

Dental Sleep Medicine II

Barry Glassman, DMD

In the first article the basics of sleep medicine were reviewed. Normal sleep stages were outlined, and the definition and diagnostic procedures for sleep disorders were discussed.

It was emphasized that dentists can play a significant role in the treatment of patients with diagnosed obstructive sleep disorders.

Sleep medicine is a relatively new specialty in medicine. More and more studies have linked many medical complications with obstructive sleep disorders, including hypertension, stroke, myocardial infarctions, acid reflux (GERD), diabetes, and weight gain. In addition excessive daytime sleepiness resulting from sleep disturbed breathing (SDB) is often severe enough to cause accidents at work and motor vehicle accidents. Obstructive disorders tend to cause elevations in sympathetic tone, thereby causing elevated pain levels in patients with sympathetically maintained chronic pain patients. Combined with the obvious difficulty chronic pain patients have in initiating and maintaining sleep, pain and SDB can be a vicious cycle making the pain levels and the quality of life of these patients.

Snoring is at the beginning of the continuum of sleep disorders. Obviously a social issue, but our sleeping patients need to be diagnosed as to whether or not they have a more complex obstructive disorder. As stated in my first installment, treating snoring without a more complete diagnosis is not advisable. This would be comparable to treating gingivitis without probing or evaluating a dental radiograph for the more significant underlying disease process of periodontitis. In this case, however, rather than risking tooth loss, we've missed an opportunity to diagnose a more significant sleep disordered breathing condition and a possibly protecting our patient from the life threatening co-morbidities associated with obstructive sleep disordered breathing.

It has been estimated that ninety percent of all patient with obstructive sleep disorders remain undiagnosed. The reasons are numerous. The diagnosis can best be made after a polysomnogram, a laboratory controlled all night sleep study that is admittedly cumbersome and not entirely reliable and often not available. Clearly, alternative testing procedures which are available need to be considered. Family physicians often do not ask questions related to sleep, and family physicians do not see patients on a regular basis at the rate dental patients are seen by dentists. When asked why questions about sleep, such a critical aspect of health, are not included during examinations or interviews, family physicians refer to both the limited amount of time they have as well as some frustration with both the diagnostic procedures as well as the difficulties with the treatment options. It is clear that the dentist's role can be significant in helping to identify patients with SDB as well as giving the many patients who have difficulties utilizing continuous airway pressure and potentially successful alternative. The dentist can therefore play a role in both diagnosis and treatment.

THE DENTIST'S ROLE IN DIAGNOSIS

No profession has been as successful as dentistry in the field of prevention. As a result, a patient is more likely to see his dentist on a regular basis than any other health care professional. It was long ago determined that dentist could play a major role in helping to uncover potential health risks in their patients. Medical updates on six month or yearly recall visits often include questioning about basic health issues and blood pressure recordings. There is a movement in the dental and medical fields to educate dentists to ask basic questions about their patient's quality of sleep. Simply asking if patients snore and do they wake up and feel refreshed will screen patients for additional questions. Neck circumference alone has been shown to be an excellent predictor of apnea. Additional questions would be about having excessive daytime sleepiness, the presence of witnessed apneas, or difficulty in falling asleep or staying asleep.

Further questioning related to many of the co-morbidities associated with SDB may also lead the dentist to a proper referral to the sleep specialist and/or another medical specialist. These questions should not only be related to hypertension and excessive thirst, but should also include questions about oral acidity and esophageal burning. During the dental examination the dentist should look for excessive wear facets which are likely to be a combination of parafunction and oral acidity. Obvious enamel defects from acid including dentinal pooling should be noted. Often the first signs of Gastro Esophageal Reflux Disease (GERD) are odontogenic, and there is a relationship between GERD and sleep apnea, with a proposed pathophysiology related to alterations in diaphragmatic and abdominal pressure gradients.

Positive responses should lead to a referral to the sleep specialist. There are those dentists involved with dental sleep medicine who feel that the dentist should diagnose various sleep disorders and proceed with therapy. While the polysomnogram is indeed the gold standard in sleep medicine's diagnostic regimen, various home testing units are available. Many of these testing devices do in fact give valuable information. None of them, at this point in time, can evaluate EEG patterns and diagnose alterations in sleep architecture. The lack of supervision with these home testing units remains a concern, and thus at this time these testing procedures and generally considered excellent screening devices but are not considered diagnostic by themselves and are generally not at this time reimbursable by third party payers in the United States. It is this author's opinion, as well as the position of the American Academy of Dental Sleep Medicine, that while it would be in the patient's best interest to have the type of screening described above completed in a dental office or in their homes as prescribed by a dentist, it is the responsibility of the dentist to then refer his patient to a sleep specialist for diagnostic purposes. It is essential to understand that there are other sleep disorders that are not obstructive in nature that can be contributing to a patient's signs and symptoms. Making a referral with information gained from the history and/or screening testing is an excellent service we can provide for our patients.

THE DENTIST'S ROLE IN TREATMENT

It is generally accepted that the gold standard of treatment for patients with sleep apnea is the use of continuous positive airway pressure (CPAP). This effective therapy utilizes positive airway pressure to create a pneumatic air splint reducing pharyngeal compliance. The amount of pressure required for each patient is determined in a titration procedure in the sleep lab. While it is a very effective therapy, patient compliance remains the most difficult obstacle to successful treatment. Despite recent improvements which include an a change from constant pressure to alternating pressures for inhalation and exhalation (called BiPAP), the addition of warm air humidifiers, smaller more portable and more quiet units, compliance after six months on many studies is well below fifty percent. Patient's report problems with the fitting of the mask, air leakage and skin reactions to the air pressure, stomach bloating, claustrophobia, noisy machines, and total inconvenience.

Options to CPAP use include either a surgical procedure or the use of an oral appliance. Surgery options were at one time very often utilized. While the reported rate of success for the various surgical procedures vary, there is a significant level of pain associated with the most common procedure (uvulopalatopharyngoplasty) and the most recent rates of success measured at six months are often reported to be below fifty percent, with the percentage dropping over time. A laser assisted procedure was very commonly used, but has been essentially abandoned due to a lower level of success. Other procedures include bimaxillary orthognathic surgery and, in severe cases, tracheostomies.

In 1995 a landmark study by Schmidt-Norwarwa reported that the use of oral appliance therapy was effective for mild to moderate sleep apnea. More recent studies have shown successful therapy for severe apnea in some cases. In addition, many sleep specialists consider the use of oral appliance therapy in primary snoring and upper airway resistance syndrome the treatment of choice. Many patients who use CPAP successfully use oral appliance therapy for traveling or in combination with their CPAP, allowing lower pressures to be more effective. When given the alternatives, many patients who are CPAP non-compliant choose the oral appliance as their treatment of choice. The long term compliance of oral appliance therapy is much higher than that of CPAP. Clearly, oral appliance therapy plays a significant role in the treatment of patients with obstructive sleep disorders.

The method of action of the oral appliance is now well understood. By maintaining the mandible in a forward posture the base of the tongue is pulled forward through the action of the genioglossus muscle. At the same time, action on the tensor veli palatine muscle is initiated through the attachments of the base of the tongue through the mandible and the ptergomandibular raphe. In addition, the alteration in the compliance of the pharynx with oral appliance therapy indicates a change in the tone of the pharyngeal musculature during sleep, including REM sleep in which the musculature would normally be most compliant. MRI studies of the pharynx with the oral appliance in place demonstrates increases in the airway in the lateral dimension. Thus the appliance is doing more than simply pulling the tongue forward and creating a decreased possibility of obstruction at the junction of the base of the tongue and the soft palate. The fact is that most often the obstructions that a patient suffers is at more than one site, and the oral appliance remains

effective in those cases. In addition, the oral appliance keeps the mandible from dropping open, another cause of pharyngeal compliance.

Specific training is required to treat patients with sleep disordered breathing. The dentist should understand the nature of the patient's dysfunction and should work in a coordinated fashion with the sleep specialist. The dentist should discuss at length the possible side effects of oral appliance therapy which include excessive salivation, temporomandibular joint pain, muscular pain and soreness, morning maladaptive mandibular posture, and dental occlusal changes. Treatment of these side effects involve both joint and muscular therapy, the use of a leaf gauge upon wakening, and palliative therapeutic measures. Oral appliances require specific supervision in both patient adaptation as well as proper titration of the mandibular advancement.

SUMMARY

Obstructive sleep disorders have the potential to negatively alter our patient's quality of life. Not only can the associated snoring be disruptive to the sleeping pattern of the bed partner, but excessive day time sleepiness, altered sleep architecture, and the co-morbidities of hypertension and cardiac disease, stroke, and GERD can further debilitate our patients and not only decrease their quality of life but significantly decrease their life span. The vast majority of patients with sleep disorders breathing are not so diagnosed. The dentist has the potential to be a major factor in both initiating diagnostic procedures and playing a major role in the treatment of these patients.