the patient is diagnosed with OSA. The main function of the oral appliance is to move the lower jaw forward, increase the posterior vertical dimension and, subsequently, move the tongue forward and open the pharyngeal airway.

Apnea appliances

Most oral appliances reposition the lower jaw and tongue forward to open the airway.[15,16] The ideal appliances have two pieces that can be adjusted antero-/posteriorly and allow for lateral movement. (Many of my patients prefer the Panthera appliance, Fig. 5, which is made of nylon. If a patient doesn't have enough teeth for retention, then the Somnodent appliance, Fig. 6, can be utilized.)

These adjustments help improve the patency of the upper airway by increasing the dimensions and reducing the airway's ability to collapse. These adjustable appliances

Fig. 5: *Panthera appliance*

Fig. 6: *Somnodent appliance*

are preferred with bruxers to help prevent breakage. Many authorities believe that patients brux at night to open the airway after an apneic event. The term is therefore often called "sleep bruxism."

These two-piece appliances are adjusted anteriorly, either by a strap or a screw, to advance the mandible in 1mm increments or less, per U.S. Medicare guidelines. The appliances depend on an adequate number of teeth for proper retention; ideally, 10 teeth on each arch and, preferably, posterior teeth for adequate retention.

The advantages of oral appliances are that they are inexpensive, nonintrusive, easy to fabricate, removable, easy for travelling, and comfortable with a high rate of compliance.

To receive compensation from U.S. insurance companies, it's important to use only oral appliance that have been approved by the FDA. The lab fees for oral appliances are generally $200–$600.

Characteristics of good candidates for oral appliances

- Healthy teeth.
- Lack of periodontal disease.
- No significant temporomandibular jaw joint problems.
- Normal weight.
- Airway obstruction is behind the tongue.
- Diagnosed with mild to moderate obstructive sleep apnea by a sleep specialist after a hospital or home sleep study.
- Moderate to severe OSA but cannot tolerate CPAP.
- Does not respond to weight loss.
- Cannot sleep on side.
- Surgical correction of nasal or oral obstruction does not solve OSA problem.
- Patient refuses surgical treatment.

Efficacy of appliance therapy

If patients are still snoring two weeks after the oral appliance is inserted, they should be instructed to advance the mandible slightly.

In the case of the Panthera appliance, the nylon straps are changed; with the Somnodent Appliance, the screw on the side is turned. After the oral appliance has been adjusted, ask the patient two questions:

1. Are you still snoring?
2. Do you feel more rested during the daytime?

Give the patient the Epworth Sleepiness Scale again, to confirm that they are feeling more refreshed. Then give the patient the home sleep study to take home and check the efficacy of the oral appliance.

Adverse effects with oral appliances

- Excess salivation when the appliance is first inserted.
- Excessively sore anterior teeth when the mandible is moved forward.
- TMJ discomfort when the mandible is moved too far forward, too quickly.
- Posterior open bite when patient wakes up in the morning. It may take 15–30 minutes for the bite to return to normal. Permanent bite changes can occur in rare cases; patients usually do not mind because the snoring and sleep apnea problems have been stopped.

Conclusion

The prevalence of obstructive sleep apnea is exceedingly high in all first world countries, including the U.S. and Canada, because of the obesity epidemic. An estimated 25 percent of men and 9 percent of women will develop OSA in their lifetimes.[18] I believe it's the obligation of dental professionals to learn how to diagnose and treat these patients.

Thousands of patients are seeking alternative forms of treatment. Compounding this problem is that it has been estimated that 85 percent of the patients with OSA are undiagnosed by the medical and dental profession.[20] The dental profession must learn to work with the medical profession, including primary care physicians and sleep specialists, to provide the best possible health service for the severely compromised patients. ■

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