



# Mandibular advancement devices: obstructive sleep apnoea

## Intervention

Nightly use of a mandibular advancement device (MAD).

MADs are an alternative to continuous positive airway pressure (CPAP) for obstructive sleep apnoea (OSA).

## Indication

Around one in four men over 30 years have some degree of OSA, making it more common than asthma.

Mild to moderate OSA, and moderate to severe OSA when patients are intolerant of CPAP.

The severity of OSA is measured using the apnoea–hypopnoea index (AHI), which is the number of apnoea and hypopnoea events per hour (counted during an overnight sleep study). Mild OSA is as defined as 5–14 events per hour; moderate is 15–30; severe is >30.

MADs have been shown to reduce the severity of OSA (i.e. fewer apnoea/hypopnoea events per hour during sleep) and improve symptoms such as daytime sleepiness.

For patients with mild to moderate OSA, the efficacy of MADs is comparable to CPAP.

## Contraindications

MADs are not suitable for patients with central sleep apnoea or with no teeth or very poor dental structure.

## Adverse effects

The use of MADS has been associated with temporomandibular joint (TMJ) pain, tooth tenderness and excessive saliva formation. These effects may be minimised by correctly fitting and adjusting the device.

## Availability

There are several types of MAD including:

- thermoplastic ‘boil and bite’ devices, which are available from pharmacies and online at an approximate cost of \$40–\$60
- semi-tailored devices, where the patient creates their own dental impression mould (using something similar to a boil and bite device) and sends it away to have an MAD made. Patients may benefit from assistance by a sleep specialist or a dentist to create the mould. These are available from pharmacies or online and cost around \$200
- tailored MADs, which are custom-made by sleep specialists or dentists who specialise in the use of oral appliances to treat OSA. These cost approximately \$1500–\$2000, and rebates are available from some health insurers.

Boil and bite and semi-tailored devices are typically marketed as anti-snoring devices.

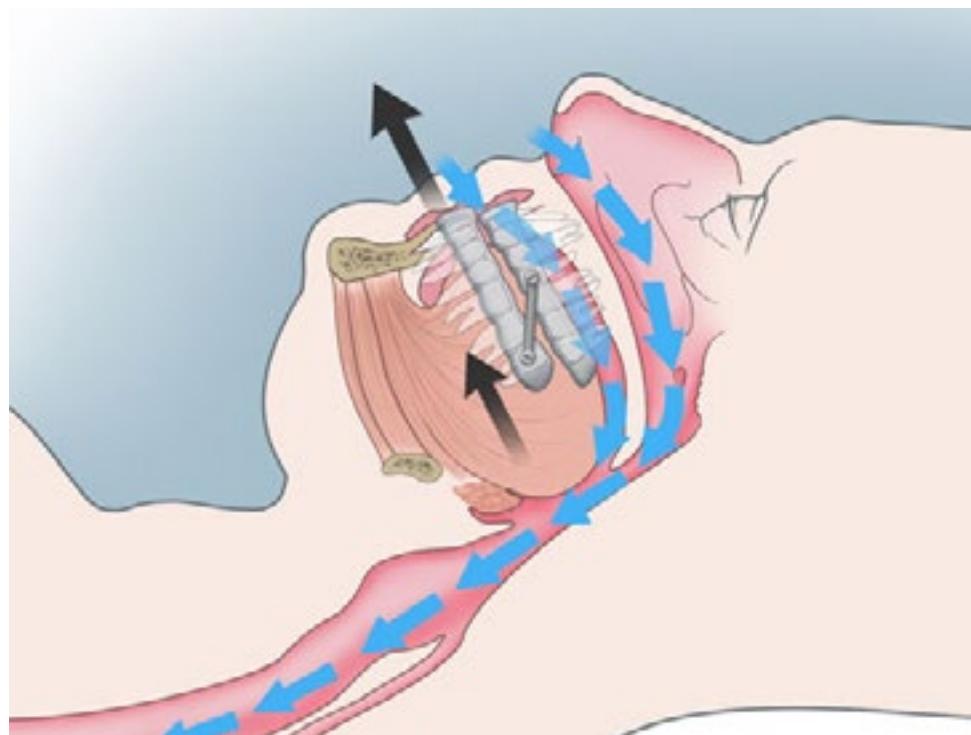
While many experts recommend the use of a tailored device to achieve efficacy and comfort (which affects factors such as the patient removing the device during the night or the device falling out), the TOMADO trial found that many participants preferred the semi-tailored MADs. The trial concluded that semi-tailored devices were the most cost-effective in the short term and should be the first-choice device. Tailored MADs may be reserved for patients who have difficulty producing their own mould for a semi-tailored device or whose dental eligibility is more marginal.



## Description

MADs are worn in the mouth during sleep to hold the mandible and tongue forward and therefore maintain upper airway patency. The device fits over the upper and lower teeth and creates forward placement of the lower jaw by approximately 8–10 mm (so the lower teeth end up in front of the upper teeth).

Ideally patients should have a follow up sleep study to see if the device is working.



Source: *Division of Sleep Medicine at Harvard Medical School*.

## Tips and Challenges

IMADs have potential advantages over CPAP (the current first-line therapy for OSA). They are less obtrusive and more portable; they make no noise, are not reliant on a power source and are often more acceptable to patients and families. However, they are not effective for every patient.

Patient acceptance of MADs is generally high. However, physiological, structural and individual patient characteristics influence response to MAD therapy. Factors associated with better treatment outcomes include:

- lower OSA severity (i.e. mild to moderate)
- female gender
- younger age
- OSA that is less pronounced when the patient sleeps on their side
- a face shape with a slightly receding jaw (retrognathic mandible).



## Tips and Challenges (cont'd)

Factors associated with poorer efficacy of MADs include:

- older age
- obesity and greater neck circumference
- increased nasal resistance
- a very stiff jaw (which impedes advancement)
- dental conditions (e.g. TMJ disease, periodontal disease, insufficient dentition to hold the device in the mouth).

Assessment for suitability may require assessment by a sleep specialist (and include a sleep study) or a dentist.

## Grading

NHMRC Level 1 evidence.

## Training

The Australasian Sleep Association provides resources about [OSA for health care professionals](#).

## References

Sharples L, Glover M, Clutterbuck-James A et al. [Clinical effectiveness and cost-effectiveness results from the randomised controlled trial of oral mandibular advancement devices for obstructive sleep apnoea-hypopnoea \(TOMADO\) and long-term economic analysis of oral devices and continuous positive airway pressure](#). Health Technol Assess. 2014;18(67):1–296.

Sutherland K, Cistulli PA. [Mandibular advancement splints for the treatment of sleep apnea syndrome](#). Swiss Med Wkly. 2011;141:w13276.

## Consumer Resources

The Sleep Health Foundation provides resources about [OSA](#) and oral appliances.

The Australasian Sleep Association provides multiple consumer resources including [Oral Appliances to Treat Snoring and Obstructive Sleep Apnoea](#).

HealthDirect Australia is a portal that provides multiple links to trusted information about [sleep apnoea](#).

Harvard Medical School, Division of Sleep Medicine has an [online sleep and health education program](#). This includes a module on OSA, which provides comprehensive information about what OSA is, how it is diagnosed, and treatment options.