

Sleep Disorders and Orofacial Pain: Is there an Interplay?

Valentina Belli

The Journal of Contemporary Dental Practice (2023): 10.5005/jp-journals-10024-3526

Dear Editor,

Sleep disorders and orofacial pain are two multifaceted conditions that frequently coexist and have an impact on one another.¹ Orofacial pain often coexists with other comorbidities, such as sleep disorders, anxiety, depression, and temporomandibular disorders (TMDs).² Orofacial pain is a common manifestation of TMDs.³⁻⁶ Literature evidence primarily associates sleep bruxism with temporomandibular disorders.⁷ Apart from TMDs, burning mouth syndrome and trigeminal neuropathy can also affect sleep quality.⁸ Temporomandibular disorders and sleep disorders are interrelated. Many individuals with TMD experience disruptions in their sleep patterns, and sleep quality. Sleep disturbances can also contribute to the development or exacerbation of TMD-related symptoms such as orofacial pain. Sleep bruxism may result in the emergence of TMD by applying excessive pressure to the temporomandibular joint and its surrounding structures. TMDs can increase muscle activity during sleep, which aggravates bruxism and subsequently disrupts sleep. Temporomandibular disorder by itself can also cause pain and dysfunction in the jaw joint and the surrounding muscles that control jaw movement, which can result in sleep disturbances.⁹⁻¹¹

Orofacial pain and sleep regulation share common neurobiological pathways. The neurons of the central nervous system are highly sensitive to nociceptive (pain) inputs, which help in the development of chronic pain syndromes like orofacial pain.¹² Central sensitization can also affect sleep architecture. It increases cell excitability and neurotransmitter release, causes orofacial pain, and causes sleep disturbances. Serotonin, a neurotransmitter, regulates mood, sleep, and pain.^{13,14} Serotonin dysfunction is linked to both pain and sleep difficulties. Temporomandibular disorder and insomnia are linked to serotonin neurotransmission changes. Inflammation is noted in many orofacial pain problems and sleep difficulties.¹⁵ Cytokines and chemokines sensitize pain pathways and disturb sleep-wake cycles. Inflammation links orofacial pain to sleep disturbances. The autonomic nervous system controls pain and sleep-wake cycles.¹⁶ Orofacial discomfort and sleep disorders share autonomic nervous system dysregulation, characterized by increased sympathetic activity and decreased parasympathetic activity. Autonomic dysfunctions can affect both pain and sleep.

Understanding the interplay between orofacial pain and sleep disorders holds significant clinical and therapeutic implications. Facial pain, headaches, and sleep problems are typically overlapping symptoms of both orofacial pain and sleep disorders. Understanding how these conditions interact can improve diagnostic accuracy and increase the chances of targeted treatment. A vicious relationship exists between sleep difficulties and orofacial pain. Orofacial discomfort might intensify due to sleep disruptions, while pain itself can cause sleep disturbances. By identifying and addressing the underlying causes of the symptoms, an understanding of the association helps break this cycle. By

Istituto Nazionale Tumori - IRCCS - Fondazione G. Pascale, Napoli, Italia

Corresponding Author: Valentina Belli, Istituto Nazionale Tumori - IRCCS - Fondazione G. Pascale, Napoli, Italia, Phone: +39 3338563782, e-mail: valentina.belli25@yahoo.com

How to cite this article: Belli V. Sleep Disorders and Orofacial Pain: Is there an Interplay? *J Contemp Dent Pract* 2023;24(6):349-350.

Source of support: Nil

Conflict of interest: None

effectively managing both issues, the patient can experience improved sleep and reduced orofacial pain.

Dental professionals can create a multi-condition, comprehensive intervention strategy by understanding their interactions, thus improving patient outcomes and quality of life. Treating both the orofacial discomfort and the sleep disturbance will allow for a more comprehensive management of the patient's condition. Given that they can impact and reinforce one another, treating just one factor alone may not completely relieve the symptoms. The scarcity of literature on evaluating sleep quality on parameters of chronic orofacial pain, both in frequency and intensity, calls for longitudinal, well-planned research. Dentists need to be trained in comprehensive evaluation to develop treatment plans addressing both orofacial pain and sleep disturbances.

REFERENCES

1. Lavigne GJ, Sessle BJ. The neurobiology of orofacial pain and sleep and their interactions. *J Dent Res* 2016;95(10):1109-1116. DOI: 10.1177/0022034516648264.
2. Dos Santos EA, Peinado BRR, Frazão DR, et al. Association between temporomandibular disorders and anxiety: A systematic review. *Front Psychiatry* 2022;13:990430. DOI: 10.3389/fpsy.2022.990430.
3. Minervini G, Franco R, Marrapodi MM, et al. Prevalence of temporomandibular disorders in children and adolescents evaluated with Diagnostic Criteria for temporomandibular disorders (DC/TMD): A systematic review with meta-analysis. *J Oral Rehabil* 2023;50(6):522-530. DOI: <https://doi.org/10.1111/joor.13446>.
4. Minervini G, Franco R, Marrapodi MM, et al. Prevalence of temporomandibular disorders (TMD) in pregnancy: A systematic review with metanalysis. *J Oral Rehabil* 2023;50(7):627-634. DOI: <https://doi.org/10.1111/joor.13458>.
5. Minervini G, Franco R, Marrapodi MM, et al. Correlation between temporomandibular disorders (TMD) and posture evaluated through the diagnostic criteria for temporomandibular disorders (DC/TMD): A systematic review with meta-analysis. *J Clin Med* 2023;12(7):2652. DOI: <https://doi.org/10.3390/jcm12072652>.
6. Rathi S, Chaturvedi S, Abdullah S, et al. Clinical trial to assess physiology and activity of masticatory muscles of complete denture wearer following vitamin D intervention. *Medicina (B Aires)* 2023;59(2):410. DOI: <https://doi.org/10.3390/medicina59020410>.

7. Bartolucci ML, Incerti Parenti S, Bortolotti F, et al. Sleep bruxism and orofacial pain in patients with sleep disorders: A controlled cohort study. *J Clin Med* 2023;12(8):2997. DOI: 10.3390/jcm12082997.
8. Tait RC, Ferguson M, Herndon CM. Chronic orofacial pain: Burning mouth syndrome and other neuropathic disorders. *J Pain Manag Med* 2017;3(1):120. PMID: 28638895.
9. Minervini G, Franco R, Marrapodi MM, et al. Economic inequalities and temporomandibular disorders: A systematic review with meta-analysis. *J Oral Rehabil* 50:715–723. DOI: <https://doi.org/10.1111/joor.13491>.
10. Qamar Z, Alghamdi AMS, Haydarah NKB, et al. Impact of temporomandibular disorders on oral health related quality of life: A systematic review and meta-analysis. *J Oral Rehabil* 50:706–714. DOI: <https://doi.org/10.1111/joor.13472>.
11. Minervini G, Franco R, Marrapodi MM, et al. Prevalence of temporomandibular disorders in subjects affected by Parkinson disease: A systematic review and metanalysis. *J Oral Rehabil* 2023;00:1–9. DOI: <https://doi.org/10.1111/joor.13496>.
12. Yam MF, Loh YC, Tan CS, et al. General pathways of pain sensation and the major neurotransmitters involved in pain regulation. *Int J Mol Sci* 2018;19(8):2164. DOI: 10.3390/ijms19082164.
13. Latremoliere A, Woolf CJ. Central sensitization: A generator of pain hypersensitivity by central neural plasticity. *J Pain* 2009;10(9):895–926. DOI: 10.1016/j.jpain.2009.06.012.
14. Liu YJ, Li YL, Fang ZH, et al. NMDARs mediate peripheral and central sensitization contributing to chronic orofacial pain. *Front Cell Neurosci* 2022;16:999509. DOI: 10.3389/fncel.2022.999509.
15. Shrivastava M, Battaglino R, Ye L. A comprehensive review on biomarkers associated with painful temporomandibular disorders. *Int J Oral Sci* 2021;13(1):23. DOI: 10.1038/s41368-021-00129-1.
16. Park JW, Chung JW. Inflammatory cytokines and sleep disturbance in patients with temporomandibular disorders. *J Oral Facial Pain Headache* 2016;30(1):27–33. DOI: 10.11607/ofph.1367.