

# "Does Your Spouse Snore"

Did you hear about the newly discovered link between snoring and rib bruising? It's long been a puzzle until recently when one spouse admitted to the doctor that her husband's bruises were from her efforts to stop the snoring! Mystery diagnosis solved!

With 200 million (estimated 67%) snorers in the United States the odds are that everyone will have numerous opportunities to be "entertained" or annoyed by a snorer. Whether it is someone in the next tent, in the next room, or lying next to you in bed, snorers oblivious to their own plight can make life miserable for anyone trying to sleep around them.

Consider the impact of the following noises:

- Jackhammer = 85 decibels
- Lawnmower = 95 decibels
- Airplane = 118 decibels
- Loudest recorded snorer = 93 decibels (Kare Walkert of Kumla, Sweden is listed in the Guinness Book of World Records)

Snoring can be very hard on marriages, causing many couples to sleep in different rooms of the house. It can have other unintended consequences such as daytime tiredness, falling asleep while driving, and impaired mental clarity.

Humor aside, snoring is no joke for those who have to put up with it. But there is a darker side associated with this annoying nocturnal sound effect.

As annoying and problematic as snoring is, it is only the tip of this noisy and deadly iceberg. Snoring is the beginning of a health-disease continuum that researchers now link with many of life's most challenging diseases, and even to death itself.

As snoring deepens or persists, its cousin Sleep Apnea can raise its ugly head. Apnea is the Greek expression for "without breath" or "want of breath." The numbers for this are equally staggering. With an estimated 17-20% of the population suffering from some form of sleep apnea, (from American Academy of Sleep Medicine) that means upwards of nearly 60 million Americans suffer nightly oxygen deprivation (shallow breathing or hypopnea), and episodes of no breathing - which sets in play a host of risk factors connected to many troubling medical disorders.

Modern medical research has now shown that sleep apnea has terrible health consequences, nearly all of which can lead to eventual death for the sufferer. The reduced air flow lowers oxygen saturation in the blood and can lead to learning and memory problems, irritability, depression, accidents and productivity problems at work or school. More importantly, sleep apnea is linked to such medical conditions as heart attacks and heart disease, stroke, weight gain, headaches, high blood pressure and kidney disease.

According to the National Sleep Foundation people with untreated sleep apnea have been estimated to be three times more likely to have motor vehicle accidents. It is estimated that roughly one in four truck drivers suffer sleep apnea and experience excessive daytime sleepiness.

To be sure, oxygen is king! Without it we die. But what happens when there is subtle and chronic deprivation due to persistent nightly obstruction or narrowing of the windpipe that carries precious air to the lungs and bloodstream?

Why is this minor alteration in breathing so consequential when it comes to your health?

## **Consequences of Sleep Apnea: Consider the following:**

- Excessive daytime sleepiness
- Increased risk of motor vehicle accidents
- Neurocognitive deficits
- Increased risk of hypertension
- Increased risk of cardiovascular disease
- Increased risk of insulin resistance and diabetes
- Increased risk of metabolic syndrome
- Decreased quality of life

Because of the constant cyclical nature of this repetitious arousal phenomenon, people who suffer from obstructive sleep apnea can't get a good night's sleep. Other than the impact that snoring has on partners, this is the most annoying part of sleep apnea. They often experience excessive daytime sleepiness and tiredness, along with neurocognitive deficits. Because people with sleep apnea are prone to fall asleep easily and at inappropriate times, they risk experiencing more motor vehicle accidents and pose a greater danger to others on the road. (It is calculated that one in four commercial truck drivers suffer from sleep apnea). Additionally, when impaired work performance from excessive tiredness is factored into the equation, it is easy to imagine the many other social and economic costs sleep apnea presents to society.

Along with the generally decreased quality of life, they also experience an increased risk of hypertension, heart disease, stroke, metabolic syndrome, insulin resistance, impotence, cognitive dysfunction, and depression. Many people with sleep apnea are obese. However not all obese people are apneic, and there are many non-obese people who experience sleep breathing disorders.

Other common findings in people with sleep apnea are enlarged tonsils, elongated palate, uvular lengthening and edema, and thick necks. Sleep apnea is more common among men and among people in the African American and Hispanic populations, according to the National Institutes of Health. Others at risk include anyone with a family history of sleep apnea, people who are overweight, have high blood pressure, possess small airways in nose/throat/mouth, etc.

## The Science of Sleep Disordered Breathing

Sleep Disordered Breathing (SDR) occurs along a continuum, stretching from snoring all the way to breath cessation, or complete apnea. Its most innocent manifestation is snoring which occurs when the tissues of the throat (soft palate, uvula, and back of the tongue) relax and vibrate against each other during breathing. Its worst manifestation is the complete cessation of breathing with its concomitant lowering of blood oxygen levels (hypoxia).

During sleep or relaxation, the muscles of the mouth and throat relax and the size of the airway decreases. This narrowing of diameter in the airway increases the rate of airflow traveling through the throat. This creates a low pressure environment (Bernoulli's Principle) and an opportunity for the flexible soft tissue airway walls to collapse into the opening. This is similar to sucking hard on a thin flexible milkshake straw and seeing it collapse on itself. As these tissues at the base of the tongue and soft palate (oropharynx) collapse and approach each other, rapidly moving air speeding past these structures creates a vibration in the tissues heard audibly as snoring.

When the airway collapses completely, all airflow stops, creating an apnea (which means "stopped breath"). This occurs despite repeated efforts to breathe ("paradoxical breathing") where diaphragmatic and chest wall muscles continue to struggle almost violently to take a breath. Without free flowing oxygen to enrich the lungs, blood levels of oxygen decrease and carbon dioxide levels increase. These changes in blood oxygen levels and blood chemistry stimulate an arousal or partial awakening in the brain, which in turn increases motor activity to drive the muscles around the airway to open the airway so breathing can resume. The sleeping person then gasps and chokes as the airway opens and they take in a breath or two. They then quickly settle back into a more relaxed state only to see the entire cycle repeat itself again, and again, and again.

Severity of sleep apnea is rated or diagnosed by the AHI or "Apnea-Hypopnea Index". This measures the number of times each hour there is an episode of altered breathing.

There is now an escalating amount of information from the medical research that frequent nighttime arousals (which occur when the oxygen level in the blood drops and the need to breathe overpowers sleep), set in play insidious biochemical processes which produces subtle yet serious injury to the body.

It is now believed that sleep apnea is an oxidative stress disorder. The plausible biological mechanism is through a "deox/reox mechanism". During moments of cyclical intermittent hypoxia, an enzyme is activated which creates a burst of free radicals which increases inflammatory biomarkers and adhesion molecules (C-reactive protein) which leads to endothelial dysfunction and atherosclerosis or heart disease and stroke. People with sleep apnea can have elevations in CRP levels, and treatment for SA have shown reductions in inflammatory mediators which are implicated in cardiovascular disease and endothelial dysfunction.

## **Treatment for Obstructive Sleep Apnea**

Strictly defined, Apnea is the cessation of breathing – which by interpretation is the lack of oxygen entering the body. Hypoxia is an incremental decrease in oxygen saturation in the blood stream, meaning it carries less oxygen in the blood cells. Therefore, treatment for sleep apnea is aimed at keeping the airway open so that normal breathing occurs through the night and hypoxia can be avoided. This is commonly accomplished via a pneumatic splint (CPAP therapy), or through repositioning the mandible forward either through the use of oral appliances or through surgical methods to advance the lower jaw forward.

Other surgical methods characterized by surgically removing portions of the soft pallet (UPPP), or stiffening the soft through the use of implants or creating scar tissue, have enjoyed very mixed results and poor patient acceptance. Many other less invasive strategies are also employed such as positional therapy (sleeping on side), and weight reduction.

A relatively new strategy for supporting the airway is accomplished by pulling the lower jaw forward, much as a paramedic would do to open the airway when dealing with an unconscious person. Oral dental appliances made of plastic trays, anchor on the teeth and help hold the lower jaw in a forward position and thus keep the tongue from falling on the back of the throat when relaxed. Oral appliance therapy is currently enjoying a wide surge in popularity due in large part to the inability of many people to tolerate CPAP therapy.

Traditional pneumatic splint therapy (CPAP) has enjoyed mixed patient acceptance. While its success rate is clearly good among those who can put up with the therapy, there are a lot of people who are CPAP intolerant, or whose condition is mild enough that an oral appliance is preferable.

Due to the effective use of oral appliance therapy for repositioning the mandible and pulling the base of the tongue forward, a landmark publication occurred in 2006 which opened the door for dentistry to become involved in sleep medicine. A position paper published by the American Academy of Sleep Medicine in 2006 has now established that oral appliances are indicated for mild to moderate obstructive sleep apnea. This is a very significant happening.

## **Dental Sleep Medicine**

As mentioned, oral appliances which hold the lower jaw forward, have recently gained considerable popularity. The staggering numbers of people who are non-compliant or intolerant of a CPAP device, and who face a life-time of problems without nightly therapy, now have an acceptable alternative therapy. It is generally well tolerated and quite often preferred over a CPAP device. However its use is generally limited to treating mild to moderate sleep apnea. When CPAP can be tolerated and/or there is a severe sleep apnea diagnosis or other extenuating circumstances, the CPAP is preferable.

Oral Appliances thus serve a very important role in treating today's epidemic of obstructive sleep apnea. This has created a new sub-specialty in dentistry, called "Dental Sleep Medicine.

The American Academy of Sleep Medicine and the American Academy of Dental Sleep Medicine have come together to develop standards and protocols for the joint effort to treat sleep apnea as it relates to the use of oral appliances.

The American Academy of Sleep Medicine has recently published its Practice Parameters regarding Oral Appliances for Obstructive Sleep Medicine. In part they read:

*“Oral appliances (OAs) are indicated for use in patients with mild to moderate OSA who prefer them to continuous positive airway pressure (CPAP) therapy, or who do not respond to, are not appropriate candidates for, or who fail treatment attempts with CPAP. ...Oral appliances should be fitted by qualified dental personnel who are trained and experienced in the overall care of oral health, the temporomandibular joint, dental occlusion and associated oral structures.” – American Academy of Sleep Medicine, Practice Parameters*

The bottom line is that sleep apnea is a medical condition. The standard-of-care requires a proper diagnosis by a sleep physician through appropriate testing at a sleep lab. Should a dentist inadvisably initiate anti-snoring treatment on a snoring patient who also has sleep apnea, they have made a presumptive diagnosis which could turn out to be fatal. Modern standards-of-care and accepted practice parameters discourage dentists and physicians from unilaterally treating snoring without proper sleep analysis by a sleep physician. Likewise, people should not elect to self-treat their snoring without a proper evaluation by someone trained in such analysis.

These conditions of fact require that dentists and patients be exceptionally wary of agreeing to fabricate and deliver snoring and sleep apnea appliances without the involvement of a physician and a sleep lab. This is because they must suspect an occult or hidden sleep apnea problem until it is ruled out. To make a snoring device without proper evaluation would be to make a presumptive diagnosis ruling out an underlying sleep apnea problem, which would and could leave many parties open to problems.

Dental sleep specialists and sleep physicians are now working together to provide an expanded array of options to help many people who suffer from sleep apnea. They are also helping tens of millions of people who must live and sleep with a snorer, or worse yet – with a loved one who stops breathing during the night – over and over and over again!

Indeed – snoring is no joke! For those who do it, and for those who must suffer sleeplessly through it! Finally there is another way out of the nightmare. For dentists, physicians and their patients – there's another life to be saved, another relationship to mend, and more good night's sleep to be achieved!