

## Effect of Laser Photobiomodulation with Gradual or Constant Doses in the Regeneration of Rats' Mental Nerve After Lesion by Compression

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### Abstract

**Objective:** Assess morphologically the efficacy of constant dose (CD) or gradual dose (GD) in photobiomodulation therapy (PBMT) during the regeneration process of rats' mental nerve after compression lesion.

**Materials and methods:** Forty-eight male Wistar rats were used and divided into four groups (n = 12): negative control (NC): lesion by compression; positive control (PC): no lesion; GD: lesion by compression and PBMT with GD; and CD: lesion by compression and PBMT with CD. One day after the surgery, the groups GD and CD underwent PBMT daily in three equidistant points around the incision area. The parameters were wavelength of 808 nm, 100mW, CD received treatment with 120 J/cm<sup>2</sup>, while GD underwent the protocol of application: 1st and 4th sessions: 80 J/cm<sup>2</sup>; 5th to 8th sessions: 90 J/cm<sup>2</sup>; 9th to 12th sessions: 100 J/cm<sup>2</sup>; 13th to 16th sessions: 110 J/cm<sup>2</sup>; and 17th to 20th sessions: 120 J/cm<sup>2</sup>. Euthanasias were performed at 3, 7, 14, and 21 days. Qualitative and quantitative analysis of the mental nerves were performed with ANOVA (analysis of variance) and Tukey tests (p ≤ 0.05).

**Results:** It was observed that PBMT was able to accelerate the process of nerve regeneration presenting an increase in the number of myelinated fibers starting at 14 days of treatment for groups CD and GD, and at 21 days they were similar to PC. It was observed a better lamellar organization of myelin sheath at 7 days for GD and at 14 days for CD, similar to PC. Both GD and CD presented significant differences compared to NC and PC for thickness of the myelin sheath, outer perimeter, internal area, and number of myelin fibers.

**Conclusions:** PBMT presented positive effect on the regeneration of nerve starting at 14 days, and after 21 days there was no difference between GD and CD.