

Photobiomodulation exerts anti-inflammatory and antinociceptive effects in CFA-induced myositis

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Introduction: Muscle injury occurs frequently, leading to impaired function, pain and an unfavorable impact in the quality of life of individuals. Different complementary therapeutics have been studied in an attempt to ameliorate inflammation, thus improving muscle regeneration and, consequently, quality of life of patients affected by such kind of injuries. Several studies showed that photobiomodulation (PBM) modulates inflammation, favors tissue healing and promotes pain relief. Therefore, our main objective was to investigate whether PBM, through low-level laser (LLL) and light emitting diode (LED) devices, can improve nociception and the inflammatory process in a model of Freund's Complete Adjuvant (CFA)-induced myositis. **Methods:** All procedures were approved by the Institution's Animal Care Committee (CEUA, protocol number 7373190319). Male Wistar rats (*Rattus norvegicus*), 6-8-weeks-old, weighing 200-220 g, were randomly divided into four groups: naïve (non-injected or treated; n=4), vehicle (injection of mineral oil plus saline; n=4), CFA (injured by the injection of CFA, 150 µg per 300 µL; n=4), CFA+LLLT (660 nm, 3 J; n=4) and CFA+LEDT (850 nm, 3 J; n=4). CFA or vehicle were injected partially in the right (150 µL) and partially in the left (150 µL) gastrocnemii bellies. PBM started at the 6th day after CFA intramuscular injection by direct contact over the injected area and was applied during 5 consecutive days. Tactile allodynia and thermal hyperalgesia (von Frey filaments and Hargreaves tests, respectively) were evaluated before and after PBM sessions. Additionally, the edematogenic response in the gastrocnemius muscle was analyzed by pachymetry. After behavioral tests, rats were humanely euthanized (at the 11th day), and gastrocnemii were collected for histological analyses. Areas (µm²) of inflammatory infiltrates and fibers with central nuclei were also quantified. Statistical analyses were performed using the GraphPad Software (version 8); *Two-way* or *One-way* ANOVA followed by Bonferroni post-test were applied; the adopted level of significance was $p \leq 0.05$. **Results:** CFA injection caused an important persistent inflammatory response in the gastrocnemius muscle, characterized by the extensive presence of myonecrotic fibers intermingled amid huge inflammatory infiltrates. We observed an improvement of tactile allodynia, edematogenic and inflammatory responses after both LLLT and LEDT treatments, when compared to the untreated CFA group. However, regarding to thermal hyperalgesia, no improvement of the withdrawal latency was observed. **Conclusion:** We suggest a beneficial effect of the treatment with PBM and may also propose as an adjuvant in the treatment of patients affected by myositis.

Keywords: muscle pain, myositis, photobiomodulation therapy, allodynia, hyperalgesia.