

Adult snoring: Clinical assessment and a review on the management options

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Abstract

Simple snoring is common in the UK and the estimated prevalence is 14% to 50%. It can be a frustrating problem for patients and partners alike. It is vital to differentiate simple snoring from obstructive sleep apnoea as the clinical management differs for these two conditions. This article highlights the assessment of an adult presenting with snoring and reviews the current literature in the management of troublesome snoring.

CASE REPORT

A 45-year-old man presents to the clinic along with his partner who complains of his excessive snoring habit forcing her to sleep in a separate room.

HISTORY

Simple snoring is common in the U.K and the estimated prevalence is 14% to 50% 1,2. It can be quite frustrating for partners and patients alike. Snoring is the sound produced by the vibration of the upper airway walls in the presence of partial airway obstruction. The common areas of vibration in descending order are the soft palate, supraglottis, tonsils, tongue base and epiglottis³. Aggravating factors include obesity, male gender, smoking, excessive alcohol consumption, increasing age and reflux disease⁴⁻⁶. A thorough history is important to aid the clinician plan appropriate management.

WHAT SHOULD YOU COVER IN THE HISTORY?

1. Duration of snoring?

2. How severe is it?

Is it audible in the same room, anywhere in the house or a disturbance to other guests in a hotel?

3. Is the snoring positional?

Snoring usually occurs when patients lie in the supine position.

4. Is there a history suggestive of sleep apnoea?

It is vital to ascertain coexisting obstructive sleep apnoea (OSA) i.e. witnessed apnoeic attacks, nocturnal choking, daytime somnolence, early morning headaches, or

poor concentration as OSA will require further management which includes continuous positive airway pressure (CPAP).

5. Are there symptoms of nasal disease?

Nasal airway obstruction is a contributing factor to snoring and if identified should be dealt with appropriately.

Therefore the history should elicit symptoms of chronic nasal obstruction (deviated nasal septum, enlarged inferior turbinates) runny nose or postnasal drip (Chronic Rhinitis, nasal polyps).

6. Are there any aggravating factors?

Smoking (active or passive), excessive alcohol consumption (> 20 units/ week) history of recent increase in weight or collar size and/or symptoms of gastro oesophageal reflux disease.

7. Has any conservative treatment measures been tried before?

Eg: weight loss, Mandibular advancement prosthesis or nasal valve strips.

8. Past medical history

Does the patient suffer from cardiovascular (hypertension, arrhythmias, angina) or respiratory (COPD) diseases that may pose an anaesthetic risk?

WHAT SHOULD YOU COVER IN THE EXAMINATION?

Examination of the nose is important to assess nasal airway patency. Anterior rhinoscopy may reveal a deviated nasal septum, collapsed nasal valve, inferior turbinate hypertrophy or nasal polyps.

Examination of the oral cavity and oropharynx may identify large palatine tonsils, redundant soft palate or an elongated uvula.

A flexible nasoendoscope is used to perform a detailed assessment of the nasal cavity, nasopharynx and hypopharynx. This may identify adenoidal tissue, small postnasal space, prominent tongue base, large floppy epiglottis, enlarged lingual tonsils or lax pharyngeal mucosa.

With the nasoendoscope in position, a Müllers manoeuvre^{7,8} is performed i.e. forced inspiration against a closed nasal and oral airway. This may demonstrate the extent of airway collapse at different levels. However this manoeuvre is rarely used in isolation to select patients for snoring surgery.

MEASUREMENTS

At initial consultation, the height and weight of the individual is recorded and the body mass index (BMI) calculated. In patients with a BMI of >30, any form of snoring surgery is less effective as they are likely to present with OSA with multi-segmental or tongue base collapse.

SYSTEM REVIEW

The examiner should be aware of potential complication of OSA (arrhythmia, low oxygen saturation or hypertension) and if suspected, clinical evaluation should include examination of the cardiovascular and respiratory systems.

The patient is asked to complete an Epworth sleepiness scale (ESS). The ESS score is extremely variable when sequentially recorded and may not differentiate patients with simple snoring and obstructive sleep apnoea⁹. Studies reveal that a combination of clinical assessment, BMI and ESS score can be used to rule out nonapnoeic snorers with a sensitivity of 93% and specificity of 60%¹⁰.

WHAT INVESTIGATIONS SHOULD YOU PERFORM?

The examiner should rule out concomitant obstructive sleep apnoea (OSA) and in subjects with a low index of suspicion, an overnight pulse oximetry recording is organised.

However if there is a high index of suspicion, the patient is referred for sleep studies. Polysomnography remains the gold standard investigation for OSA.

SLEEP NASOENDOSCOPY

This was first described in 1991^{11,12} and is commonly performed in the U.K. It involves sedating the patient with an infusion of propofol until they reach a state of snoring. The examiner then visualises the upper airway with a nasoendoscope to identify areas of obstruction. The technique is carried over in the presence of an anaesthetist with continuous cardiac monitoring and appropriate resuscitation equipment.

The two main disadvantages of this procedure are that induced sleep may not correlate well with natural sleep and currently there is no standardised protocol for sedation. Therefore studies report a significant variation of results between patients and centres^{13,14}.

IMAGING

A variety of imaging techniques have been used in an attempt to delineate areas causing airway obstruction with limited value¹⁵. These include cephalometry, CT, MRI and somnoflouroscopy. MRI can be used in wake or asleep patients to obtain midline sagittal and cross sectional views of the upper airway. However imaging is not frequently used in the U.K due to its major limitations.

WHAT TREATMENT SHOULD YOU OFFER?

Treatment for snoring without OSA should be tailored to every individual. Treatment includes conservative management and operative interventions. Conservative measures include weight reduction, smoking cessation and reducing alcohol intake^{16,17}. Failure to address these factors initially limits the chance of a successful outcome.

Mandibular advancement prosthesis is widely used for snoring and they work on the principle of protruding the mandible and tongue forward and therefore increasing the width of the oropharyngeal and hypopharyngeal airway. Studies have shown the device to be an effective long-term solution for snoring and mild to moderate OSA¹⁸. The advantages of this appliance are its easy availability, reversibility and cost effectiveness.

SURGERY

Surgery for coexisting nasal pathology

Poor nasal airflow is implicated in the severity of snoring

therefore it is important to address nasal obstruction before contemplating any form of snoring surgery¹⁹. This may include septoplasty, nasal polypectomy and submucous diathermy or trimming of inferior turbinates.

UVULOPALATOPHARYNGOPLASTY (UPPP)

UPPP was first described in 1964 and involves excision of a strip of soft palate and uvula along with tonsillectomy^{20,21}. This is followed by suturing of the anterior and posterior tonsillar pillars. Studies report a high short-term success rate of up to 95% however its long-term success rate decreases to 45 %²². This observation associated with a high complication rate (pain, haemorrhage, nasal regurgitation and voice changes) makes UPPP less favourable compared with other procedures.

PALATOPLASTY TECHNIQUES

Palatal flutter is one of the most common sites of snoring production and over the years several procedures have been designed to address this anatomical area. Surgery on the soft palate can be divided into palatal softening and palatal shortening procedures.

PALATAL STIFFENING TECHNIQUES

The procedure involves laser excision of a longitudinal strip of mucosa from the soft palate and uvula²³. Healing by fibrosis results in stiffening of the soft palate and increases oropharyngeal airway. Radiofrequency tissue volume reduction (somnoplasty) is a newer technique²⁴, which uses low-temperature energy to produce submucosal necrosis and scar formation of the soft palate.

The main advantages of this procedure are it can be performed under local anaesthetic and involves minimal postoperative pain. Other techniques developed include diathermy and coblation assisted uvulopalatoplasty, laser palatoplasty with excision of the uvula and soft palate cautery.

PALATAL SHORTENING PROCEDURES

Laser assisted uvulopalatoplasty was introduced in 1993 by Kamami and was originally described as an outpatient procedure performed under local anaesthetic²⁵. It involves vertical incisions placed in the soft palate followed by laser vaporisation of the uvula. To avoid excess removal of palatal tissue, the procedure was performed up to 5 times each separated by a 4 to 6 week interval. Postoperative results are similar to UPPP with an early success rate of 79% and long-term rates of 55%²⁶.

UVULOPALATAL ELEVATION PALATOPLASTY

This method uses laser to excise a strip of mucosa from the soft palate and uvula followed by creating lateral palatal incisions²⁷. It releases the soft palate and allows the uvula to fall anteriorly over the denuded surface of the palate. The uvula is then secured with sutures.

Other palatal procedures performed with varying degrees of success include injection snoroplasty²⁸, uvulopalatal flap²⁹ and palatal implants³⁰. Occasional procedures for snoring have also been described on areas such as the tongue base, epiglottis, trachea and maxilla³¹⁻³⁴. Most of the published literature on these techniques are pilot studies and based on subjective criteria only.

CONCLUSIONS

Snoring is a common problem in the U.K and one of the main challenges for otolaryngologists remains in the exact localisation of the site of snoring. The examiner should rule out coexisting OSA as this has significant treatment implications. Sleep nasoendoscopy as an investigation tool needs further validation. Early success rates following palatal surgery are promising but these outcomes seem to deteriorate with time.

QUESTIONS

1) The most common anatomical structure implicated in the aetiology of snoring are the Tonsils True/ False

(False. Correct answer: soft palate)

2) Continuous Positive Airway Pressure is the treatment of choice for obstructive sleep apnoea True/False

(True)

3) Sleep Nasoendoscopy is the gold standard investigation for diagnosing Obstructive sleep apnoea True/False

(False. Correct answer: Polysomnography)

4) The Epworth sleepiness score alone can be used as a reliable tool to distinguish snoring from obstructive sleep apnoea True/False

(False)

5) Current evidence suggests that uvulopalatopharyngoplasty has a favourable outcome in patients treated for snoring True/False

(False)

KEY REFERENCES

Quinn SJ, Daly N, Ellis PD. Observation of the mechanism of snoring using sleep nasoendoscopy. *Clinical Otolaryngology and allied sciences*. 1995; 20: 360-4.

Lim PVH, Curry AR. The role of history, Epworth sleepiness score and body mass index in identifying non apnoeic snorers. *Clinical Otolaryngology and allied sciences*. 2000; 25: 244-8

Hicklin LA, Tostevin P, Dasan S. Retrospective survey of long term results and patient satisfaction with Uvulopalatopharyngoplasty for snoring. *Journal of Laryngology and Otology*. 2000; 114:675-81

Sandhu GS, Vattas A, Whinney D, Kotecha B, Croft CB. Somnoplasty for simple snoring- a pilot study. *Clinical Otolaryngology and allied sciences* 2003; 28:425-9.

Smatt Y, Ferri J Retrospective study of 18 patients treated by maxillomandibular advancement with adjunctive procedures for obstructive sleep apnoea syndrome. *J Craniofac Surg*. 2005 Sep; 16(5): 770-7.

References

1. Woodhead CJ, Allen MB. Obstructive sleep apnoea in adults presenting with snoring. *Clinical Otolaryngology* 1991; 16:401-5
2. Ah-See KW, Banham SW, Carter R, Stewart M, Robinson K, Wilson JA. Systematic analysis of snoring in women. *Annals of Otolaryngology, Rhinology and Laryngology* 1998; 107:227-31
3. Quinn SJ, Daly N, Ellis PD. Observation of the mechanism of snoring using sleep nasoendoscopy. *Clinical Otolaryngology and allied sciences*. 1995; 20: 360-4.
4. Franklin KA, Gislason T, Omenaas E, Jogi R, Jensen EJ, Gunbjornsdottir M et al. The influence of active and passive smoking on habitual snoring. *American journal of respiratory and critical care medicine*. 2004; 170: 799-803
5. Khoo SM, Tan WC, Ng TP, Ho CH. Risk factors associated with habitual snoring and sleep disordered breathing in a multi-ethnic Asian population. A population based study. *Respiratory medicine*. 2004; 98: 557-66
6. Konermann M, Radu HJ, Teschler H, Rawart B, Heimbucher J, Sam BM. Interaction of sleep disturbances, gastroesophageal reflux and chronic laryngitis. *American Journal of Otolaryngology*. 2002; 23:20-6.
7. Borowiecki B, Sassini J. Surgical treatment of sleep apnoea. *Archives of Otolaryngology* 1983; 109:508.
8. Sher AE, Thorpy MJ, Shprintzen RJ, Spielman AJ, Burack B, McGregor PA. Predictive value of Muller manoeuvre in selection of patients for Uvulopalatopharyngoplasty. *Laryngoscope* 1985; 95:1483-7.
9. Osman EZ, Osborne J, Hill PD, Lee BW. The Epworth sleepiness scale: can it be used for sleep apnoea screening among snorers. *Clinical Otolaryngology and allied sciences*. 1999; 24:239-41
10. Lim PVH, Curry AR. The role of history, Epworth sleepiness score and body mass index in identifying non apnoeic snorers. *Clinical Otolaryngology and allied sciences*.

2000; 25: 244-8

11. Croft CB, Pringle M. Sleep nasoendoscopy: a technique of assessment in snoring and obstructive sleep apnoea. *Clinical Otolaryngology* 1991; 16:504-9
12. Camilleri AE, Ramamurthy L, Jones PH. Sleep nasoendoscopy: what benefit to the management of snorers? *Journal of Laryngology and Otology* 1995; 109:1163-5
13. Takeda K. Sleep nasoendoscopy and selection of surgical treatments for simple snoring and sleep apnoea syndrome. *Journal of the medical society of Toho University* 1998; 45(2): 250-9
14. Marais J. The value of sedation nasoendoscopy: a comparison between snoring and non-snoring patients. *Clinical Otolaryngology* 1998; 23:74-6.
15. Jäger L, Gunther E, Gauger J, Reiser M. Fluoroscopic MR of the pharynx in patients with obstructive sleep apnoea. *American Journal of Neuro-Radiology* 1998; 19:1205-14
16. Wenzel M, Schonhofer B, Siemon K, Kohler d. Nasal strips without effect on obstructive sleep apnoea and snoring. *Pneumologie* 1997; 51(12): 1108-10
17. Braver HM Block AJ, Perri MG. Treatment for snoring. Combined weight loss, sleeping on side and nasal spray. *Chest* 1995; 107(5): 1283-8.
18. Jauhar S, Lyons MF, Banham SW. Ten- year follow up of Mandibular advancement devices for the management of snoring and sleep apnoea. *Journal of Prosthetic dentistry* 2008 April; 99(4): 314-21.
19. Woodhead CJ, Allen MB. Nasal surgery for snoring. *Clinical Otolaryngology* 1994; 19:41-4
20. Ikematsu T. Study of snoring, 4th report: Therapy. *Journal of Oto-Rhino-Laryngological society of Japan* 1964; 64:434-5.
21. Fujita S, Conway W, Zorick F, Roth T. Surgical correction of anatomic abnormalities in obstructive sleep apnoea syndrome: Uvulopalatopharyngoplasty. *Otolaryngology head and neck surgery* 1981; 89:923-34.
22. Hicklin LA, Tostevin P, Dasan S. Retrospective survey of long term results and patient satisfaction with Uvulopalatopharyngoplasty for snoring. *Journal of Laryngology and Otology*. 2000; 114:675-81
23. Ellis PDM, Ffowcs Williams JE, Shneerson JM. Surgical relief of snoring due to palatal flutter: a preliminary report. *Annals of the Royal College of Surgeons of England* 1993; 75:286-90.
24. Sandhu GS, Vattas A, Whinney D, Kotecha B, Croft CB. Somnoplasty for simple snoring- a pilot study. *Clinical Otolaryngology and allied sciences* 2003; 28:425-9.
25. Kamami Y-V. Laser CO2 for snoring: preliminary results. *Acta Oto-rhino-larngologica Belgica* 1990; 44:451-6.
26. Berger G, Finkelstein Y, Stein G, Ophir d. Laser assisted uvuloplasty for snoring. Medium to long-term subjective and objective analysis. *Archives of Otolaryngology- Head and neck Surgery*. 2001; 127:412-7.
27. Wilde AD, Swift AC. A day case procedure for treating simple snoring. *Clinical Otolaryngology* 1995; 20:486.
28. Brietzke SE, Mair EA. Injection snoroplasty: extended follow up and new objective assessment. *Otolaryngology and Head and Neck surgery*. 2003; 128: 605-15.
29. Neruntarat C. Uvulopalatal flap for snoring on an outpatient basis. *Otolaryngology and Head and Neck Surgery*. 2003;129:353-9.
30. Ho WK, Wei WI, Chung KF. Managing disturbing snoring with palatal implants. A pilot study. *Archives of Otolaryngology and Head and Neck surgery*. 2004; 130:753-8.
31. Fischer Y, Khan M, Mann WJ. Multilevel temperature controlled Radiofrequency therapy of palate base of tongue and tonsils in adults with obstructive sleep apnoea.

Laryngoscope 2003; 113: 1786-91

32. Thatcher GW, Maisel RH. The long-term evaluation of tracheostomy in the management of obstructive sleep apnoea. Laryngoscope 2003; 113: 201-4

33. Woodson BT. A tongue base suspension suture for

obstructive sleep apnoea and snorers. Otolaryngology and Head and Neck Surgery. 2001; 124: 297-303.

34. Smatt Y, Ferri J Retrospective study of 18 patients treated by maxillomandibular advancement with adjunctive procedures for obstructive sleep apnoea syndrome. J Craniofac Surg. 2005 Sep; 16(5): 770-7.

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