



## Obstructive sleep apnoea (OSA)

### General Information

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Sleep apnoea is when breathing stops during sleep. There are two types: *obstructive* - which is the most common type and *central* - which is rare. This fact sheet will discuss obstructive sleep apnoea (OSA).

Sleep and breathing are among the essential functions for life to continue, yet both are highly complex.

A breath results when the diaphragm (the muscle between the chest and abdomen) and the intercostal muscles (the muscles between the ribs) contract. This causes the ribcage and lungs to expand allowing air to enter the lungs. There are a number of other muscles in the nose and at the back of the throat, which also contract when we breathe in. This helps to open up the airway, better enabling air to move into the lungs.

Sleep helps to restore our bodies although the mechanism for this is still not fully understood. There are two types of sleep – REM (rapid eye movement) and non-REM (which has four stages ranging from light to deep sleep). The body is most restored during the periods of deep sleep. A sleep cycle, which involves moving through all stages of sleep, takes approximately 100 minutes and is repeated throughout the night.

During sleep the muscles in the upper airway are more relaxed and so the airway is narrower. This usually causes no problems with breathing during sleep.

### What Happens In OSA?

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In some people the muscles in the airway can become so relaxed when they are asleep that the airway is completely blocked. OSA occurs when breathing stops for periods of at least 10 seconds during sleep. A person with OSA keeps trying to breathe but no air enters the lungs and the level of oxygen in the blood drops (hypoxia). This eventually leads to the breathing centre in the brain sending a message to the upper airway muscles to open the airway and breathing resumes, usually accompanied by a loud snort or gasp. The person affected by sleep apnoea is unaware that they have woken and immediately returns to sleep. Once asleep the muscles relax again and the whole cycle recurs. This cycle can occur hundreds of times during sleep.

## Who Gets OSA?

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OSA can occur at any age (including infancy) but is most common in middle-aged males. There is an incidence of 1-4% in the general population rising to approximately 10% in middle-aged males.

OSA is also more common if:

- A person is overweight. This makes people more susceptible to OSA because excess weight on the outside of the throat increases pressure on the inside of the throat, which in turn narrows the airway.
- Alcohol, tranquillisers or sleeping tablets are used prior to going to sleep. This can excessively relax the muscles making people more susceptible to OSA.
- A condition that leads to excess tissue in the airway is present eg: enlarged tonsils or jaw deformities.

## Signs and Symptoms

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There are a number of signs and symptoms that may indicate that OSA is occurring. Often, the first indication is reports from others in the household about noisy snoring while asleep.

OSA can lead to:

- Waking up feeling as if there hasn't been enough sleep
- Morning headache
- Feeling sleepy throughout the day
- Difficulty concentrating
- Loss of interest in sex
- Memory loss
- Depression
- Personality change

## Why is OSA a Problem?

Some studies have shown that people with OSA may be at greater risk of developing the following conditions:

- Hypertension (high blood pressure)
- Heart disease
- Stroke
- Irregular heart beat (arrhythmia)

Due to feeling sleepy throughout the day there can be a propensity to fall asleep while driving. This can clearly be potentially very dangerous.

## Diagnosis

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As there can be many reasons for disturbed sleep, diagnosing OSA can be difficult. The doctor will first obtain a detailed history of the problem and will examine the throat for signs of narrowing. It may often be helpful for the person's spouse/partner to be present, as they will be able to explain what is happening during sleep, of which the person is unaware.

Polysomnography is the main medical test undertaken to diagnose OSA. This involves an overnight stay in a special sleep clinic. Before going to sleep for the night the person is attached to a number of leads to monitor what happens during sleep. Although the number of leads used can be unsettling, it is a painless and safe procedure that requires no specific preparation.

The leads applied include:

- One applied to a finger to measure the oxygen levels in the blood.
- Leads across the head to measure the brain wave activity (EEG).
- Leads on the face around the eyes to monitor eye movements.
- Leads under the chin to measure muscle tone.
- Heat sensitive leads under the nose to measure airflow.
- ECG (electrocardiograph) leads across the chest to measure the electrical activity of the heart.
- Bands around the chest to measure the efforts to breathe.
- A lead around the leg to monitor any involuntary leg movement.

## Treatment

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OSA cannot be cured but it can be managed. The two main treatment options are lifestyle changes and CPAP (continuous positive airway pressure). Dental appliances and surgery are recommended on rare occasions. There are no medications which are effective in treating OSA.

### Lifestyle changes

In cases of mild OSA, lifestyle changes may lead to improvement in the condition.

Changes include:

- Weight loss - as even a small loss in weight can improve symptoms.
- Avoiding alcohol for at least a few hours prior to going to sleep.
- Avoiding sleeping tablets or tranquillisers.
- Using measures to assist sleeping on the side, as OSA can often be worse when sleeping on the back,

## **CPAP (Continuous positive airways pressure)**

This is the treatment of choice for OSA. It necessitates the person wearing a mask over their nose while they sleep. An air compressor attached to the mask continuously forces air through the nasal passages. The pressure used is just enough to prevent the airway from collapsing during sleep. The amount of pressure required to maintain an open airway varies with each individual.

If the results of the sleep study clearly indicate OSA, a CPAP machine is often applied and adjusted to the appropriate settings while the study is in progress. It may be necessary to return to the sleep clinic after the study to receive training on how to properly use the CPAP machine at home.

Many people find they feel much better within a few days of commencing using CPAP as they are now getting the deep restorative sleep they have been lacking. Initially there can be a sensation of having to use too much effort when breathing out while using a CPAP mask although this doesn't last very long.

Some people have difficulty in using CPAP for long periods due to side effects that can occur. These include:

- Drying and irritation of the nasal passages from the continuous airflow.
- Abdominal bloating due to air entering the stomach.
- Headaches.

Sometimes the mask can leak which can lead to irritation of the skin around the mask and sore eyes. Any problems should be discussed with the staff at the sleep clinic who will endeavour to find a solution. If CPAP is discontinued the problems of OSA will recur.

## **Dental appliances**

There are a number of dental appliances available that can help to hold the jaw and tongue in a position in order to help maintain an open airway. These need to be fitted by a dentist or orthodontist and can have side effects such as damage to teeth and soft tissues. They have their greatest effectiveness in mild OSA.

## **Surgery**

There are a number of surgical procedures that have been used to treat OSA, with limited success. For this reason surgery is not commonly used for treatment of OSA. Surgery may be considered however if obstruction is due to enlarged tonsils or nasal obstruction.