

Can Snoring Kill?

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Definition

Snoring historically an age-old problem that has disrupted domestic peace in most households at sometime, has significant physical and social consequences^{1,2}. Normally air passes from the throat to the lungs silently and unhindered³. A rough, hoarse inspiratory noise of snoring is heard during sleep due to the vibration in the pharynx^{4,5}.

Epidemiology/Prevalence

One in every four persons is a habitual snorer⁵. Nine out of 10 snorers are men⁶, and most of them are ages 40 or older. Alcohol intake prior to sleep increases snoring⁷. It is less common in women prior to menopause, and may be more common in blacks than in whites. In fact, it is estimated that approximately 25% of the population (50 million people in the US) suffer from this common, unpleasant and potentially serious malady⁵. The likelihood of snoring increases with age⁸, because the loss of tone in the oropharyngeal musculature promotes vibration of the soft palate and pharynx⁹ and then declines^{10,11}. Children's snoring usually results from enlarged tonsils or adenoids^{6,12}.

Risk Factors

Increased body mass index (BMI), cranio-facial anatomical features, and older age have been linked to the occurrence of snoring⁸⁻¹³. Heavy drinking, smoking and sluggish life style^{7,10} can aggravate the level of snoring. It can result from a number of things including enlarged tonsils and adenoids and deformities in the nasal passages^{6,9,12,14}. Overeating (especially before bedtime) and nasal allergies can lead to snoring by swelling the nasal passages and blocking the free flow of air¹⁵. Also, persons who sleep on their backs are more likely to snore because the tongue falls back toward the throat and partly closes the airway¹⁶.

Pathophysiology

Snoring is often related to physical occlusion at the back of the throat during sleep, mostly starting from the level of the soft palate. The muscles of the palate, uvula, and some times the tonsils relax during deep sleep, and act as vibrating noisemakers when the air of breathing moves across them^{6,17}. Excessive bulkiness of tissue at the back of the throat in people, who are obese. is less firm and more inclined to vibrate. Weak throat muscles in increased age causes the surrounding tissues to sag and vibrate. A low-set, thick soft palate, or enlarged tonsils can narrow the airway¹⁸. Longer-than-normal uvula can limit airflow and increase vibrations^{6,9}. Nasal blockages caused by allergies or a deviated nasal septum (DNS) can limit airflow through nose^{13-14,18}. Alcohol and certain drugs (such as tranquilizers) affect central nervous system (CNS). causing extreme relaxation of pharyngeal muscles⁶. When sleeping on the back, the tongue falls backwards into throat, which causes narrowing of the airway and increased air resistance during sleep¹⁶⁻¹⁷.

Snoring occurs even in persons who would not snore if they could breathe through the nose properly. This explains why some people snore only during their fever season, or when they have a cold or sinus infection.

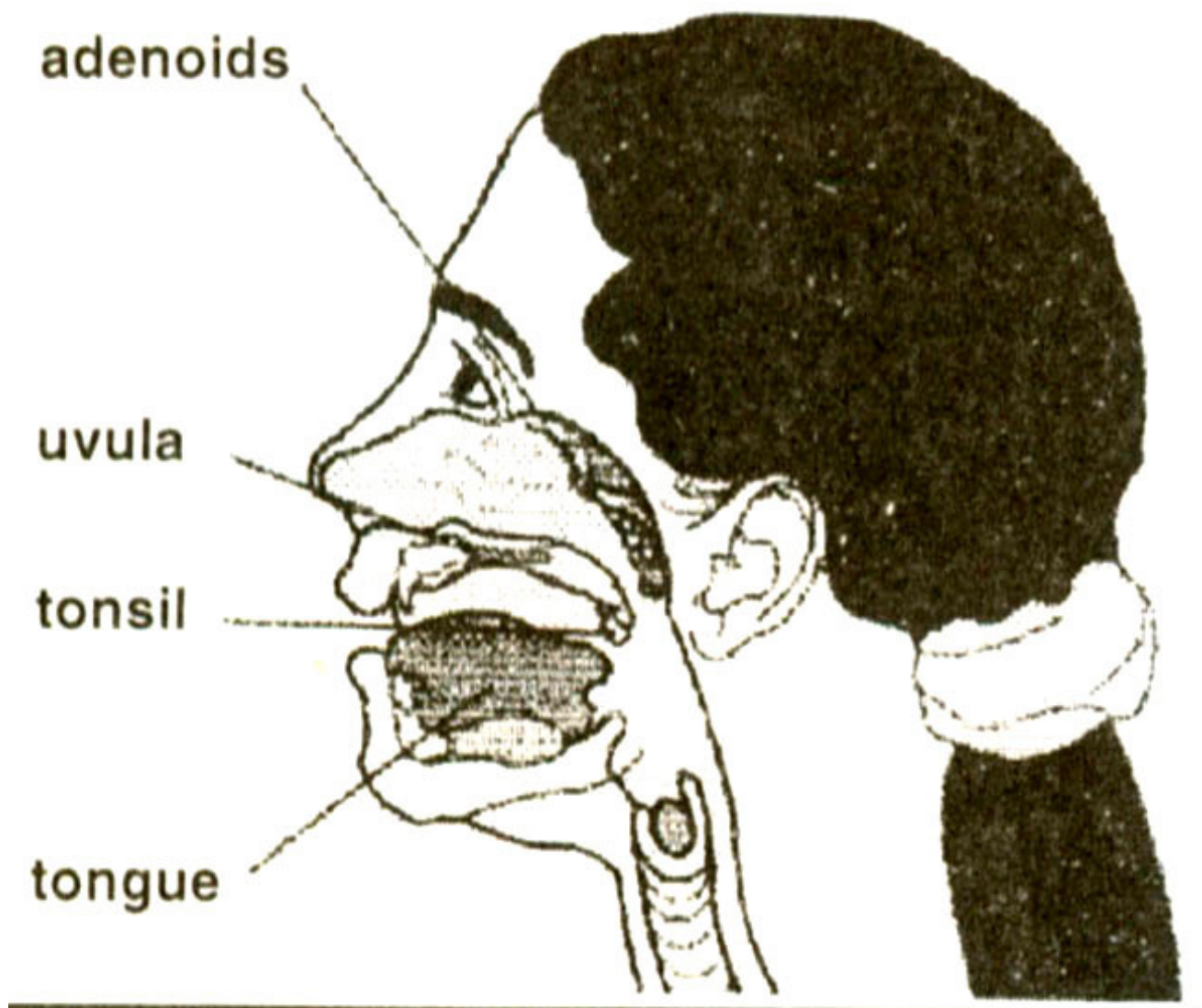


Figure 1 Tissues that can affect snoring

Com plications

In medical students, snoring seems to be associated with an increased risk of failing examinations¹⁹. Persistent snoring is an independent risk factor for the development of hypertension, and myocardial infarction²⁰.

Sleep Apnea

As the field of sleep medicine has evolved recently, snoring, has been examined and recognized as a sleep related breathing disorder that can in advanced cases, develop into a more acute major health problem known as Obstructive Sleep Apnea Syndrome (OSAS) with significant mortality and morbidity^{2,21}.

Stoppage of breathing while sleeping for at least 10 seconds has become an official Sleep apnea. This critical event became an episode of apnea. Episodes of apnea could be Central if ventilatory effort is absent during apneic episode, Obstructive if ventilatory efiort persists throughout the apneic episode but no airflow occurs because of transient upper airway obstruction (UAO), and Mixed if ventilatory effort proceeds upper airway obstruction during apneic episode^{6,9,12}.

Obstructive Sleep Apnea Syndrome (OSAS)

Obstructive sleep apnea is an illness characterized by snoring, partial or complete cessation of breathing syndrome⁶.during sleep, reductions in blood oxygen levels, severe sleep fragmentation, and excessive daytime sleepiness⁹.

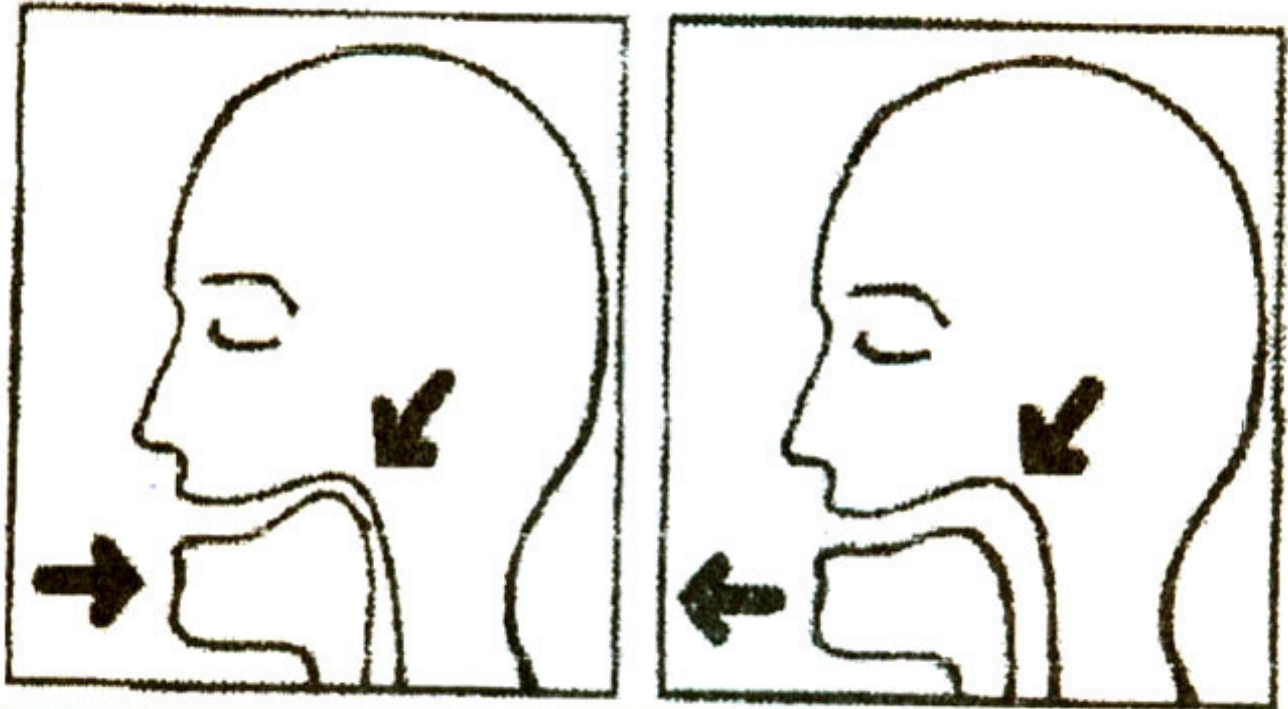


Figure 2

Epidemiology

In the United States, 11,845,000 people between the ages of 30-60 are estimated to have sleep Apnea. Nearly one-quarter of patients with obstructive sleep apnea (3,029,000) experience the disorder at a moderate or severe levels. Recent studies show that among employed people 30 to 60 years olds, at least 2 percent of the women and 4 percent of the men may have treatable sleep apnea syndrome⁶.

Pathophysiology

The factors that determine whether this leads to upper airway obstruction in a particular individual are complex, which could be divided into two groups. First there may be abnormalities of the activation of these pharyngeal dilator muscles including palatoglossus and genioglossus, perhaps due to defective or unstable central control secondly there may be anatomical abnormalities that allow significant obstruction to occur even with the normal sleep-related reduction in muscle tone²².

Causes of Obstructed Sleep Apnea

Local Factors

Central (neck) Obesity

Micro or retrognathia

- Pharyngeal encroachment (e.g tonsils hypertrophy, acromegaly, tumors, fatty infiltration, edema)

Nasal obstruction

Macroglossia

Neuromuscular

Bulbar palsy

Neurological degenerative disorder

Myopathies (e.g Duchenne l)ystrophy)

Other provoking factors

Alcohol

Sedative drugs

Sleep deprivation

Hypothyroidism

Predisposing Factors

Predisposing factors of OSAS includes being obese male^{6,9,10,12}. middle-aged^{6,8} and^{6,9,12} owing to the effect of testosterone on upper airway and parapharyngeal fatty deposits, which narrow the throat⁶. Patients having anatomically narrowed airway e.g. nasal obstruction²³ macroglossia, micrognathia, obesity, tonsillar hypertrophy are at risk of developing this syndrome^{6,9,12}. Acromegaly and hypothyroidism^{6,9,12} predisposes the

individual by submucosal infiltrates in the pharyngeal wall⁶. The condition is usually familial, having a back set mandible and maxilla thus enhancing obstruction^{6,9}. Alcohol and sedatives predispose to apneas by relaxing the tone of pharyngeal dilators^{6,7,9,12}. Nasal obstruction of any kind may worsen the condition and cigarette smoking could enhance the episode of apneas as well^{6,7,9,10,12}.

Sign and Symptoms

Most patients with OSAS have excessive daytime sleepiness (EDS)^{12,24}, morning headaches^{6,12,25}, irritability or moodiness, cognitive impairment, hypertension, frequent nocturnal urination and impotence. Bed partners usually notice loud snoring with cessation of breath, and often thrashing movements of extremities. Usually snoring is associated with thoracic breathing, ribcage/abdominal asynchrony and increased fractional inspiratory time²⁶.

Complications

Socially OSAS is disruptive to family life. Snorers become unwelcome roommates on vacations or business trips⁷. The EDS and fatigue caused by sleep apnea syndrome can have severe consequences from job impairment due to inattentiveness and sleepiness to loss of life from falling asleep at the wheel of motor vehicle^{6,11,27,28}.

Medically the NCSDR attributes 38,000 cardiovascular deaths a year to consequences of OSAS⁵. The decreased levels of oxygen in the blood during sleep with improper breathing can contribute to respiratory and cardiopulmonary problems including hypertension^{24,28-29} especially diastolic hypertension in children³⁰, coronary heart disease²⁸, myocardial infarction²⁸, pulmonary hypertension, congestive heart failure²⁴, stroke, abnormal heartbeats, abnormal motor activity and fluid retention. Neuropsychiatric problems, cognitive impairment, sexual dysfunction⁹ with morning headache²⁵ chronic fatigue and hyperlipidemia (28) could also complicate the syndrome⁵. Life-threatening cases of OSAS might require a tracheotomy⁷.

Investigations

A heavy snorer and chronically snoring child should be thoroughly diagnosed on the basis of history³¹, spouse or family reports, complete examination of the nose, mouth, palate, throat, and neck and an overnight polysomnogram done in the laboratory or at home³². This sleep laboratory is necessary to determine how seriously it affects the health of the snorer⁶. Patients can also be assessed through questionnaire-based method for evaluating and reporting the severity of snoring, the snoring scale score (SSS), which provides an assessment of the loudness, frequency and periodicity of snoring sound³³.

The SSS although subjective offers a uniform, simple yet comprehensive way to evaluate and grade snoring³³. Another method for investigating sleep disorder is Sedation or Sleep nasendoscopy that is

widely being used in the UK³⁴.

Treatment

The objective of treatment is to make snorers sleep more restful, thereby making life easy for the household members and avoiding, the many complications of OSAS.

Surgical as well as non-surgical modalities are available depending on the type and severity of OSAS. Non-surgical approaches include weight loss which may help reduce excessive fatty tissue in the throat causing obstruction as well as other life style modifications which includes position of head as well as pillow, as elevated head prevents the tongue from falling against the back of the throat. Sleeping sideways rather than on the back, avoiding tranquilizers, sedatives, alcoholic beverages and heavy meals prior to sleep^{6,9,12,16}.

Lubricating sprays to the throat, palate and uvula could also be used to relieve noise associated with snoring³⁵.

Oral appliances including tongue and mandibular devices³⁶ are inserted into the mouth at bedtime to hold the jaw forward and prevent pharyngeal occlusion have modest effectiveness in mild to moderate OSAS^{6,37}, but patient compliance is not optimal⁶. Continuous positive air pressure (CPAP) is considered the treatment of choice for OSAS² and it is cost effective³⁸, but poor patient acceptance and compliance remain problematic³⁷. Physicians and others trained specialists accept as the gold standard treatment in sleep disorders medicine is the application of CPAP through a nasal mask during sleep. The additional air pressure keeps the airway from collapsing. Since this permits normal breathing to continue during sleep, normal sleep patterns emerge, sleep becomes restful and the patient feels better. The impact is often immediate and dramatic although the patient may need to continue therapy permanently. Unfortunately, only 75% of patients continue to use nasal CPAP after 1 year^{6,9,39}.

Surgical intervention includes various operations.

Uvulopalatopharyngoplasty (UPPP) has become a routine operation for snoring³⁹ consisting of resection of pharyngeal soft tissue and amputation of soft palate uvula which helps in relieving retro palatal occlusion during sleep⁶. Nasal obstruction should be treated if snoring and excessive daytime sleepiness persist after UPPP²³.

The list of complications included pain and nasal regurgitation, along with a dry mouth and altered taste. Overall, 78% of patients would recommend the procedure to others³⁹. This operation is successful in reducing the severity of snoring noise in the majority of patients. as well as in improving the quality of the patients sleep. This success, however, decreases with time and must be put in context with the relatively high morbidity³⁹. The UPPP method gave a significantly better result than LAUP for the symptom snoring⁴⁰.

A relatively new procedure popular method for reducing snoring⁴¹ is now being performed over the age of sixteen called as Laser Assisted Uvula- Palatoplasty Surgery (LAUP). LAUP involves removal of excess tissue from soft palate and uvula with a small, hand-held laser. The operation makes airway larger. thus decreasing vibrations. The procedure is performed under a local anaesthetic takes about 30 minutes and requires 3 to 5 sessions spaced about 4 weeks apart.

The overall success rate was 87% and was confirmed by sleeping partners¹⁰. The 13 % of non-responders have significantly high BMI, which indicates that the postoperative success rate of LAUP depends upon this factor^{42,43}.

LAUP is less invasive, less morbid, entails less bleeding, more cost-effective, and better tolerated and is perhaps the most appropriate procedure for debilitating symptomatic snoring. Eating and speaking are not affected. Draw backs are the large initial expense of the laser unit and related equipment and

required safety precaution⁴¹. Currently, LAUP is not recommended for the treatment of OSAS and should be considered as adjuvant therapy rather than a sole treatment of OSAS⁴⁴ despite some efficacy from mild OSAS³⁷.

Diathermy Pulatopi asty (DP) is a new technique for the relief of snoring, that is associated with low morbidity and requires little in the way of expensive equipment⁴⁵.

The grossly enlarged tonsils of a heavily snoring child or adult with upper airway obstruction are usually sufficient indication for tonsillectomy⁴⁶ or even adenoidectomy could be performed.

Nasal septoplasty is performed if gross anatomical nasal septum deformity is present⁶.

Patients who had nasal polypectomy as part of their nasal surgery obtained the greatest snoring relief. When ever snoring and nasal obstruction coexist, nasal surgery should be considered as the first line of surgical treatment¹³.

A procedure of 30 minutes done under local anesthesia called as Soinnop/asii' involves low temperature radio frequency energy being delivered beneath the mucosa of soft palate or uvula, to reduce the volume and stiffening of the area responsible for snoring. The soninoplasty procedure is virtually painless and allows for a quick recovery.

Discussion

Snoring is universally accepted as a social problem with varying degrees of tolerance. For some it can lead to domestic upheavals and in others it may progress into OSAS.

While snoring itself is not a life-threatening problem, unchecked OSAS has the potential of causing complications. Quite often, the patient is advised to reduce weight, which is a very difficult task for this group of people. Insidious onset of cardio-vascular problems is another area, which often is not linked early enough to OSAS. The effect of oxygen deprivation during the night has a direct effect on the alertness and overall function of the brain during the daytime. Anoxic episodes cause pulmonary hypertension leading to right heart disease. Most patients with established OSAS may be helped with CPAP machines initially. Others may require surgery immediately or soon after. Unrecognised, this disease has certainly got the potentials of a killer.

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