

MWT

Maintenance of Wakefulness Test

MWT is performed in hospital and consists of 4 test periods of 40 minutes each at around 8.30am, 10.30am, 12.30pm and 2.30pm where you are required to sit quietly in a chair and stay awake. You **are not allowed** to use your phone, eat, drink or walk around the room, or perform any activity that may help you stay awake.

The amount of light is reduced. Your ability to stay awake is monitored by brain wave activity recorded by little cup electrodes attached to your head. There are standard values that you are compared to.

Appointments

Ensure that you book your appointments well in advance to your due licence date for the RMS.

If this has not been possible the RMS may accept a letter with appointment details from us.

Remember if you are on CPAP bring your CPAP machine with you, not just the memory card, when you come to our clinic to be reviewed.



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DRIVING and Sleep Disorders



DRIVING and Sleep Disorders

IMPORTANT:

Having a sleep disorder does not stop you from driving, privately or commercially.

However, because people with sleep disorders have an increased risk of micro-sleeps that can cause accidents on the road or at work, there are regulations put in place by the RMS to improve the safety of the driver and the public.

Common sleep disorders that can increase the risk of micro-sleeps are **obstructive sleep apnea** and **narcolepsy** (and conditions similar to narcolepsy) If you have any of these conditions the RMS requires either:

- That you are on treatment and that the treatment is effective and used consistently. It is expected that CPAP is used at least 4 hours per night and for more than 70% of the time.

OR

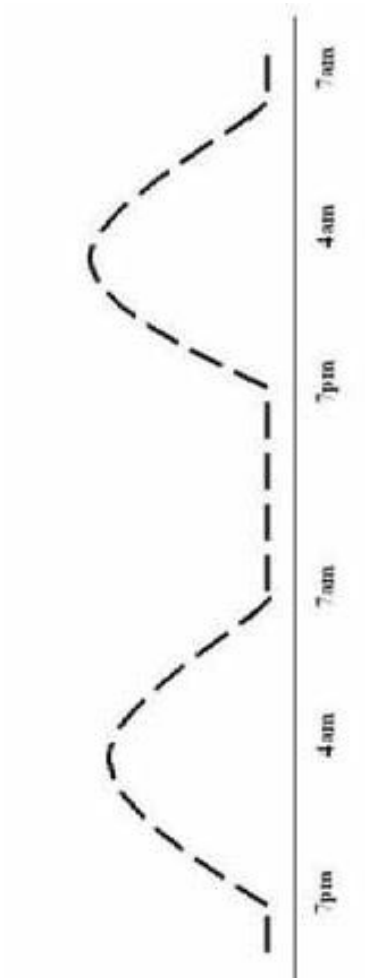
- Evidence to show that during the day you are able to maintain an adequate level of alertness. Currently to do this we use a test called an MWT (Maintenance of Wakefulness Test). Following the medicare changes from the first of November 2018, the MWT usually requires an overnight study the night before the test.

See next page for the explanation of what an MWT consists of.

Medical standards for licensing – Sleep disorders

Condition	Private standards (Drivers of cars, light rigid vehicles or motorcycles unless carrying public passengers or requiring a dangerous goods driver licence – refer to definition, page 21)	Commercial standards (Drivers of heavy vehicles, public passenger vehicles or requiring a dangerous goods driver licence – refer to definition, page 21)
Sleep apnoea (also see text)	<p>A person is not fit to hold an unconditional licence:</p> <ul style="list-style-type: none"> • if the person has established sleep apnoea syndrome (sleep apnoea on a diagnostic sleep study and moderate to severe excessive daytime sleepiness*); or • if the person has frequent self-reported* episodes of sleepiness or drowsiness while driving; or • if the person has had motor vehicle crash/es caused by inattention or sleepiness; or • if the person, in opinion of the treating doctor, represents a significant driving risk as a result of a sleep disorder. <p>A conditional licence may be considered by the driver licensing authority subject to periodic review, taking into account the nature of the driving task and information provided by the treating doctor as to whether the following criteria are met:</p> <ul style="list-style-type: none"> • the person is compliant with treatment; and • the response to treatment is satisfactory. <p>* The treating doctor should not rely solely on subjective measures of sleepiness such as the ESS to rule out sleep apnoea. Refer to section 8.2.3.</p>	<p>A person is not fit to hold an unconditional licence:</p> <ul style="list-style-type: none"> • if the person has established sleep apnoea syndrome (sleep apnoea on a diagnostic sleep study and moderate to severe excessive daytime sleepiness*); or • if the person has frequent self-reported* episodes of sleepiness or drowsiness while driving; or • if the person has had motor vehicle crash/es caused by inattention or sleepiness; or • if the person, in opinion of the treating doctor, represents a significant driving risk as a result of a sleep disorder. <p>A conditional licence may be considered by the driver licensing authority subject to periodic review, taking into account the nature of the driving task and information provided by a specialist in sleep disorders as to whether the following criteria are met:</p> <ul style="list-style-type: none"> • the person is compliant with treatment; and • the response to treatment is satisfactory. <p>* The treating doctor should not rely solely on subjective measures of sleepiness such as the ESS to rule out sleep apnoea. Refer to section 8.2.3.</p>
Narcolepsy	<p>A person is not fit to hold an unconditional licence:</p> <ul style="list-style-type: none"> • if narcolepsy is confirmed. <p>A conditional licence may be considered by the driver licensing authority subject to periodic review, taking into account the nature of the driving task and information provided by a specialist in sleep disorders on the response to treatment.</p>	<p>A person is not fit to hold an unconditional licence:</p> <ul style="list-style-type: none"> • if narcolepsy is confirmed. <p>A conditional licence may be considered by the driver licensing authority subject to at least annual review, taking into account the nature of the driving task and information provided by a specialist in sleep disorders as to whether the following criteria are met:</p> <ul style="list-style-type: none"> • cataplexy has not been a feature in the past; and • medication is taken regularly; and • there has been an absence of symptoms for six months; and • normal sleep latency present on MWT (on or off medication).

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



MELATONIN



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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.mayoclinic.com/search/melatonin/)

[http://www.endocrine-source.com/neuroendo/
neuroendo15/neuroendo15.htm](http://www.endocrine-source.com/neuroendo/neuroendo15/neuroendo15.htm)

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 your 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

(WHAT ACTUALLY HAPPENS)



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.

SNORING

Snoring, Upper Airway Resistance Syndrome and Apnoea: are all related conditions. However, the consequences of each are different.

Snoring is the noise produced by vibrating tissue as air goes through the throat while the person is asleep.

Upper Airway Resistance Syndrome (UARS) is a condition halfway between pure snoring and sleep apnoea. A person with UARS needs to make an extra effort to breathe because the airways are narrow. This extra effort during sleep often makes the person feel tired the next day.

Apnoea means stopping breathing. Sleep apnoea refers to a condition which involves snoring and stopping breathing regularly while the person is asleep. The oxygen levels in the body may drop because the person is not breathing properly.

"It is a delicious moment, certainly, that of being well-nestled in bed and that you shall drop gently to sleep. The good is to come, not the past; the limbs are tired enough to render the remaining in one posture delightful; the labor of the day is gone."

- Leigh Hunt



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SNORING

TREATMENT

Snoring is very common.

Habitual Snoring

Which is snoring that occurs almost every night is found in approximately 20% of the population. This means that about 1 out of every 5 people snore almost every night. Snoring is more common in men (1 in 4) than in women (1 in 6).

Snoring tends to increase after the age of 30 up to approximately 65 years of age. However, it tends to diminish after 65 years of age.

Factors in which snoring is more likely to occur:

Being overweight, large tonsils, a small receding chin, drinking alcohol in the evening, having a blocked nose, sleeping tablets and sleeping on your back.

Does snoring lead to other medical conditions?

In most cases, snoring does not cause ill health. High blood pressure is more common amongst snorers than non snorers, however, it is not known if snoring actually causes high blood pressure. In some heavy snorers, the noise itself can lead to disrupted sleep and the person feels tired the next day.

From a practical point of view, snoring does not bring about ill health. It is often only a problem when it is a nuisance for the people around the snorer. As snoring is not really a health problem, the person may decide not to do anything about it. Weight reduction, avoidance of alcohol in the hours before going to bed and not sleeping on your back are steps which can help reduce snoring (see "Positional Treatment" pamphlet).

Surgery

Surgery to the palate and the tongue is available but the success rate is very low. The experience with different surgical interventions over 20 years suggests that surgery should only be undertaken after other treatments have been considered and only in special circumstances.

There are a few techniques widely used in the past by ear, nose and throat (ENT) surgeons (the specialists who do the surgery).

They have complex names such as:

uvulopalatopharyngoplasty (UPPP)
and laser uvulopalatopharyngoplasty.

Uvulopalatopharyngoplasty (UPPP)

The surgeon removes the tonsils, if present, and reshapes the palate reducing the amount of soft tissue in the throat.

Laser Uvuloplatopharyngoplasty

Laser treatment may be performed under general anaesthetic or local anaesthesia. A strip of soft palate is treated with a laser beam which causes inflammation and scarring. This usually makes the floppy part of the throat more stiff which reduces snoring. Both procedures can be painful for a few days after treatment.

Mandibular Advancement Surgery

This is another surgical operation that is sometimes undertaken. It involves the repositioning of the jaw in a more forward position in people who have a very short jaw or a small receding chin. It also involves orthodontic treatment.

Glossoplasty

This procedure refers to reduction in the size of the tongue, particularly the back portion of the tongue. It may be performed on its own or together with the Uvuloplatopharyngoplasty.

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 a lot.
- 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.