▪ Headache Medicine 2026, Supplement ▪ p-ISSN 2178-7468, e-ISSN 2763-6178

Headache Medicine

ID: 250

Effects of transauricular vagus nerve stimulation on chronic pain management in a patient with temporomandibular disorder associated with headache: a case report

Gilma Serra Galdino[1], Pedro Serra Galdino Farias de Brito[2]

[1]State University of Paraíba, Campina Grande, Paraíba, Brazil
[2]UNIFACISA University Center, Campina Grande, Paraíba, Brazil

Gilma Serra Galdino
gilmagaldino1963@gmail.com

Introduction
Chronic headache is frequently associated with musculoskeletal alterations that affect function and quality of life. Studies have demonstrated a relationship between temporomandibular disorders (TMD) and headache, suggesting shared pathophysiological mechanisms such as central sensitization and impaired processing of nociceptive stimuli. Transauricular vagus nerve stimulation (taVNS) has emerged as a non-pharmacological therapeutic strategy for chronic pain management, aiming to modulate pain perception, reduce sensitization, and promote functional improvement. This study aimed to analyze the effects of taVNS on chronic pain management in a patient diagnosed with TMD and headache.

Case presentation
A 43-year-old homemaker presented with frequent chronic headache that was unresponsive to analgesic and prophylactic medications and was associated with pain in the temporomandibular region and masticatory muscles, cervical pain, and emotional tension. On the painDETECT questionnaire, the patient scored 12 points and showed a predominantly nociceptive pain phenotype. Pain intensity was 9 on the visual analogue scale (VAS), and sleep quality was impaired according to the Pittsburgh Sleep Quality Index (PSQI). The transcutaneous auricular vagus nerve stimulation protocol consisted of two sessions per week for two months. Stimulation was applied to the auricle using clips positioned over the concha and earlobe, with a 25 Hz current, a pulse width of 250 microseconds, intensity below the pain threshold, and a duration of 25 minutes.

Discussion
taVNS has been considered a promising strategy for managing TMD and chronic headache because of its ability to modulate pain-related neural networks, including the periaqueductal gray matter, locus coeruleus, and raphe nuclei. Through these pathways, afferent stimuli reach the nucleus of the solitary tract, promoting neurotransmitter release, reducing pain-signal transmission, and modulating the trigeminovascular system. Evidence indicates that taVNS may reduce pain intensity, frequency, and duration by altering the functional connectivity of brain regions involved in nociceptive processing. As a noninvasive, safe, and easy-to-apply technique, it may serve as a therapeutic alternative for headache treatment.

Conclusion
Transauricular vagus nerve stimulation demonstrated therapeutic potential, with improvement in the clinical condition related to TMD and headache. The VAS score decreased to 6 after two weeks of treatment, and improvements in functional impact and quality of life persisted at the six-month follow-up. It is a noninvasive, non-pharmacological, safe, and easy-to-apply strategy that may contribute meaningfully to the multidisciplinary management of chronic pain. Further studies using different protocols are needed to improve understanding of these effects and their various clinical applications.

Keywords:
Headache
Chronic pain
Temporomandibular disorders
Neuromodulation

© Copyright 2025