

sleep apnea

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Sleep apnea (AP-ne-ah) is a disorder in which one or more pauses in breathing, or shallow breaths, occur during sleep. These breathing pauses can last from a few seconds, up to a number of minutes, before normal breathing resumes; sometimes with a loud snort or choking sound. When sleep apnea does occur, it often causes the person to shift out of a deep sleep into a lighter sleep stage, which results in poor sleep quality. In children, sleep apnea can cause: hyperactivity, poor school performance, angry or hostile behavior, and learning and memory deficits. Sleep apnea may even possibly lower IQ scores. Some of the signs of sleep apnea in children are: unusual sleeping positions, bedwetting, and breathing through the mouth instead of the nose during the day. Sleep apnea typically produces different effect in children than it does in adults. For example, in adults severe sleep apnea often leads to weight gain, while in children it does the opposite, and may even result in a condition called "failure to thrive." The poor growth that may occur in children with sleep apnea is thought to be the result of two things: first, it takes more work to breathe at night so calories are burned at higher rates. Second, blockages in the nose and throat make food more tasteless, and rarely even physically uncomfortable to swallow. There are two basic types of sleep apnea: obstructive sleep apnea and central sleep apnea. Obstructive apnea is the result of a blockage somewhere along the airway, and central apnea is the result of "forgetting" to take a breath.

Obstructive sleep apnea is the most common of the two types of sleep apnea. The airway begins at the nose and mouth, continues into the throat and then goes down the windpipe (trachea) and then finally into the lungs. With each breath (inhalation), oxygen is brought down to the lungs and carbon dioxide is then blown off (during exhalation). Obstructive sleep apnea may occur with either a narrowing or complete blockage, anywhere along this airway path. When the airway becomes partially closed, airflow gets louder and may result in snoring. If the blockage is severe enough, there may be no airflow at all. Obstructive apnea is most likely to occur in very deep sleep, when the body is most relaxed. With reduced airflow going to the lungs, the oxygen levels in the blood will decrease (and carbon dioxide levels will increase) sending a signal to the brain to wake enough to open the airway. Some of the more common causes for obstructive sleep apnea include enlarged tonsils and adenoids, nasal blockages (like a deviated septum, or a high arched palate), a longer soft palate or bigger uvula, an enlarged tongue (from benign growths, or over-growths like in Beckwith-Wiedemann syndrome), a small upper jaw (which can occur with syndromic craniosynostosis), a smaller lower jaw (which can occur with Robin sequence, hemifacial microsomia, and Treacher Collins), and airway blockages from growths (lymphangiomas, hemangiomas, etc.).

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Central sleep apnea is less common than obstructive sleep apnea. This type of apnea occurs when the area of the brain that controls breathing does not send the correct signals to the breathing muscles. As a result, the body makes no effort to breathe until the oxygen level gets low enough that the body begins to wake up a little and starts breathing again. As with obstructive sleep apnea, central sleep apnea can result in higher blood levels of carbon dioxide, which can lead to slight brain swelling, raising intracranial pressure. Because there is no effort made to breathe, central sleep apnea does not produce snoring, and may go undetected. The most common cause of central sleep apnea in children with a craniofacial issue is a condition called "cerebellar tonsillar herniation (or a "Chiari Malformation"), which occurs when part of the brain pushes against the upper spinal cord. This condition can occur in some types of craniosynostosis (syndromic, or lambdoid) and may be either be present at birth, or develop over time.

Diagnosing sleep apnea usually requires a test called a sleep study (also called "polysomnography"). Just because a parent hears snoring, it does not necessarily mean that their child has sleep apnea. However, a child can sleep very quietly all night long; yet, have significant central sleep apnea. A sleep test is able to diagnose both obstructive and central sleep apnea. The sleep study results are often expressed by an apnea-hypopnea index, which is a measure of how many times breathing is interrupted. An apnea-hypopnea index greater than 1.5, or a minimum oxygen saturation level (a measure of how much oxygen is in the blood) of less than 92 percent, is generally considered abnormal in children.

The treatment of sleep apnea depends upon what is causing it, and how severe the apnea actually is. When obstructive sleep apnea is diagnosed, sometimes treatment can be as simple as prescribing medication. There are a number of drugs that can help to open up a partially blocked airway in order to improve airflow. If medication cannot take care of the blockage, a breathing device such as a CPAP, or BiPAP, mask may be recommended. These devices, which are worn at night, help to push air into the lungs with each breath. If children will not tolerate these masks, at the Craniofacial Center we suggest that parents first let their child fall asleep, and then put on the mask about 40 minutes later. Nevertheless, many children will still not tolerate a CPAP mask, making surgery the only solution. Various operations can be performed depending upon the specific area that is causing the obstruction, such as: straightening the nasal septum, opening the nasal passages, reducing the tongue, performing a lip-tongue adhesion (for Robin sequence), removing the tonsils and adenoids, removing tumors blocking the airway, advancing the upper or lower jaws (with or without distraction devices), and finally performing a tracheostomy. Deciding which operation is the smallest, and most likely to solve the problem, is not always easy and may require the experienced judgment of a craniofacial surgeon. When central sleep apnea has been diagnosed, a brain scan such as an MRI is typically required to rule out cerebellar tonsillar herniation from a Chiari malformation. If a Chiari is present, then there are a number of different possible surgical treatments that are able to reduce the pressure on the brain stem. If no Chiari is present, medication can be used to help reduce the number of central apneas.