

Oral Appliances and Sleep Disordered Breathing

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Background- Oral appliances are increasingly being used now a day as one of the important treatment strategies for sleep disorders. Most of the treating physicians are unaware of their role in treatment for sleep disorders.

Objective- The authors reviewed medical and dental literature dealing with available oral appliances and their role in treatment for sleep disorders

Results-The authors found that oral appliances are indicated for use in following cases⁵:

1. Patients with primary snoring or mild OSA who do not respond or are not appropriate candidates for treatment with behavioural measures such as weight loss or sleep position change
2. Patients with moderate to severe OSA who are intolerant of ,or refuse treatment with nasal CPAP
3. Patients who refuse or who are not candidates for tonsillectomy and adenoidectomy, cranial facial operations or tracheostomy

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Presently more than 38 oral appliances are commercially available. Two appliance categories have been documented as being effective in this therapy: tongue-retaining devices, or TRDs, which retain the tongue anteriorly by means of an extraoral suction bulb, and mandibular advancement devices, or MADs, which retain the mandible anteriorly by means of dental anchorage. The basic mode of function of these oral appliances is to prevent the tongue from approaching the posterior wall of the pharynx and causing an obstruction⁴.

Tongue –retaining devices were first described in 1982. They consist of hollow bulb supported by trays that fit over the maxillary and mandibular teeth or edentulous ridges². To prevent the tongue from approaching the posterior wall of the pharynx, the patient projects the tip of the tongue into a hollow bulb, thereby creating a

suction which retains the tongue in an anterior position (Figure 1). Advantages of the TRDs over MADs are that TRDs can be used on edentulous patients³, require minimal or no adjustment and cause minimal sensitivity in teeth or in the temporomandibular joint. Tongue-retaining devices are effective in offsetting fluctuation of genioglossal muscle activity and in treating patients with obstructive sleep apnoea, or OSA.



Fig 1: TRD

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Mandibular advancement devices were first described by Robin in 1934. At present many models are available. They may be fixed position, with no allowance for adjustability for advancement or retrusion of the mandible, or adjustable. Almost all MADs require that the patient have a sufficient number of teeth so the device will be highly retentive, generally on both arches but atleast on the maxillary arch. Adjustable oral appliances are generally preferred because they can be adjusted in an anteroposterior direction until an acceptable level of symptom improvement has occurred, while teeth or temporomandibular joint sensitivity is controlled. With either a fixed or adjustable device, the initial position of mandible is generally approximately 70 % to 75% of maximum protrusion relative to maximum retrusion.

Clasp Retained Mandibular Positioner (Figure 2)

This appliance is a type of fixed MADs and use multiple clasps to positively lock the mandible into the appliance and prevent it from retruding. Because it is a one-piece appliance, vertical dimension could be controlled by changing the height of the appliance.

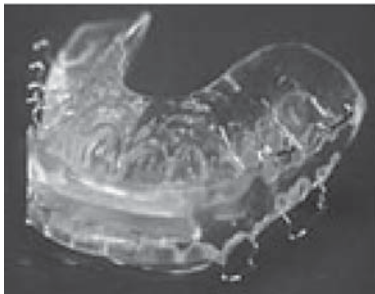


Fig 2: Clasp Retained Mandibular Positioner

SomnoGuard 2.0 (Figure 3)

One-part thermoplastic mandibular advancement device to treat snoring and mild to moderate obstructive sleep apnoea. Appliance consists of a hypoallergenic thermoplastic body. After heating the appliance in water that has been boiled the thermoplastic co-polymer becomes soft and mouldable. While soft, the appliance is fitted to the upper and lower jaws and once cooled it is ready to be worn at night. This has thicker molar area, which helps in faster fitting and is easier for those patients with a “deep bite”.



Fig 3 : SomnoGuard 2.0

Role of Oral Appliances in Sleep Disordered Breathing

The upper airway is basically a soft tissue tube, the patency of which is maintained in part by the activity of muscular groups of which the tensor veli (Tenses soft palate) and genioglossus muscles (Protrude and retracts the tongue) are highly important members. When patient falls asleep in the supine position; with muscle relaxation, the base of the tongue approaches the posterior wall of pharynx and causes obstruction in airflow to lungs resulting in OSA. To counteract it, there is increase in airflow velocity causing vibration of soft tissues (like Uvula). This vibration is the sound of snoring¹. Oral appliance keeps the soft tissue from collapsing and interrupting normal breathing patterns. The purpose of the oral appliance may be to reposition the lower jaw, tongue, soft palate, and hyoid bone into a certain position, to keep the airway open with stabilization of the tongue and jaw, or to provide artificial muscle tone to prevent collapse and resulting airway blockage.

In the oropharynx the palatoglossus and palatopharyngeus are active in controlling airway dimension. As the mandible is advanced, the muscles are spread apart, causing tension on palatoglossus . This tension is transferred to the soft palate, thus reducing vibrations and in turn snoring.

Disadvantages

Few side effects have been noted in some cases, although these were described as being only “mildly disturbing”. Listed side effects were mucosal dryness, tooth discomfort, jaw soreness, and excessive salivation. These side effects usually passed within a few hours of waking and removing the appliance. The symptoms usually passed completely in well under 3 weeks. It is universally recognised that it is essential the appliances be individually designed and custom fitted for each patient

by qualified professionals in order to be optimally effective.

Conclusion

Oral appliances plays an important role in treatment strategies for sleep disordered breathing especially in patients intolerant to CPAP and patients with primary snoring and mild OSA and physicians should take full advantage of this modality of treatment for greater benefit of their patients.

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