

# Obstructive sleep apnoea

## When to consider referral for surgery

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Continuous positive airway pressure is first-line treatment for obstructive sleep apnoea, but is often not well tolerated by patients. Surgery can help facilitate other therapies or provide improvement when other management options are not viable.

### Key points

- **Obstructive sleep apnoea (OSA) is very common and is associated with significant impact on patient health and partner's sleep.**
- **Continuous positive airway pressure (CPAP) is first-line treatment for OSA, but adherence can be problematic.**
- **Surgery can improve adherence of, or be complementary to, other therapies.**
- **Surgery may provide benefit where other therapies have failed.**
- **A detailed history and examination are key for selecting appropriate surgical candidates.**
- **Modern surgical techniques have evolved to preserve tissue and function with good outcomes.**



Obstructive sleep apnoea (OSA) is a highly prevalent condition affecting 2 to 9% of women and 4 to 24% of men in the western world and this number is likely to increase secondary to growing rates of obesity.<sup>1</sup> Many people with OSA remain undiagnosed and untreated. The effects of OSA are well documented with increased morbidity and mortality. The condition causes increased risk of cardiovascular disease, decreased neurocognitive function, excessive daytime sleepiness, impaired quality of life and mood disturbance. OSA may also increase a patient's risk of mortality and metabolic derangements. The impacts on their partner's quality of sleep and their relationship are also important considerations.

### Why is OSA so difficult to manage?

OSA is a heterogeneous disease, with several different phenotypes according to patient soft or hard tissue structures, body mass index and neuromuscular physiology. Diagnosis of OSA requires a thorough patient history and examination. Assessment should ideally include a dynamic flexible nasendoscopic examination of the airway (to determine correctable anatomy<sup>2</sup> and potentially uncover unsuspected pathology) and usually a good-quality high-level sleep study. Additionally, OSA often 'overlaps' with other sleep disorders or occurs concomitantly.

Tailoring treatment is complex, because a heterogeneous disease requires heterogeneous solutions and there are numerous options for management (see Flowchart). Each treatment has its merits and downsides. Options include, but are not limited to, sleep physician-directed continuous positive airway pressure (CPAP), dentist-supervised titrated mandibular advancement splint (MAS), positional devices, weight loss, medical and/or surgical nasal management and upper airways reconstructive surgery.

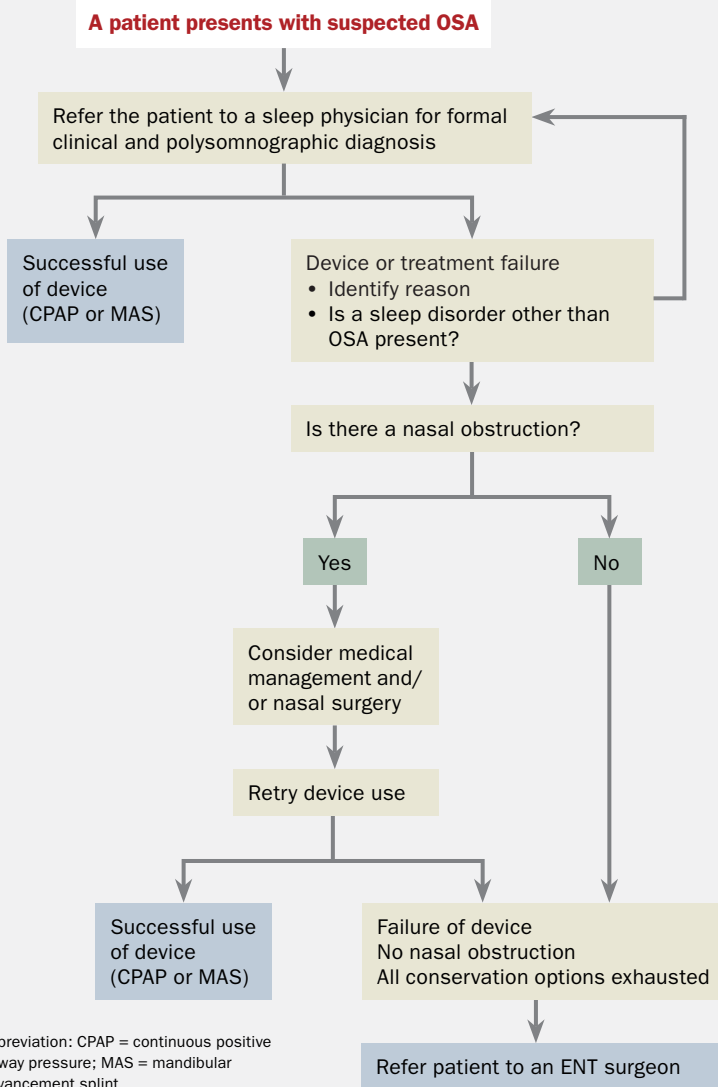
### Where does surgery fit into treatment paradigms?

The two main roles of surgery for OSA are to facilitate device use (i.e. CPAP and MAS) or as a salvage option when this fails. Optimal device use can be limited by several factors including device-specific complications, nasal obstruction, difficulty tolerating high-pressure settings,

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**TREATMENT APPROACH FOR A PATIENT WITH SUSPECTED OBSTRUCTIVE SLEEP APNOEA (OSA)**



patient preference and claustrophobia.

Generally, adherence to CPAP machines and MAS require a patent nasal airway. Nasal blockage is either caused by an anatomical problem that is usually amenable to surgical correction or inflammatory disorders that can be treated medically with topical corticosteroid sprays, nasal irrigation or immunotherapy. In some cases, a combination of surgery and medical treatment may be necessary. In patients with a patent nasal airway, device use may still not be feasible for the

reasons outlined above. In such instances, surgery can offer partial (and occasionally complete) treatment with the aim of improving symptoms and mitigating the degree of OSA severity.

**Who should be considered for surgery for OSA?**

All patients with a confirmed diagnosis of moderate or severe OSA who fail nonsurgical management, should be considered for referral to an ear, nose and throat (ENT)

surgeon with an interest in surgery for OSA (see <http://surgicalsleep.org/current-members>). If a concomitant surgical disorder such as recurrent tonsillitis or a compressive lesion is suspected then surgical opinion should be sought earlier. Patients who desire surgery or have treatable anatomy (e.g. enlarged palatine/lingual tonsils, adenoids, epiglottic collapse or macroglossia) can also be candidates, and in these patients device failure may be accepted at a lower threshold. Those with ‘simple’ snoring or mild OSA can be offered either conservative measures or surgery initially, with patient and partner preference taken into account.

**Does surgery work for OSA?**

Surgery can be successful in carefully selected patients with realistic goals of what surgery for OSA can achieve. Although it can mitigate the severity of OSA, the primary aim of contemporary airways surgery is to improve the patient’s symptoms or potentially return them to device use. The available evidence supports a role for surgery in patients with OSA to:<sup>3-9</sup>

- improve quality of life
- reduce snoring
- decrease sleepiness
- promote vigilance
- improve survival
- mitigate risks of cardiovascular disease and motor vehicle collisions
- improve the severity of OSA.

Many recent meta-analyses also substantiate a role for surgery.<sup>10-14</sup>

**What are the surgical options for OSA?**

The philosophy of surgery for OSA has changed in the past decade, with importance being placed on mucosal and functional preservation instead of tissue removal or resection. There are several surgical options for achieving stability of the upper airway during sleep. What each patient requires is highly individualised and can only be determined after taking a thorough history and examination.

In general, nasal obstruction is addressed first, if present. This may involve correcting a deviated septum, reducing the size of inferior turbinates, performing an adenoidectomy and/or stabilising any dynamic nasal

### When to refer to an ENT surgeon

- Anatomical nasal obstruction
- Failed adherence to or tolerance of device use
- Unresolvable complications of device use
- Patient with concomitant surgical disease
- Patient desires surgery\*
- Patient with favourable anatomy\*

\*Relative indication, further discussion required.

cartilage collapse. Subsequent focus is usually on the palate and tongue. Rarely the larynx and trachea have correctable anatomy. Procedures may be performed simultaneously or in a staged fashion. The most common procedure performed is a tonsillectomy combined with a modern reconstructive variant of uvulopharyngopalatoplasty (mUPPP) and some form of tongue volume reduction, usually radio frequency channeling. However, more extensive surgical options such as transpalatal advancement pharyngoplasty, midline glossectomy and submucosal lingualplasty may be required.

In Australia, all of the above mentioned procedures are available in both the public and private healthcare systems, but ideally should be performed by a surgeon with an interest in OSA. The field is ever evolving with new techniques, including implantable devices (hypoglossal nerve stimulator)<sup>15</sup> and horizontal technologies that hold promise in appropriately selected patients.

### What are the complications of surgery for OSA?

Most complications in current surgery for OSA arise during the two-week postoperative recovery period. Pain is the most frequent symptom, because it can be caused by common functions such as swallowing, talking and coughing. It often peaks at postoperative days four to seven before subsiding, during which time oral intake is a challenge. Patients often lose weight and are encouraged to keep it off, because weight loss will likely improve outcomes.

Bleeding risk is similar to that of tonsillectomy (about 4%). Generally, with modern techniques, long-term issues with surgery such as velopharyngeal insufficiency (i.e. incomplete closure of the velopharyngeal sphincter between the oropharynx and the nasopharynx allowing food and fluid to enter the nasal cavity), altered voice and injury to taste and tongue function are uncommon. There are other risks specific to each surgery, but discussion of these is beyond the scope of this article. Should surgery fail to achieve the desired result despite a good postoperative examination, patients can undergo evaluation of their airways while in a chemically induced sleep (drug-induced sleep endoscopy) and have subsequent targeted surgery.

### What is the next step if the patient fails CPAP or other device use?

The main objective is to uncover the reason for the device failure, which can be identified by

taking a thorough patient history and examination. Once the reason for device failure has been identified, the issue may be fixed. All modern CPAP machines have downloadable data that can be reviewed and will assist with selecting optimal settings for the patient. The patient should be referred back to a sleep physician or device provider (i.e. dentist for MAS) to see if the problem can be rectified. If there is obvious anatomical nasal obstruction, unexpected pathology, outright rejection of the device or examination of the upper airways is required, then referral of the patient to an ENT surgeon is appropriate (Box).

### Conclusion

Surgery for OSA has advanced significantly in the past decade with a greater understanding of the disease and development of techniques to deal with various challenges in stabilisation of the airways during sleep. The role of surgery is becoming increasingly solidified as both an aid to device use or as a treatment option in those unable or unwilling to accept device use.

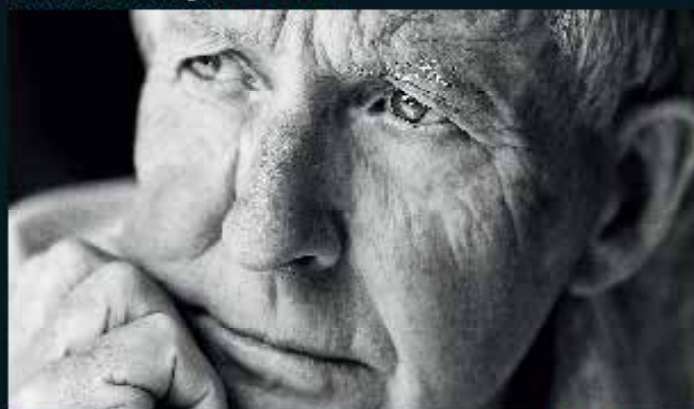
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A list of references is included in the website version of this article ([www.medicinetoday.com.au](http://www.medicinetoday.com.au)).

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