MINIMALLY INVASIVE TREATMENTS OF SNORING AND SLEEP APNEA

OVERVIEW

The past decade has seen the rise of effective, minimally-invasive treatments for patients with snoring and/or OSA who have failed to respond to medical interventions. Some of these treatments are discussed below.

NASAL TREATMENTS

In cases where nasal obstruction is present, and felt to contribute to snoring or sleep apnea, interventions directed towards this area may be appropriate. Minimally-invasive treatments have been designed to address the inferior turbinates.

Inferior Turbinates

The inferior turbinates are highly vascular structures that extend from the front of the nose along the side of the nasal floor all the way back towards the opening into the throat (nasopharynx). These are the only structures within the nasal cavity that freely swell and shrink on a routine basis (the nasal cycle). When these structures are enlarged (hypertrophied), especially at the front of the nose, they can cause significant functional obstruction. In many instances patients with inferior turbinate hypertrophy can be managed with medical and allergy treatments. In other cases surgical reduction of the inferior turbinates may be indicated.

Treatment of the inferior turbinates is a matter of some controversy. Some authors advocate inferior turbinate sacrifice as an almost routine treatment of nasal obstruction; others categorically advise against surgical reduction because of the risk of atrophic rhinitis. In our view, there should be a balanced approach. A thorough search to determine the cause of nasal obstruction is essential, and that cause should be addressed. The proper treatment of nasal obstruction is not simply turbinectomy. By the same token, it is unlikely that the inferior turbinates are immune from pathologic conditions; turbinate hypertrophy must be recognized. A
graduated stepwise approach to the inferior turbinates is prudent. It is possible that atrophic rhinitis does develop in some patients after inferior turbinectomy, so we undertake this procedure with great caution. Also, newer techniques have been designed specifically to limit the incidence of atrophic rhinitis.

The advent of radiofrequency devices (Somnus Medical Technologies Inc., Sunnyvale, CA; Coblation Corp., California) to reduce the size of the inferior turbinates has been a significant advance providing a conservative procedure that may be performed with the patient under local or general anesthesia as an alternative to more aggressive approaches. Radiofrequency (RF) volumetric tissue reduction uses radiofrequency heating to induce submucosal tissue destruction, leading to reduction of tissue volumes. The RF generator (Somnus Medical Technologies) is connected to a specialized single-use delivery tip and handpiece. The tip is a 22-gauge electrode, 4 cm long; the active portion is 1 cm, and the remaining 3 cm is insulated. Two thermocouples allow constant temperature feedback at the location of treatment and in the surrounding tissue, thereby limiting mucosal injury. Topical and infiltrative anesthesia is used. To avoid tissue shrinkage, some surgeons prefer not to use vasoconstrictive agents, which could increase the risk of mucosal injury. Under direct vision, we place the RF electrode in the anterior-inferior portion of the turbinate, with several millimeters of the inactive portion in contact with the mucosa to avoid mucosal injury. We then deliver the RF energy at a specified energy setting. Measure the temperature at the delivery site constantly, and modulate the rate of energy delivery to ensure a maximal temperature of less than 75°C. This allows the procedure to be performed with the patient under local anesthesia, without pain. Time and experience have shown that the recommended energy levels create a submucosal injury that causes favorable tissue shrinkage. Often a second lesion immediately posterior to the first is both safe and effective. Several authors have suggested that it is reasonable to expect 70% to 80% subjective improvement in patients treated with this technique.

While RFA of the inferior turbinates appears to be effective for many patients, there is a risk of minor and major complication. One paper recently reported the case of a patient who suffered orbital apex syndrome and subsequent blindness after RFA treatment of the turbinates.\(^1\)
A submucosal resection of the turbinate may also be performed as a minimally invasive method to treat the inferior turbinates. With newer techniques using powered instrumentation, the submucosal tissues of the inferior turbinate which provide the bulk of the turbinate can be removed in a fairly atraumatic fashion with a resultant decrease in the overall size of the turbinate. Another technique involves resection of the lateral aspect of the turbinate along with the bony concha. We tend to reserve this latter technique for patients with severe turbinate hypertrophy. All of these newer techniques, however, are designed to preserve the inferior turbinate’s physiological functions of warming, lubricating, and air-conditioning are preserved. Submucosal resection may also be complemented by outfracture of the turbinate bone. This maneuver is a very effective means to open the nasal airway; however, it is best performed under general anesthesia.

**ORAL TREATMENTS**

**Pillar Procedure**

Recent years have seen the introduction of minimally invasive procedures – radiofrequency ablation\(^2\) and the Pillar Procedure – with increased efficacy and decreased patient recovery time and morbidity. In the appropriate patient, these procedures may have a large positive impact.

The Pillar Procedure, for example, is performed under local anesthesia and takes around 20 minutes to perform in the clinic setting with most patients. Several studies have shown a significant decrease in patient snoring intensity with associated decreases in daytime sleepiness and significant improvements in lifestyle after patients underwent the Pillar Procedure. Other studies have demonstrated patient and bed partner satisfaction with the reduction in snoring after the Pillar Procedure at 80% or higher\(^3\)\(^-\)\(^4\). Studies of patients with OSA demonstrate approximately 80% of patients with a reduction in their AHI (sleep index), and results were sustained at one year after palatal implants/Pillar Procedure\(^5\)\(^-\)\(^7\)\(^8\)\(^9\)\(^10\). Another study has documented significant improvement in snoring and sleep apnea with insertion of palatal implants in patients who had failed surgical intervention with prior uvulopalatopharyngoplasty\(^11\).
The data in support of the Pillar Implant as an effective, minimally invasive treatment for patients with snoring and/or OSA continues to grow.

Palate Treatments

While the bulk of data seems to support the safety and efficacy of the Pillar Implants for snoring and sleep apnea, the past few decades have also seen the rise of radiofrequency treatments for OSA and snoring. Many surgeons around the world have suggested the use of radiofrequency ablation (RFA) on the palate as a minimally-invasive treatment option. A recent review of 30 articles published between 1998 and 2008 found that while RFA treatments for snoring appeared relatively safe, there was insufficient evidence to support the claim that this treatment method is effective over the long-term\textsuperscript{12}.

CONCLUSION

Snoring can have a significant impact on the quality of life of patients and their bed partners. Recent years have seen the arrival of some minimally invasive procedures for snoring which appear to be quite effective and promising. These treatments, however, are individualized to each patient’s anatomy and should be carefully reviewed with a patient’s treating physician.


