

IS SINGLE APPLICATION OF 810 nm LASER EFFECTIVE IN FASTER BONE FORMATION?: A RABBIT HISTOMORPHOMETRIC STUDY

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Background: In last decade, low-level laser therapy has been evaluated for stimulation and acceleration of bone formation. In spite of promising results, biphasic 'dose' response remains. Moreover, the use of single session of low-level laser on healing of bone is not explored thoroughly. The aim of this study was to determine the optimal 'dosage' for formation of bone using diode laser of 810 nm under single irradiation.

Study: The study was carried out adhering to guidelines of the CPCSEA and institutional ethical committee. Six New Zealand male rabbits were used weighing 1.5–2 Kgs and 10 months old for the study. Femur was chosen as site of surgery. The center of the femur was drilled using implant osteotomy drills to the size of 2.8 mm in width and 6 mm in depth. A 810 nm diode laser was used in this study. Laser parameters were, wavelength of 810 nm, power of 90 mW, time of 30 seconds (energy of 2.7J) in continuous mode using the disposable fibre of 300 µmm diameter in punctual contact. *Contra* lateral femur was used as a control and the laser was sham treated. At the end of 2 weeks, samples were collected from the surgical area and slides were prepared. The density of osteocyte, osteoblast and amount of bone formation evaluated using Histomorphometry analysis.

Results: Data were analyzed using Microsoft SPSS 11.0 for Windows (SPSS Inc., Chicago, IL, USA). The differences between the groups were analyzed with the Wilcoxon Mann–Whitney test. The level of statistical significance was set at 5% ($p \leq 0.05$). At the end of 2 weeks, there was increase in the osteoblasts and amount of bone formation in the laser treated compared to control group. The results were significant at $p < 0.05$.

Conclusion: Single application of diode laser of 810 nm at 2.7 J energy effectively showed faster deposition of bone in osteotomy site in 2 weeks.