Photomedicine and Laser Surgery
Volume 32, Number 4, 2014
ª Mary Ann Liebert, Inc.
Pp. 212–218
DOI: 10.1089/pho.2012.3398

Therapeutic Outcomes of Low-Level Laser Therapy for Closed Bone Fracture in the Human Wrist and Hand

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Abstract

Objective: The therapeutic outcomes of low-level laser therapy (LLLT) on closed bone fractures (CBFs) in the wrist and hand were investigated in this controlled study.

Background data: Animal research has confirmed that LLLT increases osteocyte quantity; however, little research has been conducted to determine the effect of LLLT on the treatment of human bone fractures. Methods: In this study, the therapeutic outcomes of administering 830 nm LLLT to treat CBFs in the wrist or hand were examined. Fifty patients with CBFs in the wrist and hand, who had not received surgical treatment, were recruited and randomly assigned to two groups. The laser group underwent a treatment program in which 830 nm LLLT (average power 60 mW, peak power 8W, 10 Hz, 600 sec, and 9.7 J/cm2 per fracture site) was administered five times per week for 2 weeks. Participants in a placebo group received sham laser treatment. The pain, functional disability, grip strength, and radiographic parameters of the participants were evaluated before and after treatment and at a 2-week follow up.

Results: After treatment and at the follow-up, the laser group exhibited significant changes in all of the parameters compared with the baseline ($p < 0.05$). The results of comparing the two groups after treatment and at the follow-up indicated significant between-group differences among all of the parameters ($p < 0.05$).

Conclusions: LLLT can relieve pain and improve the healing process of CBFs in the human wrist and hand.