Snoring

Snoring is noisy breathing caused by vibration of relaxed soft tissues of the nose, soft palate or pharynx whilst sleeping or drowsy.

Epidemiology

- Snoring affects around 40% of the UK population [1] [2].
- It is more common in men although the ratio in the literature varies.
- It is most common between the ages of 40-60.
- Prevalence in children is lower, with rates between 1-20% being quoted in children of school age [3]. In children it is most commonly due to adenotonsillar enlargement or craniofacial abnormalities. In the preschool age group, prevalence has been reported in one UK-based study as 7.9% for habitual snoring, with atopy and respiratory infections being common causes [4]. Nearly 60% of the children in this study were reported as having snored at some point in the previous 12 months.

Aetiology

The snoring sound can be generated at one or more levels:

- In the nose.
- At the level of the soft palate and uvula.
- At the level of the pharyngeal wall and tonsils.
- At the base of the tongue.

There is lack of consistency in definitions used for snoring and sleep-related breathing disorders. However, essentially [5]:

- Snoring is the description of the noisy breathing made during sleep.

- Simple snoring is the presence of snoring without irregular breathing and hypoxia causing daytime sequelae. However, there is evidence that it is not an entirely benign condition and may be associated with cardiovascular morbidity as well as psychological and social problems.
- Obstructive sleep apnoea/hypopnoea syndrome (OSAHS) is the presence of irregular breathing in the night followed by sleepiness during the daytime[6]. There is total upper airway collapse, with cessation of airflow for at least 10 seconds, occurring >5 times per hour[7]. Obstructive sleep apnoea/hypopnoea (OSAH) or obstructive sleep apnoea (OSA) is disrupted irregular breathing without daytime sleepiness. However, these terms are often used interchangeably within the literature.
- Most people with OSA snore. The prevalence of OSA in people who snore varies widely in the literature from 20-70%, reflecting differences in definition and diagnostic rates[8].
- It may well be that the two conditions are at opposing ends of a continuum.
- The upper airway resistance syndrome (UARS) has been described as potentially another condition on this spectrum where there are respiratory effort-related arousals during the night, but no associated hypoxia[9].

There is a separate article discussing Obstructive Sleep Apnoea Syndrome.

Snoring is not usually due to an underlying disorder, but the following may predispose by causing narrowing of the upper airway:

- Obesity. There is a strong association between increasing weight and the prevalence of OSA. This association is present but less strong for snoring[10]. Those with a body mass index (BMI) of over 40 kg/m^2 have been calculated to have a 27 times increased risk of OSA.
- Hypothyroidism.
- Acromegaly.
- Nasal congestion, blockage or septal deviation.
- Enlarged tonsils and adenoids.

- Craniofacial abnormalities.

Other factors which may make snoring more likely include:

- Alcohol intake.
- Sedative medication.
- Smoking.
- Supine position.
- Age (prevalence increases with age generally).

History

Cover the following questions:

- Duration of snoring?
- Frequency - is it every night?
- Is snoring more likely in any particular position? (For most people it is worse when they sleep on their back.)
- Any precipitants/modifiable factors - alcohol, sedatives, a recent increase in weight?
- Any history of nasal problems/obstruction?
- Does it disturb the patient's sleep?
- Does it disturb the partner's sleep? What are the relationship effects?
- Has the partner noticed any apnoeic episodes?
- Is there daytime somnolence? When using the Epworth Sleepiness Scale a figure of 10 or more is considered sleepy. This scale has been validated for OSA, which is important to be excluded [11].
- Are there any other symptoms suggestive of OSAHS, including early morning headaches, choking episodes during sleep, accidents, inability to concentrate and irritability?

Examination

- Calculate BMI.
- Record collar size: neck circumference >43 cm correlates with snoring and OSA [2].
- Perform a good general examination: cardiovascular system, respiratory system and thyroid gland.
- Note whether the site of obstruction is apparent: nasal (eg, polyps, septal deviation), tongue, tonsils and oropharynx, mandible (retrognathia).

Investigations

- Arrange sleep studies (polysomnography) if OSA is suspected, especially if surgery is contemplated for snoring (see under 'Management', below) as palatal surgery may reduce the options for OSA treatment.
- Nasendoscopy (awake, sedated and/or asleep) or acoustic analysis of the snoring usually helps to clarify the level of obstruction. It can exclude upper airway tumours and cysts as a rare cause [12].
- Pharyngeal manometry may be appropriate in some cases [13].
- Perform TFTs if hypothyroidism is suspected.

Management

There is limited evidence for all forms of management, both non-surgical and surgical. Ascertaining any cause or predisposing factors will be helpful in improving efficacy of the advice, device or procedure offered.

Non-surgical

- Encourage weight loss as appropriate.
- Lifestyle advice: more exercise, less alcohol, fewer sedatives, stop smoking.

- Posture adjustment and sleep position training: for example, a tennis ball taped to the back of pyjamas to stop the patient rolling on to the back. Bed wedges and pillows may also help.
- Earplugs for the partner [14].
- Decongestants and steroid nasal sprays can help nasal congestion.
- Devices that splay the nasal alae may help nasal obstruction. Nasal strips and nasal dilators are available commercially. There has not been sufficient research to ascertain if these are beneficial, and if so which type is more effective.
- For those who snore due to mouth-breathing, chin straps (to keep the mouth closed) or vestibular shields (essentially closing off the mouth and forcing breathing through the nose) may be of benefit.
- Oral appliances can advance the soft palate, tongue or mandible and therefore open the airway. Mandibular advancement devices may help if snoring is generated from the tongue base or in mouth breathers. These are best fitted by a dentist but choice of device and adequate training of dentists are important for this form of treatment to be effective [15] [16].
- Continuous positive airway pressure (CPAP) often works well but may not be readily available for those without OSA.
- Some people find acupressure rings worn on the fingers help. These are advertised commercially, but there are no robust trials into their efficacy.

Surgical

Those with normal or near-normal BMI do best. The procedure performed depends on the level of obstruction:

Nasal surgery

- Septoplasty.
- Polypectomy.
- Turbinate reduction.

Sometimes the above procedures are carried out in combination.

Adenotonsillectomy

- The most frequent surgical treatment for snoring in children but used for those children who also have OSA or recurrent tonsillitis [3].
- Also done in adults where enlarged tonsils are demonstrably the cause of snoring [17].

Palatal surgery [18]

- Uvulopalatopharyngoplasty (UPPP): involves tonsillectomy, reorientation of the anterior and posterior tonsillar pillars and excision of the uvula and posterior rim of the soft palate.
- Laser-assisted uvulopalatoplasty (LAUP): a tissue-sparing approach may result in a better outcome [19].
- Radiofrequency electrosurgery: radiofrequency ablation (delivered using an electrode) reduces volume of palatal tissue and makes the remaining palate more dynamically stable. It is an outpatient procedure usually under local anaesthetic. National Institute for Health and Care Excellence (NICE) guidance in 2014 noted lack of evidence for long-term outcomes, but sufficient evidence for short-term efficacy [18]. NICE suggests that patient selection is important and, if used, there should be arrangements for audit, consent and research. One series following up 29 patients concluded that the procedure produced long-term benefits in one in four patients and that patient selection may be improved by prior electromyography of the palatoglossus muscle [20]. One systematic research concluded that if soft palate surgery is performed, minimally invasive procedures such as radiofrequency therapy should be preferred [13].

- Soft palate implants: implants are inserted in the soft palate under local anaesthetic with the aim of stiffening the soft palate over weeks, due to fibrosis. NICE guidance in 2007 suggests that this procedure should only be carried out in context of research, due to lack of well-controlled evidence, and it should be reserved for patients who snore but do not have episodes of apnoea or hypopnea[21]. A subsequent review stated that of 99 patients receiving a soft implant, a reduction in snoring intensity was seen three months following treatment. A random controlled trial had found long-term benefit over a three-year period. Extrusion was a complication. The use of rigid implants conferred no additional benefit[13].

Tongue base procedures

- Tongue base reduction (laser).
- Mandibular advancement and osteotomy.

Other points

- Uvulectomy may help patients with a large uvula.
- Tonsillectomy with adenoidectomy may be helpful in children.
- Surgery is not usually recommended in patients with both snoring and OSA, except nasal surgery to facilitate CPAP. This is due to lack of evidence and the efficacy of CPAP.

Complications

Owing to the variation in the literature of definitions and prevalence rates of snoring and OSA, it is difficult to ascertain the complications which arise from snoring alone. Some term it a benign condition but there is some evidence that it may cause the following complications.

Social

- Marital/relationship problems.
- Embarrassment in social situations, staying with friends, holidays.

Psychological

- Difficulty concentrating.
- Anxiety and depression. It is difficult to ascertain how prevalent this is for simple snoring without OSA but there does appear to be some increase in symptoms of anxiety or depression [22] [23].

Physical

- Sleepiness due to sleep disruption.
- Sleepiness in others being disturbed by snoring.
- There is evidence that habitual snoring may carry an increased risk of coronary heart disease and stroke [24]. However it remains contentious whether this applies to snoring alone, or to snoring in the presence of OSA. It appears that those who snore have a higher risk of carotid atherosclerosis than those who do not [25].
- A Korean study found that snoring was an independent risk factor for pre-diabetes and type 2 diabetes [26].
- Effect on safe driving. Patients with OSA who drive should inform the Driver and Vehicle Licensing Agency (DVLA). Full details, including a link to the DVLA guidelines, are available from the separate Obstructive Sleep Apnoea Syndrome article.

Further reading

- Campos AI, Garcia-Marin LM, Byrne EM, et al; Insights into the aetiology of snoring from observational and genetic investigations in the UK Biobank. Nat Commun. 2020 Feb 14;11(1):817. doi: 10.1038/s41467-020-14625-1.
- Fischer R, Kuehnel TS, Vielsmeier V, et al; Snoring: is a reliable assessment possible? Eur Arch Otorhinolaryngol. 2020 Apr;277(4):1227-1233. doi: 10.1007/s00405-020-05813-2. Epub 2020 Feb 3.

Last updated by: Dr Laurence Knott 16/03/2021	
Peer reviewed by: Dr Hayley Willacy, FRCGP 16/03/2021	**Next review date:** 15/03/2026

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