



# Can Physical Therapies for Chronic Temporomandibular Disorders Cause the Wind-Up of Nociceptive Neurons in the Trigeminal Subnucleus Caudalis?

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Various physical therapies have been used in patients with temporomandibular disorders (TMDs). Although the mechanisms of physical therapy is largely unknown, they appear to rely on the action of diffuse noxious inhibitory controls (DNIC), which has often been described as 'pain inhibits pain' [1].

However, chronic TMD is associated with impaired DNIC, as evidenced by the fact that significant chronic TMD patients have unresolved and persistent headaches and comorbidities such as irritable bowel syndrome [2]. If DNIC is collapsed in patients with TMDs, the noxious inputs mediated by physical therapy are more likely to produce wind-up of nociceptive neurons in the trigeminal subnucleus caudalis, rather than to control the pain through the descending inhibitory regulation [3]. The wide dynamic range neurons of the trigeminal subnucleus caudalis could be sensitized by noxious stimuli from physical therapies. With the development of sensitization in the trigeminal subnucleus caudalis, not only harmful stimuli that produce primary and secondary hyperalgesia, but also non-nociceptive stimuli are received as pain-related inputs. Wind-up due to physical therapies might also involve the role of N-methyl-D-aspartate receptors [4].

Therefore, if a TMD patient suffers from increased pain after physical therapy than before, clinicians would be better to examine the involvement of collapsed DNICs and the wind-up of the trigeminal subnucleus caudalis, and taking

this aspect into consideration in the treatment strategy.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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## REFERENCES

1. Le Bars D, Dickenson AH, Besson JM. Diffuse noxious inhibitory controls (DNIC). I. Effects on dorsal horn convergent neurones in the rat. *Pain* 1979;6:283-304.
2. Ohrbach R, Fillingim RB, Mulkey F, et al. Clinical findings and pain symptoms as potential risk factors for chronic TMD: descriptive data and empirically identified domains from the OPPERA case-control study. *J Pain* 2011;12(11 Suppl):T27-T45.
3. Moana-Filho EJ, Herrero Babiloni A, Theis-Mahon NR. Endogenous pain modulation in chronic orofacial pain: a systematic review and meta-analysis. *Pain* 2018;159:1441-1455.
4. Ghorpade A, Advokat C. Evidence of a role for N-methyl-D-aspartate (NMDA) receptors in the facilitation of tail withdrawal after spinal transection. *Pharmacol Biochem Behav* 1994;48:175-181.

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