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Obstructive Sleep Apnea and Its Prosthodontic Approach-Part I "Unveiling the Obstruction"

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Abstract

The subject of sleep medicine continue to offer great challenges and opportunities in terms of diagnosis, treatment planning and treatment based on qualitative evidence for dental professionals especially Prosthodontists. Short sleep duration and poor quality of sleep, increasingly common in our modern society, have many adverse effects on general health. Obstructive sleep apnea (OSA) is a disorder in which a person frequently stops breathing during his or her sleep. The Apnea-Hypopnea Index (AHI) is the average number of disordered breathing events per hour. Typically, OSA syndrome is defined as an AHI of 5 or greater with associated symptoms (e.g.: excessive daytime sleepiness, fatigue, or impaired cognition) or an AHI of 15 or greater, regardless of associated symptoms.

Although the role played by the prosthodontists is still in its infancy, there is much to learn and understand in the rapidly evolving field of sleep medicine as the recognition of co-managing patients with sleep disorders by the prosthodontists is fast becoming a reality. This article discusses at length the prosthodontic perspectives of the research in the field of sleep medicine, particularly on obstructive sleep apnea.

Keywords: Obstructive Sleep Apnea; Apnea-Hypopnea Index; Sleep Medicine; Prosthodontist

Abbreviations: SDB: Sleep Disordered Breathing; OSA: Obstructive Sleep Apnea; TRD: Tongue Retaining Device.

Introduction

Sleep disordered breathing (SDB) is an extremely common medical disorder associated with important morbidities. Obstructive sleep apnea (OSA) is one such chronic condition of upper airway collapse during sleep characterized by repetitive episodes of cessation of respiration (apnea) or decrements in airflow (hypopnea), associated with sleep fragmentation, arousals and reductions in oxygen saturation [1].

Between 9% and 38% of the general adult population has

OSA [2]. The etiology of OSA is multifactorial: associations with various demographic, anatomical, biological and behavioral factors have been described. Its consequences are considerable: OSA can cause the patient to wake up feeling unrested, excessive fatigue/daytime sleepiness, cardiovascular diseases (including hypertension, stroke, heart failure, coronary artery disease and atrial fibrillation), cognitive deterioration, a reduction in libido and a range of other health problems, some of which are serious [3-5]. Associations with multiple dental sleep disorders have been found, notably with sleep-related orofacial pain, xerostomia, hypersalivation, GERD, and bruxism.

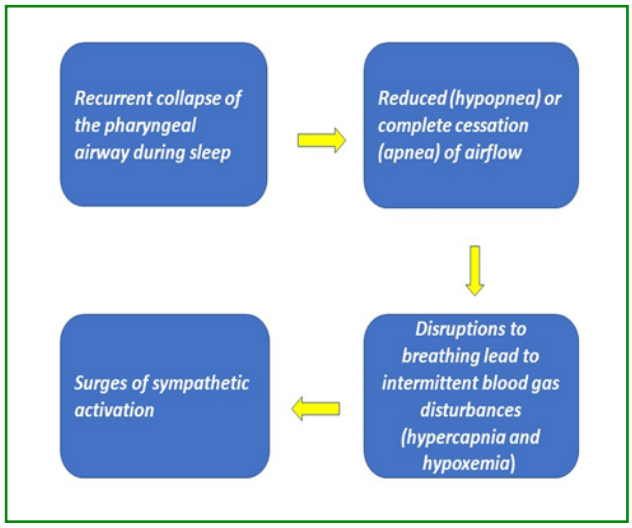
Prevalence

SDB (Sleep disordered Breathing) can reach high prevalence as shown by the HypnoLaus study, which found rates of 49.7% for men and 23% for women. It is estimated that approximately 23 million adults in the United States have undiagnosed or untreated moderate to severe obstructive sleep apnea. Approximately 936 million adults around the world are estimated to have mild to severe OSA.

Historical Perspective

George Cattlin was the first person to relate the influence of sleep quality on daytime function [6]. He stated that native North American Indians were healthier than their immigrant counterparts and attributed it to the habit of breathing through their nose rather than the mouth [7]. Following his work, there were many patented devices to promote nasal breathing. However, documented clinical work began in 1903, when Pierre Robin first described his device "monoblock", for the treatment of glossoptosis [8]. Fifty years later, Cartwright RD, et al. [9] described the tongue retaining device (TRD) [9].

Pathopysiology



Obstructive sleep apnea (OSA) is characterized by recurrent collapse of the pharyngeal airway during sleep, resulting in substantially reduced (hypopnea) or complete cessation (apnea) of airflow despite ongoing breathing efforts. These disruptions to breathing lead to intermittent blood gas disturbances (hypercapnia and hypoxemia) and surges of sympathetic activation. Loud snoring is a typical feature of OSA and in most cases the culmination of a respiratory event is associated with a brief awakening from sleep (arousal). These events result in a cyclical breathing pattern and fragmented sleep as the patient oscillates between wakefulness and sleep [10].

Types

Types of sleep apnea includes [11]:

- Obstructive sleep apnea
- Central sleep apnea
- Complex sleep apnea

Obstructive Sleep Apnea

The most common form of sleep apnea is OSA. It occurs when there is a functional obstruction in the mouth and throat. For example, when the tongue falls against the soft palate during sleep, and the soft palate and uvula then fall against the throat, it makes breathing more difficult, or even impossible in some cases.

OSA can lead to snoring as the tongue and soft palate rattle. It can also cause a person to wake up feeling as though they cannot breathe. With OSA, the lungs work normally, and the body still tries to breathe, but it is not possible to get enough air in through the upper airway.

OSA becomes more common with age and is more prevalent in males, people with excess body weight, pregnant people, and people who sleep on their back. Some symptoms include:

- waking during sleep or feeling very tired when awake
- waking from sleep feeling panicked
- snoring or gasping for air during sleep
- frequent headaches
- awaking with a dry mouth
- feeling confused or unable to concentrate at work or school

Central Sleep Apnea

Central sleep apnea also inhibits breathing at night, but it does not occur due to upper airway obstruction. Instead, the cause is neurological.

Unlike with OSA, the body does not try to breathe in central sleep apnea, so there is no snoring. Instead, because the brain and nervous system do not consistently send a signal

to breathe, the person stops breathing.

Some people have no symptoms, but others may notice:
- insomnia
- waking up short of breath or feeling panicky
- daytime sleepiness or trouble concentrating

Some potential causes include:
- drugs, especially sedating drugs such as opiates
- sleeping at high altitudes
- congestive heart failure

However, central sleep apnea can sometimes be idiopathic, which means that doctors cannot identify an underlying disease.

Sometimes central sleep apnea occurs in a pattern called Cheyne-Stokes breathing, a kind of breathing that causes a person to alternate between hyperventilating and not breathing at all. This type of central sleep apnea can occur with congestive heart failure.

Complex Sleep Apnea

Having one type of sleep apnea does not necessarily mean that a person cannot have another.

It is a type of sleep apnea that combines OSA and central sleep apnea. Sometimes, complex sleep apnea syndrome is obvious in an initial sleep study. Other times, it becomes apparent after the apnea does not resolve with a typical CPAP machine or other traditional OSA treatments.

The symptoms are similar to those of OSA and include:
- brief wakings from sleep
- daytime fatigue
- confusion on getting up
- headaches or dry mouth
- insomnia or poor quality sleep

Symptoms of Sleep Apnea

The symptoms of obstructive and central sleep apneas overlap, sometimes making it difficult to determine which type you have. The most common symptoms of obstructive and central sleep apneas include [12]:
- Loud snoring.
- Episodes in which you stop breathing during sleep - which would be reported by another person.
- Gasping for air during sleep.
- Awakening with a dry mouth.
- Morning headache.
- Difficulty staying asleep, known as insomnia.
- Excessive daytime sleepiness, known as hypersomnia.
- Difficulty paying attention while awake.
- Irritability.

Risk Factors

Sleep apnea can affect anyone, even children. But certain factors increase your risk.

Obstructive Sleep Apnea

Factors that increase the risk of this form of sleep apnea include:
- Excess weight. Obesity greatly increases the risk of OSA. Fat deposits around your upper airway can obstruct your breathing.
- Neck circumference. People with thicker necks might have narrower airways.
- A narrowed airway. You might have inherited a narrow throat. Tonsils or adenoids also can enlarge and block the airway, particularly in children.
- Being male. Men are 2 to 3 times more likely to have sleep apnea than are women. However, women increase their risk if they're overweight or if they've gone through menopause.
- Being older. Sleep apnea occurs significantly more often in older adults.
- Family history. Having family members with sleep apnea might increase your risk.
- Use of alcohol, sedatives or tranquilizers. These substances relax the muscles in your throat, which can worsen obstructive sleep apnea.
- Smoking. Smokers are three times more likely to have obstructive sleep apnea than are people who've never smoked. Smoking can increase the amount of inflammation and fluid retention in the upper airway.
- Nasal congestion. If you have trouble breathing through your nose - whether from an anatomical problem or allergies you're more likely to develop obstructive sleep apnea.
- Medical conditions. Congestive heart failure, high blood pressure and type 2 diabetes are some of the conditions that may increase the risk of obstructive sleep apnea. Polycystic ovary syndrome, hormonal disorders, prior stroke and chronic lung diseases such as asthma also can increase risk.

Complications

Sleep apnea is a serious medical condition. Complications of OSA can include [12]:

Daytime fatigue: The repeated awakenings associated with sleep apnea make typical, restorative sleep impossible, in turn making severe daytime drowsiness, fatigue and irritability likely.
- You might have trouble concentrating and find yourself falling asleep at work, while watching TV or even when driving. People with sleep apnea have an increased risk

of motor vehicle and workplace accidents.

- You might also feel quick-tempered, moody or depressed. Children and adolescents with sleep apnea might perform poorly in school or have behavior problems.
- High blood pressure or heart problems: Sudden drops in blood oxygen levels that occur during OSA increase blood pressure and strain the cardiovascular system. Having OSA increases your risk of high blood pressure, also known as hypertension.
- OSA might also increase your risk of recurrent heart attack, stroke and irregular heartbeats, such as atrial fibrillation. If you have heart disease, multiple episodes of low blood oxygen (hypoxia or hypoxemia) can lead to sudden death from an irregular heartbeat.

Type 2 diabetes: Having sleep apnea increases your risk of developing insulin resistance and type 2 diabetes.

- Metabolic syndrome: This disorder, which includes high blood pressure, abnormal cholesterol levels, high blood sugar and an increased waist circumference, is linked to a higher risk of heart disease.
- Complications with medicines and surgery: Obstructive sleep apnea is also a concern with certain medicines and general anesthesia. People with sleep apnea might be more likely to have complications after major surgery because they're prone to breathing problems, especially when sedated and lying on their backs.
- Before you have surgery, tell your doctor about your sleep apnea and how it's being treated.

Liver problems: People with sleep apnea are more likely to have irregular results on liver function tests, and their livers are more likely to show signs of scarring, known as nonalcoholic fatty liver disease.

Sleep-deprived partners: Loud snoring can keep anyone who sleeps nearby from getting good rest. It's common for a partner to have to go to another room, or even to another floor of the house, to be able to sleep.

References

1. Mohan MS, Gowda EM, Banari AS (2015) Obstructive sleep apnea (OSA): A prosthodontic perspective. Medical Journal Armed Forces India 71(S2): S395-S399.
2. Lobbezoo F, Vries ND, Lange JD, Aarab G (2020) A Further Introduction to Dental Sleep Medicine. Nat Sci Sleep 12: 1173-1179.
3. Yaggi HK, Concato J, Kernan WN, Lichtman JH, Brass LM, et al. (2005) Obstructive sleep apnea as a risk factor for stroke and death. N Engl J Med 353(19): 2034-2041.
4. McNicholas WT, Bonsigore MR (2007) Management Committee of EU COST ACTION B26. Sleep apnoea as an independent risk factor for cardiovascular disease: current evidence, basic mechanisms and research priorities. Eur Respir J 29(1): 156-178.
5. O'Connor GT, Caffo B, Newman AB, Quan SF, Rapoport DM, et al. (2009) Prospective study of sleep-disordered breathing and hypertension: the Sleep Heart Health Study. Am J Respir Crit Care Med 179(12): 1159-1164.
6. Annapurna K, Suganya S, Vasanth R, Kumar PR (2014) Prosthodontic approach to treat obstructive sleep apnea. Ann Med Health Sci Res 4(4): 481-486.
7. Catlin G (1872) The Breath of Life. Wiley, New York, USA, pp: 92.
8. Robin P (1902) Practical demonstration on the construction and commissioning of a new unit enbouche recovery. Journal of Stomatology 9: 561-590.
9. Cartwright RD, Samelson CF (1982) The effects of a nonsurgical treatment for obstructive sleep apnea. The tongue-retaining device. JAMA 248(6): 705-709.
10. Eckert DJ, Malhotra A (2008) Pathophysiology of adult obstructive sleep apnea. Proc Am Thorac Soc 5(2): 144-153.
11. Medical News Today (2024) Obstructive sleep apnea.
12. Mayo Clinic (2024) Obstructive sleep apnea.