

BONE HEALING

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EFFECT OF LOW-LEVEL LASER THERAPY ON BONE REPAIR: A RANDOMIZED CONTROLLED EXPERIMENTAL STUDY

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CASE REPORT

ABSTRACT

The aim of this study was to investigate the effect of low-level laser therapy (LLLT) on bone repair in femoral fractures. Sixty adult Wistar rats were randomly assigned into one of two groups: group A (osteotomy + LLLT) or group B (osteotomy + sham laser). An experimental model of complete bone fracture was surgically created by removing a 2-mm fragment from the middle third of the femoral shaft. Data were analyzed on days 8, 13, and 18 after the fracture (subgroups 1, 2, and 3). Samples were assessed for changes in inflammatory infiltration; trabecular bone matrix, periosteal, and new bone formations; and changes in the expression of particular osteogenic-related proteins (osteocalcin, osteopontin, and osteonectin). Microscopic analysis revealed a significant decrease in inflammatory infiltration, intense trabecular bone matrix and periosteal formation, and an increase in newly formed bone after laser irradiation. We also found an increase in the expression of bone matrix proteins with LLLT, with a significant difference measured for osteocalcin in the LLLT group at day 8 ($p=0.007$). We show that LLLT plays an important role in augmenting bone tissue formation, which is relevant to fracture healing. LLLT may therefore be indicated as an adjunct therapeutic tool in clinical practice for the treatment or recovery of nonunion injuries.

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.

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