

# Obstructive Sleep Apnoea

**Obstructive sleep apnoea is a serious condition which commonly remains undiagnosed.**

While obstructive sleep apnoea is more commonly found in older men, it can affect men and women of any age, and also children.

Approximately one in every five adults, or 4.2 million people in Australia, have a sleep disturbance problem. Of these people, up to 80% are undiagnosed and untreated.

## What are the risks?

Researchers from the Woolcock Institute of Medical Research have found that moderate to severe sleep apnoea increases the risk of all-cause mortality.

"Individuals that suffered from moderate to severe sleep apnoea had more than a 20 per cent increased risk of all-cause mortality than those without the disorder". (1)

Sleep apnoea sufferers are also more likely to suffer from cardiovascular disease. Sleep apnoea cycles at night cause irregular heartbeat and sharp rises in blood pressure, leading to daytime hypertension and therefore increasing the risk of heart attack or stroke.

Sufferers of untreated sleep apnoea were 25 times more likely to be involved in a motor vehicle accident than the general population.

Disrupted night-time sleep reduces the ability to concentrate, reduced driving ability and increased likelihood of falling asleep at the wheel. This affect is even more noticeable when sleep restriction or alcohol is added, and

is extremely serious for those with occupations involving driving or operating machinery.

"The overall conclusion was that compared with healthy people, those with untreated sleep apnoea had worse simulated driving performance. In addition, the negative effects on driving performance of limited sleep and alcohol were greater in people with untreated sleep apnoea than in healthy people."(1)

## What is Obstructive Sleep Apnoea (OSA)?

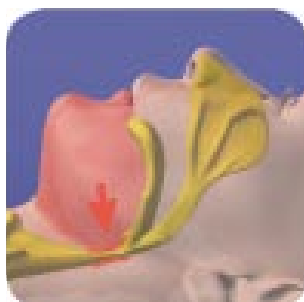
Obstructive sleep apnoea occurs when the muscles around the airway relax during sleep. This causes the soft palate at the back of the throat to collapse, partially blocking the airway. The result is a lack of oxygen entering the lungs, causing noticeable pauses in breathing of up to 60 seconds. The cycle may occur hundreds of times during the night, causing sleep disruption and reducing oxygen supply to the body. The problem is compounded when the patient sleeps on their back as this will cause the soft palate to impede the throat, while sleeping on the side will cause less obstruction to the airway. Airway obstruction is also aggravated by an increase in fatty deposits around the neck caused by weight gain.

## Are you at risk of developing Obstructive Sleep Apnoea?

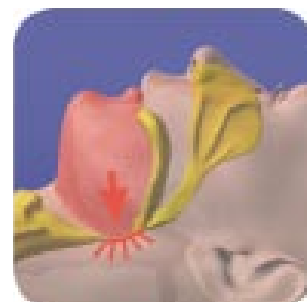
While sleep apnoea can affect anybody, there are some identified risk factors for people who



**Normal:** During normal sleep, the muscles that control the tongue and soft palate hold the airway open.



**Snoring:** When these muscles relax, the airway narrows. This can lead to snoring and breathing difficulties.



**OSA:** If the muscles relax too much, the airway can collapse and become blocked, obstructing breathing.

Pictures adapted from Somnomed

are more prone to the condition. These include:

- ◆ Obesity – breathing can be obstructed by fat deposits around the upper airway
- ◆ Having a larger neck – a neck circumference greater than 44cm is associated with a greater risk of sleep apnea
- ◆ Being male
- ◆ Women post menopause
- ◆ Being older – being over 65 increases the risk of sleep apnea by up to 3 times.
- ◆ High blood pressure
- ◆ Congenital abnormalities such as naturally narrow airway
- ◆ Structural abnormalities in the face and skull such as an overbite or larger tongue
- ◆ Family history
- ◆ Smoking – may increase the amount of inflammation in the upper airway. Smokers are 3 times more likely to develop sleep apnea
- ◆ Use of alcohol, sedatives or tranquilizers – these relax the muscles in the throat so that the soft palate collapses

### The symptoms of Obstructive Sleep Apnoea may include:

The most common symptom of sleep apnoea is excessive fatigue, especially during the day. This may affect a person's ability to drive and concentrate at work, as well as causing irritability and personality changes. At night, pauses in breathing followed by gasping for breath, may be noticed, as well as loud snoring and restless sleep.

Other symptoms include depression, loss of memory and concentration, insomnia, heartburn, impotence and increased need to urinate at night.

### Treatment of Obstructive Sleep Apnea

Medication is not effective in the treatment of sleep apnoea. The most important part of the treatment program is lifestyle changes, which in mild cases may be sufficient. Such changes include weight loss, limitations on the use of alcohol and sleeping pills, as well as a wedge pillow or similar device to stop the patient sleeping on their back.

When lifestyle changes are not sufficient, Continuous Positive Airway Pressure (CPAP) Therapy is the most effective and common treatment. CPAP involves a pump that blows air through a mask worn over the nose.

The air pressure keeps the airway open by preventing the collapse of soft tissue into the upper airway. While this is effective in treating the symptoms of sleep apnea, it will return when the treatment is ceased.

People with mild to moderate symptoms of OSA can benefit from the use of mandibular advancement splints, which reposition the tongue and jaw.

In severe cases surgical treatments can be used to remove excess tissue and clear the airway, or alternatively to move the jaw forward. These treatments have a success rate of up to 60% however the long term effects are currently not known.

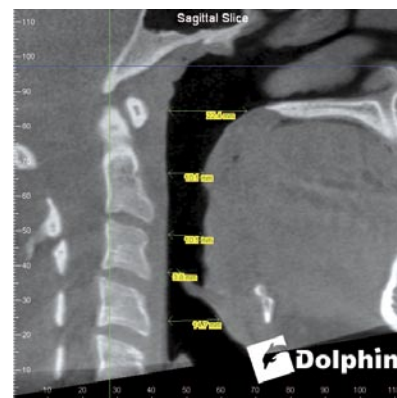
### The Use of CBCT in the diagnosis of sleep apnoea

The use of Cone Beam CT (CBCT) has opened up new dimensions for understanding the upper airway anatomy and physiology. The technology enables complete, fast and detailed upper airway images at a relative low cost.

CBCT is ideal when looking at the patency of the airway in relation to hard tissue, as well as visualizing any anatomic abnormalities which may be associated with sleep apnea. These include deviated septae, mandibular or maxillary hypoplasia, displacement of the hyoid bone relative to the mandible or cross-bite.

The data obtained through CBCT can be manipulated in 3 planes and the contrast can be changed to place emphasis on the skeleton or the airway. The 3D images can also be used to more accurately measure both cross sectional area and airway volume, allowing measurement of the narrowest part of the airway, and is therefore a useful tool in the diagnosis of sleep apnea.

As the entire face and jaw is visualized on CBCT it is also possible to obtain views of the temporomandibular joints. This is important as disease of this area can cause changes in the



location of the associated soft tissue. The CBCT data can also be used to obtain cephalometric measurements using specialized cephalometric tracing and analysis software.

The use of the Morita Accuitomo 170 Cone Beam CT provides a number of potential advantages for the diagnosis of obstructive sleep apnoea. Published reports indicate that the effective dose of radiation for a CBCT is significantly reduced by up to 98% compared with helical CT systems. This reduces the effective patient dose to approximately the same as a periapical survey of the dentition or 3–15 times that of a single OPG. The Accuitomo also provides sub-millimetre resolution as low as 0.08mm, exceeding that of the highest grade multi slice CT. ◆

*This article has been prepared by Dental @ Medical Diagnostic Imaging (DMDI) – “A centre of excellence”*

*DMDI is a digital diagnostic centre, specializing in 3D diagnostics of the head and neck and offers referring practitioners complete Sleep Apnea diagnostic protocols, imaging and lateral Ceph tracings with complete accuracy.*

*To refer patients to DMDI you can download a referral form from [www.dmdi.com.au](http://www.dmdi.com.au). You may also telephone 03 9889 1771 for a referral pad to be sent to you, or email [admin@dmdi.com.au](mailto:admin@dmdi.com.au).*

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### References

- (1) <http://www.woolcock.org.au>
- (2) <http://blogs.flinders.edu.au/flinders-news/2009/10/30/sleep-apnea-sufferers-risk-accidents/>
- (3) [http://www.somnomed.com/for\\_dental\\_professionals/obstructive\\_sleep\\_apnea.aspx](http://www.somnomed.com/for_dental_professionals/obstructive_sleep_apnea.aspx)