

Sleep apnoea: diagnosis and treatment

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ABSTRACT While many people take sleep for granted, sleep disorders are common and can have serious health consequences, including causing fatal road traffic accidents. And yet such disorders are both under-diagnosed and under-treated. In this article, Dr Tom Mackay provides an overview of the diagnosis and treatment of sleep apnoea, the most common cause of excessive daytime sleepiness.

KEYWORDS CPAP, excessive daytime sleepiness, sleep apnoea

LIST OF ABBREVIATIONS Body mass index (BMI), continuous positive airway pressure (CPAP), obstructive sleep apnoea/hypopnoea syndrome (OSAHS)

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In the UK, sleep disorders remain among the most under-diagnosed and under-treated of medical conditions,¹ and the time allocated to teaching medical students in the undergraduate curriculum has been estimated at less than ten minutes.² This is despite estimates that up to 6% of adults may suffer from excessive daytime sleepiness,³ which equates to a figure in excess of 3.5 million people in the UK. It is also estimated that 20% of accidents on motorways are caused directly by excessive daytime sleepiness⁴ and untreated sleep apnoea, which is the most common medical cause of excessive daytime sleepiness and may cost the NHS in excess of £400 million per year due to potentially unnecessary medical costs.⁵

DAYTIME SLEEPINESS

There are many causes of excessive daytime sleepiness, including inadequate sleeping time in our 24-hour society and poor sleep quality. A wide variety of conditions can produce poor sleep quality, such as shift working patterns, obstructive sleep apnoea/hypopnoea syndrome (OSAHS), narcolepsy, depression, dystrophica myotonica, multiple sclerosis, Parkinson's disease, chronic pain, the side effects of a wide variety of medications and restless legs syndrome. Of all these conditions, the most common medical problem is OSAHS.

OSAHS

Obstructive sleep apnoea/hypopnoea syndrome is a syndrome characterised by excessive daytime sleepiness due to poor quality, fragmented nocturnal sleep. Muscle relaxation is part of normal sleep, but in subjects who have a naturally narrow upper throat area the addition of muscle relaxation in the supine position during sleep causes obstruction of the upper airway. This results in recurrent pauses to breathing during the night, preventing

air from entering the lungs and forcing the person to awaken briefly to re-initiate breathing before falling back to sleep again. The sufferer is usually entirely unaware that they are awakening briefly. These awakenings can happen many hundreds of times each night, producing poor quality, fragmented sleep, resulting in excessive daytime sleepiness. This excessive daytime sleepiness can lead to poor concentration, changes in mood and a marked reduction in quality of life.^{6,7} Excessive body weight, with a body mass index of more than 30 kg/m², is one additional risk factor in producing sleep apnoea.⁷ This is associated with the deposition of fatty tissue around the neck (resulting in a collar size of more than 42 cm), which can compress the upper airway during sleep, exacerbating the tendency towards collapse of the upper throat area.

It has been estimated that approximately 2–4% of middle-aged men suffer from OSAHS in the UK, suggesting that approximately 300,000 people may have this condition. This gives OSAHS a similar prevalence to type I diabetes and moderate/severe asthma.⁷ Women can, of course, also suffer from OSAHS, but their prevalence is thought to be approximately 50% that of the middle-aged male population.⁸ Overall it is thought that less than 20% of cases of OSAHS are diagnosed and treated.⁷

DIAGNOSIS

Sleep apnoea can be diagnosed relatively easily, providing the correct questions are asked and potential patients are referred for appropriate investigation.

An accurate clinical history from both the patient and his or her partner is vital. The sufferer may be unaware of the night-time problem him/herself, but the partner can often give a clear history of recurrent episodes of excessive snoring due to upper airway narrowing leading to

TABLE 1 The Epworth sleepiness scale

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even if you have not done some of these things recently, try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation:

- 0 = no chance of dozing
 1 = slight chance of dozing
 2 = moderate chance of dozing
 3 = high chance of dozing

SITUATION	CHANCE OF DOZING
Sitting and reading	_____
Watching TV	_____
Sitting inactive in a public place (e.g a theatre or a meeting)	_____
As a passenger in a car for an hour without a break	_____
Lying down to rest in the afternoon when circumstances permit	_____
Sitting and talking to someone	_____
Sitting quietly after a lunch without alcohol	_____
In a car, while stopped for a few minutes in traffic	_____
TOTAL	_____

vibration of the soft tissues in the throat; recurrent breath-holding episodes (apnoeas) when the sufferer's throat closes over; and restless broken sleep as the patient awakens briefly on numerous occasions throughout the night to re-initiate breathing. The patient him/herself is often aware of the daytime consequences of poor night-time sleep, with reduced quality of life and impairment in concentration powers with recurrent episodes of excessive sleepiness. A good method of assessing subjective sleep is to ask both the patient and the partner to complete an Epworth sleepiness questionnaire, which is a simple eight-question scale that allows excessive daytime sleepiness to be graded. A score of less than 11 is normal; a score of 11 or greater indicates increasing severity of daytime sleepiness (see Table 1).

Patients who have an Epworth score of 11 or greater and a suggestive clinical history of OSAHS can then be referred for an overnight sleep study. These sleep studies take many forms, ranging from a simple measure of oxygen saturation, which can classically show repeated falls overnight caused by the recurrent episodes of upper airway narrowing, to more complicated tests involving measurement of not just oxygen levels but also pulse rate, breathing depth, rate and rhythm and nasal airflow using a variety of sensors. If simple sleep studies fail to give a firm answer, either when performed at home or in the hospital

setting, the patient can be referred for more complex sleep analysis in a specialised sleep centre. These more detailed tests (full polysomnography) involve measurement of both oxygen and breathing patterns together with assessment of brainwave activity to analyse whether the patient has actually slept. Polysomnography also gives an indication of the quality of sleep overnight.

Once the sleep study analysis has been undertaken it is then possible to determine whether or not the person is actually suffering from OSAHS and whether treatment is likely to be beneficial.

TREATMENT

Treatment options include advice about obtaining restful good quality sleep by encouraging people to sleep in a quiet, dark, warm environment and to make sure that they get at least eight hours' sleep per night under these conditions. Weight loss is also encouraged if the person has a BMI in excess of 30 kg/m². There is no evidence that singing or throat exercises are useful in the treatment of this condition.

Some cases of sleep apnoea can be treated using various forms of gum shield devices, which allow the lower jaw to be held forward during sleep, thus opening up the upper throat area. However, these devices are not recommended for anyone other than simple snorers or patients who only have mild OSAHS, or those who cannot tolerate continuous positive airway pressure (CPAP).

The mainstay of treatment for moderate or severe OSAHS, and certainly in those patients with significant excessive daytime sleepiness leading to potentially dangerous driving, is CPAP. This consists of an air compressor linked to a nasal or full-face mask that the patient wears overnight every night. The air pressure produced keeps the upper throat area open. Continuous positive airway pressure therapy results in improvement of sleep quality, reduction or abolition of excessive daytime sleepiness and better quality of life in more than 80% of patients.¹²

Treatment with either a gum shield or CPAP is usually lifelong. There is no evidence that any operation on the palate can lead to long-term improvement in OSAHS,¹³ nor is there evidence that any currently available oral medication is beneficial.¹⁴ It is also important to realise that the quality of life of patients' partners can be improved substantially by treating OSAHS as they themselves benefit from sleeping beside somebody who sleeps much more peacefully and the CPAP machine itself is virtually silent.^{12,15-17}

CONCLUSION

Obstructive sleep apnoea/hypopnoea syndrome is an under-diagnosed and under-treated condition. Untreated, it leads to significant impairment in the quality of life and well-being of the patient and also of his/her entire family. If unrecognised, it can lead to significant morbidity and, indeed, mortality as the excessive daytime sleepiness is associated with a 7–12-fold increased risk of road traffic accidents.¹⁸ It is, therefore, a public health issue. There is also an increased risk of vascular disease as untreated OSAHS patients are more likely to suffer from high blood pressure,^{19–21} placing the untreated patient at increased risk of stroke and myocardial infarction.⁷ However, OSAHS is easily treated and there are major health gains for the individual and his or her family from accurate and speedy diagnosis.

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KEYPOINTS

- Obstructive sleep apnoea/hypopnoea syndrome is the most common cause of excessive daytime sleepiness and affects up to 4% of adults.
- Poor concentration and mood changes significantly impair quality of life, and sleepiness increases the risk of motor vehicle accidents some 7–12 times.
- Obstructive sleep apnoea/hypopnoea syndrome predisposes to hypertension, and treatment contributes to prevention of myocardial infarction and stroke.
- Obstructive sleep apnoea/hypopnoea syndrome can be diagnosed from a history taken from the patient and his/her partner, supplemented by completion of an Epworth sleepiness questionnaire.
- Polysomnography performed in a sleep centre is the ultimate means for diagnosing OSAHS.
- Weight loss and advice on promoting good sleep are important, but the mainstay of treatment is CPAP.