



ADVANCES IN TREATMENT OF OBSTRUCTIVE SLEEP APNEA SYNDROME

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As health-conscious individuals, we pay careful attention to the recommendations of our primary care physicians, watch our diets, drive carefully, take our prescribed medicine, and attempt to lose weight and engage in exercise whenever possible. These recommendations are based on the recognition of factors that—when ignored—place us at significant risk of death and disability due to heart, lung, vascular, endocrine, and neurological disease. In two words—preventative medicine.

Yet, until recently, an important factor in preventative medicine has been largely ignored. That factor is healthy sleep.

The doctors specializing in obstructive sleep apnea medicine and surgery at ENT and Allergy Associates, LLP have recognized this long-underappreciated role of sleep and are in the forefront of developing new perspectives, new treatment paradigms, and new minimally invasive procedures for the benefit of our affected patients.

Sleep, the other third of our life.

Sleep has traditionally been regarded as a “blank” time in our lives. In the past two decades, this idea has been turned on its head, and an entire field of study has evolved to understand the important contribution that quality sleep makes to our well-being. Disordered and apneic sleep places a tremendous burden on our hearts, blood vessels, lungs, and brain, and contributes to hypertension, heart attack, heart failure, obesity, diabetes, pulmonary hypertension, stroke, erectile dysfunction, memory loss, accidents, depression, anxiety, inattention, poor work performance, and dementia.

Sleep. What could possibly go wrong?

Sleep and wakefulness are not “on and off” binary situations, but rather a spectrum that can slowly or rapidly alternate. Decision-making is intact or impaired depending upon vigilance and alertness. This is particularly true when frequent shift changes occur in the workplace, “on call” duties or medical conditions arise, or unforeseen factors at home disrupt the circadian rhythm and ability to resume sleep (sleep inertia).

Some sleepiness-related mistakes are of monumental consequence, particularly in the transportation, medical, law

enforcement, military, and nuclear fields. People working in these occupations are becoming increasingly aware of this and have implemented regulations governing fatigue and alertness in the workplace. Sleep deprivation and/or sleep apnea were found to be at least a partial factor in the Three Mile Island, Space Shuttle Challenger, Chernobyl, Exxon Valdez, AA Flight 1420, and Metro-North train derailment disasters.

Driving while sleepy has been shown to degrade alertness and driving skill as much as a rested individual with a blood alcohol level of 0.10%, well above the legal limit for driving under the influence. Some states, such as New Jersey (“Maggie’s Law”- 1997) and Arkansas, factor fatigue into criminal findings of reckless driving by sleep-disordered drivers.

Sleep apnea—snoring isn’t funny.

Sleep apnea is the stopping of breathing during sleep. Obstructive sleep apnea (OSA), which is by far the most common form of apnea, is increasingly common and increasingly significant as a cause of morbidity and mortality. While not everyone who snores has sleep apnea, virtually everyone with sleep apnea snores. At ENTA we use a simple mnemonic to identify those individuals with a moderate or high risk of OSA, who are then offered additional evaluation. The mnemonic is: STOP-BANG:

Snoring
Tired or fatigued during the day
Observed to halt breathing at night.
Pressure: High blood pressure

BMI > 35
Age > 50
Neck size > 16 inches.
Gender: Male

Those with a STOP-BANG score of 0-3 are at low risk for OSA. If the STOP-BANG score is 4-8, then the individual is at high risk for OSA. For those individuals, a Home Sleep Study (HST) is recommended.

An HST measures the physiologic parameters that are most critical in the evaluation of OSAS. This study is

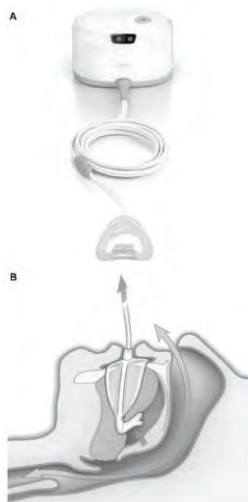
done in the comfort and privacy of your own bed, and the device is mailed or delivered to the sleep lab in the morning. From that data, a further lab study or, more likely, a treatment plan is devised.

CPAP and OAT: How can I sleep with that thing?

Long considered the “gold standard” of treatment, nasal Continuous Positive Airway Pressure (CPAP), is traditionally the first stage of treatment for patients because it is non-surgical, has potential to eliminate snoring, and can be used without significant side effects. Elimination of snoring causes an improvement in the spouse/partner’s sleep as well. However, recent studies show only about 40% mid-term compliance, or the will to maintain treatment. Nonetheless, some patients tolerate CPAP quite well over a long term. It is covered by most insurance companies.



Oral appliance therapy (OAT) is an alternative to CPAP and uses a nocturnal mouth guard to advance the lower jaw relative to the upper jaw and dilate the upper airway. It has a similar compliance rate to CPAP. Impossible to use in patients with dentures, teeth grinding, or TMJ, it nonetheless is well-tolerated in a minority of patients. With a prescription for use in OSA, many insurance companies will cover the cost of the device when measured and constructed by a dentist. A more recent alternative is the “Winx” device, which is an oral mouthpiece placed between the teeth and attached to a suction machine, which sucks the tongue and palate forward during sleep. Of course, not everyone tolerates CPAP, OAT, or its derivatives over a long period of time.



Surgical options for OSA—Something you don't have to wear.

A reasonable option for many people with OSA is surgery to improve the airway, which extends from the nostrils to the bronchioles. All forms of OSA are either thought or demonstrated to be due to an anatomic obstruction caused

by abnormal anatomy or abnormal muscle tone in the setting of air flow and pharyngeal pressure changes. The upper airway is not a tube but a moving, elastic, variable, and highly complex space. When added to the changing complexity of the nasal airway, it is clear that considerable planning is necessary by the surgeon/patient team prior to surgery. The typical patient has more than one area of obstruction.

One approach is to determine the contribution of the nose to OSA or to failure of CPAP or OAT. Nasal obstruction is by itself complex and usually occurs because of factors at the nasal valve (nostril), the septum (wall dividing two halves of the nose) or the turbinates (sidewall shelves that regulate heat and humidity). With regard to the nasal valve, a simple test called the Cottle Test can be used to predict whether nasal valve obstruction is to blame. These issues can be corrected—sometimes with a simple procedure in our office done under local anesthesia.



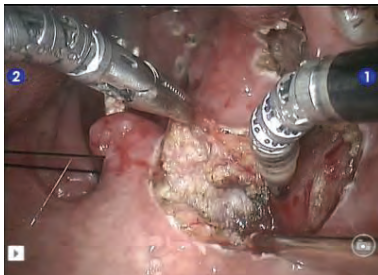
In terms of the oral and pharyngeal airway, it is critical to determine the precise locations for surgery. This is accomplished by utilizing Drug-Induced Sedation Endoscopy (DISE), 3-D reconstruction from CT or MRI scan data (virtual endoscopy), and/or careful orthognathic measurements on a lateral skull X-ray. Of these techniques, DISE is the most useful since it is a dynamic measurement and most closely approximates the conditions of sleep. In this procedure, conducted in the outpatient surgery center, a state of pseudo-sleep is induced with intravenous propofol. While asleep, the patient's upper airway is fiberoptically examined and a video file is created—indicating the specific areas of airway collapse—in order to plan the most effective and minimally invasive surgical procedure. Several days later, the specific surgery is planned with the patient and performed.

At ENT and Allergy, LLP we offer two new and robust options to deal with the surgical targets above—Trans-Oral Robotic Surgery (TORS) and Implantable Hypoglossal Neurostimulation (HGN—two different modes possible). The findings from ENT were presented at the May, 2019 Meeting of the International Surgical Sleep Society in Manhattan, co-chaired by a doctor from our group.

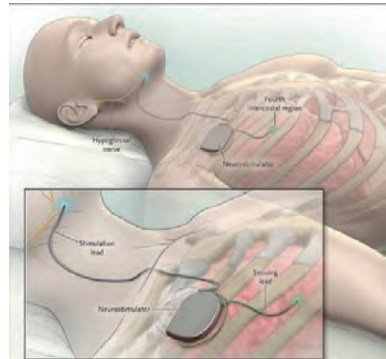
TORS—Safe, effective, and minimally invasive

With TORS, the appropriate target area—lingual tonsils, median tongue base, or epiglottis—is selected through information gleaned from the sleep study, examination,

imaging studies (if applicable), and most importantly, DISE. The appropriate target tissue and physiology is addressed in the operating room with the use of the daVinci Surgical Robot. This permits safe and effective surgery in a confined space, with either instrumentation or fiberoptic laser, thereby avoiding excess surgical resection and limiting the hospital stay to a < 23 hour observation period. Thus the surgery is not a “one size fits all” approach and addresses the anatomic issues in a straightforward way.




Hypoglossal Neurostimulation (HGN)– Surgery meets physiology



The concept behind HGN is a paradigm shift in OSA surgery. Rather than operate directly at the obstruction site, the surgery is targeted at altering the patient’s anatomic response to nocturnal breathing. It accomplishes this by pacing (in a manner similar

to a cardiac pacemaker) the hypoglossal nerve on one side of the patient. In the most common system, the pacer is inserted under the skin under the collar bone and a sensing electrode is burrowed under the skin to the rib muscles (intercostals) to sense when the brain initiates a breath. The second electrode is a pacing electrode burrowed under the neck skin and placed in contact with a motor branch of the hypoglossal nerve. Stimulation of this causes a forward and downward action of the tongue. Thus, the pacer coordinates appropriate muscular clearance of the airway with each breath. Because of the magnetic properties of the pacer, the unit can be turned on and off by the patient and the impulses can be custom-programmed by the doctor (see ENTA Magazine, 2018).

Control Sleep Apnea–Live longer and better.

Multiple studies have demonstrated that uncontrolled OSA leads to decreased life expectancy and the morbidity factors listed above. It has been associated with cognitive decline, accidents, and general decline in quality of life measures. At ENTA, we can help you avoid these tragic consequences. 

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