G5 Obstructive Sleep Apnea-Hypopnea Syndrome (OSAHS): Medicolegal Implications and the Role of the Dentist in a Multidisciplinary Approach

Francesca Zangari, MD, Ravenna 48121, ITALY*

Learning Overview: By attending this presentation, attendees will better understand the medicalegal aspects correlated to OSAHS.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the importance of a multidisciplinary approach wherein the dentist can potentially play an important diagnostic and therapeutic role.

OSAHS is a common sleep breathing disorder characterized by disruptive snoring and repetitive upper airway complete (apnoea) or partial (hypopnoea) collapse with increased airflow resistance during sleep, resulting in oxygen desaturation and sleep fragmentation.[1-3] Repetitive episodes of intermittent hypoxia are responsible for pathophysiological consequences that increased morbidity and mortality linked to cardiovascular, cerebrovascular and metabolic deseases.[4] OSAHS has been estimated to occur in around 24% of middle-aged men and 9% of women, affecting 4% of men and 2% of women in the middle-aged workforce, resulting in high costs and lost workdays.[5-7] It has been also found that among adults aged 30–69 years, 17% of adults had mild or worse sleep disordered breathing, and 5.7% of adults had moderate or worse sleep disordered breathing.[8]

Owing to its prevalence, OSAHS is recognized as a significant public health issue, which can manifest serious physical and social consequences if not managed properly. Medical costs can be significantly reduced when effective diagnosis and treatment are performed early.[9-11] This disorder, apart from potentially leading to an impaired quality of life for its signs and symptoms (excessive daytime sleepiness, irritability, impaired cognitive ability, and deficits in the domains of attention/vigilance), has been also associated with a high risk for motor vehicle accidents.[12,13] Drivers with OSAHS have roughly twice the risk of crashing as compared to healthy drivers. Physicians have a responsibility to promptly detect medical conditions that may impair driving and cause an increased risk of harm to the patient or the public.[14-16] So, a patient involved in a drowsy driving accident resulting in serious injury or death is the most likely situation in which physicians could face charges of legal negligence in relation to management of a patient with OSAHS.[17,18] However, state regulations for physician reporting of patients with medical conditions that may render them unfit for driving safely vary from "no requirement" to mandatory reporting of all patients with a diagnosis listed as reportable. Physicians are also in a very difficult position if they have to counsel their patients on the best attitude when traveling by car. The situation is even worse for commercial drivers for whom the legislation is more severe but leaves sleep apnea uncovered in many countries.[19] This is all the more disturbing if one considers that sleep apnea can be suspected, screened, and diagnosed with relative ease, and that once diagnosed the adequate treatment allows for safe driving.

In recent decades, dentists have become increasingly involved in the treatment of disorders that also fall within the domain of other medical specialists, OSAHS included. The awareness of having a potential diagnostic and therapeutic role stems from a growing recognition of orofacial characteristics as important developmental factors and from the realization that they have therapeutic implications.[20] These trends indicate the need for optimal collaboration among the different specialists involved. From the screening perspective, dentists, because of their contact with many members of the general population during routine examinations, are ideally placed to screen for potential OSAHS sufferers. They can recognize patients with suspected OSA through the identification of anatomic risk factors or symptoms, administer appropriate screening questionnaires, and refer patients at risk of OSA to sleep medicine physicians. As regards treatment, an increasing body of published literature reflects the growing worldwide recognition that oral devices have a role to play in the treatment of OSAHS. Standard treatment with Continuous Positive Airway Pressure (CPAP) is highly efficacious for OSAHS, but adherence to the treatment limits its overall effectiveness.[21] Oral appliance therapy, which aims at enlarging the upper airway during sleep by holding the mandible in a forward and downward position, can be a viable alternative in the treatment of OSAHS, especially in the mild and moderate cases and in patients unwilling or unable to tolerate CPAP.[22-24]

This presentation discusses the most relevant medical-legal aspects correlated to OSAHS and highlights the importance of a multidisciplinary approach wherein the dentist plays a significant prevention, diagnostic, and therapeutic role.

Reference(s):

1. Atul Malhotra A., David P. White. Obstructive sleep apnoea. *The Lancet*, 360, no. 9328 (2002): 237-45. https://doi.org/10.1016/S0140.6736(02)09464-3.
2. Asher Qureshi, Robert D. Ballard. Obstructive sleep apnea. *Journal of Allergy Clinica Immunology,* 112, no. 4 (2003): 643-51. https://doi.org/10.1016/j.jaci.2003.08.031.
3. Amy S. Jordan, David G. McSharry, Atul Malhotra. 2013. Adult obstructive sleep apnoea. 2014. *The Lancet*, 383, no. 9918 (2013): 736-47. https://doi.org/10.1016/S0140-6736(13)60734-5.
4. Marco Fusetti, Alessandra Fioretti, Marco Valenti, Francesco Masedu, Maria Lauriello, Martina Pagliarella. Cardiovascular and metabolic comorbidities in patients with obstructive sleep apnea syndrome. *Acta Otorhinolaryngologica Italica*, 32, no. 5 (October 2012): 320-5.
5. Terry Young, Mari Palta, Jerome Dempsey, James Skatrud, Steven Weber, Safwan Badra. 1993. The occurrence of sleep-disordered breathing among middle-aged adults. *The New England Journal of Medicine*, 328 (1993): 1230-5. doi:10.1056/nejm199304293281704.
6. Eva Lindberg, Thorarinn Gislason. Epidemiology of sleep-related obstructive breathing. *Sleep Medicine Reviews*, 4, no. 5 (October 2000): 411-33. https://doi.org/10.1053/smrv.2000.0118.
7. Raphael Heinzer, S. Vat, P. Marques-Vidal, H. Marti-Soler, D. Andries, N. Tobback, V. Mooser, M. Preisig, A. Malhotra, G. Waeber et al. Prevalence of sleep-disordered breathing in the general population: the HypnoLaus study. *The Lancet Respiratory Medicine*, 3, no. 4 (2015): 310-8. https://doi.org/10.1016/S2213-2600(15)00043-0.
8. Terry Young, Paul E. Peppard, Shahrad Taheri. Excess weight and sleep-disordered breathing. *Journal of Applied Physio*logy, 99, no. 4 (October 2005): 1592-9. https://doi.org/10.1152/japplphysiol.00587.2005.

*Presenting Author

9. Steven W. Barthel, Marshall Strome. Snoring, obstructive sleep apnea, and surgery. *Medical Clinics of North America*, 83, no. 1 (January 1999): 85-96. https://doi.org/10.1016/S0025-7125(05)70089-4.
10. Vishesh Kapur, David K. Blough, Robert E. Sandblom, Richard Hert, James B. de Maine, Sean D. Sullivan, Bruce M. Psaty. The medical cost of undiagnosed sleep apnea. *Sleep*, 22, no. 6 (September 1999):749–55. https://doi.org/10.1093/sleep/22.6.749.
11. Thierry Pieters, Daniel O. Rodenstein. Therapeutic options in obstructive sleep apnoea: Have we made enough progress? *Sleep Medicine Reviews*, 5, no. 1 (2001): 3-6. https://doi.org/10.1053/smrv.2000.0148.
12. Terry Young, Paul E. Peppard, Daniel J. Gottlieb. Epidemiology of obstructive sleep apnea: a population health perspective. *American Journal of Respiratory and Critical Care Medicine*, 165, no. 9 (September 2002): 1217-39. https://doi.org/10.1164/rccm.2109080.
13. Nathaniel S. Marshall, Keith H. Wong, Peter Y. Liu, Stewart R.J. Cullen, Mattehew W. Knuiman, Ronald R. Grunstein. Sleep apnea as an independent risk factor for all-cause mortality: The Busselton Health Study. *Sleep*, 31, no. 8 (September 2008): 1079-85.
14. Seithikurippu R. Pandi-Perumal, J.C. Verster, L. Kayumov, A.D. Lowe, Marcos G. Santana, Maria L.N. Pires, S. Tufik, Marco T. De Mello. Sleep disorders, sleepiness and traffic safety: a public health menace. *Medical and Biological Research*, 39 (2006): 863-71. http://dx.doi.org/10.1590/S0100-879X2006000700003.
15. Stephen Tregear, James Reston, Karen Schoelles, Barbara Phillips. Obstructive sleep apnea and risk of motor vehicle crash: Systematic review and meta-analysis. *Journal of Clinical Sleep Medicine*, 5, no. 6 (December 2009): 573-81.
16. Daniel Rodenstein. Sleep Apnea: Traffic and Occupational Accidents – Individual Risks, Socioeconomic and Legal Implications. *Respiration*, 78, no. 3 (September 2009): 241-48. https://doi.org/10.1159/000222811.
17. Daniela Boisteanu, Angela Mita-Baciu, Raluca Vasiluta. Medico-legal implications of respiratory disorders during sleep. *Romanian Journal of Legal Medicine,* XVIII, no. 1 (2010): 37-42. DOI: 10.4323/rjlm.2010.37.
18. Francesca Ingravallo, Giuseppe Plazzi. Medico-legal aspects of disability in narcolepsy. In Meeta Goswami, Seithikurippu R. Pandi-Perumal, Michael J. Thorpy (Eds) Narcolepsy. A clinical guide. *New York: Springer-Uerlag*, 2016.
19. Audrius Alonderis, Ferran Barbé, Maria R. Bonsignore, Peter M.A. Calverley, Jan W. De Backer, Kinstanze Diefenbach, F. Fanfulla, Ingo Fietze, Karl A. Franklin, Ludger Grote et al. Medico-legal implications of sleep apnoea syndrome: driving licence regulations in Europe. *Sleep Medicine*, 9, no. 4 (2008): 362-75. https://doi.org/10.1016/j.sleep.2007.05.008.
20. F. Milano, S. Mondini, M.C. Billi, R. Gobbi, A. Gracco, G. Sorrenti. The impact of a multidisciplinary approach on response rate of mandibular advancing device therapy in patients with obstructive sleep apnoea syndrome. *Acta Otorhinolaryngologica Italica*, 33, no. 5 (October 2013): 337-42.
21. Amy M. Sawyer, Nalaka S. Gooneratne, Carole L. Marcus, Dafna Ofer, Kathy C. Richards, Terry E. Weaver. A systematic review of CPAP adherence across age groups: clinical and empiric insights for developing CPAP adherence interventions. *Sleep Medicine Reviews*, 15, no. 6 (December 2011): 343–56. https://doi.org/10.1016/j.smrv.2011.01.003.
22. Jerome Lim, Toby J. Lasserson, John Fleetham, John J. Wright. Oral appliances for obstructive sleep apnoea. *Cochrane Database of Systematic Reviews*, January 2006. https://doi.org/10.1002/14651858.CD004435.pub3.
23. Aaron B. Holley, Christopher J. Lettieri, Anita A. Shah A. Efficacy of an adjustable oral appliance and comparison with continuous positive airway pressure for the treatment of obstructive sleep apnea syndrome. *Chest* 140, no. 6 (April 2011): 1511-16. https://doi.org/10.1378/chest.10-2851.
24. Serena Incerti Parenti, Elena Aroni, Laura Laffranchi, Corrado Paganelli, Giulio Alesssandri-Bonetti. The effectiveness of mandibular advancement devices in the treatment of obstructive sleep apnoea in adults: a methodological quality assessment of systematic reviews. *European Journal of Orthodontics*, 8 (August 2019): 1-11. http://dx.doi.org/10.1093/ejo/cjz065.

*Presenting Author