The Effect of an 810-nm Diode Laser on the Proliferation of Osteoblasts and Formation of Bone in an Osteotomy Site: An Animal Study (0058)

Shrikar R. Desai, MDS; Jayashree A. Mudda, BDS
H.K.E. Society’s S. Nijalingappa. Institute of Dental Sciences and Research, Gulbarga, Karnataka, India

Introduction and Objective: The use of a single session of low-level laser irradiation on healing of bone is not explored thoroughly. The aim of this study is to determine the optimal dosage for formation of bone using a single irradiation of an 810-nm diode laser.

Materials and Methods: Fifteen New Zealand male rabbits were used for the study. 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. An 810-nm GaAlAs diode laser (Picasso™ Lite, AMD Lasers, Indianapolis, Ind., USA) was used in this study. Laser parameters were: wavelength of 810 nm, power of 90 mW, time of (Group I) 30 sec (energy of 2.7 J), (Group II) 120 sec (energy of 10.8 J), (Group III) 180 sec (energy of 16.2 J) and (Group IV) 300 sec (energy of 27 J) in continuous mode using the disposable fiber of 300 µm diameter in contact, in uninitiated mode. The contralateral femur (Group V) was used as a control and the laser was sham-treated. At the end of 4 weeks samples were collected from the surgical area and slides were prepared. The density of osteocyte, osteoblast, and amount of bone formation was evaluated using histomorphometry analysis.

Results: At the end of 4 weeks, there was increase in the osteoblasts and amount of bone formation in the Group IV compared to other groups. The results were significant at $P < 0.05$.

Conclusions: The 810-nm diode laser at 27 J energy effectively showed an increase in the proliferation of osteoblasts and faster deposition of bone in an osteotomy site in 4 weeks.

Educational Objectives
- Determine the effect of a single session of 810-nm diode laser irradiation on regeneration of bone in an animal osteotomy study.

Shrikar R. Desai, MDS
HKE Society’s S.N. Institute of Dental Sciences and Research, Gulbarga, Karnataka, India

Dr. Desai is a Research Scholar in the Department of Periodontics, HKE Society’s S. Nijalingappa Institute of Dental Sciences and Research, Gulbarga, Karnataka, India.
Disclosure: Dr. Desai has reported no commercial affiliations or personal conflicts of interest relative to this presentation. Contact Dr. Desai by e-mail at drshride@yahoo.com