

# Sleep Study



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## WHAT IS THIS PROCEDURE ABOUT?

**Your doctor is sending you for a sleep study because there is a suspicion that you may have sleep apnea.**

Sleep apnea is a sleep disorder in which you stop breathing during the night for as little as 10 seconds or up to 2 minutes. It is usually caused by your airway collapsing after you fall asleep. This pattern of sleep and breathing is hard on your body, but fortunately once the diagnosis of sleep apnea is confirmed by the sleep study, it can be treated.

Sleep apnea is treated with a machine called a CPAP (see-pap) which stands for Continuous Positive Airway Pressure. The CPAP is a machine that blows air through a mask that is fitted over your mouth and nose. The CPAP is worn when you sleep. The continuous pressure helps keep the airway open.

As part of the sleep study, the technician may have you try the CPAP and adjust the mask or settings so that it is comfortable for you. On occasion the CPAP will not be comfortable this first night, but modification can be made later to improve comfort. The pressure of the airflow through the machine is key for treating sleep apnea; the pressure will be titrated to the correct settings during your study. There are other options if you can not tolerate CPAP.

When you arrive for the sleep study the technician will explain what will happen during the night. They will also hook you up to monitors which collect all the data needed to interpret the study. During the first night of the study, you

sleep like you normally do and the technician monitors your sleep breathing pattern. If the data reveals that you do have sleep apnea, then you will be scheduled for a second night study with the CPAP mask on. The machine may be a little uncomfortable in the beginning because of the constant air flow, but most people adjust to it quickly. If you are having problems tolerating the CPAP or the mask doesn't feel right, please let the technician know.

Once the study is done, a sleep specialist needs to interpret the study so that the final recommendations can be made. The results will be forwarded to the ordering physician. You need to make an appointment with your doctor so that you can go over the results 1-2 weeks after the study is done.

## SLEEP APNEA: A NON-TECHNICAL PRESENTATION

**William P. Baird**

Sleep apnea is an illness. Those who suffer from sleep apnea stop breathing many times during each night's sleep. The most common result is excessive daily sleepiness.

The word "apnea," means a suspension of breathing. It reasonably follows then that "sleep apnea" refers to non-breathing which occurs during sleep. If the apneas (non-breathing periods) which occur during asleep other medical problems, then it would be said that the person suffers from a "sleep-induced apnea syndrome." Usually, and in the remainder of this paper, this condition is simply referred to as "sleep apnea."

Anyone can develop sleep apnea at any age. It is a serious and sometimes life threatening disorder. It appears that men have sleep apnea more frequently than women and those who have narcolepsy develop it more often than others. It is estimated that about 10 percent of the males who have narcolepsy also have sleep apnea.

Once a person has developed sleep apnea, they appear to have it for life. There is no known cure, although in some cases certain surgical procedures can provide complete relief of symptoms and, in others, certain drugs can give partial relief. In some cases, the symptoms reach maximum severity very quickly while in other cases the

symptoms begin gradually and may require years to reach their most serious level.

In a true case of sleep apnea, the occurrence of sleep alone is sufficient to induce repetitive episodes of apnea. There are many other possible neurological conditions (such as bulbar poliomyelitis) that may predispose to the occurrence of the apneic periods during sleep in someone who might not otherwise have the syndrome. However, such other causes can be detected while the person is awake whereas in a true case of sleep apnea, that which is the subject of this paper the breathing of the person is entirely normal when fully awake.

To repeat, with only rare exceptions, a medical examination of a person, suffering from sleep apnea will reveal absolutely no characteristic physical abnormalities while the person is awake. In addition, when they wake up they usually will not recall having experienced apneic periods while they were asleep. After all, they were asleep when it happened. Therefore, the only means of detecting the condition is by examining/observing the person while they are asleep. Many cases have been diagnosed only after the sufferers spouse or bed partner reported observing the apneic episodes.

## TYPES OF SLEEP APNEA

There are two main types of sleep apnea. One, called "central sleep apnea," is relatively rare and is found mainly in persons complaining of insomnia. When a person suffering from this type of sleep apnea falls asleep, the diaphragm (the muscle separating the chest and abdominal cavity which helps move air in and out of the lungs) stops moving because the sleeping brain fails to send impulses through the nerves which control the movement of the diaphragm. When the diaphragm stops functioning, breathing stops.

A more common and serious type of apnea is "upper airway sleep apnea." In this type, the onset of sleep does not affect the diaphragm. There is, however, an abnormal loss of tone (healthy elasticity) in the muscles of the tongue, throat, and larynx during sleep. As a result, at the onset of sleep or during sleep, the throat is completely collapsed and air flow is completely blocked. During the apneic episode, the diaphragm continues to contract rhythmically with a progressively greater effort against the closed airway until finally a partial or complete awakening occurs and normal breathing is resumed.

Finally, some individuals who suffer from sleep apnea, particularly those afflicted with narcolepsy, have a third type which is called "mixed sleep apnea." This type is a combination of

the previous two types. These apneic episodes always begin with central apnea, which then turns into upper airway sleep apnea. The reverse order has not been seen.

## SYMPTOMS WHILE ASLEEP

If one observes a sleeping person who suffers apnea it will be noted that they may have few or many apneic episodes during a night's sleep. For example, 35 individuals suffering from sleep apnea were recently studied at Stanford University's Sleep Disorders Clinic. In this group the number of apneic episodes ranged between 68 and 682 occurring during a seven hour sleep period. The length of time that each apnea lasted ranged between 10 and 190 seconds. The latter figure is not a misprint; some individuals sometimes stopped breathing for as long as three minutes and ten seconds!

In a typical case, sleep and the associated apneic periods are terminated by a partial arousal during which breathing resumes. After a few breaths, sleep deepens, breathing stops, and the cycle repeats itself. This cycle continues over and over throughout the night. Most individuals who suffer from sleep apnea experience both long and short apneic periods during every night's sleep. It is not known why the apneic periods vary in length, why a given apneic period ends, nor why partial arousals occur.

Loud snoring is a common symptom. A history of snoring precedes the development of other symptoms. The snoring occurs as the person begins to breathe at the end of each apneic period. Some sufferers are described as having a snorting or gasping respiration during sleep.

A study of 12 persons suffering from sleep apnea revealed that their sleep was very agitated, and frequently they moved around in an abnormal manner before they resumed breathing at the end of an apneic period. The movements ranged from simple "flapping tremors" of the hands and feet to larger and sometimes quite violent movements of arms, legs, or even the entire body. Some individuals would suddenly sit up in bed, try to get out of bed and often succeed, try to walk or walk a little and then fall to the floor where they often would sleep for the rest of the night. All of these persons were difficult to awaken during apneic episodes, and, if suddenly awakened, they did not know where they were.

When sleep apnea occurs in children, it commonly causes nightly bedwetting. Thus, the occurrence of bedwetting in a child who has been previously dry through the night is suggestive of the development of a sleep apnea syndrome. Bedwetting also occurs occasionally in adults with sleep apnea. Bedwetting episodes may occur more than once a night.

## SYMPTOMS WHILE AWAKE

Those who suffer from central sleep apnea usually complain of insomnia. They often say they are unable to get a night of continuous sleep. Although they are unaware of the apneic episodes, they are often aware that they awaken frequently during the night and are unable to go back to sleep for some time. They also have many awakenings of which they are unaware. In one small study of such individuals, the number of awakenings ranged between 40 and 60 per night, each lasting between 10 and 60 minutes. This, of course, also results in the person being tired during the day.

The primary symptom, of which those who suffer from upper airway or mixed sleep apnea are usually unaware, and the problem of which they most often complain, is excessive daytime sleepiness. Complaints such as, "I never seem to get enough sleep," "I'm sleepy, all day, every day," or "I'm always sleepy" are common. This symptom is similar to the sleepiness that afflicts the person with narcolepsy. A major difference is the absence of cataplexy. Although their nighttime sleep is very disrupted, those who suffer from upper airway or mixed sleep apnea are invariably completely unaware of the disturbance and feel their sleep is deep and continuous.

There are other problems characteristic of sleep apnea, which are sometimes reported by those who suffer from this

