

Effect of Photobiomodulation on Bone Formation Around Dental Implants Placed in Overprepared Sites: Micro CT Scan Study

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ABSTRACT

Background: osseointegration is a prerequisite for success of dental implants. Various biological and physical methods have been shown to enhance osseointegration. The aim of this study was to evaluate the effect of laser photobiomodulation on bone formation around dental implants.

Material and Methods: Six adult male sheep served as the sample for this study. On either side of the lower border of mandible, four implants were inserted. To accommodate an implant that was 8 mm long and 4 mm wide, the implant bed was made to measure 10 mm long and 4.8 mm wide. Photobiomodulation with a 940-nm diode laser was applied daily for the next seven days, targeting the periimplant area. The animals were sacrificed at 4, 8, and 12 weeks (two animals at each time point). The dissected specimens were radiographed by micro-CT scan to evaluate the amount of bone formation.

Results: At the three time points, the laser group should a statistically significant higher values of bone implant contact, bone volume, intersection surface, bone surface density trabecular number, and trabecular thickness ($P<0.05$). However, trabecular separation in the laser group was statistically significantly less than the control group ($p<0.05$).

Conclusion: Laser therapy enhance bone-implant contact and increase osteointegration. A randomized clinical trial is recommended to reach a solid evidence- based conclusion.

Keywords: Bone, Implant, Laser, Photobiomodulation, Osseointegration

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