

Sleep Disorder Support Foundation



SLEEP APNOEA INFORMATION

BOOKLET

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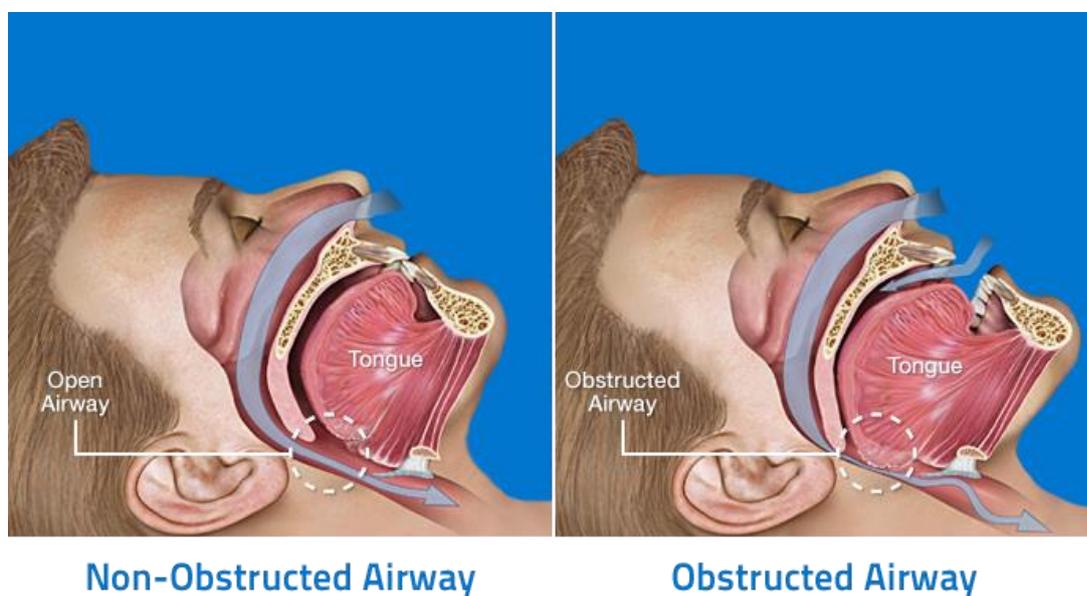
What is Sleep Apnoea?

To give it its full title, SA is Sleep Apnoea Hypopnoea Syndrome.

It is a Respiratory Sleep Disorder, not a disease. It is Respiratory in nature (as we stop breathing), but it only happens when we sleep or nap.

An Apnoea event occurs when our airway closes, collapses or constricts completely causing a complete cessation of airflow for at least 10 seconds. A Hypopnoea is a partial closure of the airway and is defined as a reduction in ventilation of at least 50% that results in a decrease in arterial saturation of 4% or more due to partial airway closure for at least 10 seconds. In simple terms there is a greatly reduced airflow.

At first glance a Hypopnoea doesn't seem as dangerous as an Apnoea, but it does create its own problems and should not be disregarded or ignored.



Non-Obstructed Airway

Obstructed Airway

The above diagram shows how the airway becomes blocked, causing Sleep Apnoea.

A layman's definition of Sleep Apnoea is 'the cessation of breathing during sleep'. When breathing stops the levels of oxygen in the blood begin to drop. After a brief time, the lack of oxygen causes a reflex response. This response forces open the airway with a loud snort, maybe gasping breaths and loud snoring. There may also be kicking and flailing of the arms.

There are three different types of sleep apnoea:

- o obstructive
- o central
- o mixed

Obstructive Sleep Apnoea (OSA) is the most common.

Central Sleep Apnoea and Mixed Apnoea are rare.



Severity

Severity of Sleep Apnoea is determined by the AHI (Apnoea Hypopnoea Index). This index is determined by the average number of breathing cessations per hour of sleep.

Mild Apnoea equates to an AHI of between 5 and 14 (below 5 is considered normal)

Moderate Apnoea equates to an AHI of between 15 and 30

Severe Apnoea equates to an AHI above 30

While this scale is accepted internationally, it is somewhat 'crude' as it does not consider the level of symptoms being experienced by the patient, the level of oxygen saturation in the blood and other forms of disruption.

In some cases, clinicians may refer to the Respiratory Disturbance Index (RDI), which, in simple terms is the AHI plus any Respiratory Effort Related Arousals (RERA). These events are not full Apnoea's or Hypopnoeas but are seen to disrupt sleep and are of a Respiratory nature.

Obstructive Sleep Apnoea

Obstructive sleep apnoea is caused by the obstruction and/or collapse of the upper airway (back of throat), usually accompanied by a reduction in blood oxygen saturation, often a 'cardiac' event and then an awakening (arousal) to activate breathing again. This is called an apnoea event.

Why?

There are many factors:

Extra or loose tissue in the back of the throat, such as large tonsils, large uvula, large tongue or long/floppy soft palate. There may also be an obstruction at the base of the tongue, turbinate problems or nasal blockages.

A decrease in the tone of the muscles holding the airway open.

There is growing evidence that the condition may be hereditary (receding jawline etc).

Central Sleep Apnoea

Central Sleep Apnoea is defined as a neurological condition where there is a cessation of all respiratory effort during sleep (the brain forgets to instruct the body to breathe), usually with decreases in blood oxygen saturation levels. The person is aroused from sleep by an automatic breathing reflex, so may end up getting very little sleep at all. Note that Central Sleep Apnoea, which is a neurological disorder, is very different in cause than OSA, which is a physical blockage/constriction - though the symptoms are very similar.

Mixed Apnoea

Mixed Sleep Apnoea, as the name suggests, is a combination of Obstructive and Central Sleep Apnoea's'.

Some commentators have **INCORRECTLY** described this condition as '**Complex Apnoea**' (see below).

Within the family of Sleep Disordered Breathing Conditions, there is also a condition called:



Upper Airway Resistance Syndrome (UARS)

This is somewhat like Sleep Apnoea and requires treatment.

Treatment options are like those in use for Sleep Apnoea.

Another condition,

Complex Sleep Apnoea

This is a rare enough condition, first diagnosed c.2007.2008.

Complex Sleep Apnoea is a form of Sleep Apnoea in which Central Apnoea's persist or emerge during attempts to treat obstructive events with a continuous positive airway pressure (CPAP) or bi-level device.

In 'layman's terms', it means that while treatment with a 'PAP' device effectively treats Obstructive Apnoea, it is also responsible for introducing Central Apnoea events.

This condition can only be identified when a patient is undergoing treatment with either a CPAP/APAP or Bi-Level device. It is successfully treated with an Adaptive Servo Ventilator (ASV) device.

LIMB Movements

In some cases, Sleep Apnoea sufferers also suffer from a condition known as Periodic Limb Movement Disorder (PLMD). This condition involves limb movements (twitches) during sleep. These can often be severe enough to disrupt sleep, both for the sufferer and bed partner.

In many cases, the effective treatment of Sleep Apnoea causes this condition to diminish or disappear altogether.

Another condition called Restless Legs Syndrome (RLS) may be prevalent, but not directly linked to Sleep Apnoea. This condition may be treated with medication.

Is Sleep Apnoea a serious condition?

We believe that it is a very serious condition, once left untreated.

Symptoms and co-morbidities associated with the condition can, in severe cases, be detrimental to your overall health and could lead to untimely death.

Research and numerous statements by eminent clinicians indicate that if the condition remains untreated it can lead to serious co-morbidities, affect yours and your family's quality of life, your employment prospects and leave you at a higher than average (or acceptable) risk of having a road traffic accident.

Typical symptoms:

- Really loud snoring
- Cessation of breathing while sleeping (can be frightening for a bed partner)
- Abrupt awakenings
- Morning headache



- Excessive daytime sleepiness (hypersomnia)
- Regular bathroom visits during the night (Nocturia)
- Inability to concentrate or maintain interest in everyday things
- Impaired cognitive function
- Short term memory impairment
- Uncontrolled Hypertension (high blood pressure)
- Right ventricular heart failure
- Severe mood swings
- Irritability

Sleep Apnoea sufferers do not necessarily suffer from all (or any of the above symptoms), as they tend to become more noticeable as the condition deteriorates.

How is it diagnosed?

Sleep Apnoea is diagnosed by way of a Polysomnogram, which is an Overnight Sleep Study.

The gold standard in Polysomnography is an overnight stay in a Sleep Clinic where your sleep and respiratory effort is monitored and recorded. Once diagnosed, the patient returns to the Sleep Clinic for another study to 'titrate' them for CPAP treatment therapy.

As technology continues to improve, a sleep test can be carried out in the comfort of your own home with a Domiciliary Sleep Study. While not as detailed as the full study it is quite sufficient for diagnostic purposes. The Domiciliary Study can either be set up in the Sleep Clinic, after which you go home, sleep and return the equipment the next day. Some Sleep Clinics use the services of a commercial enterprise, whose representative calls to your home, sets up the study and returns the next day to collect the equipment and data. This type of study is considerably cheaper than the overnight one in the Sleep Clinic.

Before you attend for a Polysomnogram

Prior to attending at the Sleep Clinic there are some preparations that you should make. Check with your Sleep Clinic before your appointment, to ensure it hasn't been cancelled and exactly the time they would like you to attend (this can often be late afternoon/early evening). It will be important to avoid caffeine, alcohol and naps the day of your study, as these may interfere with your ability to sleep

Restrictions on What to Bring

It will be important to check with your Sleep Clinic to see if they have special restrictions for you. In general, patients are encouraged to bring comfortable sleepwear, maybe their own pillows or other "comfort items" that may help you sleep. Pets and bed partners are not included. If there is something you can't sleep without, it may not hurt to ask ahead of time.



What to Expect at the Sleep Clinic?

Sleep Clinics are usually based in hospital wards, or private/semi private rooms. There will be a bed, bathroom facilities and the equipment necessary to complete the study. There may be bedroom furniture, a television and a range of other amenities.

Getting Set Up for the Study

After arriving and making yourself comfortable, the sleep technician/scientist will ask you to change into your sleepwear. Everyone will be more comfortable if you wear something to bed, but if you don't wear pyjamas, a loose-fitting T-shirt and shorts will do nicely. The technician/scientist will then spend about 45 minutes setting you up for your sleep study. This time can vary, depending on their efficiency and the complexity of your individual set-up. Some studies for seizures may take as long as two hours to set up.

The technician/scientist will measure the dimensions of your head. At designated places, a small cotton-tipped applicator, such as a Q-tip, will be used to clean a small patch of your skin. The cleaning paste is a little abrasive, but it is important to clean off the oils of your skin.

Then wires with gold-cupped electrodes will be put in to place for the EEG. Paste will be applied to each electrode. It serves to keep the wires in place as well as to better conduct the electrical waves of your brain. This paste is sticky, like shortening used in cooking, but will also wash off. Some of the wires on the face will be taped in place. There are no needles in modern sleep electrodes, and this preparation should not hurt.

In addition to the electrodes on your face and scalp, there are a few other items that shall be applied. The exact set-up may vary from one Sleep Clinic to another, but these are standard to most:

a flat, plastic snore microphone taped to your neck

sticky pads on your chest to monitor your heart rhythm

stretchy cloth belts that go across the chest and stomach to measure breathing

sticky pads applied to your shins or forearms to monitor movements (an EMG)

These wires will be connected to a small box. This box can be carried around, so don't worry that you won't be able to get up after being wired.

Finally, just before going to bed, a nasal cannula - which is plastic tubing that sits in the nose - will be applied. It will not give you oxygen, but will rather measure airflow. Some laboratories may use a thermistor, which is a pronged wire that sits in the nostrils and measures temperature differences.

What to do Before You Sleep

After getting set up, some patients worry about what they will be doing before they sleep. Most technicians/scientists will have one or two other patients to set up, so you will have some time when you are left alone. Some Clinics will have their patients watch an educational video about sleep disorders. If you are likely to need continuous positive airway pressure (CPAP) during the night, you may be fitted with a mask and practice with this before going to bed.



When the Study begins

When you have reached your bedtime, or you feel drowsy enough to fall asleep, it will be important to let your technician/scientist know. They will help you in to bed and connect the wire box to a computer that will allow them to monitor you from another room. There MAY be a small infrared camera and two-way speaker in the bedroom. If you need to get up during the night, this is how you will call for assistance.

Just prior to going to sleep, the technician/scientist will need to test the equipment. As part of this testing, you will open and close your eyes, move them around, snore, take breaths in and out and even move your arms and legs. If something goes wrong with a wire, or if one comes loose during the night, your technician/scientist or nurse will come in to fix it.

Will I Sleep?

The biggest concern most people have is whether they will be able to sleep. Surprisingly, most individuals can sleep, even with all the wires, the strange environment and any number of things that could be disruptive. It is exceptionally rare to have someone not be able to sleep at all.

If you are concerned that you may not be able to fall asleep, some clinicians may prescribe a sleeping medication to be used the night of the study. There are some that will not change the results of your sleep study. Make certain that all medications are approved by your doctor before using them the night of the study.

The Morning After

Most people get up at a regular time, and if you let your sleep technician/scientist know this before going to bed, they will be happy to wake you (there may be no clocks in the bedroom). The wires and other measurement devices will be removed with surprising speed, perhaps in as little as 5 minutes. There may be a questionnaire about your night's sleep to complete.

It is recommended that you have a shower to help remove some of the 'sticky' solvents that have been used to anchor the electrodes. You should be good to go home or to work from the Clinic. You will likely not be given any information about your study until a sleep doctor has had a chance to review the results, which could be a few days or weeks.

THE DOMICILIARY SLEEP STUDY IS CARRIED OUT IN YOUR HOME. SLEEP CLINICS AND COMMERCIAL HOMECARE COMPANIES HAVE DIFFERENT PROTOCOLS FOR SETTING THESE UP.



Treatment options

There are only a few effective treatments for OSA. They fall into several categories: weight loss/life style change, surgery, dental appliances, implantable devices and an air splint device. The most popular and most effective is the latter one, a device which delivers air under slight pressure to the airway by way of a nasal mask. This is a type of 'air splint' that keeps the airway open. There are basically two types of positive airway pressure devices; CPAP (Continuous Positive Airway Pressure) and APAP (Auto Adjusting Positive Airway Pressure). In a small number of cases Bi-level positive airway pressure may be used. This is a type of Non-Invasive Ventilation that may be required to treat the condition where other respiratory conditions are present.

More recently, Adaptive Servo Ventilators (ASV) are being used to treat Central Sleep Apnoea and other difficult cases.

There is no guaranteed, permanent, device-free "cure" for apnoea!

The type of treatment prescribed will depend on the type and location of airway obstruction/constriction and on the person's overall health. Obstructions can occur anywhere from the nose (deviated septum; swollen nasal passages from allergies), the upper pharynx (enlarged adenoids; long soft palate; large uvula; large tonsils), or the lower pharynx (tongue that is large or situated far back; short jaw; short, wide neck with narrow airway).

Weight loss/lifestyle change

For those who are overweight or obese, weight loss is extremely helpful in improving overall health and is something that must be recommended. In the case of Sleep Apnoea it is NOT a guaranteed cure for the condition.

If weight gain is the only specific cause of Sleep Apnoea, then weight loss should 'cure' or 'relieve' the condition. In many cases, weight gain exacerbates the condition rather than causes it. Poor quality sleep has an adverse effect on our metabolism.

Often, when patients are advised of the treatment options, they opt for weight loss/life style change without quantifying exactly what is required. Typically, (and this is NOT a definitive or clinical statement) weight loss involves losing at least 20% of body weight before reassessing the condition. In the case of a 15 stone male, this equates to a 3 stone weight loss with no guarantee that they will NOT require additional treatment. Many patients who have opted for this option find that while they are able to lose weight, they have great difficulty in maintaining the weight loss. Another problem is that while patients are losing weight, their condition remains untreated and is likely to deteriorate with symptoms remaining or getting worse.

It can be likened to the 'chicken and egg debate; which comes first'. Did sleep apnoea cause the weight gain or vice versa.

Air Splint Devices

Continuous Positive Airway Pressure (CPAP)

"Nasal CPAP" is the Gold Standard treatment for Sleep Apnoea and is the treatment of choice for most people with obstructive and mixed apnoea. It is the most reliable and effective treatment for the condition. This treatment was invented/developed by Prof. Colin Sullivan (University of Sydney) in 1981 and remains the first line treatment option. Millions of CPAP devices are now in use treating



obstructive sleep apnoea worldwide. An added advantage with this treatment is the elimination of snoring.

It involves using a small air blower device connected via a hose to a nasal or full-face mask you wear while you sleep - much like a regular oxygen mask, with straps to keep it in place. Essentially, this device blows air into your nose, or nose and mouth to keep your airway from collapsing and creating an obstruction to breathing. It increases the air pressure in your airway, thereby stopping its collapse. It isn't as unpleasant as it sounds - most people get used to the sensation quickly.

Admittedly, having to wear a face mask to bed isn't the most attractive thing in the universe. Most bed partners are usually happy to live with that rather than snoring! And it is infinitely preferable to the effects of apnoea, both the fatigue and the other physical effects (additional strain on the heart). The exact results vary, but a great many people report significant changes in their lives when they start using CPAP - they feel more awake, more alive - "like a whole different person", in some cases.

Auto Adjusting Positive Airway Pressure (APAP)

In the belief that the reduction of total airway flow would provide greater comfort to the patient and encourage patients to use the airway pressure treatment on a regular basis, APAP devices were introduced. These devices incorporate flow and pressure sensors and automatic regulation systems to ensure that the correct air pressure is delivered to the airway, only when required (rather than the same constant pressure).

The algorithms used in these devices are designed to offer greater patient comfort insofar as the overall pressure is reduced, providing that the changes in pressure reduce or eliminate apnoea, snoring, or flow limitation.

Bi-Level Positive Airway Pressure

Bi-level positive airway pressure is a type of Non-Invasive Ventilation (NIV). Instead of providing air at a constant, fixed pressure all night, the machine "senses" how much air a person needs, based on inspiration and expiration, and varies its level of pressure accordingly. On inspiration, a higher pressure is needed to prevent Apnoea's, Hypopnoeas, or snoring. But on expiration the patient typically requires several centimetres less pressure.

What is the purpose of this? Well, some people find that they simply cannot sleep with regular CPAP due to the constant air pressure. Bi-level pressure helps this problem by providing less pressure when you are breathing out (exhaling) and more when you are breathing in (inspiring).

Bi-level pressure devices are significantly more expensive than regular CPAP.

Adaptive Servo Ventilators (ASV)

These devices are the very latest technology for treating Central Sleep Apnoea, Cheyne's Stokes Respiration and other 'difficult to treat' conditions. As the name suggests they are a type of Non-Invasive Ventilation (NIV) and are best described as a further advance in Bi Level therapy.



Oral Appliances

Oral Appliances also referred to as Dental devices have been in use for almost as long as Continuous Positive Airway Pressure (CPAP).

Oral Appliance use in Ireland has been, until recently, uncommon, although their use in the USA is commonplace for over twenty years now.

Oral Appliances have been referred to as 'second line' treatment (after CPAP), but advances in technology and the skills of certain dentists have improved their results in treating certain types of Apnoea. Typically, they have proven successful in treating mild and moderate apnoea, in the main.

Oral appliance therapy is extremely successful in treating snoring itself. (See section: What can I do about my snoring if I don't have sleep apnoea?)

Oral Appliance Therapy (OAT) is safe and in some cases an effective alternative to CPAP. OAT may be indicated for cases of mild to moderate apnoea, under the guidance of a sleep physician (consultant). OAT is also indicated in severe sleep apnoea for those who cannot tolerate CPAP and whose sleep apnoea does not improve sufficiently with weight loss and other measures. Your sleep physician may wish you to have a further sleep study whilst wearing your appliance to verify its effectiveness. Although not routinely recommended in those with severe apnoea, many in this situation will do very well with an appliance, but their effectiveness is certainly not enough to recommend their routine use and again it must be stressed that the most effective treatment for moderate to severe apnoea remains CPAP.

FOR SUCCESSFUL TREATMENT WITH AN ORAL APPLIANCE, THE TRAINING, SKILL AND EXPERIENCE OF THE DENTIST IS PARAMOUNT.

There are two distinct groups of OAT:

1. Mandibular Advancement Devices (MADs), sometimes referred to as Mandibular Splints

These are the more successful type of appliance and are the most commonly used. These specialised dental devices should be provided by a dentist with suitable training and understanding of this treatment. As most dental schools worldwide do not routinely provide this training for dentists, it is often provided by dentists with specialist post-graduate training. The appliance is like a small upper and lower teeth gum shield and correctly fitted will hold the lower jaw in a forward position which serves to keep the airway open whilst sleeping and prevent snoring whilst in certain cases relieving the blockage which causes apnoea.

As with CPAP they are only worn at night and ideally to get maximum benefit they must be worn all night, every night. The best appliances are correctly and individually made to fit the teeth and so do not interfere with sleep but may take a few nights to get accustomed to. It is crucial that the appliance can be adjusted by the wearer as its effectiveness is dependent on having the jaw in the correct position. Simple versions of these appliances can be bought over the counter and on the internet. These are not adjustable and are bulky and uncomfortable and although inexpensive are generally not very successful.

Side effects can include excess salivation and joint and muscle pain (soreness) in some cases and these usually disappear within weeks, where they do occur. Once your dentist and sleep consultant are happy with the results you are attaining with your appliance you will usually be checked with your appliance once yearly to ensure that all is well.



A certain number of 'natural' teeth are required to anchor this type of device.

2. Tongue-Restraining Devices (TRDs)

This is a suction cup that is gripped between the teeth or lips and which sucks the tongue forward, thus opening the airway behind the tongue. People, who snore only when lying on their back, and whose tongue is the main source of obstruction, sometimes find this device helpful. It is not as effective as a mandibular advancement appliance and is usually reserved for those who are missing most or all their teeth (back teeth).

What can I do about my snoring if I don't have sleep apnoea?

Oral appliance therapy (OAT) if correctly used is almost universally effective in eliminating snoring. It has been used for this purpose in the USA for as long as CPAP has been used to treat sleep apnoea. As their correct use involves specialist training most of the dentists with the experience to provide effective treatment have had post-graduate specialist training in the USA.

Despite the failure of other home remedies, snorers and their partners and families can rest assured that there is a relatively simple, non-surgical treatment that is tried and tested and does work!

Implantable Devices

These devices have been around for about 10/15 years now and in the initial stages, their development was plagued by power issues (batteries). A number of companies now produce them and they have been clinically cleared for use in Europe (CE Approval) for some time, and within the last two years have been cleared for use in the USA (FDA Approval).

The devices comprise a small box, similar in size and construction to a cardiac pacemaker, with two 'wires' that sense breathing patterns (connected to the airway/lung) and delivers mild stimulation (electrical impulse) to maintain multilevel airway patency during sleep (connected to the hypoglossal nerve). The device is 'turned on' by way of a remote-control unit at bed time and turned off when we awaken.

The lifetime of the battery (needed to power the device) is reported to be about 9/10 years. The device must be removed/replaced then. There are reports that rechargeable batteries are being developed (without the need to remove the device).

These devices are quite expensive (reported at €23,000+), which includes the cost of the surgical procedure to implant the device. While sales material indicates that the device can be implanted in an 'outpatient' setting, we have been informed independently that 'in patient' is probably best.

Positional Sleep Apnoea Devices

In cases where Mild or Moderate Apnoea is diagnosed, and its primary cause is the position in which the patient sleeps (supine position/on their backs), it is referred to as Positional Sleep Apnoea. This condition can, in some cases, be adequately treated using a 'device' that stops the sufferer sleeping on their backs. This device is strapped to the sufferer's back by way of a harness. It is like a block of wood or polystyrene and makes it extremely difficult to roll on to the back. These devices are available in Ireland.



Surgeries

General

Surgery (of any type) where anaesthesia is used, poses a very real danger to people suffering from Sleep Apnoea. In all cases your surgeon and anaesthetist should be informed (in advance) if you suffer from Sleep Apnoea. You also need to inform your sleep specialist of any impending surgery, as they may need to send medical data to your surgeon. If using CPAP, you will probably be advised to bring your CPAP machine to hospital and possibly to the operating theatre. It may be required during the post-operative recovery period.

Surgery for Sleep Apnoea

The goal of surgery is to enlarge the airway and prevent snoring and airway collapse. Surgery is site specific (to enlarge a specific portion of the airway). Due to the risks associated with anaesthesia or an operation, surgery should not be considered as a first option. There is also a risk that surgery may cure snoring, but if the patient has Sleep Apnoea, one of the primary symptoms (snoring) will be removed while the Sleep Apnoea remains and may go undiagnosed while further damage is being done to the respiratory and cardiovascular systems possibly leading to a stroke (which may have been avoided).

The clinical definition of a surgical success in treating sleep apnoea is 'A reduction in AHI (Apnoea Hypopnoea Index) of 50% or better, with a residual AHI of 20 or better'.

The clinical definition of a medical success in treating sleep apnoea is 'A reduction in AHI (Apnoea Hypopnoea Index) to below 5'

There is a considerable difference in what is considered to be 'success'. An AHI of 20 equates to Moderate Apnoea, while an AHI of below 5 is considered 'normal'.

We are unable to source reliable figures for success/failure with surgery. In general, except for a tracheostomy (see below) surgery for 'curing' Sleep Apnoea is not successful and is quite painful. There are incidences where there is temporary relief post-surgery, but research indicates that the apnoea will return, anytime up to five years' post-surgery. In America an increasing number of ENT (Ear Nose and Throat) surgeons continue to pioneer this method of treatment and now offer a 'cocktail' of surgical procedures over a period of two to four years, (please see section on multi-phase surgery) In some cases 'success' has been claimed, however they are usually short lived as symptoms of Sleep Apnoea start to reappear within a short space of time. There are no 'quick fixes' for Sleep Apnoea.

The following is a list of all known surgical procedures currently in use to treat/cure Sleep Apnoea. There are no reliable figures available for the success or failure of any one procedure. The best estimates for UPPP surgery is 'a 50% improvement in 50% of cases'. Unfortunately for anyone with moderate to severe Sleep Apnoea this means that CPAP must still be used after the operation.

SOME OR MANY OF THESE PROCEDURES MAY NOT BE AVAILABLE IN IRELAND

Nasal Surgery

Septoplasty

The septum is the divider between the two nasal passages. A deviated (crooked) septum may obstruct the nasal airway. A Septoplasty is performed through the nostrils. The cartilage and bone of



the septum is straightened. For someone with a 'blocked nose' (injury) this type of surgery is ideal to increase airflow and is helpful in becoming compliant with CPAP, at possibly reduced air pressure. It is not successful in 'curing' sleep apnoea.

Turbinate Reduction

The turbinates within the nose are made of bone surrounded by soft tissue whose functions are to warm and moisten the air as you breathe. There are three turbinates' in each nostril (lowest, middle and upper). Reduction of the size of an enlarged turbinate can improve the size of the nasal airway. Turbinate reduction may be performed with surgical instruments, lasers. Radio frequency energy or cauterised.

Removal of Polyps

Nasal polyps can obstruct the nasal airway. Removal of polyps can 'free up' the airway.

Sinus Surgery

Sinus infections can contribute to nasal obstruction and surgery may be necessary.

Upper Airway Surgery

Uvulopalatopharyngoplasty (UPPP) surgery

This surgery removes the uvula, the lower edge of the soft palate trimmed. If present, the tonsils are generally removed and tissues around the tonsils trimmed. It can be done separately or in conjunction with other treatments, depending on where in the airway the obstructions occur. There are the usual surgical risks involved with this surgery. Notable ones are general anaesthetic (depresses breathing reflex and can be risky in people with breathing problems like sleep apnoea), swelling of the airway, need for pre-and post-operative medications (may depress the breathing reflex), bleeding, and significant pain lasting up to several weeks.

This surgical procedure (introduced around the same time as CPAP) has proven to be ineffective in 'curing' sleep apnoea over an extended period. We have been unable to source 'independent' research on its success/failure beyond a three/five-year period.

Most people who have undergone UPPP for the treatment of Obstructive Sleep Apnoea do have to continue using CPAP, or return to CPAP.

Laser-Assisted Uvulopalatopharyngoplasty (LAUP)

LAUP involves laser surgery on the uvula and soft palate that is reported to diminish snoring, but no controlled studies have been done to show that it reduces sleep apnoea. Because it is less extensive than UPPP, it is unlikely to be any more effective than UPPP in treating obstructive apnoea. It is usually done in several steps, and is an outpatient procedure. This procedure is painful (the laser burns away tissue) and claims that patients are fit to return to work immediately should be discounted.

Potential patients should be careful that they don't see an advertisement in the paper, call the doctor, and rush into an LAUP procedure without research and consideration. This type of surgery is usually carried out in a 'cosmetic clinic' setting.



TORS (Trans Orbital Robotic Surgery)

This type of surgical device (Da Vinci Robot) was originally developed in the US to remove 'hard to reach' cancerous tumours in the airway. It is now being used in the US (by some practitioners) to carry out what is in effect the Uvulopalatopharyngoplasty (UPPP) surgery.

Early indications are that it is no more effective than the traditional procedure; however, it is not in use for long enough to determine its effectiveness. Anecdotal reports indicate that recovery time may be extended through its use.

Somnoplasty (Radio-frequency Tissue Ablation of the Palate)

Deliverance of Radio-frequency waves by a needle electrode to the underside of the soft palate to cause contraction of excessive tissues that cause snoring. This procedure involves a progressive shrinkage of the soft palate and uvula. Usually patients require up to four treatment sessions of 15/20 minutes, under local anaesthesia.

Tonsillectomy and Adenoidectomy

Tonsils are tissues on the sides of the upper throat and if enlarged may narrow the width of the upper airway. Adenoids are at the back of the nose and can obstruct the nasal airway. This surgery is most common with children as Adenoids usually shrink with age.

Lower Airway Surgery

Genioglossus Advancement

The Genioglossus muscle attaches from the back of the tongue to a spot on the back of the chin. This surgery attempts to pull the back of the tongue forward to enlarge the air space behind the tongue. The procedure pulls forward a rectangular or circular segment of chin bone (below the front four teeth) and holds it in place with a plate or screw. A minimal change in the appearance of the chin results (millimetres).

Hyoid Advancement

The Hyoid bone is just above the Adam's apple. The Hyoid bone is moved forward and either attached to the Adam's apple or jaw bone. The purpose is to enlarge the air space behind the tongue.

Midline Glossectomy, Lingualplasty, and Lingual Tonsillectomy

Midline Glossectomy involves a reduction in the size of the tongue (if enlarged). The back of the tongue is reduced in size by excising a V shaped portion of the centre part of the tongue.

Lingualplasty is a more aggressive resection with additional removal of side wedges. Lingual Tonsillectomy involves the removal of tonsil like tissue on the back part of the tongue, it may also be removed with a laser. A temporary tracheostomy is usually performed with these procedures to avoid breathing difficulty that might result from temporary swelling. The purpose is to reduce the size of the tongue thereby increasing the air space behind the tongue.



Bimaxillary Advancement (Lafort 1 Maxillary Osteotomy with Bilateral Sagittal Split Mandibular Osteotomy)

The upper and lower jaw bones are moved forward along with all teeth to pull soft tissue structures forward and make more room for the tongue. Metal plates and screws are used to hold the realigned jaw bones in place. Orthodontic work prior to or following the procedure may be necessary to maintain proper alignment of the teeth. Change in facial appearance relates to the extent of the advancement.

Tongue Suspension Suture (Repose)

The tongue is pulled forward by way of a permanent stitch attached to a screw which has been placed through the back of the tongue. This is to prevent the tongue falling back during sleep and obstructing the airway.

Surgical Bypass of the Airway

Tracheostomy

An opening is made at the front of the neck to the windpipe and a plastic or metal pipe is inserted. During sleep the patient breathes through the tube, while during the day the tube is covered to allow normal speech and breathing. There are considerable hygiene problems with this procedure.

This procedure is the only surgery that is guaranteed to 'cure' sleep apnoea.

Multi-Phase Surgery/Stanford Protocol

A relatively new concept (12/14 years old) is a series of surgical procedures pioneered by surgeons at Stanford, California (hence the name).

The Protocol involves two phases, the first of which involves Uvulopalatopharyngoplasty (UPPP) and one or more of Genioglossus Advancement or Hyoid Suspension. If this is unsuccessful, the second phase of the operation involves maxillomandibular advancement.



What can I expect from my treatment?

Once compliant with your treatment you can expect to achieve control of the symptoms of Sleep Apnoea, including restful/restorative sleep, cessation of snoring and an improvement in your overall health.

Numerous studies show that with compliant use of 'PAP' therapy, there is a reduced risk of stroke (by up to 33%), a reduction in hypertension readings (by up to 25%), less chance of developing Diabetes and a substantial reduction (in many cases, total cessation) of frequent bathroom visits during the night (a condition called Nocturia).

Excessive Daytime Sleepiness is also controlled/eliminated.

'PAP' therapy, has been proven to encourage the body (through restful sleep) to repair a lot of the damage already done to the main organs (obviously if the condition is identified and treated early enough).

If using 'PAP' therapy, and experiencing problems (leaks/discomfort etc), you should discuss it with your CPAP Supplier/Homecare Company in the first instance, as a small 'comfort' tweak may be all that is required. If this can't be rectified, you should consult with your Respiratory Sleep Consultant.

Treatment Compliance

Patients should strive to achieve complete compliance to their treatment, which is to use the CPAP therapy 'all night, every night'. At this level of compliance, you can expect to achieve the maximum gains from the treatment.

Sleep Apnoea is a condition, as distinct from a disease and as such it is seldom that it can be cured. It can however be successfully managed.

From time to time (**with your consent**) data downloads may be taken from the memory card in your machine. This can be carried out by your equipment supplier/home care company or sleep clinic. This data shows the level of compliance being achieved.

International Insurance Companies have decided that 'compliance to therapy' is achieved if the patient uses their therapy for greater than 4 hours per night on 70% of nights. This figure is the very minimum compliance and it has been agreed that this level of compliance is unlikely to fully treat most of sleep apnoea patients. There are many issues that can affect your ability to become compliant with CPAP, some of which are:

Mask discomfort. This problem usually arises because either the patient adjusts the headgear too tightly or because the mask does not fit properly. A CPAP mask should fit the face snugly to avoid air leak but not so tight that it feels uncomfortable or causes pain. It is the most important piece of equipment, as it is the only device that is in constant contact with your skin. If a mask must be pulled tightly to prevent leaks the mask does not fit properly. You should contact your CPAP supplier/home care company and let them know that your mask may not fit well and you would like to try another size or style. Do not let anyone tell you that a sore on your nose is to be expected!

Typically, there are two types of mask. Nasal masks, which cover the nose and full-face masks which cover the nose and mouth. Nasal masks (also nasal pillows) are typically for nasal breathers (ie breathe in and out through the nose). For them to work effectively, the patient's mouth must remain closed during the night.



Full face masks are usually for patients who breathe through their nose and mouth. They allow for the mouth remaining open during sleep.

Proper fitting of a mask is imperative if the patient is to have any chance of becoming compliant.

Nasal congestion, irritation or runny nose that seems to be caused by using CPAP. Your nose is your airway's humidifier. It warms and humidifies the air that you breathe. If the CPAP begins to dry your nose, your body will increase the production of mucus in the nose to add more moisture to the inhaled air. Unfortunately, this may cause nasal congestion and a runny nose. In some cases, the dryness will cause irritation, burning and sneezing. These symptoms can be alleviated using a heated humidifier with your CPAP (these are usually built into your CPAP unit). Heating the air and the water will allow the air to carry more moisture as it travels to your nose (just like the summer air is more humid than winter air). In almost all cases this resolves nasal congestion and irritation if it is caused by CPAP.

Difficulty breathing through your nose. If you have allergies, chronic sinus problems or a deviated septum (your nose is crooked on the inside) you may have trouble using CPAP. If during the day you often find yourself breathing through your mouth, CPAP may be difficult to use. If the problem is allergies speak with your doctor about treatment. There are a number of good nasal steroid sprays and allergy medications that can treat your nasal congestion. Individuals with a deviated septum or other structural problems in their noses may benefit from seeing an Ear Nose and Throat specialist if CPAP cannot be tolerated.

Headache or ear pressure. Although treating sleep apnoea usually eliminates morning headache, some CPAP users develop headaches on CPAP. Others find that their ears develop pressure or pain in them. Most of this relates to underlying sinus congestion due to allergies or to CPAP itself. It is much like travelling in an airplane when you have a cold. The congestion can block the ear canals and changes in air pressure can cause pain when air gets trapped. Sometimes the congestion remains in the ears and sinuses after the acute symptoms of the cold are gone. If you develop headache or ear pain on CPAP, speak with your sleep specialist. If you have a bad cold and feeling 'stuffy' it might be best to cease using CPAP for a few days to allow the cold to clear up. You should check with your Consultant in this case.

'I take off my mask at night and don't realize it'. This can happen for many reasons: difficulty breathing through the nose, mask discomfort, insufficient oxygen or sleep disturbance. Speak with your CPAP supplier/home healthcare provider if your mask hurts. It may just be that you need some time to adjust to wearing a mask on your face at night. During an arousal, when you are not fully alert you may not remember that you now wear CPAP. It can be a scary thing to awaken with a strange thing on your face! After a few nights you should adapt to wearing the mask.

Air in the stomach. Occasionally, a CPAP user will experience air trapping in the stomach and awaken with stomach pain or gas. This is known as '**aerophagia**'. Sometimes simply making sure that you sleep with your head aligned with your body can help with this. If you want to elevate your head in bed you should do that with a wedge pillow or with bricks under the headboard. If you sleep with several pillows it may cause your head to tilt forward and block your airway. Lowering the CPAP pressure can help but your sleep specialist may not want to do this if it reduces the effectiveness of your treatment.

The air is too cold. This can be fixed with a heated humidifier. If you cannot get one you may try running the tubing under the covers, next to your body to warm the air.



The air is too hot. This is more difficult to fix but it may help to lower your room temperature as low as possible.

CPAP is too noisy. It is most likely a lot less noisy than your snoring, but if noise is a problem you have several options. Most machines are quiet so this is rarely a problem. Check with your CPAP supplier/home healthcare provider if you have an old machine. You can get an extra length of tubing so you can move the CPAP further away from the bed. A fan or other source of "white noise" can also help to disguise the noise.

The tubing gets in my way. Draping the tubing behind you and over the headboard helps with that.



How do I finance my treatment?

In Ireland there are three methods of financing your CPAP equipment.

Medical Card Holders:

Those patients who hold a Medical Card merely give their Medical Card details to the CPAP/Homecare supplier, along with their prescription. The CPAP/Homecare supplier will then handle all the necessary paper work and submit the relative forms to The Health Service Executive to ensure payment. Payment for replacement masks is handled similarly. All other costs are covered under the Medical Card Scheme.

Outright Purchase:

Patients who opt for this method will normally attempt to negotiate the best possible deal with the CPAP/Homecare supplier and pay them for the machine. At present, Health Insurers (VHI, VIVAS) make no contribution towards purchase to those insured. Laya Healthcare makes a small annual contribution towards CPAP (€150 per annum). Glo Health contribute €250 per annum. These payments are subject to confirmation from your Medical Consultant. The Health Service Executive refuse to make a contribution (although there have been reports of some individual successes). It may be possible to negotiate some form of contribution with some of the smaller Health Insurers (St. Paul's, ESB etc).

Tax relief is available for all equipment costs. Receipts should be included on the Med 1 Form.

Drugs Payment Scheme:

This scheme covers lease/rental of machines (only) and consumables (masks, headgear etc). It is effectively a 'co – pay' scheme whereby the patient pays the first €144 per month of the total cost of all pharmacy, equipment lease/rental and consumables, with the balance refunded by The Health Service Executive.

The onus is on the patient to initiate the claim, by sending the relevant claim form and receipts (pharmacy, CPAP Rental and mask/tubing/filter purchases) to the centralised payments office at:

DPS Refunds

PO Box 12012

Finglas

Dublin 11

Call save 1890 252 919

Full details, with downloadable Claim Form are available at:

www.drugspayment.ie

Claim progress can be monitored online.

The 'co – pay' element (€144 per month, or portion thereof) may be claimed against income tax using the Med 1 Form.



In the event of a claim being refused, the patient should immediately lodge a formal appeal against the decision. This process should take no more than 3/4 weeks. Traditionally, appeals have been upheld.

Oral Appliance Therapy

We are unaware of any financial support for this type of treatment.

In the case of Medical Card Holders, we suggest contacting the Health Service Executive in advance of opting for this type of treatment.

Electric Power

To ensure continuous supply, we strongly recommend that you register for 'Priority Support' with Electric Ireland. Just download the form at this link:

<https://www.electricireland.ie/ei/home/EI-PrioritySupport.pdf>

It should ensure that supply is not cut off, or should be restored as soon as possible in the event of a broken supply.

Complete the form and post it (FREEPOST) to:

Register for Priority Support

Electric Ireland (F4354)

PO Box 10969

FREEPOST

Dublin 11.



Sleep Apnoea and Driving (Group 1 Drivers)

EU Directive – COMMISSION DIRECTIVE 2014/85/EU of 1 July 2014 amending Directive 2006/126/EC of the European Parliament and of the Council on driving licences, has made new and far reaching changes to driving licensing for ordinary drivers, but especially for all types of professional drivers. All countries in the EU have now adopted these regulations. The regulations especially affect sleep apnoea sufferers, but also any person suffering from daytime sleepiness.

The regulations now require that a driver should advise the National Driving Licence Service (NDLS) of any long-term or permanent injury or illness that may affect their safe driving ability (see NDLS)

Driving licence applications must be accompanied by a Medical Report Form (D501) if you:

Are applying for a driving licence in respect of a truck or bus, licence categories C, C1, CE, C1E, D, D1, DE or D1E (unless you have previously provided a medical report which is still valid)

Will be 70 years of age or more on the first day of the period for which the licence for any licence category is being granted

Suffer from any of the disabilities or diseases specified in the diseases and disabilities list

Have ever suffered from alcoholism or epilepsy

Are a regular user of drugs or medication that would be likely to make your driving unsafe.

The medical report must be completed by a registered medical practitioner and you must also sign the declaration in his/her presence.

Specified diseases and disabilities which need to be reported on application for, or renewal of, a driving licence are contained in Medical guidelines Sláinte agus Tiomáint: Medical Fitness to Drive Guidelines (Group 1&2). For Group 1 licence categories AM, A, A1, the guidelines set out clear minimum medical requirements and all applicants presenting themselves for medical examination should be assessed on the basis of the minimum standards outlined.

SLEEP APNOEA IS NOW INCLUDED ON THE LIST OF SPECIFIED DISEASES AND ILLNESSES TO BE REPORTED TO THE NDLS

Appeals

An appeals mechanism is available for drivers who have been refused a licence on medical grounds. The NDLS will inform drivers of the appeals process when informing them of the licensing decision.



Group 2 Drivers (Bus and Truck Drivers)

EU Directive – COMMISSION DIRECTIVE 2014/85/EU of 1 July 2014 amending Directive 2006/126/EC of the European Parliament and of the Council on driving licences, has made new and far reaching changes to driving licensing for ordinary drivers, but especially for all types of professional drivers. All countries in the EU have now adopted these regulations. The regulations especially affect sleep apnoea sufferers, but also any person suffering from daytime sleepiness.

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Driving licence applications must be accompanied by a Medical Report Form (D501) if you:

Are applying for a driving licence in respect of a truck or bus, licence categories C, C1, CE, C1E, D, D1, DE or D1E (unless you have previously provided a medical report which is still valid)

Suffer from any of the disabilities or diseases specified in the diseases and disabilities list

Have ever suffered from alcoholism or epilepsy

Are a regular user of drugs or medication that would be likely to make your driving unsafe

The medical report must be completed by a registered medical practitioner and you must also sign the declaration in his/her presence.

Specified diseases and disabilities which need to be reported on application for, or renewal of, a driving licence are contained in Medical guidelines Sláinte agus Tiomáint: Medical Fitness to Drive Guidelines (Group 1&2). For Group 1 licence categories AM, A, A1, The guidelines set out clear minimum medical requirements and all applicants presenting themselves for medical examination should be assessed on the basis of the minimum standards outlined.

As in the past Group 2 guidelines require a higher standard of physical and mental fitness on the part of these drivers considering the duration of time they spend behind the wheel and the greater size and weight of their vehicles. The updated Group 2 guidelines have been drafted following a public consultation process, including associations representing Group 2 drivers.

SLEEP APNOEA IS NOW INCLUDED ON THE LIST OF SPECIFIED DISEASES AND ILLNESSES TO BE REPORTED TO THE NDLS

Appeals

An appeals mechanism is available for drivers who have been refused a licence on medical grounds. The NDLS will inform drivers of the appeals process when informing them of the licensing decision.



Healthy Sleep Tips

These tips have been proven effective for helping people to achieve restful/restorative sleep, regardless of a sleep disorder. They form part of Cognitive Behavioural Therapy used to treat numerous sleep disorders.

1. Maintain a regular bed and wake time schedule including weekends.

Our sleep-wake cycle is regulated by a "circadian clock" in our brain and the body's need to balance both sleep time and wake time. A regular waking time in the morning strengthens the circadian function and can help with sleep onset at night. That is also why it is important to keep a regular bedtime and wake-time, even on the weekends when there is the temptation to sleep-in.

2. Establish a regular, relaxing bedtime routine such as soaking in a hot bath or hot tub and then reading a book or listening to soothing music.

A relaxing, routine activity right before bedtime conducted away from bright lights helps separate your sleep time from activities that can cause excitement, stress or anxiety which can make it more difficult to fall asleep, get sound and deep sleep or remain asleep. Avoid arousing activities before bedtime like working, paying bills, engaging in competitive games or family problem-solving. Some studies suggest that soaking in hot water (such as a hot tub or bath) before retiring to bed can ease the transition into deeper sleep, but it should be done early enough that you are no longer sweating or over-heated. If you are unable to avoid tension and stress, it may be helpful to learn relaxation therapy from a trained professional. Finally, avoid exposure to bright before bedtime because it signals the neurons that help control the sleep-wake cycle that it is time to awaken, not to sleep.

3. Create a sleep-conducive environment that is dark, quiet, comfortable and cool.

Design your sleep environment to establish the conditions you need for sleep – cool, quiet, dark, comfortable and free of interruptions. Also make your bedroom reflective of the value you place on sleep. Check your room for noise or other distractions, including a bed partner's sleep disruptions such as snoring, light, and a dry or hot environment. Consider using blackout curtains, eye shades, ear plugs, "white noise," humidifiers, fans and other devices.

4. Sleep on a comfortable mattress and pillows.

Make sure your mattress is comfortable and supportive. The one you have been using for years may have exceeded its life expectancy – about 9 or 10 years for best quality mattresses. Have comfortable pillows and make the room attractive and inviting for sleep but also free of allergens that might affect you and objects that might cause you to slip or fall if you have to get up during the night.

5. Use your bedroom only for sleep and sex.

It is best to take work materials, computers and televisions out of the sleeping environment. Use your bed only for sleep and sex to strengthen the association between bed and sleep. If you associate an activity or item with anxiety about sleeping, omit it from your bedtime routine. For example, if looking at a bedroom clock makes you anxious about how much time you have before you must get up; move the clock out of sight. Do not engage in activities that cause you anxiety and prevent you from sleeping.

6. Finish eating at least 2-3 hours before your regular bedtime.



Eating or drinking too much may make you less comfortable when settling down for bed. It is best to avoid a heavy meal too close to bedtime. Also, spicy foods may cause heartburn, which leads to difficulty falling asleep and discomfort during the night. Try to restrict fluids close to bedtime to prevent night-time awakenings to go to the bathroom, though some people find milk or herbal, non-caffeinated teas to be soothing and a helpful part of a bedtime routine.

7. Exercise regularly. It is best to complete your workout at least a few hours before bedtime.

In general, exercising regularly makes it easier to fall asleep and contributes to sounder sleep. However, exercising sporadically or right before going to bed will make falling asleep more difficult. In addition to making us more alert, our body temperature rises during exercise, and takes as much as 6 hours to begin to drop. A cooler body temperature is associated with sleep onset... Finish your exercise at least 3 hours before bedtime. Late afternoon exercise is the perfect way to help you fall asleep at night.

8. Avoid caffeine (e.g. coffee, tea, soft drinks, chocolate) close to bedtime. It can keep you awake.

Caffeine is a stimulant, which means it can produce an alerting effect. Caffeine products, such as coffee, tea, colas and chocolate, remain in the body on average from 3 to 5 hours, but they can affect some people up to 12 hours later. Even if you do not think caffeine affects you, it may be disrupting and changing the quality of your sleep. Avoiding caffeine within 6-8 hours of going to bed can help improve sleep quality.

9. Avoid nicotine (e.g. cigarettes, tobacco products). Used close to bedtime, it can lead to poor sleep.

Nicotine is also a stimulant. Smoking before bed makes it more difficult to fall asleep. When smokers go to sleep, they experience withdrawal symptoms from nicotine, which also cause sleep problems. Nicotine can cause difficulty falling asleep, problems waking in the morning, and may also cause nightmares. Difficulty sleeping is just one more reason to quit smoking. And never smoke in bed or when sleepy!

10. Avoid alcohol close to bedtime.

Although many people think of alcohol as a sedative, it actually disrupts sleep, causing night-time awakenings. Consuming alcohol leads to a night of less restful sleep.

If you have sleep problems...

Use a sleep diary (<http://www.sdsf.ie/sleep-diary/>) and talk to your doctor. Note what type of sleep problem is affecting your sleep or if you are sleepy when you wish to be awake and alert. Try these tips and record your sleep and sleep-related activities in a sleep diary. If problems continue, discuss the sleep diary with your doctor. There may be an underlying cause and you will want to be properly diagnosed. Your doctor will help treat the problem or may refer you to a sleep specialist.



Things You Should Know About Smoking, Snoring & Sleep Apnoea

1. Current and past smoking is a risk factor for snoring and sleep apnoea.
2. People exposed to cigarette smoke (passive smoking) are at risk of snoring and sleep apnoea also.
3. Smokers inhale 25% of smoke. 75% of smoke is released into the atmosphere where non-smokers are exposed.
4. Environmental tobacco smoke exposure is an independent risk factor for snoring in children.
5. Nicotine is the most common drug of addiction. Nicotine addiction is not just limited to daytime. Unknown to themselves, as the nicotine disappears from the body's tissues at night smokers will have disturbed sleep due to their bodies craving for more nicotine.
6. Nicotine is a stimulant and will disrupt your sleep pattern. It suppresses refreshing sleep and increases wakefulness.
7. The effect of nicotine stimulates the nervous system and increases the depth of breathing and raises the blood pressure.
8. There is a dose-response relationship between smoking and snoring, short sleep and poor sleep. The more cigarettes you smoke the more likely you are to suffer these sleep problems.
9. Cigarette smoke irritates the lining of the nose and throat causing swelling, congestion and narrowing of the airway. This promotes unhealthy mouth breathing, bad breath, snoring and sleep apnoea.
10. Smoking also increases the likelihood of chest and respiratory infections, and diseases such as chronic obstructive pulmonary diseases (COPD), bronchial asthma, digestive diseases and cancer.

(British Snoring and Sleep Apnoea Association)



Paediatric Sleep Disorders are a worrying condition both for children and parents alike. They can be disruptive to family life, but can also be responsible for other conditions and illnesses that inhibit the natural development of our children. The following chart highlights the wide range of paediatric sleep disorders.

Sleep Apnoea (SA) is probably the most common form of Sleep Disordered Breathing in children.

Apnoea is a Greek word meaning 'without breath' and the condition involves a cessation of breathing while asleep.

When you go to sleep, your muscles relax, including those in your throat. In some children, especially those with enlarged tonsils or adenoids, the relaxed muscles cause narrowing, which can reduce the airflow. This can cause snoring and irregular breathing.

If the airway closes completely, a child might temporarily stop breathing. This is called 'apnoea'. If the airway partially closes, breathing is reduced and this is called an 'hypopnoea'.

As breathing stops or is interrupted or reduced, there may be a fall in the level of oxygen in the blood. Sensors in the brain will tell the body to re-start or increase breathing. Breathing often re-starts with a gasp or snort.

When the problem is severe this can happen many times each night and disturb the quality of sleep. This causes a lot of problems for a child including irritability, reduced cognitive function, social skills problems, mood swings, and excessive tiredness. In young children, SA can inhibit growth and development due to reduced amounts of quality sleep. Obviously, this will often affect all members of the family.

SA is quite common and may affect up to 3% of children (as many as 40,000 in Ireland). It affects boys and girls equally. The following factors increase the likelihood that children will be affected:

- Large tonsils and adenoids
- Obesity
- Family history of OSA
- Down's syndrome
- Sickle cell disease
- Craniofacial malformations such as an abnormally small chin, large tongue or cleft palate
- An extremely narrow upper airway
- Rare diseases of the nerves or muscles, which cause loss of upper airway tone because of poor muscle strength
- Problems with control of breathing



A child with SA might display some of these symptoms.

Night time symptoms

- snoring (although this is also common in children without SA)
- Pauses in breathing noticed by parents and carers, which might be followed by a gasp or snort
- Gasps, snorts and choking sounds
- Restlessness and sudden arousals from sleep
- Laboured breathing
- Unusual sleep posture, for example with the head bent backwards
- Bedwetting (although this is common in children with no SA)
- Breathing through the mouth, a dry mouth and bad breath

Daytime symptoms

- Changes in behaviour, for example being irritable and having tears and tantrums
- Hyperactivity, which may alternate with sleepiness
- Poor concentration
- Poor or decreased performance at school
- Tiredness and sleepiness
- Failure to gain weight or grow
- Developmental delay
- Learning difficulties
- Breathing through the mouth
- Speech that sounds nasal
- Difficulty swallowing
- Early morning headache

If you think your child might have SA, it is important that you talk to your GP. Take your child with you so the doctor can examine him or her.

Before you make an appointment, talk to the child-minder, nursery or school and ask if they think your child might have a problem.

When you go to your GP, you can help by taking with you:

a list of your child's symptoms;

a list of any relevant observations, reports or notes about your child from the child-minder, nursery or school.

a completed Sleep Diary (over 7 days) <http://www.sdsf.ie/sleep-diary/>



If your GP thinks your child might have OSA, the next step should be a referral to a Respiratory Sleep Disorders Specialist (who specialises in paediatrics). Remember, OSA in children is not quite the same as that in adults, and therefore specialist knowledge is required.

Respiratory Sleep Specialists (Adults) do not normally deal with Paediatrics.

Diagnosis

Oximetry (Oxygen saturation monitoring)

This test is used as a screening tool for Obstructive Sleep Apnoea (OSA). It has an excellent negative predictive value but a poor positive predictive value for OSA in otherwise healthy children. It is a simple test that monitors the patient's oxygen levels whilst they sleep and it can be performed in the patient's home. The child wears a probe on the finger throughout the night. This can be removed in the morning and the data analysed with a computer programme. Each study should be reported on by a respiratory consultant. The key benefit of this test is that it is easy, cheap and can be performed quickly. With the poor negative predictive value of oximetry, approximately 40% of children who have this test performed will need to have a more thorough sleep study performed.

Transcutaneous Oximetry/Capnography (TCOM)

This is a non-invasive test used to monitor a patient's oxygen and carbon dioxide levels overnight. It gives valuable information about the patient's ventilation status at night and is also used to monitor patients who are on non-invasive ventilation (NIV). This test is performed on patients who have been admitted to the hospital in most of cases. The child wears a probe on the ear or cheek throughout the night. This can be removed in the morning and the data analysed with a computer programme. Each study should be reported on by a respiratory consultant.

Limited Sleep studies (Domiciliary Sleep Study)

A supervised PSG is the gold standard test recommended by the American Academy of Sleep Medicine (AASM) for all children who have been referred for sleep investigations. This is highly labour intensive, time consuming and expensive. There is therefore a role for limited sleep studies where a smaller number of channels of recording. Limited PSGs look at the respiratory and cardiac variables but do not measure brain waves (EEG). They are easier to perform, with fewer probes, and provide very useful information in most instances. The equipment that is required for these studies is usually hand held and portable. Studies must be performed in hospital but can be performed in regional units where ward staff have training in the use of these devices. As the technology improves some of these studies may be performed in the home with the appropriate support staff. These studies can be performed in an unsupervised setting but this increases the risk of insufficient data collection. Insufficient data collection runs the risk of making clinical decisions with inaccurate data and increases the rate of repeat studies, thus reducing system efficiency. These studies require manual analysis by a technician and reporting by a paediatric respiratory consultant.

Full Overnight Sleep Study/Polysomnogram (PSG)

A supervised PSG is the gold standard test which is recommended by the AASM for all children who have been referred for sleep investigations. It is a non-invasive test which monitors the patients breathing, oxygen levels, carbon dioxide levels, respiratory effort and brain wave activity. This is a comprehensive labour intensive test which needs to be analysed manually by a technician and then reported on by a Respiratory consultant.



The performance of fully supervised and video recorded PSG is a significant undertaking but is necessary for the diagnosis of complicated sleep disorders, or in complicated or very young patients.

Waiting lists for all types of sleep diagnostic study (in the public health system) in Ireland are long. They range from 8 months to 14 months and longer depending on the nature of the study.

Treatment

SA is a treatable condition and if your child is diagnosed with it there is lots of help available. These are the options available to treat SA in children.

Weight loss

If your child is overweight or obese, weight loss is an essential first step to controlling OSA.

Adenoid/tonsillectomy

This operation to remove the child's tonsils and adenoids has a good success rate for treating OSA in children who are otherwise well. It is not suitable for all cases.

Continuous Positive Airway Pressure (CPAP)

CPAP is an effective treatment in some cases of children with OSA. It is a simple machine that pumps air through a mask worn at night to keep the airway open. The machine uses ordinary room air and is powered from the home electrical power supply. Proper/professional mask fitting and follow-up is imperative and should be managed by a specialist respiratory paediatric team.

Tracheostomy

In a tracheostomy, the surgeon creates an opening in the neck at the front of the windpipe. This is only required in cases of extremely severe OSA if all other options have failed.

Oral Appliances (Mandibular Advancement or Repositioning Splints)

This option could be considered for OSA in children with 'malocclusion' of the jaw. This means faulty contact between the upper and lower teeth when the jaw is closed, for example when the lower jaw is set back.

Mandibular and maxillary advancement surgery

This may be helpful for children with craniofacial syndromes (a group of similar inherited conditions affecting the skull, face and sometimes the limbs), which cause a set-back lower jaw.

What happens if OSA isn't treated?

It is important that SA in children is diagnosed and treated. Untreated SA has been linked with:

- Failure to grow or gain weight
- Worsening behaviour, hyperactivity and aggression
- Poor or impaired performance at school
- Inferior quality of life
- Risk of high blood pressure or heart disease



Paediatric Sleep Disorders' services are available at the following centres:

Our Lady's Hospital for Sick Children, Crumlin, Dublin 12.

Children's University Hospital, Temple Street, Dublin 1.

Cork University Hospital, Cork

The National Children's Hospital, Tallaght, Dublin 24.

Mid-Western Regional Hospital, Limerick.

Galway University Hospital, Galway.

Mater Private Hospital, Eccles Street, Dublin 7.



You can sign up for regular updates on Sleep Apnoea and other Sleep Disorders.

Just send us your contact details (Name/Address/Mobile Number and Email) to help@sdsf.ie

Or use the contact form at this link:

<http://www.sdsf.ie/contact-us/>

We respect your privacy and do not tolerate spam and will never sell, rent, lease or give away your information (name, address, email, etc.) to any third party. Nor will we send you unsolicited email.

Our Privacy Policy is available at this link:

<http://www.sdsf.ie/privacy-policy/>

OUR WEBSITE AT www.sdsf.ie is fully GDPR (General Data Protection Regulation) compliant.



Alphabetical list of equipment distributors/home care providers in Ireland

Air Liquide Healthcare Ireland Ltd

18H Rosemount Business Park,
Ballycoolin Road,
Blanchardstown,
Dublin 11.
Philips Range
Tel: Lo-call 1850 240 202 (ROI only)
Web: <http://www.ie.airliquide.com/>

BOC Healthcare

Bluebell Industrial Estate,
Dublin 12
Covidien/Fisher & Paykell Ranges
Tel: Lo-call: 1890 22 02 02 02
Web: www.boconline.ie

Direct Medical Ltd

Suite 2 Gateway Centre
Monksland,
Athlone,
Co. Roscommon.
DeVilbiss Range
Tel: 090-649 0190
Web: <http://www.directmedical.ie/>



Home Health Care Ltd

Ballykeeran,

Athlone,

Co. Westmeath,

MAP/Puritan Bennett/Tyco/Transcend Ranges

Tel: + 353 (0)90 6474854

Web: <http://www.homehealthcare.ie/>

Medicare Health & Living Ltd

Glencormack Business Park,

Kilmacanogue,

Co. Wicklow

Apex Range

Tel: 01 2014900

Web: <http://www.medicare.ie/>

OREGA Systems Ltd

24 Lauriston,

The Park,

Midleton,

Co. Cork.

Breas Range

Office Tel: + 353 (0)21 4634905

Web: <http://www.oregasystems.ie/>



ResMed PEI

Sleep & Respiratory Medicine Team

M50 Business Park

Ballymount Road Upper

Ballymount

Dublin 12

ResMed Range

Tel: 1800 734 000

Web: <http://www.resmedpei.com/>

RespiCare Ltd

Medical Centre,

Applewood Village,

Swords,

Co. Dublin.

Fisher & Paykell /Weinmann Ranges

Telephone: (01) 890 4020

Web: <http://www.respicare.ie/>