

Your stay in our Sleep Lab

When you come into the Sleep Disorders Laboratory for your overnight sleep study, you will be sleeping in one of our private sleep rooms. The lab technicians will be working in a control room next door. This room contains the instruments that will be used to monitor your sleep.

After you arrive in our lab, we will ask you to fill out a questionnaire which asks 10 questions about what medications you may have taken the day of your test and how you feel the night of your test.

The technician will ask you to get into your night clothes and will apply the various recording devices for the study. These devices are attached with small amounts of glue or tape to your scalp, face, chest and lower legs. They look like small silver coins, a little smaller than a dime, with a long thin wire attached to each one. They are called electrodes and are used to detect changes in your breathing patterns and brain wave activity while you are asleep. We attach them in a way that you should not find bothersome. The wires will be plugged into a special amplifier at the head of your bed.

In addition, we will ask you to wear a couple of small, stretchy, belt-like devices around your chest and abdomen. These devices measure movements of your chest

and abdomen, and are very important in detecting respiratory problems during sleep. We will also ask you to wear a plastic sensor under your nose which is very important in measuring breathing patterns during sleep. Finally, we will ask you to wear a device on your finger to measure the oxygen level in your blood.

Once everything is connected, we will perform a series of brief checks with our instruments to make sure that they are all calibrated properly. Then the technician will wish you good night and turn off the lights. There is an intercom in your bedroom that allows the technician in the instrument room to monitor you continuously. If you have to get up for any reason during the night—such as to go to the bathroom or to get a drink of water—all you have to do is say so and the technician will assist you.

In the morning, we will wake you at an agreed upon time and remove the various measuring devices. Most people find our laboratory a comfortable place to sleep and our technicians helpful and attentive.

We will do whatever we can to make your stay in our laboratory a pleasant experience.

- the staff of the Sleep Lab

OBSTRUCTIVE SLEEP APNEA SYNDROME

Sleep apnea is a potentially serious disorder characterized by the cessation of breathing during sleep. There are three types of sleep apnea: obstructive, central and mixed. Obstructive sleep apnea is the most common form of apnea seen in adults. During sleep, the muscles of the throat relax as a normal part of the sleep process. With obstructive sleep apnea this relaxation leads to a partial or complete closure of the airway. The brain responds by waking the individual up enough to open the air passage. Breathing begins again, but the natural sleep cycle is interrupted. Less than 5 apneas per hour of sleep is considered normal. Greater than 10 apneas per hour of sleep is considered abnormal and needs to be treated. Serious medical problems can develop as a result of the repeated interruptions of the natural sleep cycle.

Frequent decreases of blood oxygen levels (from the apneas) can lead to high blood pressure, heart rhythm changes, and even heart failure. The repeated apneas also can lead to excessive daytime sleepiness, impaired daily function and reduced productivity. It is important to know that obstructive sleep apnea is associated with heart attacks, stroke and high blood pressure, thus even mild apnea may have adverse health effects.

The typical obstructive sleep apnea patient is frequently overweight and will present with complaints of daytime sleepiness or insomnia, morning headaches, and dry mouth upon awakening. Other clinical features which are frequently observed by others include loud snoring and pauses in breathing followed by gasping during sleep. In many cases these patients' medical histories include diagnoses for hypertension or depression.

In order for a diagnosis to be made, these patients need to have a sleep test performed. A diagnosis of OSA can be made if during the test the patient has more than ten obstructive apneas, greater than 10 seconds in duration, per hour of sleep (this is known as the apnea index). In association with these apneas the patient must also have frequent arousals from sleep and/or slow or high heart rate and/or a decrease in the blood oxygen level.

There are many ways of treating obstructive sleep apnea including:

- Surgery to the upper palate, nose, tongue and jaw
- Tracheostomy
- Night time supplemental oxygen
- Weight loss
- Body positioning devices and oral devices
- CPAP (which is the most common method used today)

Each of these methods have their benefits and drawbacks, and the treatment plan needs to be individualized for each patient to assure that effective resolution of their obstructive sleep apnea has been accomplished.

NASAL CPAP

Nasal continuous positive airway pressure (CPAP) was first described in 1981 as a simple and effective way of treating obstructive sleep apnea.

Obstructive sleep apnea is the result of an obstructed (blocked) airway. Your breathing muscles continue to function, but because of the obstruction, no air is able to move into or out of your lungs.

Control of breathing is different during sleep than during wakefulness. The muscles relax, and the body exerts less effort to breathe. As a result of this decreased muscle control, the tongue can fall back or the soft palate may collapse blocking the airway.

You experience an episode of apnea when there is no movement of air into or out of your lungs. These apneic episodes can last from only seconds to over a minute and may occur hundreds of times throughout the night.

During an apneic episode, your brain causes you to awaken slightly making it easier for you to breathe. Although you are unaware of these constant interruptions of your sleep, they prevent you from having restful, productive sleep.

This lack of deep restful sleep causes excessive daytime sleepiness and puts extra stress on your heart and other major organs.

Nasal CPAP involves wearing a mask over your nose or nasal pillows which are inserted into your nostrils. A blower in the CPAP unit gently pushes air into the mask or pillows. The flow of air causes a slight pressure build up in your airways, keeping them open. This allows you to breathe normally and returns you to a normal sleep pattern.

QUESTIONS

WHAT IS A POLYSOMNOGRAM / SPLIT NIGHT CPAP STUDY?

A Polysomnogram is a test, which measures bodily functions during sleep. Some of the measurements taken will include:

- Brain Waves (skin, surface electrodes on the head - applied with collodion glue)
- Heart Beats (skin, surface electrodes on the chest)
- Eye Movements (skin, surface electrodes above and below the eyes)
- Muscle Tension (skin, surface electrodes on the chin)
- Leg Movements (skin, surface electrodes on the lower leg)
- Breathing (sensors attached to the skin near the nose and mouth)
- Breathing Effort and Movement (small, elastic belts placed around the chest and stomach)
- Blood Oxygen Levels (small sensor attached to the index finger, and not taken from actual blood samples)
- Airway Pressures (a small mask may be fitted over your nose in order for us to apply pressure to keep your airway open)

WILL EVERYONE NEED TO WEAR THE CPAP MASK?

No, your physician has ordered a split night study to determine if sleep apnea is affecting your sleep. During your sleep test we will be able to determine if you have sleep apnea. If you do not, the mask will not be applied. If you do have sleep apnea, the mask will be applied half way through the night to determine the pressure that is right for you.

WHY RECORD ALL THESE THINGS?

During sleep the body functions differently than while awake. Disrupted sleep can disturb daytime activities, and sometimes medical problems during sleep involve a risk to basic health.

HOW CAN I SLEEP WITH ALL THESE THINGS ON ME?

Surprisingly, most people sleep very well. The body sensors are applied so that you can turn and move during your sleep. Generally, you will not be aware that you are wearing the devices after they have been on for a short time. Our staff tries to make the environment as comfortable and similar as possible to your home surroundings, and many patients report that they actually sleep better here than at home.

I TOSS AND TURN ALL NIGHT—WILL ALL THESE WIRES STAY ON?

All the wires connected to you are 6 to 10 feet long. They are all hooked into one box, which is connected to the side of your bed. You are able to move side to side, from your back or stomach. Sometimes electrodes do come loose. At that point, we would try to manipulate signals through the computer. As a last resort, we might have to awaken you shortly to reapply a loose or missing electrode.

WHAT HAPPENS IF I NEED TO GO TO THE BATHROOM?

All you need to do is speak in the room and the cameras will pick up your voice and one of the techs will assist you.

USE OF CPAP UNIT

- Please place the CPAP unit on a bedside table or chair next to the bed.
- Make sure that bedding, curtains or other items are not blocking the filter or vents of the CPAP unit. Air must flow freely around the unit for it to work properly.
- Connect the circuit. Examine the flexible tubing for any damage or debris. Replace any damaged tubing.
- Adjust the chinstrap for a comfortable fit so your mouth doesn't fall open while sleeping.
- Adjust the mask and headgear until you have a comfortable fit and there is no airflow leaking into your eyes.
- If Smart Start is enabled, exhale through your nose to start the treatment.
- If the CPAP doesn't start, press the manual start/stop button. There may be a poor mask seal, which doesn't allow the machine to sense your breathing. Use your mask-fitting feature.
- The mask-fitting feature ensures that the mask has an acceptable seal. Press the lower bar. Pressure in the mask will increase. Stars should appear in the LCD display. If 4-5 stars appear, the mask fit is ok, if 3 or less stars appear, re-fit your mask. Press the lower bar again to return to the preset pressure. The pressure in the mask will automatically return to the preset pressure after 3 minutes if you don't press the button again.
- If the airflow from the unit feels cold, re-position the circuit tubing so that it runs under your bed covers to heat the air.
- Please unplug the power cord from the CPAP unit before placing it in the carrying case.

NOTE: DO NOT EXPOSE YOUR CPAP MACHINE OR COMPONENTS TO SMOKE. IF SOMEONE SMOKES, KEEP BEDROOM DOORS CLOSED AND AIR OUT OF THE ROOM THE SMOKER WAS IN.

TIPS TO HELP AVOID AIRWAY DRYNESS

If you are experiencing dryness in your airway during therapy, here are some suggestions to help make you more comfortable.

- **Drink lots of fluids throughout the day.**

If you are on fluid restrictions per doctor's orders, please check with your doctor.

- **May try normal saline nasal spray.**

- a) humidifies the nose
- b) just salt water (same chemistry as body tissue)
- c) may use as often as necessary (no contraindications)
- d) non-prescription (brand names "Ocean Mist or Ayr")

- **May try water-based lubricant.**

- a) small amount placed in each nostril, couple of times per day and before sleep
- b) **DO NOT USE PETROLEUM-BASED PRODUCTS**, such as Vicks or Vaseline.
- c) Brand names - KY Jelly or Surgilube

- ▶ Remember: Water also helps keep mucous more thin so it can drain more freely. Thickening of mucous can lead to impacting of sinuses and that may lead to infections.
- ▶ Remember: Mouth dryness may occur if your mouth opens up during therapy. You may need to tighten your chin strap to help keep your mouth closed.

DO NOT USE CPAP IF...

YOU CONTRACT A SINUS OR MIDDLE EAR INFECTION

Please seek medical advice for your infection. Contact your primary physician to find out if you need further treatment. Also your physician needs to make a decision whether or not you should continue using CPAP/BIPAP while infection is being treated.

Your obstructive sleep apnea symptoms, such as sleepiness, may temporarily return while not using therapy. Be aware of this effect on your driving and working routine.

Symptoms of Sinus Infection

- A. Colored (yellow or green) nasal drainage
- B. Pressure behind eyes and frontal headaches

Symptoms of Middle Ear Infection

- A. Pain in middle ear

A PROGRAM FOR A BETTER NIGHT'S SLEEP

Sleep Hygiene Rules

- ▶ Do not go to bed until you are drowsy.
- ▶ Get up at approximately the same time each morning, including weekends. If you feel you must get up later on weekends, allow yourself a maximum of one hour later arising.

- ▶ Do not take naps.

These first three rules will give you a consistent sleep rhythm and synchronize your biological clock. With time, your bedtime, or the time you become drowsy, will also tend to become regularized.

- ▶ Do not drink alcohol later than two hours prior to bedtime.
- ▶ Do not consume caffeine after about 4:00 PM, or within six hours prior to bedtime. Learn all the foods, beverages and medications that contain caffeine.
- ▶ Do not smoke within several hours prior to your bedtime.
- ▶ Exercise regularly. The best time to exercise is in the late afternoon. Avoid strenuous exertion after 6:00 PM.
- ▶ Use common sense to make your sleep environment most conducive to sleep. Arrange for a comfortable temperature and minimum levels of sound, light and noise.
- ▶ If you are accustomed to it, have a light carbohydrate snack before bedtime (e.g. crackers, graham crackers, milk or cheese). Do not eat chocolate or large amounts of sugar. Avoid excessive fluids. If you awaken in the middle of the night, do not have a snack then or you may find that you begin to wake up habitually at that time feeling hungry.

- ▶ Do not use your bed or bedroom for any activity other than sleep. You should not watch television, read, talk on the telephone, worry, argue with your spouse or eat in bed. The only exception to this rule is that you may engage in sexual activity in bed.

- ▶ Establish a set of regular presleep routines to signal that bedtime approaches. Lock the door, plug in the coffee machine, brush teeth, set the alarm and perform any other behaviors that make sense for this time of night. Do these activities in the same order each night. Use your preferred sleep posture and combination of favorite pillows and blankets.

- ▶ When you get into bed, turn out the lights with the intention of going right to sleep. If you cannot fall asleep within a short time (about ten minutes), get up and go into another room. Engage in some quiet activity until you begin to feel drowsy and then return to the bedroom to sleep.

- ▶ If you still do not fall asleep within a brief time, repeat the previous step. Repeat this process as often as it is necessary throughout the night. Use this same procedure if you awaken in the middle of the night and do not return to sleep within about ten minutes.