Capitol Sleep Medicine
Newsletter

Timothy J. Walter, M.D.
Uma Marar, M.D.

April 2009 • Volume 4 • Number 4

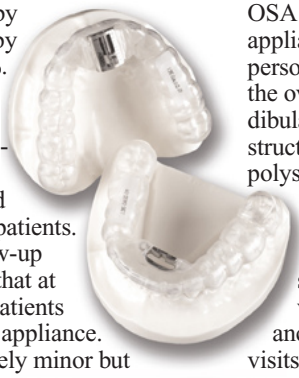
1-800-SNORING • P: 614-317-9990 • www.CapitolSleepMedicine.com

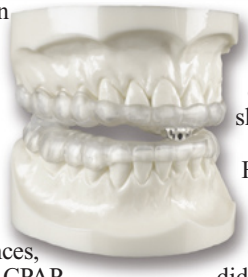
OSA and Oral Appliances

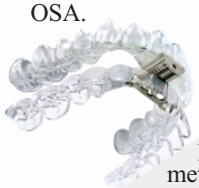
For patients with a diagnosis of obstructive sleep apnea (OSA), continuous positive airway pressure (CPAP) is considered to be the gold standard in regards to treatment efficacy. Other treatment options include weight loss, oropharyngeal surgery, treatment of nasal congestion, and the use of mandibular advancement devices that increase the caliber of the airway during sleep by advancing the jaw forward.[1] The rationale regarding the use of mandibular advancement devices is that by advancing the jaw forward, the base of the tongue may also be advanced forward away from the posterior oropharyngeal wall. These devices may also increase the volume of the effective oropharyngeal airway at the level of the velopharynx, or the more superior area of the posterior oropharynx that is more commonly occluded by the soft palate in patients with OSA. In most patients, it is the vibration of the soft palate against the velopharynx that leads to snoring and hypopneas, while complete obstruction can lead to frank apneic events.

What is the real efficacy of the use of mandibular advancement devices in patients with OSA? An evidence-based review of literature regarding use of oral appliances in the treatment of snoring and obstructive sleep apnea from 1995 until 2006 evaluating 87 publications determined that the efficacy of oral appliances in decreasing the apnea-hypopnea index to less than 10 per hour was an average of 52% of treated patients. Effects on sleepiness and quality of life were also demonstrated, but improvements in other neurocognitive outcomes were not consistent in this review. Treatment adherence was variable with patients reporting using the appliance a median of 77% of nights at 1 year. Minor tooth movement and small changes in the occlusion developed in some patients after prolonged use.[2]

Another comprehensive review of 89 publications performed between 1982 and 2006 involving a total of 3,027 patients regarding the use of oral appliance in the treatment of OSA found that the success rate, defined as the ability of the oral appliances to reduce apnea/hypopnea index to less than 10, is 54%. The response rate, defined as at least 50% reduction in the initial apnea/hypopnea index (although it still remained above 10), is 21%. When only the results of randomized, crossover, placebo-controlled studies are considered, the success and response rates were 50% and 14%, respectively. Snoring was reduced by 45%. In the studies comparing oral appliances to CPAP therapy or to uvulopalatopharyngoplasty (UPPP), CPAP therapy reduced the initial AHI by 75%, an oral appliance by 42%, and UPPP by 30%. Use of oral appliances diminished subjectively reported daytime somnolence as the Epworth sleepiness score dropped from 11.2 to 7.8 in 854 patients. A summary of the follow-up compliance data shows that at 30 months, 56-68% of patients continued to use an oral appliance. Side effects were relatively minor but frequent. The most common ones were excessive salivation and tooth discomfort. Efficacy and side effects depended on the type of appliance, degree of protrusion, vertical opening, and other settings. The conclusion of this literature review was that oral appliances, although not as effective as CPAP therapy in reducing sleep apnea, snoring, and improving daytime function, have a definite role in the treatment of snoring and OSA.[3] Some authors have concluded that treatment success with oral appliance therapy appears to depend not only on anterior titration of the mandibular position to enlarge the upper airway, but also on the amount of change in the size of the upper airway in response to mandibular advancement.[4] In other words, there is likely a subset of patients with a diagnosis of OSA who have a specific type of oropharyngeal airway, jaw, and tongue anatomy who are more likely to benefit from treatment with an oral device than other patients with OSA.







In 2006 the American Academy of Sleep Medicine published a paper on practice parameters regarding the use of oral appliances in the treatment of patients with OSA. This paper states that oral appliances are indicated for use in patients with mild to moderate OSA who prefer them to CPAP therapy, or who do not respond to, are not appropriate candidates for, or who fail treatment attempts with CPAP therapy. CPAP therapy is indicated whenever possible for patients with severe OSA before considering oral appliances. Oral appliances should be fitted by qualified dental personnel who are trained and experienced in the overall care of oral health, the temporomandibular joint, dental occlusion and associated oral structures. Follow-up polysomnography (Type 1 polysomnogram) or an attended cardiorespiratory (Type 3 polysomnogram) sleep study is required to verify efficacy once the device is utilized, and may be needed when symptoms of OSA worsen or recur. Patients with OSA who are treated with oral appliances should return for regular follow-up office visits with both the dentist to monitor patient adherence, evaluate device deterioration or maladjustment, and to evaluate the health of the oral structures and integrity of the occlusion.[5] Regular follow up visits with the sleep medicine physician are also recommended.

How far should the mandible be anteriorly advanced? In one study of 55 patients with mild to moderate OSA, a more pronounced (75% of maximum) mandibular advancement did not show a greater improvement over a more modest (50% of maximum) advancement for patients with mild to moderate OSA.[6] Another study echoed this sentiment by postulating that the changes in overbite might be lessened by keeping the bite opening to a minimum.[7]

Management of OSA with an oral appliance should only be handled by a dentist who is trained and experienced in the overall care of oral health, temporomandibular joints, and dental occlusion.[8] The initial diagnosis of OSA should be done through polysomnography evaluated by a board certified sleep medicine physician and if medically indicated, an initial trial with CPAP therapy is recommended. As there is now a sleep medicine board certification process for dentists provided by the American Board of Dental Sleep Medicine (ABDSM), should an oral appliance be indicated, treatment by a dentist who possesses board certification by the ABDSM is recommended.

1 Sleep Med Rev. 1998 Aug;2(3):163-74.
2 Sleep. 2006 Feb 1;29(2):244-62.
3 Sleep Breath. 2007 Mar;11(1):1-22.
4 Am J Orthod Dentofacial Orthop. 2004 May;125(5):548-55.
5 Sleep. 2006 Feb 1;29(2):240-3.
6 Acta Odontol Scand. 2003 Dec;61(6):356-62.
7 Eur J Orthod. 2003 Aug;25(4):371-6.
8 J Mass Dent Soc. 2006 Summer;55(2):18-20.