

A Patient's Guide to Understanding Sleep Apnea

I. What is sleep apnea?

Apnea is the combination of two Greek words, (a and pnea) meaning ("a") without and ("pnea") air. Sleep apnea refers to the loss of air movement during sleep. This results in a depletion of oxygen and a build up of carbon dioxide in the lungs and blood.

Snoring is the most obvious event associated with sleep apnea and results from turbulent air flow in a narrow airway. Airway collapse (apnea) is caused by negative air pressure (vacuum). This vacuum develops when air moves through a restricted space at high speed. The more severe the restriction, the louder the snoring becomes and the more likely apnea is to occur. When the throat collapses like a pinched straw on inspiration, carbon dioxide levels rise and oxygen levels decrease, resulting in arousal. The patient will simply lighten their sleep for a few seconds (arousal), open the airway to breathe and return to sleep, only to resume snoring and repeat the apnea cycle about once per minute. Therefore, in more severe cases, it is possible for a person to experience 500 to 600 episodes of sleep apnea each night. The bed partner becomes aware of this problem because of pauses in air flow that are followed by gasping. They may become concerned that their mate is about to die in their sleep from either not breathing or choking.

II. What are the effects of obstructive sleep apnea?

Sleep apnea is a progressive disease. Mild snoring converts gradually to sleep apnea as more negative pressures are created because of weight gain, aging, etc. Initially this may be only a few apneas per night. As the number of apneic events increases, both physical and mental symptoms develop. These are usually not noted until there are at least 50 or more events per night.

These are several symptoms which indicate the possible presence of apnea:

- Weight gain
- Fitful sleep
- Tired appearance
- Loud snoring
- Mumbling in sleep
- Drooling on the pillow
- Frequent urination at night

These cognitive (mental) dysfunctions may be present:

- Poor concentration
- Inappropriate asleep
- Poor memory
- Increased irritability
- Chronic fatigue
- Decreased libido
- Some depression

- Claustrophobia
- Rapid sleep onset
- Avoidance of social events
- Awakening with a headache
- Sweating in sleep

Long-term effects of sleep apnea include:

- Increased risk of cardiovascular disease, heart attack, stroke, angina pectoris (chest pains) and hypertension
- Impaired performance at work and home

Symptoms may vary among patients, but most will have several of the above complaints. These problems are generally reversible with treatment.

III. Who is at risk for developing obstructive sleep apnea?

A. Three risk factors are largely determined at birth:

1. age: prevalence and severity of symptoms increase with age.
2. gender: Males are about twice as likely to develop OSA until women reach menopause.
3. airway size and shape:
 - a. craniofacial structure (cleft palate, mandibular retroposition).
 - b. micrognathia (small jaw).
 - c. macroglossia (large tongue), adenotonsillar enlargement (large tonsils).
 - d. small trachea (narrow airway).

B. Disease risk factors: Impaired control of breathing in association with:

1. emphysema and asthma.
2. neuromuscular disease (polio, myasthenia gravis, etc).
3. nasal obstruction.
4. hypothyroid condition.

C. Lifestyle Risk:

1. smoking
2. obesity: 30-60% of OSA patients are morbidly obese.
 - a. weight loss improves/lessens symptoms.
 - b. weight gain increases symptoms.
 - c. weight loss is easier in patients who are treated by nasal CPAP.

SUMMARY

A typical patient is a loud snoring male over the age of 35 who has gained weight and has three or more other symptoms of sleep apnea. There is usually a family history of snoring especially if the patient is a female.

IV. How do I know if I have obstructive sleep apnea?

The purpose of the initial interview is to explore those signs and symptoms and to arrange testing as appropriate. The only definitive test for obstructive sleep apnea is an overnight polysomnogram which measures breathing effort, airflow, brain waves, eye movements, muscle tone, heart rate, breath sounds and leg movements across a night's sleep. This data is then analyzed to detect sleep disturbance, breathing impairment, oxygen loss and any cardiac irregularities induced by obstruction of your airway during sleep. With this data, we can quantify the severity of the problem and determine if a significant disorder does exist.

V. If I have obstructive sleep apnea, is there a treatment available?

Treatments can be generally divided into three types:

- Prosthetic devices
- Surgical intervention
- Changes in lifestyle

Prosthetic Devices:

The most frequently used treatment for sleep apnea in this category is nasal continuous positive airway pressure, referred to as nasal CPAP. In this therapy, a prosthetic device consisting of an airflow generator, a flexible hose and a nasal mask is attached to you while you sleep. It uses room air, under pressure, to splint your airway passage open and prevents both snoring and obstruction of airflow in and out of the lungs. To obtain this device, one must sleep in a Sleep Center, under observation in order to determine the amount of pressure necessary to keep the airway freely open during sleep. It is available by prescription following the test.

Nasal CPAP has the advantages of being:

1. Able to eliminate both snoring and apnea
2. Effective on almost all patients
3. Quickly available
4. Non-invasive
5. Used in conjunction with weight loss

Other prosthetic devices:

Oral Dental Appliances. They reposition the upper and lower jaw relationship in an effort to bring the tongue forward and increase the posterior airway space.

A Tongue Retaining Device. It moves the tongue forward independently and increased the posterior airway space.

Cervical Collars or Pillows. They have been reported to relieve sleep apnea, but there are no studies that validate this claim.

Surgical intervention:

Nasal surgery. This usually involves correction of a deviated septum, repair of a broken nose, reduction of turbinate bones which project from the sidewalls of the nasal passage and/or the removal of nasal polyps. In general, any chronic obstruction of the nasal passage is likely to worsen or induce obstructive sleep apnea.

Plastic surgery of the palate, uvula and pharynx. This is referred to as uvulopalatopharyngoplasty (UPPP). In this procedure, the soft palate and the associated uvula is reduced in size. Any excess tissue in the back of the mouth and throat is removed along with tonsils and/or adenoids.

Somnoplasty. This procedure employs microwave energy to heat the inside of the soft palate, resulting in tissue death. The intent is to shrink the tissue mass as scar tissue replaces the destroyed cells. It is an experimental procedure.

Recommendations for either nasal or soft palate surgery should be obtained from an ENT specialist, sometimes referred to as an otorhinolaryngologist.

Other surgical procedures. Some patients have had their lower jaw surgically relocated, portions of the back of the tongue removed or other types of facial surgery. These surgeries remain experimental and are only recommended in unusual cases. A cephalometric x-ray is performed at our Center. It is helpful in determining which type of surgery, if any, is likely to be effective. It is best used in conjunction with the examination by the otorhinolaryngologist.

Tracheostomy. This is a very effective procedure, but is seldom used. An opening from the surface to the trachea is made just below the Adam's apple (larynx). A plastic insert is placed in the incision. This device may be closed during the day and opened at night to prevent apnea.

Lifestyle changes:

Weight reduction. Weight loss, in addition to providing other benefits, often reduces the severity of sleep apnea. The only way to determine if weight reduction is beneficial is to undergo the weight loss and then be tested for sleep apnea subsequent to attaining the ideal body weight.

Avoidance of alcohol and sleeping aids. These substances reduce the body's ability to arouse when the obstruction occurs. They also increase the likelihood of obstruction by further relaxing the throat muscles and lowering the threshold for airway collapse. Lastly, once the collapse occurs, these sedating compounds make it more difficult to correct the obstruction of the airway. This makes the associated changes both in terms of oxygen loss and carbon dioxide build-up more severe and worsen the effects of the sleep apnea.

Avoidance of extreme fatigue, sleep deprivation and use of caffeine late in the day