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Dental Sleep Medicine: A New Arena in Dentistry

[1]Dr. Peddireddy Tejaswi, MDS, Periodontology, Kamineni Institute of Dental Sciences, Narketpally

[2]Dr. Kotha Sushmitha Bindu, MDS, Periodontology

[3]Dr. Koppula Reshma Reddy, BDS, Kamineni Institute of Dental Sciences, Narketpally

[4]Dr. Poreddy Vaishnavi Reddy, MDS, Oral Medicine and Radiology

[5]Dr. Harshitha Akkinepally, MDS, Oral Medicine and Radiology, Kamineni Institute of Dental Sciences, Narketpally

[6]Dr. Avinash Vallabhaneni, BDS, Kamineni Institute of Dental Sciences, Narketpally

Corresponding Author: Dr. Harshitha Akkinepally, MDS, Oral Medicine and Radiology, Kamineni Institute of Dental Sciences, Narketpally

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Abstract

Dentistry has expanded its scope to include dental sleep medicine (DSM), resulting in increased interest in this field. DSM traditionally focuses on sleep-related breathing disorders, such as snoring and obstructive sleep apnea. However, other sleep disorders are also linked to dentistry, including sleep-related orofacial pain, xerostomia, hypersalivation, gastroesophageal reflux disease, and bruxism. As a result, a new definition covering all diagnostic and treatment aspects of these disorders has been formulated for dental sleep medicine. This article briefly describes the different dental sleep disorders, emphasizing notable associations between these disorders and their treatments through dentistry.

Keywords: obstructive sleep apnea, orofacial pain, comorbidity, sleep disorder

Introduction

The specialized field of dental sleep medicine encompasses a range of medical disciplines, including ear, nose and throat, neurology, pulmonary diseases, internal medicine, and psychiatry. In the past, the accurate diagnosis and treatment of these multifaceted disorders posed challenges due to their multidisciplinary nature. Dentistry has emerged as a key player in not only diagnosing but also formulating comprehensive treatment plans for various sleep disorders, such as snoring, obstructive sleep apnea, sleep-related orofacial pain, xerostomia, hypersalivation, gastroesophageal reflux disease, and bruxism.

The field of dental sleep medicine and airway-focused dentistry is rapidly gaining attention and interest within the broader dental community. The proposed definition for this field was put forward in 2016.[1]

"Dental Sleep Medicine is the discipline concerned with the study of the oral and maxillofacial causes and consequences of sleep-related problems."

Obstructive Sleep Apnea (OSA)

Obstructive sleep apnea (OSA) is defined by recurrent blockage of the collapsible portion of the upper airway, leading to decreased oxygen levels and interrupted sleep. OSA affects between 9% and 38% of the adult population. The development of OSA is influenced by a variety of factors, including demographic, anatomical, biological, and behavioural elements.

The role of the dentist, or dental specialist, extends beyond simply creating a mandibular advancement appliance as advised by a medical specialist. They are also able to recognize symptoms and risk factors of OSA, such as loud snoring, excessive fatigue, daytime sleepiness, and morning headaches. Additionally, the dentist or dental specialist can assess the openness of the intraoral airway by identifying a large tongue, enlarged tonsils, and a retrognathic mandible. [2-5]

Orofacial Pain

Orofacial pain comes in many guises. The pain can, for example, be dentoalveolar in nature (and thus originate from the dental elements and the supporting tissues around them), musculoskeletal (pain that originates from muscles or joints), neuropathic (pain that originates from the nervous tissue) or vascular (pain that originates from the vascular or perivascular tissues). Headaches are also deemed orofacial pains.

All forms of orofacial pain can affect the patient's sleep because, for instance, they make it difficult for him/her to drop off or wake him/her up during the night. To illustrate this, 36% of patients with painful temporomandibular disorders (TMD) experience insomnia. [6]

The dentist needs to understand the source of pain, whether it is related to the teeth, muscles, or nerves, in order to address the issue effectively. Collaboration across different disciplines, both within and outside of dentistry, will often be required.

Xerostomia

Xerostomia, or "dry mouth," is characterized by a sensation of dryness in the oral cavity and throat. Its prevalence ranges from 10% to 80%, depending on the population studied. Possible causes include mouth breathing upon waking, sleeping with an open mouth and snoring, medical conditions like diabetes, Sjögren's syndrome, obstructive sleep apnea (OSA), and gastroesophageal reflux disease (GERD), as well as the use of medications that often lead to dry mouth as a side effect. Treatment for OSA, such as mandibular advancement appliances and continuous positive airway pressure (CPAP), is also linked to dry mouth complaints, although it's worth noting that CPAP devices with air humidification can help alleviate this issue. Xerostomia can lead to repeated awakenings at night, prompting individuals to seek relief by drinking water once awake. [7-12]

Dentists play a vital role in recognizing the signs of dry mouth and in preventing its potential negative effects. Causal treatment is typically overseen by general practitioners or medical specialists. In cases of mouth breathing, speech therapists may also be involved.

Hypersalivation

Hypersalivation entails the production of too much saliva. This means that the balance between saliva production and the frequency of swallowing is disturbed. The frequency of swallowing is lower during sleeping

than waking hours: when asleep, on average people swallow about three times an hour whereas, when awake, they swallow at least once every two minutes. Possible causes are conditions such as Parkinson's disease; periodontal problems, poorly fitting/loose prosthetics; irritated soft tissues in the oropharynx resulting from GERD; and, again, a whole range of medicines. [13-16]

The dentist can be important in identifying and treating hypersalivation caused by dental issues. In cases where non-dental factors cause hypersalivation, a collaborative approach with general practitioners/medical specialists is recommended for treatment.

Gastroesophageal Reflux Disease (GERD)

GERD occurs when stomach acid flows back into the lower part of the oesophagus and sometimes even into the mouth.

Individuals experiencing this condition often describe it as "heartburn" that disrupts their sleep and may also mention a sour taste in their mouth.[17] Epidemiological studies indicate that approximately 20% of the overall population encounters GERD every week, indicating that it is a significant societal issue.

Causes of GERD can include a weakened or damaged lower oesophagal sphincter, a diaphragmatic hernia, obesity, and pregnancy. There is also strong evidence indicating a connection between GERD and sleep bruxism, with GERD events often occurring before bruxism events. Dentists play a critical role in identifying reflux based on its effects on the soft tissues of the oropharynx (such as redness and swelling) and on the teeth (erosion). Furthermore, they can address tooth erosion by using composite material to restore worn and sensitive teeth. [18,19]

Sleep Bruxism

Bruxism was recently defined as a repetitive masticatory muscle activity that is characterized by clenching or grinding of the teeth and/or bracing or thrusting of the lower jaw. Although bruxism can occur during the day (awake bruxism, i.e, masticatory muscle activity during wakefulness that is characterized by repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible and is not a movement disorder in otherwise healthy individuals), sleep bruxism (i.e, masticatory muscle activity during sleep that is characterized as rhythmic (phasic) or non-rhythmic (tonic) and is not a movement disorder or a sleep disorder in otherwise healthy individuals).[20-22]

The prevalence of sleep bruxism in the general population is around 12.8 ± 3.1%. Stress and anxiety, sleep arousals, disturbed neurotransmitter balance, genetics, medication use, smoking, and alcohol are all factors that contribute to the complex causes of these disorders.

There is a possibility of teeth, fillings, or implants breaking or being lost; the teeth may experience internal mechanical wear (attrition); the muscles used for chewing may enlarge; there may be pain in the muscles and skeleton (TMD pain, as mentioned above); and there may be complaints of dysfunction in the jaw.[23]

Sleep bruxism is associated with other sleep-related disorders, such as insomnia, Leg Movements in Sleep, and Periodic and Rapid Eye Movement sleep Behavior Disorder.

The dentist is the appropriate professional to diagnose and treat bruxism. However, treatment should only be pursued if the disorder leads to significant negative consequences for the patient, such as severe tooth wear or temporomandibular joint (TMJ) pain. In cases of severe bruxism, diagnosis and treatment should be

carried out in collaboration with general practitioners or medical specialists, ideally after consulting with an orofacial pain specialist. [24-26]

Conclusion

Understanding dental sleep medicine reveals that various dental sleep disorders frequently occur together and are rarely found alone in individual patients. Consequently, dental sleep disorders as a whole create a complicated web of coexisting medical conditions. It is essential to unravel this web to offer patients customized care plans. Therefore, it is vital to conduct further research with appropriate methodologies that are aligned with the objectives of the studies. In this regard, dental sleep medicine has the potential to develop as an innovative and unique field within dentistry.

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