

EFFECT OF LOW-LEVEL LASER THERAPY ON THE FRACTURE HEALING PROCESS

Kazem Shakouri S¹, Soleimanpour J, Salekzamani Y, Oskuie MR

¹Tabriz University of Medical Sciences, Tabriz, Iran. sk0531ir@yahoo.coms

CASE REPORT

ABSTRACT

Low-level laser therapy (LLLT) is a biophysical form of intervention in the fracture-repair process, which, through several mechanisms, accelerates the healing of fractures and enhances callus formation. The effect of laser on fracture healing is controversial. Some authors affirm that LLLT can accelerate bone formation by increasing osteoblastic activity. The objective of our study was to evaluate the effect of laser therapy on fracture healing. Thirty rabbits were subjected to tibial bone open osteotomies that were stabilized with external fixators. The animals were divided into two study groups: laser group and control group. Callus development and bone mineral density were quantitatively evaluated by CT; the animals were then killed and the fractures were assessed for biomechanical properties. The results demonstrated that the increasing rate of bone mineral density was higher in the laser (L) group than in the control (C) group. CT at 5 weeks revealed a mean callus density of 297 Hounsfield units (HU) for the control group and 691 HU for the L group, which was statistically significant ($P = 0.001$). In the L group, the mean recorded fracture tension was 190.5 N and 359.3 N for healed and intact bones, respectively, which was statistically significant ($P < 0.001$). The result of the study showed that the use of laser could enhance callus development in the early stage of the healing process, with doubtful improvement in biomechanical properties of the healing bone; therefore, laser therapy may be recommended as an additional treatment in non-union fractures in humans.

CLINICAL STUDIES CONCLUSION:

Based on the results of the reviewed articles, low-intensity laser therapy can accelerate bone healing in extraction sites, bone fracture defects, and distraction osteogenesis, provided proper parameters were applied.

PMID:
19399356

DOI:
10.1007/s10103-009-0670-7
[Indexed for MEDLINE]

Source of study:

<https://www.ncbi.nlm.nih.gov/pubmed/19399356>

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