Obstructive Sleep Apnea: Defining the Problem and Finding Solutions for OSA through a Sleep Clinic

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With estimates that there are over 50 million Americans suffering from a disorder known as obstructive sleep apnea (OSA), this is an opportune time for physicians, physician groups, hospitals and medical entrepreneurs to get into the sleep business: diagnosing and treating patients in sleep labs who are desperately in need of medical intervention. Obstructive sleep apnea is a disease characterized by a reduction or cessation (pause of breathing, airflow) during sleep. While OSA is traditionally thought of as being more common in adults than in children, the times are changing with the onset of the pediatric obesity epidemic in America. It is now common knowledge that increasing numbers of our kids have chronic problems with snoring and OSA. This observation is substantiated by the epidemic of ADD/ADHD that we are seeing in our classrooms. It has been reported over and over that a side effect of poor sleep is deficits in attention and hyperactivity, i.e., children who are ADD/ADHD may not be neurologically predisposed to these conditions but, instead, victims of poor sleep. Incidentally, there are two types of sleep apnea. Obstructive sleep apnea and the less common central sleep apnea, both of which will be described later in this article. Although sleep apnea appears as a common denominator to both conditions (obstructive and central) the first is a physical malady and the second, neurological. Although the diagnosis of sleep apnea is often suspected on the basis of a person's history and anatomy, it is fortunate that within the context of a sleep study at an accredited sleep clinic, otherwise and, perhaps more commonly known as a sleep lab, either of these conditions can be identified and subsequently treated. The treatments for sleep apnea are often presented as being either surgical or non-surgical, however, in the clinical opinion of this author, surgery is not an option given that the culprit in OSA is the tongue. There are vague references in the literature to “techniques that harness the tongue” but long-term, the collective wisdom from surgeons who have performed such procedures is not encouraging. Surgical mandibular advancement is also reported, but, again, there is no high-volume rallying cry for the efficacy of this procedure. The “gold standard for OSA intervention will be discussed later in this article.

Let us get specific about the clinical conduct and consequences of OSA. An *apnea* is a time epoch during which breathing stops or is dramatically reduced. In specific terms, an apnea occurs when a person ceases breathing for 10 seconds or more. Thus, if airflow in normal breath is 70% to 100%, an apnea occurs when

the patient stops breathing completely, or takes less than 25% of a normal breath (for a period that lasts 10 seconds or more). This definition includes complete stoppage of airflow. Another definition of apnea that may be used is a direct result of the reduction in the transfer of oxygen into the blood when breathing stops resulting in at least a 4% drop in the saturation of oxygen in the blood. These episodes are measured during a sleep study in a sleep clinic.

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The following information regarding apnea/hypopnea events for MedicineNet.com.

“Apneas usually occur during sleep. When an apnea occurs, sleep is disrupted. Sometimes this means the person wakes up completely, but sometimes this can mean the person comes out of a deep level of sleep and into a more shallow level of sleep. Apneas are usually measured during sleep (preferably in all stages of sleep) over a two-hour period. An estimate of the severity of apnea is calculated by dividing the number of apneas by the number of hours of sleep, giving an apnea index (AI). The greater the AI, the more severe the apnea.

A hypopnea is a decrease in breathing that is not as severe as an apnea. So, if normal breath airflow is 100% to 70%, a hypopnea is 69% to 26% of a normal breath. Like apneas, hypopneas are associated with a 4% or greater drop in the saturation of oxygen in the blood and usually occur during sleep. Also like apneas, hypopneas usually disrupt the level of sleep. A hypopnea index (HI) can be calculated by dividing the number of hypopneas by the number of hours of sleep.

The apnea-hypopnea index (AHI) is an index of severity that combines apneas and hypopneas. Combining them both gives an overall severity of sleep apnea including sleep disruptions and desaturations (a low level of oxygen in the blood). The apnea-hypopnea index, like the apnea index and hypopnea index, is calculated by dividing the number of apneas and hypopneas by the number of hours of sleep. Another index that is used to measure sleep apnea is the respiratory disturbance index (RDI). The respiratory disturbance index is similar to the apnea-hypopnea index, however, it also includes respiratory events that do not technically meet the definitions of apneas or hypopneas, but do disrupt sleep.

Sleep apnea is formally defined as an apnea-hypopnea index of at least 15 episodes/hour in a patient without medical problems that may be related to the sleep apnea. (That is the equivalent of one episode every 4 minutes.) In a patient with high blood pressure, stroke, daytime

sleepiness, ischemic heart disease low flow of blood to the heart), insomnia, or mood disorders—all of which can be caused or worsened by sleep apnea--sleep apnea is defined as an apnea-hypopnea index of at least 5 episodes/hour. This definition is stricter because the patient may be already experiencing the negative medical effects of sleep apnea, and it may be important to begin treatment at a lower apnea-hypopnea index."

Upon close examination of the physiological intricacies and ramifications of OSA, it is overwhelmingly evident that afflicted patients should be diagnosed and treated immediately. The rationale for immediacy is that after diagnosis in the sleep laboratory using polysomnographic technology, very effective treatment can be implemented. Again, to reiterate the consequences and co-morbid conditions associated with obstructive sleep apnea: there are daytime fatigue, risk for hypertension (high blood pressure), cardiac arrhythmia, early stroke, depression, anxiety, stress, irritability, diabetes, insulin resistance, difficulty controlling weight, and headaches.

Clearly action is needed. CPAP therapy has been the gold standard for decades and, due to recent scientific advances, dramatic improvements vis-à-vis patient compliance have been implemented. There has been another major development in OSA compliance. Recently oral appliances have been provided by an emerging group in dental sleep medicine. These oral appliances can be used alone as an amelioration for OSA or they can be used to compliment CPAP. The bottom line to all of this is that there is absolutely no reason for any patient in the climate of modern American sleep medicine to suffer any longer. Knowing that there is an effective path for diagnosis and treatment of obstructive sleep apnea through the sleep laboratory, to the extent that if patients are found, patients can be ameliorated, we must all share the same vision: obstructive sleep apnea in America must be confronted at every level and conquered.