In this issue of the Sleep HealthCenters® Newsletter, we discuss the use of oral appliances as an alternative therapy for patients with obstructive sleep apnea. Dr. Lockerman’s article and related case study outline the use of oral appliances, addressing their mechanism of action, success rates and complications. Oral appliances are one of several tools available for the treatment of obstructive sleep apnea and can be customized, depending on the severity of the patient’s disorder as well as patient preference.

In addition, we introduce the opening of our newest location in South Weymouth.

As always, we welcome your comments. Please feel free to contact us if we can be of any assistance.

Sincerely,
David P. White, MD
Corporate Medical Director
Sleep HealthCenters®, LLC

Oral Appliances in the Treatment of Obstructive Sleep Apnea
Larry Z. Lockerman, DDS

Dr. Lockerman is a practicing dentist on the staff of Sleep HealthCenters®. He is Credentialed by the Certification Board of the Academy of Dental Sleep Medicine and is a Diplomate of the American Board of Orofacial Pain. He is an Instructor of Surgery at the University of Massachusetts Medical School. He has 20 years of experience in teaching and treating patients with OSA. His practice solely deals with the non-surgical management of patients with obstructive sleep apnea with oral appliances and the management of chronic TMJ, face, head and neck pain.

Obstructive Sleep Apnea (OSA) is a common disorder that causes daytime sleepiness and increases the risk of developing hypertension and possibly other cardiovascular diseases such as stroke and heart failure. In OSA, the upper airway collapses repeatedly during sleep due to the interaction between the size of the airway and the changes in muscle tone accompanying sleep. OSA patients have smaller airways than those without OSA. With the onset of sleep the muscles of the airway, including the tongue (genioglossus), relax and can occlude the airway. The lack of air exchange during occlusion causes the oxygen level to drop. This stimulates attempts to breathe, which trigger arousal from sleep. The arousal returns tone to the genioglossus and other airway muscles and they resume their normal position. This cycle of short interrupted sleep prevents the person from attaining restful sleep. People with OSA are constantly tired and usually snore loudly.

How can Obstructive Sleep Apnea be managed?
Management and treatment for OSA falls into two categories: medical or surgical therapy. Medical management includes continuous positive airway pressure (CPAP) and oral appliance management, as well as behavioral modification such as weight loss. Surgical treatment includes a variety of surgeries on the soft tissues of the throat and maxillofacial reconstruction surgery. The first line therapy for moderate to severe OSA is CPAP. Patients with mild to moderate OSA do well with CPAP or an oral appliance. Surgery is usually reserved for patients who do not tolerate CPAP or an oral appliance or in rare cases of life-threatening OSA. An oral appliance is also an effective treatment for people who snore but don’t have OSA.

How Does an Oral Appliance Work?
There are two types of oral appliances: mandibular advancement devices and tongue retaining devices. The mandibular advancement devices are the most commonly used dental appliances and are similar to an orthodontic retainer except that they are not used to move teeth. They work by changing the way the lower jaw meets the upper jaw during sleep. The appliance holds the lower jaw in a forward position creating more space at the back of the tongue and throat for air flow. The appliance anchors onto the upper jaw and advances the lower jaw. The lower part of the device is moved forward over several weeks to allow the jaw muscles to adapt to the new position. The appliance has an adjustable hinge or connector apparatus allowing for some side-to-side jaw movement. MRI and cephalometric x-ray studies have shown that mandibular advancement oral appliances increase the diameter of the pharyngeal airway (Sleep 2003; 26:440-45. Sleep 2001; 24:554-60). Tongue retaining devices use a suction bulb at the opening of the mouth to hold the tongue forward during sleep, preventing collapse of the posterior airspace.

What does an oral appliance look like?
Dental appliances are small, easy to wear and weigh only a couple of ounces. Their size makes them easy to travel with. After a few weeks most people are completely comfortable with the appliance.
A NIH-funded study examining the long-term effects on quality of life, neurocognitive function, sleepiness and mood of using Continuous Positive Airway Pressure (CPAP) to treat sleep apnea. The Sleep Health Center® affiliated with Brigham and Women's Hospital is recruiting patients age 18-85 with a history of sleep apnea and who have been diagnosed with obstructive sleep apnea (OSA) in the past. Patients must have a history of moderate to severe obstructive sleep apnea (apneic events per hour without the oral appliance and 18/hour with the device). Wearing the old oral appliance provided some benefit, but the patient was still unable to tolerate CPAP and found his device easy to use and preferred to continue treatment with an oral appliance.

Impressions were made and he received a new adjustable oral appliance that allowed for mandibular movement while it was worn. After a few adjustment visits, a repeat polysomnogram was done with the new appliance and his Apnea/ Hypopnea Index was down to 3/hour, well within the normal range. He felt rested in the morning and described the new appliance as being much more comfortable. After a short time with the new appliance his symptoms resolved.

**Research Activities**

Sleep Health Centers® and their related research affiliations are actively recruiting patients for the following studies:

**Apnoea Positive Pressure Long-Term Efficacy Study (APPLES)**

A NIH-funded study examining the long-term effects on quality of life, neurocognitive function, sleepiness and mood of using Continuous Positive Airway Pressure (CPAP) to treat sleep apnea. The Sleep Health Center® affiliated with Brigham and Women's Hospital is recruiting patients age 18-85 who have been diagnosed with obstructive sleep apnea (OSA) in the past. Patients must have a history of moderate to severe obstructive sleep apnea (apneic events per hour without the oral appliance and 18/hour with the device). Wearing the old oral appliance provided some benefit, but the patient was still unable to tolerate CPAP and found his device easy to use and preferred to continue treatment with an oral appliance.

The patient had moderate OSA that responded to treatment with an oral appliance after an initial unsuccessful trial with CPAP. He originally received an oral appliance that was not adjustable. Over time, changes in the patient's muscle tone required repositioning of the mandible. Use of an adjustable appliance reestablished airway patency during sleep, maintained patient comfort and allowed for further adjustment if needed. Designing the most versatile, comfortable oral appliance that can be modified to enhance efficacy is a high priority for our sleep centers.

**Apnea/Hypopnea Index**

A polysomnographic sleep study was done at Sleep Health Centers® and showed that he had 27 apneas/hypopneas events per hour without the oral appliance and 18/hour with the device. Wearing the old oral appliance provided some benefit, but the patient was still unable to tolerate CPAP and found his device easy to use and preferred to continue treatment with an oral appliance.

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**Restless Legs Syndrome**

A research study investigating a new mode of positive pressure therapy for the treatment of Cheyne-Stokes respiration during sleep. The Sleep Health Center® affiliated with Brigham and Women's Hospital is recruiting patients age 18-85 with restless legs syndrome. The study involves clinic visits and four overnight sleep studies over a 14-week period. Compensation is available.

**Heart Failure and Cheyne-Stokes Respiration**

A research study investigating a new mode of positive pressure therapy for the treatment of Cheyne-Stokes respiration during sleep. The Sleep Health Center® affiliated with Brigham and Women's Hospital is recruiting patients age 18-85 with congestive heart failure (LVEF< 40%). The study involves one home study and up to four overnight studies in our sleep lab.

**SleeP Health Centers® Newsletter**

**CEO Corner**

Paul S. Valentine
President and Chief Executive Officer

We are pleased to announce that Sleep Health Centers® is opening its sixth sleep disorders center in South Weymouth, Massachusetts. The new center will be located at the Stetson Building at 541 Main Street, South Weymouth, Suite 318. We believe that this new facility will make our services more accessible to your patients. With four facilities located in proximity to Route 128, from the South Shore to the North Shore, and two facilities located in Boston, your patients should have little trouble visiting one of our centers.

The Sleep Health Center® at Weymouth will offer six quiet bedrooms with full-size beds and full private bathrooms. Each study will be completed using state-of-the-art diagnostic equipment. In addition, patients will be able to visit our medical clinic, as well as our CPAP clinic if applicable, in the same location. The clinic and sleep lab opened on September 29, 2003.

**What are the risks of appliance management?**

More than 25 different types of appliances are available for OSA management. Dentists must consider the efficacy and safety of the various appliances since they will be used for many years. Improper appliance selection can contribute to the development of problems. Changes in bite as well as muscle and temporomandibular joint (TMJ) pain have been documented with long-term use of mandibular advancement appliances for the treatment of OSA (Sleep 2001;24:531-7). TMJ problems, as well as occlusal changes, can result from even small amounts of mandibular advancement. Only 70% mandibular advancement may be sufficient and further advancement may displace the tongue anteriorly and collapse the airway (JADA, 2001;122:339-47) in some cases. The success of an oral appliance can also be related to sleep posture, since sleeping on one’s back can reduce the efficacy of an appliance (Sleep 2001;24:538-44) in some patients.

**Who should I see to get an Oral Appliance?**

Patients with severe OSA who either cannot tolerate CPAP or desire an alternative form of treatment should be considered for an oral appliance. Satisfaction with oral appliance therapy is greater than with CPAP and studies have shown that patients are more likely to agree to use the oral appliance than CPAP if both are effective (Thorax 1997;52:362-8).

**Specialists and training needed**

A dentist experienced in the use of oral appliances should perform a complete dental exam to look for current or potential dental problems and insure proper appliance fit and type. The American Academy of Sleep Medicine recommends that the treating dentist must be capable of treating TMJ Disorders. Dentists who specialize in the use of oral appliances undergo additional training then must pass the Certification Board of the Academy of Dental Sleep Medicine. Patients at Sleep Health Centers® are first evaluated by a sleep medicine specialist to make the diagnosis of OSA and decide on the type of treatment. Those electing treatment with an oral appliance undergo a thorough dental evaluation to detect TMJ or other preexisting problems. After being fitted for a custom-made oral appliance, they are closely followed for response to therapy and detection of any problems. Once advancement is complete, they undergo a follow-up sleep study to document the effectiveness of therapy. Almost all medical plans cover oral appliance management for OSA.

**What is the introduction to the services we will be offering there?**

If you have a patient in the South Shore area that you would like us to see, you may contact our scheduling office at 877-SLIEPHT (1-877-753-3742). We look forward to servicing you and your patients from this new location.