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The effectiveness of photobiomodulation in the management of temporomandibular pain sensitivity in rats: behavioral and neurochemical effects.

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Abstract

This study analyzed the effects of photobiomodulation (PBM) with low-level **laser therapy** on nociceptive behavior and neuronal activity in the trigeminal nucleus after experimental unilateral **temporomandibular joint** (**TMJ**) disc injury. The animals were divided into 4 groups (n = 10 each): group 1, surgical injury of the articular disc and PBM; group 2, sham-operated subjected to PBM; group 3, surgical injury of the articular disc; and group 4, control (Naïve). Ten sessions of PBM were performed using GaAs **laser** with a wavelength of 904 nm, power of 75 W pico, average power of 0.043 W, area of the beam of 0.13 cm^2, duration of the pulses of 60 nseg (in the frequency of 9500 Hz), energy density of 5.95 J/cm^2, energy per point of 0.7 J, and power density of 333.8 mW/cm^2, and the irradiation was done for 18 s per point. Neuropathic symptoms were evaluated using the von Frey test. Trigeminal ganglion samples underwent immunoblotting to examine the expression of substance P, vanilloid transient potential receptor of subtype-1 (TRPV-1), and peptide related to the calcitonin gene (CGRP). There was a total decrease in pain sensitivity after the second session of PBM in operated animals, and this decrease remains until the last session. There was a significant decrease in the expression of SP, TRPV-1, and CGRP after PBM. Photobiomodulation **therapy** was effective in reducing nociceptive behavior and trigeminal nucleus neuronal activity after **TMJ** disc injury.

KEYWORDS: Low-level **laser therapy**; Nociception; **Temporomandibular joint**; **Temporomandibular joint** disc; Trigeminal nuclei

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