

Other Abnormal Behaviour

Sleep Drunkenness

Sleep drunkenness can be confused with REM behaviour disorder. During sleep drunkenness the patient tends to perform complex activities in a state between sleep and wakefulness. The person can wake up through the night and perform complex tasks, such as making telephone calls, and go back to sleep with no recollection of what happened. In sleep drunkenness it is unusual for the person to be injured.

Sleep Epilepsy

Epilepsy can occur during sleep. Some forms of epilepsy can have complex behaviour without itting. A sleep study may help clarify if sleep epilepsy is present.

Sleep Starts

This refers to sudden jerks which occur at the beginning of sleep. This should be considered normal as it occurs in approximately 60-70% of the population. Increased exertion, emotional stress and an increase in caffeine intake can increase the frequency of sleep starts. In sleep starts the jerks may involve the arms, legs or the entire body. Sometimes the person has the feeling of falling or imbalance. Treatment is not usually needed.

Abnormal Movements

RESTLESS LEGS
PERIODIC LIMB MOVEMENT DISORDER
REM SLEEP BEHAVIOUR DISORDER

"Sleep is that golden chain that ties health and our bodies together."
- Thomas Dekker



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ABNORMAL MOVEMENTS

REM SLEEP BEHAVIOUR DISORDER (Acting Out Dreams)

In this condition patients can have violent behaviour during sleep which can lead to them injuring themselves or their bed partner. The patient can punch, kick, leap out of bed, even run from the bed during an attempted enactment of dreams. This behaviour during sleep can occur occasionally or up to 3 or 4 times per night on consecutive nights. This condition can start at any age but is most common in adults. It is more common in males than females.

Causes and predisposing factors

In the majority of cases there is no obvious reason for this condition. Occasionally it can occur following withdrawal from alcohol and sedatives as well as antidepressant medications. Often this condition is associated with neurological abnormalities such as dementia and previous stroke.

Complications

REM behaviour disorder can cause injury to the patient or bed partner. This can lead to social consequences, particularly involving the relationship with the bed partner.

TREATMENT

If the abnormal behaviour occurs frequently, treatment may be needed. A medication called clonazepam [Rivotril (in the same group as valium)] can be used and is usually effective. High levels of melatonin (6mg-15mg) appear to also be effective.

Periodic Limb Movement Disorder and Restless Legs

Periodic limb movement disorder (also called sleep myoclonus) is characterised by recurrent brief jerks which usually involve the ankles and the knees. Similar muscle jerks can involve the arms. These brief rapid movements occur during sleep and the patient is usually unaware of them. However, they can be associated with awakening from sleep. The patient can wake up completely or simply lighten his/her sleep. The jerks can involve one or both legs. The number of jerks is variable and can change from one night to another. There are people who can have up to 100 or more jerks each hour. Periodic limb movement disorder may cause difficulty falling asleep, as well as difficulty staying asleep. In some people this can result in daytime sleepiness. This condition is typical of middle age and elderly people and is rarely seen in children.

Restless Legs

Restless legs refers to an unpleasant sensation usually localised in the calves. It is often described as cramps, soreness, or a creeping sensation involving the leg below the knee. It is felt when awake and usually around bedtime. The feelings are such that the person has the need (sometimes the compulsion) to move their legs to get relief and sometimes needs to walk around the room. The severity of the symptoms vary from mild discomfort to a very severe sensation which can prevent the person from falling asleep. The majority of people with restless legs have periodic limb movement disorder.

Causes and predisposing factors

There is no known causes for periodic limb movement disorder, however, it is frequent in people with renal failure, iron deficiency and during pregnancy. It is also common in people who use medication such as antidepressants and in people who are withdrawing from medications such as anticonvulsants, benzodiazepines (Valium) and other sleeping tablets. In approximately 1/3 of cases there is a family history of the disorder. The diagnosis of periodic limb movement disorder is obtained by an overnight sleep study.

TREATMENT

Because the cause of periodic limb movement disorder and restless legs is not known the treatment is symptomatic. Simple measures may be helpful (avoidance of coffee, tea, alcohol and nicotine). Correction of medical disorders may bring about improvement (diabetes, iron deficiency, avoidance of antidepressant medications). When severe enough it requires the use of medication. The treatment may involve the use of antiparkinson medications (pramipexole and similar), benzodiazepines (medication similar to valium), codeine phosphate, morphine and methadone in the more severe cases. Other options include anti-epileptic agents (gabapentin). The response to medication varies among people.

Augmentation

Augmentation refers to worsening of Restless Legs (starting early in the evening and becoming more intense) after a few months of using anti parkinson medication.

ORAL APPLIANCES (Mouthguard)



Example of mandibular advancing device (mouthguard) used for snoring and mild sleep



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ORAL APPLIANCES

Nasal CPAP or Oral Appliance?

Nasal CPAP (Continuous Positive Airway Pressure) is a device which keeps the airways open by applying continuous pressure. Air is pumped through a mask which is placed over the nose. This effectively reduces sleep apnoea and snoring. One study has compared nasal CPAP with oral appliances. The results suggest that nasal CPAP is more effective than oral appliances in controlling sleep apnoea. However, oral appliance are better tolerated than nasal CPAP.

Side effects of Oral Appliances

Excessive salivation and transient discomfort in the morning have been reported during the initial use of oral appliances. Oral appliances may cause tempo-mandibular joint discomfort and dental misalignment. Follow-up progress of treatment should be undertaken within two or three weeks initially and two or three months after regular use.

Oral Appliances for treatment of Snoring and Obstructive Sleep Apnoea

Indications:

Oral appliances are indicated for use in patients with primary snoring (snorers only) and mild sleep apnoea who do not respond to other treatment. Oral appliances can also be used in patients with moderate to severe sleep apnoea when treatment with nasal CPAP is unsuccessful or cannot be tolerated. For both snoring and sleep apnoea, weight reduction remains the most important step to be considered. There are many dental appliances which have been described and used in patients with snoring and sleep apnoea.

Mechanism of Action

Oral appliances are likely to work through different mechanisms. It is proposed that they modify the position of the lower jaw together with the base of the tongue and the soft tissue structure of the throat. The forward and slightly downward repositioning of the lower jaw may bring about an increase in space in the back of the throat as well as altering the mechanical property of the soft tissue of the palate.

Efficacy of Oral Appliances

Snoring; Current experience suggests that snoring decreases in the majority of people who use oral appliances. Complete abolition of snoring has also been reported in up to 80% of the patients studied. The severity of snoring has also been reported to decrease in patients in whom snoring is not completely abolished.

Sleep Apnea: During the use of oral appliances in sleep apnea patients the number of times a person stops breathing per hour has been reported to be significantly reduced, even though complete abolition of the disturbed breathing may not be achieved.

Recommendations for the use of oral appliances

1. The use of oral appliances should be discussed with the sleep physician as one possible strategy in the management of snoring and sleep apnoea.
2. When a trial with an oral appliance is undertaken particular attention should be given to oral hygiene. Restoration and dental work should be undertaken beforehand by your dentist. If any temporo-mandibular (jaw) discomfort occurs it should also be discussed and the oral appliance may have to be modified accordingly.

HOME SLEEP STUDY

Care of the Instrument

Avoid exposure to sunlight and avoid getting it wet.

Please return the portable home sleep study device before 11am the next morning (we open at 8am).

The sleep technicians need to download your report and prepare the machine ready for another patient.



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HOME SLEEP STUDY

Your doctor has requested that you have a home sleep study in order to get more information about your sleep.

A home study is a “simplified” sleep recording that can be performed at home.

It is best used for the diagnosis of snoring and sleep apnoea. It is less useful for more complex sleep disorders (due to the need to video the patient with more complex problems) and when a person has multiple medical problems.

ADVANTAGES

- May be performed at home in a familiar surrounding.
- It is easy to set yourself up.
- You can put the “wires” on just before going to bed.

DISADVANTAGES

- The study is not supervised and therefore if one of the wires becomes disconnected we may lose the signal, sometimes the entire study.
- The wire attachment can become loose particularly if the patient sweats alot.
- In particular men with a beard may have difficulty in keeping the wires attached to the skin.
- The person is not video-recorded like they would be in an overnight hospital study.

SUGGESTIONS

- It is very important that the sleep study set up is done well, so that good quality signals are recorded and the test does not have to be repeated.
- Care should be taken to prepare the skin properly and apply the electrode dots and sensors accurately.
- It will take 20-30 minutes to set yourself up.
- If any electrode dots and sensors come off during the night please try to re-attach them.
- The sleep scientist will provide you with a practical demonstration on how to put on the wires.
- Also an easy to follow laminated step by step instruction sheet will be provided.
- Make sure that you use an alcohol wipe to clean the skin thoroughly.
- If the skin electrode comes off because of sweating, discard it, clean the skin again with an alcohol wipe and reapply a new one.

What are we recording?

- Some wires are attached around the head and record sleep stages, stage 1, 2, 3 and stage REM (rapid eye movement) sleep.
- One elastic band is applied around the stomach and one around the chest to measure breathing movements.
- A finger probe is placed on one of your fingers to measure your oxygen.



- A little cannula is placed just outside the nostrils to measure the flow of air in and out of your nose and any snoring that may occur.
- Two chest dots are placed on your chest to measure the heart activity (ECG).

During the Night

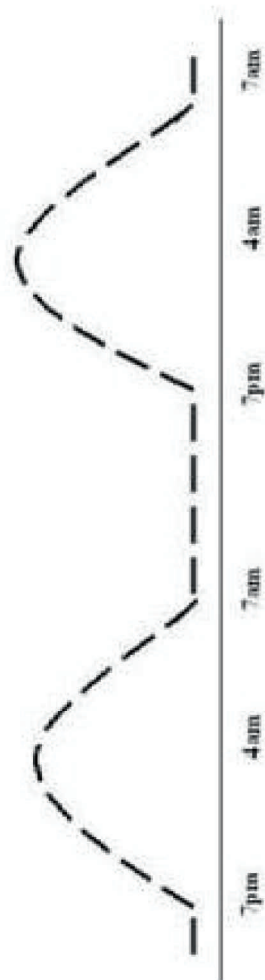
The device is completely portable. In the middle of the night you can get up and go to the toilet or to the kitchen and the equipment will keep recording. When we look at the study we know you were awake.

The study will be looked at and analyzed within one to 3 days by a sleep scientist and then reported on by a specialist physician.

The report will be available to be discussed with your doctor at your visit.

Home Sleep Studies are bulk billed. However we do require a current referral from your doctor.

Melatonin raises in the middle of the night and its level is low during the day .



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MELATONIN

**SLEEP
MEDICINE**

MELATONIN

Melatonin is a natural hormone produced by a small gland (pineal gland) in the brain (figure 1). Its main action is to synchronise body functions (body temperature, hormone secretion as well as sleep and wake pattern) with the 24 hour dark and light cycle due to the earth rotation.

Melatonin is present in all animals with similar function. As shown in Figure 1 at dusk the melatonin level rises in the body and stays up through the night. The level drops at daybreak. As the melatonin level rises, the temperature drops and the body gets the 'signal' that, in the absence of stressful situations, sleep can start.

The level of melatonin changes through the lifetime with very high levels in young children and progressively lower levels as we get older which may explain some of the difficulty in maintaining sleep that we see in elderly people.

Other functions of Melatonin

There are many other functions that melatonin has been claimed to provide such as antioxidant activity, anti-depressant, anti-aging and anti-cancer actions.

Melatonin is available without prescription as it is classified worldwide as a natural substance rather than a medication as such. Although this makes melatonin widely available it also makes the formulation of melatonin much less reliable. North America surveys reveal that up to 70% of preparations of melatonin have problems with either dosage or formulation. Therefore the best option is to have the melatonin prepared on purpose by a pharmacist.

How is melatonin produced

Because melatonin is not under the strict regulation of the Food and Drug Administration the strength and purity of the melatonin preparation is variable. The data sheet of melatonin compound available locally through pharmacies reports 97% melatonin and 3% other substances.

Side effects

Melatonin is considered safe at the recommended doses, with adverse effects not being significantly different from placebo (a 'dummy' capsule). However in individual case reports a variety of symptoms have been reported (fatigue, 'dizziness', headache and irritability, nausea).

The following group of patients need particular attention:

Epilepsy- some reports suggest increased risk of seizures, others reduced risk.

Warfarin- melatonin may increase the activity of warfarin (increasing the risk of bleeding).

Diabetes (on insulin)- melatonin may increase the sensitivity to insulin increasing the risk of hypoglycaemia

Blood pressure- melatonin may cause drop in blood pressure, which may be particularly relevant in the elderly and in patients on blood pressure medications.

Pregnancy- because of its action in the reproductive system of certain animals, the use in melatonin in pregnancy and in women planning pregnancy should be avoided.

Children- the use of melatonin in children before puberty should also be undertaken only if necessary but seems safe.

Dose of melatonin

The effect of melatonin does not depend on the dose. Specifically amounts between 1-5mg are sufficient and increase the body melatonin level up to 20 times the normal level. There are no indications for higher doses.

Timing of melatonin administration

It has been claimed that melatonin has a sleeping tablet like effect, and therefore could be given

just before going to bed. However the best use of melatonin is to be taken about 3 hours before intended bedtime. The main activity of melatonin is of synchronising the body function in order to favour sleep onset rather than inducing sleep. This is to say that if the person is under stress or is unable to switch off his/her thinking, melatonin is unlikely to put that person to sleep.

Taking the melatonin at the wrong time of the day may actually have a negative effect. Melatonin taken in the morning, rather than in the evening, may delay sleep onset. **We recommend short acting Melatonin** rather than slow release.

When do we use melatonin?

Melatonin is used in timing sleep disorders. There are groups of people whose body clock seems to be set well past midnight and these patients have difficulty falling asleep sooner than 1-2 am and sometimes later (this condition is called delayed sleep phase syndrome).

Melatonin is also used in some elderly people who have difficulty initiating and maintaining sleep. As mentioned above as we get older melatonin levels become progressively lower and increasing the level by administering melatonin in the evening seems to improve the continuity and quality of sleep.

Melatonin has also been used in the treatment of jet lag (for example 3mg at bed time for 4 days after arrival at the new destination).

Review- comprehensive (well referenced) reviews of melatonin can be found at;

<http://www.mayoclinic.com/>
(search 'melatonin')

<http://www.endocrine-source.com/neuroendo/neuroendo15/neuroendo15.htm>

How to make a positional belt

Measure your waist and add 15-20cm. Use a non stretchable cotton material of between 12 and 15 cm in width. Stitch a few cm of Velcro at both ends. At about the middle of the belt make a pouch of 12 x 12 or 12 x 15 cm with a strip of Velcro so that it can be sealed. Put a stress ball, or a bag of rice in the pouch so that there is some bulging (see figures 2 and 3). Avoid if possible the use of tennis ball, golf ball or cricket ball as they are uncomfortable and may wake the person. Make sure the pouch is sitting in the centre of the lower back. This may also be positioned at the chest level. You can also purchase a positional belt from our unit.

POSITIONAL TREATMENT (OF SNORING AND SLEEP APNEA)



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TREATMENT

Positional Treatment of Obstructive Sleep Apnea

In approximately 6% of patients with severe obstructive sleep apnea (*stopping breathing more than 30 times per hour*) and up to 50% of people with mild obstructive sleep apnea (*stopping breathing less than 15 times per hour*) the disturbed breathing is predominantly present in supine position (when lying on the back) (Fig1). One treatment option is to reduce the time the person spends on his/her back. Although some people perceive moving little through the night or even not moving at all, in reality we move randomly every 20-30 minutes. The use of a positional belt at the level of the waist is one way to reduce the amount spent on our back when asleep (Fig 2 & 3) .

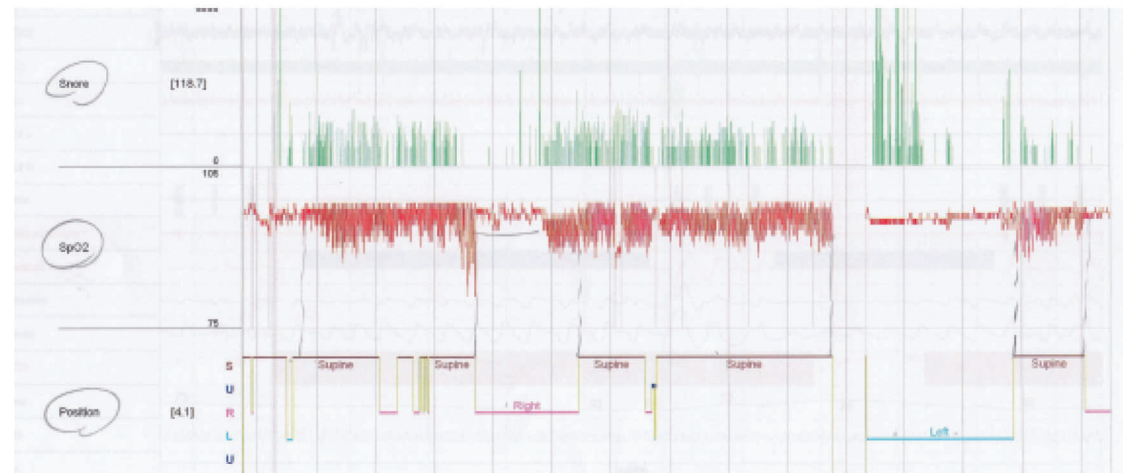


Fig 1



Fig 2



Fig 3

SLEEP STUDIES

(WHAT ACTUALLY HAPPENS)



How To Prepare For Your Sleep Study

Before the test you should shower and wash your hair. Do not put any gel or hairspray in you hair and do not put any makeup or creams on your face. If you are a man with a beard you will need to have a shave so that the electrodes may be applied to your chin. Make sure you have dinner before you come in as it is not supplied. Breakfast is supplied and if you are having an MSLT or MWT we will supply your lunch as well. It is a good idea to try and avoid caffeine (tea, coffee, chocolate) in the afternoon before your study and not to have a nap. The most common worry people have is that they will not be able to sleep in a strange environment with all these measuring devices. We have done our best to make sure the hospital is an easy place to sleep. Each person has a separate room. The wires are set up so that you can sleep in the same position as you normally do at home and you are reasonably free to move around. The rooms are air conditioned.



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SLEEP STUDIES

ROUTINE/ DIAGNOSTIC STUDY

Your first sleep study will most likely be a diagnostic study. This involves you coming into the hospital in the evening. You will get changed into your pyjamas and then the technician will prepare you for the study.

Electrodes (a small metal cup on the end of an insulated wire) will be attached to your scalp and face. The electrodes are held in place with paste on the scalp and tape on the face. Leads are also attached to your chest to monitor your heart (electrocardiogram, ECG) and your legs (to monitor leg movements). Elasticised bands are placed around your chest and abdomen to detect breathing movement and a probe is put on your finger to measure oxygenation. The skin is cleaned with a cleansing wipe and sometimes areas with too much hair (chest and legs) have to be shaved. Once this initial setup is completed you are ready to go to bed at your normal bedtime. The leads are long enough that you can sleep in any position you wish. Our Sleep Unit uses a telemetry system, that is **you are not attached to the bed** or to the wall by any cables. All the information is transmitted wirelessly to the computer and you are free to move around the unit or even outside it while you are still recorded.

There is always a sleep scientist on duty each night to monitor your sleep recording and to make sure everything runs smoothly. If necessary the sleep study can be video-taped by infrared camera. The nursing staff are also available through the night if required.

TREATMENT STUDY

For sleep apnoea (stopping breathing during sleep) the study involves the use of a nasal **CPAP (Continuous Positive Airway Pressure)** machine. A mask is placed over the persons nose and fastened with head straps to prevent air escaping. Depending on the severity of the sleep apnoea different air pressures may be needed by different people. The first trial of the CPAP machine in hospital is to introduce the sleep apnoea sufferer to the machine and determine the pressure they need to maintain regular breathing.

The set-up for the CPAP Trial involves all the same leads as the diagnostic study. The technicians will increase the pressure of the machine until the person stops snoring and they are breathing without obstruction.

A CPAP machine involves a motor unit, to which a tube is attached. This tube is flexible and connects the machine to the patient. There is a soft mask which fits snugly over the persons nose and is held in place by straps. The soft masks come in different styles and sizes so that you can find one to suit your own needs. There are other accessories available to make the machine easier to use.

A new generation of CPAP machines allows the pressure to drop in expiration (breathing out), and these may be useful in some patients. One example is the ResWell. The use of a chin strap is widely advocated, but usually **not necessary** except in patients with neuromuscular disorders. In winter and in dry climates, and in particular when the CPAP pressure is high (>10cm), the use of humidification is beneficial. Automatic machines are usually not useful except in rare situations.

MSLT

(Multiple Sleep Latency Test)

This test is conducted during the day and usually follows immediately after a routine study. You get up at about 7am, get dressed and have breakfast. At around 9.00am you lie down in a quiet dark room for twenty minutes to see whether or not you fall asleep. After twenty minutes you get up and can watch TV or read or do some work until the next nap which is around 11.00am. There are a total of four naps which will finish at around 4.00pm. Depending on the results of these four naps you may need to stay for a fifth nap at about 5.00pm. During the test you are not allowed to have any caffeine as this will affect your sleep. This means no tea, coffee, cola or chocolate!

MWT

(Maintenance of Wakefulness test)

This test consists of four periods of 40 minutes duration (usually 9am, 11am, 1pm, and 3pm) whereby you are asked to stay awake whilst sitting quietly in a dim room. It is a test to assess your ability to stay awake. This test is often used in professional drivers.

This test needs to be started 1 and half hour after waking up and not later than 3 hours after wake up time. A light breakfast is also recommended.