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Obstructive sleep apnea (OSA)

A common sleep apnea caused by obstruction of the airway. It is characterized by pauses in breathing during sleep. These episodes, called apneas (literally, "without breath"), each last long enough that one or more breaths are missed, and occur repeatedly throughout sleep. In obstructive sleep apnea, breathing is interrupted by a physical block to airflow, despite the effort to breathe.

Obstructive sleep apnea is the most common category of sleep-disordered breathing. The prevalence of OSA among the adult population in western Europe and North America has not been confidently established, but in the mid-1990s was estimated to be 3-4% of women and 6-7% of men.

The individual with sleep apnea is rarely aware of having difficulty breathing, even upon awakening. Sleep apnea is recognized as a problem by others witnessing the individual during episodes or is suspected because of its effects on the body. Symptoms may be present for years, even decades without identification, during which time the sufferer may become conditioned to the daytime sleepiness and fatigue associated with significant levels of sleep disturbance.

Since the muscle tone of the body ordinarily relaxes during sleep, and since, at the level of the throat, the human airway is composed of walls of soft tissue, which can collapse, it is easy to understand how breathing can be obstructed during sleep. Although many individuals experience episodes of obstructive sleep apnea at some point in life, a much smaller percentage of people are afflicted with chronic, severe obstructive sleep apnea.

Many people experience episodes of obstructive sleep apnea for only a short period of time. This can be the result of an upper respiratory infection that causes nasal congestion, along with swelling of the throat, or tonsillitis that temporarily produces very enlarged tonsils. Temporary spells of obstructive sleep apnea syndrome may also occur in individuals who are under the influence of a drug (such as alcohol) that may relax their body tone excessively and interfere with normal arousal from sleep mechanisms.

Signs and symptoms:

Common signs of obstructive sleep apnea include unexplained daytime sleepiness, restless sleep, and loud snoring (with periods of silence followed by gasps). Less common symptoms are morning headaches; insomnia; trouble concentrating; mood changes such as irritability, anxiety and depression; forgetfulness; increased heart rate and/or blood pressure; decreased sex drive; unexplained weight gain; increased urination and/or nocturia; frequent heartburn or Gastroesophageal reflux disease; and heavy night sweats.

In adults, the most typical individual with obstructive sleep apnea syndrome suffers from obesity, with particular heaviness at the face and neck. Obesity is not always present with OSA, in fact a significant number of adults with normal body mass indices (BMI) have decrease in muscle tone causing airway collapse and sleep apnea. The cause of the decreased tone is not presently understood. The hallmark symptom of obstructive sleep apnea syndrome in adults is *excessive daytime sleepiness*. Typically, an adult or adolescent with severe long-standing obstructive sleep apnea will fall asleep for very brief periods in the course of usual daytime activities if given any opportunity to sit or rest. This behavior may be quite dramatic, sometimes occurring during conversations with others at social gatherings.

Although excessive sleepiness may also occur in children, it is not at all typical of young children with sleep apnea. Toddlers and young children with severe obstructive sleep apnea instead ordinarily behave as if "over-tired" or "hyperactive." Adults and children with very severe obstructive sleep apnea also differ in typical body *habitus*. Adults are

generally heavy, with particularly short and heavy necks. Young children, on the other hand, are generally not only thin, but may have "failure to thrive," where growth is reduced. Poor growth occurs for two reasons: the work of breathing is high enough that calories are burned at high rates even at rest, and the nose and throat are so obstructed that eating is both tasteless and physically uncomfortable. Obstructive sleep apnea in children, unlike adults, is almost always caused by obstructive tonsils and adenoids and is usually cured with tonsillectomy and adenoidectomy.

This problem can also be caused by excessive weight in children. In this case, the symptoms are more like the symptoms adults feel: restlessness, exhaustion, and more.

Diagnosis:

Results of polysomnography in obstructive sleep apnea show pauses in breathing. As in central apnea, pauses are followed by a relative decrease in blood oxygen and an increase in the blood carbon dioxide. Whereas in central sleep apnea the body's motions of breathing stop, in obstructive sleep apnea the chest not only continues to make the movements of inhalation, the movements typically become even more pronounced. Monitors for airflow at the nose and mouth show efforts to breathe are not only present, but that they are often exaggerated. The chest muscles and diaphragm contract and the entire body may thrash and struggle.

An "event" can be either an apnea, characterised by complete cessation of airflow for at least 10 seconds, or a hypopnea in which airflow decreases by 50 percent for 10 seconds or decreases by 30 percent if there is an associated decrease in the oxygen saturation or an arousal from sleep (American Academy of Sleep Medicine Task Force, 1999). To grade the severity of sleep apnea, the number of events per hour is reported as the apnea-hypopnea index (AHI). An AHI of less than 5 is considered normal. An AHI of 5-15 is mild; 15-30 is moderate and more than 30 events per hour characterizes severe sleep apnea.

Treatment:

There are a variety of treatments for obstructive sleep apnea, depending on an individual's medical history, the severity of the disorder and, most importantly, the specific cause of the obstruction.

Some treatments involve lifestyle changes, such as avoiding alcohol and medications that relax the central nervous system (for example, sedatives and muscle relaxants), losing weight, and quitting smoking. Some people are helped by special pillows or devices that keep them from sleeping on their back, or oral appliances to keep the airway open during sleep. The most widely used current therapeutic intervention is *positive airway pressure* whereby a breathing machine pumps a controlled stream of air through a mask worn over the nose, mouth, or both. The additional pressure splints or holds open the relaxed muscles, just as air in a balloon inflates it. There are several variants:

- (CPAP), or *continuous positive airway pressure*, in which a controlled air compressor generates an airstream at a constant pressure. This pressure is prescribed by the patient's physician, based on an overnight test or titration. Newer CPAP models are available which slightly reduce pressure upon exhalation to increase patient comfort and compliance. CPAP is the most common treatment for obstructive sleep apnea.
- (VPAP), or *variable positive airway pressure*, also known as bilevel or BiPAP, uses an electronic circuit to monitor the patient's breathing, and provides two different pressures, a higher one during inhalation and a lower pressure during exhalation. This system is more expensive, and is sometimes used with patients who have other coexisting respiratory problems and/or who find breathing out against an increased pressure to be uncomfortable or disruptive to their sleep.
- (APAP), or *automatic positive airway pressure*, is the newest form of such treatment. An APAP machine incorporates pressure sensors and a computer which continuously monitors the patient's breathing

performance. It adjusts pressure continuously, increasing it when the user is attempting to breathe but cannot, and decreasing it when the pressure is higher than necessary. Although FDA approved, these devices are still considered experimental by many, and are not covered by most insurance plans.

Breathing exercises, such as those used in Yoga, the Buteyko method, or didgeridoo playing can be effective. There are muscles which act to tension and open the airway during each inspiration. Exercises can, in some cases, restore sufficient function to these muscles to prevent or reduce apnea.

Prognosis:

Although it takes some trial and error, most patients find a combination of treatments which reduce apnea events and improve their overall health, energy, and well-being. Without treatment, the sleep deprivation and lack of oxygen caused by sleep apnea increases health risks such as cardiovascular disease, high blood pressure, stroke, diabetes, clinical depression, weight gain and obesity.

The most serious consequence of untreated obstructive sleep apnea is to the heart. In severe and prolonged cases, there are increases in pulmonary pressures that are transmitted to the right side of the heart. This can result in a severe form of congestive heart failure (*cor pulmonale*).
Elevated arterial pressure (commonly called high blood pressure) can be a consequence of obstructive sleep apnea syndrome. When high blood pressure is caused by OSA, it is distinctive in that, unlike most cases of high blood pressure, the readings do *not* drop significantly when the individual is sleeping. Stroke is associated with obstructive sleep apnea. Sleep apnea sufferers also have a 30% higher risk of heart attack or death than those unaffected.

Many studies indicate that it is the effect of the "fight or flight" response on the body that happens with each apneic event that increases these risks. The

response causes many hormonal changes in the body; those changes, coupled with the low oxygen saturation level of the blood, cause damage to the body over time.

10 Tips For A Better Night's Sleep

- Sleep as much as needed (8 hours is the average necessary) to feel refreshed and healthy during the day, but not more. Excessively long times in bed may make sleep more fragmented and shallow.
- Establish a regular and relaxing bedtime regimen and get up every morning at the same time.
- Exercise daily (not within 3 hours of bedtime) to help deepen sleep, occasional exercise does not necessarily improve sleep.
- Loud noises disturb sleep even in people who are not awakened by noises and cannot remember in the morning. Sound proof your bedroom.
- Excessively warm rooms disturb sleep. Keep bedrooms cool.
- A light snack may help, as hunger may disturb sleep.
- Avoid caffeine, nicotine, and alcohol in the afternoon and evening. Caffeine and nicotine may delay and fragment your sleep, and alcohol may interrupt your sleep later in the night.
- Don't use your bed for anything other than sleep or sex. No television or paperwork. Your bed should be associated with sleep.
- When sleep onset does not occur within 30 minutes or so, get up and get involved with some form of relaxing activity away from the bedroom (i.e. reading or listening to soft music).
- A warm bath just before bed will help your body prepare for sleep.