Review Article

SLEEP DISORDERS IN CHILDREN – A REVIEW OF LITERATURE

Smita Singh Bhardwaj[1], Abdulaziz Abdulrahman Abdulaziz Albader[2], Abdullah Almalki[3], Sami Alduwayhi[4] Atul Bhardwaj[5], Sara Ayid [6]*

[1] *Assistant Professor, Department of Pediatric Dentistry, College of Dentistry, Majmaah University, Majmaah 11952, Saudi Arabia.*
[2] *General Practitioner, Ministry of Health, Saudi Arabia*
[3] *Assistant Professor, Orthodontics Department, Preventive Dental sciences, College of Dentistry, Majmaah University, Majmaah 11952, Saudi Arabia.*
[4] *Assistant professor, Department of Prosthodontics, College of Dentistry, Majmaah University, Majmaah 11952, Saudi Arabia*
[5] *Lecturer, Department of Prosthodontics, College of Dentistry, Majmaah University, Majmaah 11952, Saudi Arabia.*
[6] *Assistant professor, Department of Pediatric Dentistry, College of Dentistry, Majmaah University, Majmaah 11952, Saudi Arabia*

ABSTRACT

Sleep disruption and lack of sleep can lead to inattention and therefore problems with learning and cognition. Sleep disorders are characterized by the disturbance in the patient's timing or quality of sleep, or in the physiological or behavioral conditions associated with sleep. There is a significant relationship between sleep disorders and emotional or behavioral conditions as children who are diagnosed with sleep deficiency exhibit lower levels of self-esteem, lower grades, high levels of depression, and problems in academic abilities, as well as language and organizational skills. The dentist has an important role in the recognition of a patient who may be at risk for a sleep disorder due to the relationship between sleep disorders and other health issues. This article aims to briefly review the identification and treatment options for sleep disorders.

Key words: Sleep disorders (SD), obstructive sleep apnoea (OSA), positive airway pressure (PAP), automatic positive airway pressure (APAP), continuous posi¬tive airway pressure (CPAP).

Introduction

Sleep is an important factor for everyone especially for a child's development[1]. It is a physiologic and behavioral state characterized by partial isolation from the environment.[2] Aristotle described the word anesthesia. During sleep, people do not sense the outside world, which means that they have anesthesia. The ancient Greek word Koma means "deep sleep".[3] Sleep disorders in children typically appear between the ages of 2 and 7 years. Boys are more likely to have obstructive sleep apnoea (OSA).[4] Excessive daytime sleepiness along with depression, anxiety, headaches, orofacial pain, TMJ disorders, attention-deficit/hyperactivity disorder (ADHD), and restless leg syndrome is often seen in children diagnosed with sleep-disordered breathing.[5, 6] The effect of sleep disorders can have adverse health consequences such as hypertension, cardiovascular diseases, metabolic disorders like diabetes, gastroesophageal reflux disease, asthma, emotional and psychological disorders, and increased mortality rates.[7,8] Sleep disorders may cause obstructive sleep apnoea, bruxism, headaches, myofascial pain, and fibromyalgia. The clinical symptoms of OSAS in children differ from those of adults, such that in adults, the typical presentation is obese individuals who snore and are excessively sleepy during the day. In contrast, children who have OSAS may or may not be obese; the typical cause of this disorder in children is enlarged tonsils and adenoids. Additional symptoms of OSAS in children include restless sleep, sleeping in an upright position or with the neck hyperextended (to keep the airway open), noisy breathing, and frequent infections of the tonsils or inner ear.[9] It is important for dentists entering the field of dental sleep medicine to recognize sleep disorders, such as insomnia, respiratory or movement disorders (e.g. snoring, obstructive sleep apnoea, bruxism, gastroesophageal reflux) and pain interference.[10,11] Dentists can achieve advances in sleep disorder management along with physicians (psychiatrists, neurologists, and surgeons), psychologists, and respiratory therapists.[12] Oral appliances were first used by Pierre Robin to manage the obstruction of the upper airway of neonates born with Pierre Robin syndrome. Since then Oral appliance therapy and therefore dentistry has become an important component of treating patients with obstructive sleep apnea.[13] As dentists are becoming increasingly aware of this issue, they are frequently involved in its treatment including the use of mandibular repositioning splint, tongue retaining device, continuous positive airway pressure or surgical treatment.[14]

Symptoms and clinical findings

Headache is one of the major complaints, which can indicate a possible sleep disorder, especially in adolescents. Patients with headaches also have complaints about sleep, including inadequate sleep, daytime sleepiness, difficulty sleeping, and waking up at night.[15] Patients usually exhibit adenoid faces, poor or inadequate lip seal, small nares, nasal crease, bruxism or worn teeth, crossbite or high

palate, scalloped tongue, swollen or enlarged uvula, enlarged tonsils, deep or collapsed bite. Symptoms and findings at nighttime and daytime in children with sleep-related breathing disorders are mentioned in Table 1.

Diagnosis

For the diagnosis, the doctor has to check for abnormalities in the upper airways or soft palate, enlarged tonsils, and obesity. Polysomnography, magnetic resonance imaging, computed tomography, nasopharyngoscopy, pharyngometry, rhinometry, and cone-beam computed tomography can also be used.[16]

Treatment options

- ***Tonsillectomy and adenoidectomy***

Indications include hyperplasia of these structures, OSA, and abnormal growth of the craniofacial structures, suspicion of other pathology, dysphagia, speech changes, and halitosis.[15] Pharmacological approaches may be used for children with chronic nasal congestion, which may impair the quality of their breathing during sleep. For overweight children, weight loss is the recommended treatment.[17]

- ***Dental and orthodontic treatment***

Speech therapy and more importantly myofunctional therapy is required to correct tongue thrusting, any speech-related issues, and the swallowing pattern.[15] The occlusal splint can be provided to prevent bruxism in older children. Patients with TMD appear to be relieved by occlusal splints. Injecting botulinum toxin into the masseter muscle abolishes severe bruxing behavior. Numerous mandibular advancement appliances help prevent or minimize upper airway collapse during sleep, bring the tongue and lower jaw forward during sleep, and thereby prevent obstructive sleep apnoea. Mandibular advancement devices are successful in treating OSA in patients intolerant of surgical therapy and treatment with CPAP. Nevertheless, these devices are often expensive, need dental expertise, and may have side effects like pain in jaw or dysfunction of the temporal-mandibular joint. Young children often outgrow appliances, thereby needing refitting and replacement.[15]
Antidepressant drugs have been recommended for sleep disorders as well as for chronic facial pain. However, there is very little evidence to support their use.[18]

- ***Positive airway pressure (PAP)***

PAP device produces a pressurized airflow, which is given to the patient by a mask interface. This airflow changes the lung volume and creates positive distension of the upper airway.
For children in whom a tonsillectomy or adenoidectomy is contraindicated or unsuccessful, nasal continuous positive airway pressure (CPAP) may be used. CPAP devices maintain a constant and fixed flow rate of air pressure during inhalation and exhalation. It includes the proper mask interface and possible use of airway humidification; so many people find these devices compatible with good sleep hygiene. CPAP devices are less expensive compared to the PAP modes. In the past few years, positive airway pressure (PAP) ventilation that is administered by a nasal mask has become a safe and efficient alternative to surgery or tracheostomy in infants and children with unresolved obstructive sleep apnoea after tonsillectomy and adenoidectomy.[19] APAP (automatic positive airway pressure) mode devices use a sensor-based mechanism that automatically adjusts the air pressure flow rate by continually monitoring the upper airway patency.[19] CPAP can be successful for children and adolescents, but young children and children with developmental delays may have greater difficulty during this treatment and may need to participate in systematic desensitization to improve their compliance with wearing it during sleep.[19]
In studies that compared oral appliance treatment with CPAP, CPAP achieved a higher degree of improvement in oxygen saturation. There were similar improvements in measures of sleepiness during the day. In addition, these studies showed that patients generally find oral appliances to be more acceptable as compared to CPAP.[13]

Conclusion

The dentist has an important role in the recognition of lazy children who snore, breathe through their mouth instead of nose, wake up with a dry mouth in the morning, are restless at night, and frequently suffer from headaches at school. We have the ability to improve our patients' quality of life. The interaction of oral health, pain management, and sleep medicine by the use of oral appliances should be considered along with the use of PAP and APAP. Now that we have the evidence for sleep-disordered breathing that helps us to understand the complicated nature of sleep disorders, dentists should try to help the patients of sleep disorders by early diagnosis and possible treatment options for the benefit of our profession and our patients.

References

1. Tomar R, Allen JA. The Relationship of Training Parameters with Incidence of Injury, Sleep and Well

Being of Young University Swimmers. International Journal of Pharmaceutical Research & Allied Sciences. 2019 Jul 1;8(3).
2. Gilles J. L, Charles M. M, Maria C. Sleep Medicine for dentists. A practical overview. Nature of sleep: Quintessence Publishing; 2009. p. 27.
3. Askitopoulou H, Ramoutsaki IA, Konsolaki E. Analgesia and anesthesia: etymology and literary history of related Greek words. Anesthesia & Analgesia. 2000 Aug 1;91(2):486-91.
4. Capua M, Ahmadi N, Shapiro C. Overview of obstructive sleep apnea in children: exploring the role of dentists in diagnosis and treatment. Journal of the Canadian Dental Association. 2009 May 1;75(4):285-89.
5. Melendres CS, Lutz JM, Rubin ED, Marcus CL. Daytime sleepiness and hyperactivity in children with suspected sleep-disordered breathing. Pediatrics. 2004 Sep 1;114(3):768-75.
6. Alzahrani S. Using a reinforcement system as an intervention plan to reduce unwanted behavior of student with ADHD: deep learning study in a single subject research design. Journal of Advanced Pharmacy Education &Research| Apr-Jun. 2018;8(2).
7. Attanasio R, Bailey DR. Dental management of sleep disorders. John Wiley & Sons; 2009 Dec 29.
8. Obaid ZH, Alzaydi MD, Safar MA, Almalki AG, Obaid DY, Shalwala AR, Dhafar SO. Impact of Sleep on Glycemic Control in Type 2 Diabetic Patients in Prince Mansour Hospital, Taif, KSA. International Journal of Pharmaceutical Research And Allied Sciences. 2018 Jan 1;7(3):108-15.
9. Meltzer LJ, Mindell JA. Sleep and sleep disorders in children and adolescents. Psychiatric Clinics. 2006 Dec 1;29(4):1059-76.
10. AlQahtani RS, Aljabry RS, Omar S, Marae M, Alhejaili SM, Ekhmimi YA, Al Mazrouei A. Prevalence of Sleep Deprivation Among Children In Al-Madinah Al-Munawarh, Ksa. Pharmacophore. 2018 Jan 1;9(1):95-103.
11. Hannani S, Rezagholy P, Ziba FN, Azadi NA. Relationship Between Sleep Quality with Job Stress and Quality of Life of Operating Room Technologists Working in University Hospitals Affiliated to Iran University of Medical Sciences in 2016-17.
12. Gilles J. L, Charles M. M, Maria C. C. Sleep Medicine for Dentists, A practical Overview. Nature of sleep: Quintessence Publishing; 2009.28.
13. Seth V, Kamath P, Prasad R, Vishwanath. Obstructive sleep apnea: an overview. Journal of Advanced Oral Research. 2011 Jan;2(1):27-32.
14. Tiner B.D, Peter D.W. Peterson's Principles of Oral and Maxillofacial Surgery, Volume 2. Surgical and non surgical management of obstructive sleep apnea.3rd ed: People's medical publishing house, USA; 1493-1512.
15. Attanasio R, Bailey DR. Dental management of sleep disorders. John Wiley & Sons; 2009 Dec 29.
16. Ronald A, Dennis R. B. Imaging for sleep-related breathing disorders, Dental management of sleep disorders. Blackwell publishing; 2010.150-163p.
17. Marcus CL. Sleep-disordered breathing in children. American journal of respiratory and critical care medicine. 2001 Jul 1;164(1):16-30.
18. Carra MC, Huynh N, Lavigne G. Sleep bruxism: a comprehensive overview for the dental clinician interested in sleep medicine. Dental Clinics. 2012 Apr 1;56(2):387-413.
19. Ronald A, Dennis R. B. Positive airway pressure therapy for sleep-related breathing disorders. Dental management of sleep disorders: Blackwell Publishing; 2010. 167-195.

Corresponding Author

Dr. Smita Singh Bhardwaj
Assistant Professor, Department of Pediatric dentistry, College of dentistry, Majmaah University, Majmaah 11952, Saudi Arabia.
Email Id: smitasinghbhardwaj @ gmail.com

Nighttime	Daytime
Snoring	Neurocognitive impairment
Bruxism	(ADHD) Attention deficit hyperactivity disorder
Awakenings	Hyperactivity
Mouth breathing	Behavioral issues
Nightmares	Poor school performance

Table 1: Symptoms and findings at night time and daytime in children with sleep-related breathing disorders