

who cannot tolerate CPAP, other treatment options should be offered. Mandibular splints and surgery are valid alternatives.

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Treatments for snoring in adults

Introduction

Adult patients who snore are currently classified into four, albeit imperfect, groups including simple snoring, mild obstructive sleep apnoea, moderate obstructive sleep apnoea and severe obstructive sleep apnoea. This excludes more complex conditions such as central sleep apnoea and obesity-hypoventilation syndrome.

Moderate to severe obstructive sleep apnoea is associated with sudden death and significantly increased cardiovascular risk. Effective treatment with continuous positive airway pressure (CPAP) reduces this risk. There is also some evidence, although less well recognised, for surgery and the use of mandibular splints. To manage complicated cases, a multidisciplinary clinical team may be required.

Simple snoring and mild obstructive sleep apnoea are less likely to be associated with significant adverse cardiovascular events, but are still treated if patients are concerned socially or if they are excessively tired or waking unrefreshed.

Patients presenting with snoring need to be comprehensively assessed. This includes a history of - snoring (loudness, duration, average number of nights per week), partner witnessed sleep apnoeas,

sleep hygiene (sleep times), waking refreshed or unrefreshed, sleeping position (supine, lateral or prone), daytime somnolence (symptoms), motor vehicle or industrial accidents, nasal symptoms, thyroid symptoms, previous treatments (device, surgical) and outcomes, weight, partner or social disruption, cardiovascular comorbidities, including family history and full cardiovascular assessment, physical examination, and sleep study.

Lifestyle modifications

Weight

Obstructive sleep apnoea is strongly associated with obesity and the importance of weight loss is well recognised. Personal trainers and dietitians can help patients with weight problems and concomitant cardiovascular risk factors, as well as surgical patients in whom subsequent weight gain or regain would be detrimental. Healthcare plans, such as the Enhanced Primary Care plans, can be highly advantageous in promoting shared care and follow-up of weight loss.

Bariatric surgery should be considered a valuable treatment, particularly when the body mass index exceeds 35 (surgical treatment for snoring is less effective for these patients). It may also be an option for obese patients who

cannot tolerate CPAP.

Alcohol and other lifestyle factors

Alcohol consumption exacerbates snoring, and reducing or giving up alcohol should be advised. Other factors increasing cardiovascular risk such as smoking, diabetic control, hypertension and hypercholesterolaemia need to be addressed. Excessive daytime somnolence may relate to other sleep and medical disorders such as hypothyroidism, which can exacerbate sleep symptoms or fatigue.

Positional treatments

Sleeping on the side or in a more upright position rather than supine or prone is sometimes recommended but lacks strong evidence.

Over-the-counter remedies

As a general rule, over-the-counter remedies have limited proven efficacy in the treatment of snoring. Certainly significant sleep apnoea needs to be excluded before trialling such remedies. Nasal strips may prove useful in establishing the degree of reversibility of dynamic external nasal valve collapse before pre-phase nasal surgery.

Continuous positive airway pressure

CPAP is the gold standard treatment for moderate to severe obstructive sleep apnoea and is a viable treatment option in simple snoring and mild obstructive sleep apnoea. It can be applied via a nasal mask (with or without nasal pillows) or full face mask, and a fixed or fluctuating pressure can be used. A functional nasal airway is an absolute requirement for CPAP, and in many

instances medical (usually nasal sprays), immunological (allergy desensitisation) and surgical treatments for the nose may be necessary.

Compliance

Estimates suggest that 30% or more of patients cannot or will not use CPAP in the long term. These patients can be considered for either counselling to promote CPAP use, contemporary surgical airway reconstruction or a mandibular advancement splint.

Mandibular advancement splint

This is an intraoral appliance designed to improve or cure snoring by increasing the retrolingual airway and, due to the tongue's attachment to the soft palate via palatoglossus and overlying mucosa, may even improve the retropalatal airway. A mandibular advancement splint can relieve up to 90% of simple snoring and mild obstructive sleep apnoea cases, but long-term compliance rates are generally only around 50–60%.

A mandibular advancement splint is a viable alternative in moderate to severe obstructive sleep apnoea when CPAP has failed, but success rates are considered less. In some instances, surgery and device use may be combined to improve efficacy, but mostly single modality treatment is preferred. It is appropriate for patients with moderate to severe disease to undergo a sleep study with a fitted mandibular advancement splint in situ to establish device efficacy.

Recent evidence supports appropriate fitting of devices by trained dentists rather than the so-called 'boil and bite'

self-fitted splints. Annual follow-up with a dentist to reduce temporomandibular adverse effects is generally advised.

Pre-phase nasal surgery

Pre-phase nasal surgery is designed to facilitate subsequent treatments such as CPAP. It is rarely intended to cure snoring in isolation. It may involve a combination of septoplasty or septal reconstruction, turbinate reduction, functional endoscopic sinus surgery, external nasal valve or tip surgery, rhinoplasty and rarely in adults, adenoidectomy. Many patients require ongoing treatment with steroid nasal sprays and salt water rinses, even after nasal surgery, to maintain optimal nasal patency.

Surgical options

Surgery is a valid treatment option in sleep disordered breathing, although health professionals are often uncertain about when and who to refer. Conditions to refer patients with snoring or obstructive sleep apnoea for surgery are - failed continuous positive airway pressure or device use, favourable anatomy for surgery e.g. tonsillar hypertrophy, patient desires surgery/unwilling to use device, patient requires pre-phase nasal treatment to facilitate further therapies, significant craniofacial abnormalities (maxillofacial surgeon).

Surgical treatment options are multiple and often staged, despite patient perceptions that a single procedure will be curative. Tonsil and tongue size have implications for surgery. In patients with large tonsils (grade 3 or 4) and favourable tongue size (small – grades 1 or 2), modified uvulopalatopharyng-

oplasty with bilateral tonsillectomy should be considered. Some lesser tonsillar grades and unfavourable tongue sizes may still be considered for modified uvulopalatopharyngoplasty and radiofrequency ablation when device use has failed and where positional snoring manoeuvres and other findings suggest improvement or cure can be achieved.

In patients with less favourable tonsillar size and palatal anatomy, transpalatal advancement with uvulopalatopharyngoplasty has proven efficacious in increasing the size of the retropalatal airway, and reducing critical closing pressure. This will often be combined with multichannel tongue radiofrequency or radiofrequency and lingual tonsillectomy or tongue reduction (such as submucosal lingualplasty) or genioglossus advancement (tongue tensing operation), depending on expert assessment by a specialist trained in contemporary airway reconstruction techniques.

Maxillomandibular advancement, performed by skilled maxillofacial surgeons, remains a surgical option. It may be appropriate in device use failure or rejection where either soft tissue surgical techniques have resulted in incomplete cure or significant craniofacial structural anomaly exists precluding soft tissue surgical protocols.

Conclusion

Sleep disordered breathing, including snoring and obstructive sleep apnoea, represents a heterogeneous condition and as such requires multidisciplinary input. It can have significant adverse health consequences and for patients