The Durability of Intraoral Devices for Snoring and Sleep Apnea

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Dental devices for the treatment of snoring and sleep apnea are actively promoted by seminars, laboratory mailings and trade magazines. General practitioners are encouraged to incorporate the use of dental devices for the treatment of snoring and sleep apnea into their practices. Patients and the medical and dental professions find these devices convenient to use and easy to fabricate. Palatal surgery or the use of the cumbersome continuous positive airway pressure devices may also be avoided.

In my practice, I have encountered significant problems with 2 of these dental devices because of device breakage and defects arising due to the stresses of bruxism and the muscular forces at work when such devices are worn overnight. In one case the device failure was critical; the patient awoke with a large segment of heavy-duty wire in his pharynx, which could have led to serious medical consequences if inhaled or swallowed.

Dental devices should be chosen only after consultation with a medical practitioner and, where possible, referral to a physician specializing in sleep disorders. Commonly, overnight polysomnography is done to measure variables such as blood oxygen levels, respiratory rate and movements during an overnight sleep study. When baseline data are collected in this way, proper case selection can be made and the effectiveness of a dental device examined by a subsequent follow-up sleep study with the device in place. Dental devices are best prescribed for patients with mild to moderate sleep apnea and may not be effective in all cases.

A variety of intraoral appliances are available, and guidelines and information about their use are freely available.[1-3] In Canada, 2 devices are actively promoted — the Klearway, devised by Lowe, and the Silencer, devised by Halstrom. Both devices provide an improved airway size and reduce or eliminate snoring and apnea by repositioning the mandible forward, which pulls the tongue forward and alters the configuration of the oropharynx. Both devices are manufactured by Aurum Laboratories.

The main feature of the Klearway device is a series of arch wires connected to a heavy-duty expansion screw in the palatal area. The clinician usually sets the device at approximately 60% maximum mandibular protrusion by using a bite registration procedure. The device has clear thermoplastic bite rims similar to the nightguards used in bruxism appliances and protective athletic mouthguards. The bite rims are interconnected by arch wires. When the device is heated in hot water and inserted, the patient's mandible is protruded and the patient should notice some immediate relief of sleep problems. Instructions are always provided on the proper insertion and removal of the device, and the patient is instructed on how to open the expansion screw with a key such that the mandible can be moved forward in 0.25-mm increments twice a week until symptoms such as snoring at night and sleepiness during the day are alleviated.

In several patients, flange tears have been seen in an area on the upper rim on the lingual aspect of the upper molars. This area is where the arch wires are embedded in the rim and must be vulnerable to forces generated when patients try to brux, or the tear could simply be the result of the tendency for the mandible to pull back against the protrusive forces. The tear can be repaired by the laboratory and the area reinforced with extra cross wires and thickened resin. The repair work can lead to some frustration if the patient lives out of town and a few days go by without the device. Patients rapidly begin to depend on these devices because they feel so much better, and of course their partners appreciate the tranquillity.

When a Klearway device from a middle-aged man of heavy build who had a strong oral musculature and who was an active bruxer showed flange tears, the tears were repaired and the device returned to the patient. Subsequently, the patient reported waking in the night with one of the cross arch wires located in his throat. Following these 2 incidents it was decided to discontinue the use of this type of device with this patient. A Silencer device was then fabricated with a durable titanium hinge located in the incisor area. This device has proven to be more durable in this and several other cases, and no further problems were reported.

Both types of appliance have been used successfully with a variety of patients. Initially, the tears seen on the upper rim of Klearway devices appeared to be associated only with large

males who were heavy bruxers; however, more recently, a petite female with a history of bruxism produced the same defect. Only one case has been observed in which a structural failure involving an arch wire has occurred. I would appreciate hearing from others who have had experiences with durability problems. The Silencer device would seem to be more durable, with a titanium pin being the main connector between the upper and lower arches. However, in 2 recent cases, the inter-arch pin that holds the mandible in protrusion sheared, leaving the thread in the titanium attaching plate. This posed no threat to the individual but rendered the device useless.

In conclusion, dental devices for the treatment of snoring and sleep apnea are designed to be used every night, and durability is therefore a very important issue. Considerable forces are generated during bruxism, clenching and other parafunctional behaviours. Removing the devices can also generate stresses depending on retentiveness; each case is unique. Most snorers and sleep apnea sufferers are overweight and middle-aged and show evidence of bruxism. Practitioners are advised to carefully inspect every device for sturdiness before use. Once a device is given to the patient, a regular recall program must be instituted to inspect the device for defects. The ongoing effectiveness of the device for alleviating the sleep disorder must also be monitored, with referral back to the physicians involved. ➧

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