



## Snoring and Obstructive Sleep Apnea

### Introduction

Snoring affects 37 to 87% of adults and 20 to 28% of children. Snoring is generated from the soft palate hitting the back wall of the throat. The intensity of snoring is directly related to the resistance of airflow in the upper airway. The important issue is to distinguish patients who are habitual (social) snorers from those who snore as a result from obstructive sleep apnea (OSA).

### Definition

A patient is said to suffer from OSA if he or she stops breathing during sleep for more than 10 seconds at a time more than 5 times each hour of sleep. The more apneic episodes a patient experiences, the more severe the condition.

Patients with OSA can have up to a 20 times higher risk of suffering from hypertension, strokes and heart attacks. Many patients with OSA do not suffer obvious and dramatic symptoms and accept snoring as part of their normal sleep pattern which is why many patients go undiagnosed.

### Symptoms

1. Snoring is almost universal in patients with OSA.
2. Choking/ Gasping spells - choking or gasping spells where patients arouse themselves from sleep.
3. Restless Sleep
4. Unrefreshed Sleep – Patients commonly report feeling tired when they wake up despite adequate sleep.
5. Headache
6. Daytime Sleepiness – tendency to fall asleep at meetings, sitting in a car, etc
7. Poor Concentration
8. Behavioral changes – seen usually in children with OSA, they display behavioral changes such as irritability, temper tantrums etc.

### Signs

There is no one particular sign that distinguishes patients suffering from OSA from those that do not. However, there are signs that are common in patients with OSA.

1. **Overweight** - Many adults with snoring with or without OSA are overweight. They may have thick necks and MRI studies of neck fat have shown that this results in narrowing of the upper airway.
2. **Nasal Blockage** - blockage from allergy, polyps or deviated nasal septum increase resistance of airflow by narrowing nasal cavity.
3. **Large and obstructing tonsils and adenoids** – this is a problem seen mainly in children. The finding can be confirmed on examination of the oral cavity and nasopharyngoscopy.
4. **Tongue Prolapse** – the tongue can obstruct the airway during sleep if it is larger than usual. In some patients, the reason is a receding lower jaw that forces the base of tongue backwards and causes obstruction when the patient lies down.

### Main Effects of Undiagnosed OSA

1. **Cardiac Strain** – Repeated episodes of oxygen desaturation results in stress on the heart and vascular system, leading to hypertension, heart attack and stroke.
2. **Increased risk of Road Traffic Accidents** – Western studies show a significant risk of drivers with OSA falling asleep while driving.
3. **Poor academic performance** – Children suffering from OSA do poorly in school as a result of poor concentration from inadequate good quality sleep.
4. **Chronic Fatigue, Lethargy**

### Investigations

The gold standard test for OSA is a Polysomnogram (PSG) or Sleep Study. This can be done in a hospital or at home. A hospital-based study is a full study while a home-based study is a partial study. The partial study is sufficient to diagnose OSA. Full studies are generally required if other sleep disorders are suspected. The latest home-based sleep study devices are validated compared with the full hospital-based studies. The main advantage is the comfort and ease of use (see figure)

The Sleep Study will report the Apnea—Hypopnea Index (AHI), also known as the Respiratory Distress Index (RDI). This indicates the number of times the patient experiences episodes of apnea each hour. Less than five is normal, 5 to 15 is mild, 15 to 35 is moderate and more than 35 episodes an hour is severe. The lowest oxygen saturation is also measured. It should remain above 90%. It is considered severe if it goes below 75%.

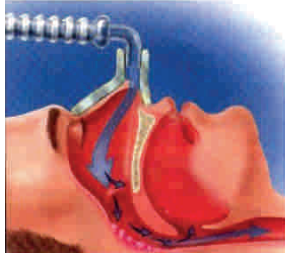


## Management

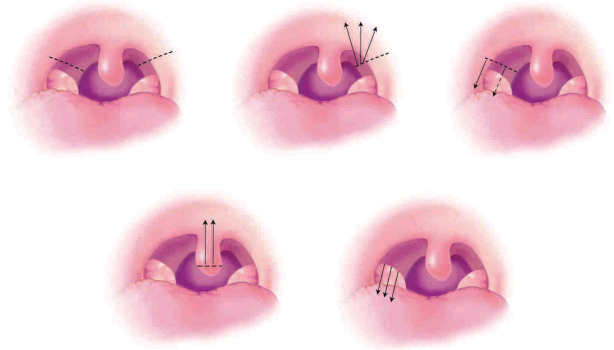
The management of OSA is fraught with controversy. This is probably because there is more than one reason for the problem. However, the options include

1. **Weight Loss** – as most patients are overweight, a weight loss program should always be included in the management plan. This can include dietary changes, medications and surgery.

2. **Continuous Positive Airway Pressure (CPAP) treatment** – upper airway obstruction during sleep occurs when the walls of the pharynx collapse when the patient breathes in. This is similar to sucking through a straw where the lumen is too small and walls too weak. The straw collapses on itself and airflow stops. This treatment involves wearing a mask over the nose and a machine generates a column of air whenever the patient breathes in. Hence, a column of ‘positive pressure’ air is pushed into the lungs rather than the patients having to suck air in. This is the best treatment for OSA if the patient can tolerate the mask. Unfortunately, this treatment does not solve the problem permanently and the patient is dependent on the machine for life.



3. Procedures performed in the clinic under local anaesthesia
  - a. **Turbinate Reduction Procedures** – the nose contributes 2/3 of the upper airway resistance and procedure to improve nasal patency improves OSA. Radiofrequency Turbinate Reduction (RTR) is the most commonly employed procedure in the clinic.
  - b. **Pillar Procedure** – this is approved for snoring and mild OSA. It involves inserting 3 polyester implants into the soft palate.
  - c. **Radiofrequency (RF) Soft Palate** – applying electrical energy to the soft palate to stiffen it.
  - d. **Coblation Assisted Upper-airway Procedure (CAUP)** – usage of coblation to create trenches in the soft palate and stiffen the soft palate. This results in actual widening of the throat and improved sleep quality.



4. Procedure performed under general anaesthesia
  - a. **Uvulopharyngopalatoplasty (UPPP)** – involves removing tonsils and tightening the soft palate. Indicated in moderate to severe OSA.
  - b. **Tonsillectomy with or without Adenoidectomy** – usually performed in children with large tonsils and adenoids as a day surgery procedure.
  - c. **Radiofrequency Tongue Base Reduction** – in some instances, a large tongue will flop backwards and obstruct the throat during sleep. Radiofrequency application to the tongue base will reduce the bulk and improve airway patency. However, this procedure is not taken lightly and patients will require overnight monitoring in a high dependency ward after surgery.
5. **Oral Appliances** – arranged by oro-maxillo-facial surgeons. The aim is to keep the tongue from obstructing the upper airway.

The aim of treatment is to achieve success in overcoming the obstruction during sleep. This can be measured with post-treatment sleep study. The criteria for success is halving the original AHI value and the AHI value must be less than 20 spells/ hour.

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