[Lasers in Medical Science](https://link.springer.com/journal/10103" \o "Lasers in Medical Science)

July 2011, Volume 26, [Issue 4](https://link.springer.com/journal/10103/26/4/page/1), pp 515–522| [Cite as](https://link.springer.com/article/10.1007%2Fs10103-010-0867-9#citeas)

Evaluation of the osteogenic effect of low-level laser therapy (808 nm and 660 nm) on bone defects induced in the femurs of female rats submitted to ovariectomy

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Abstract

The present study aimed to evaluate the effects of LLLT (660- and 808-nm wavelengths) on the process of repairing bone defects induced in the femurs of female rats submitted to ovariectomy. Bilateral ovariectomies were performed on 18 female Wistar rats, which were divided into control and irradiated groups after the digital analysis of bone density showed decreased bone mass and after standardized drilling of the femurs. The irradiated groups received 133 J/cm2 of AsGaAl (660-nm) and InGaAlP (880-nm) laser radiation. The animals were euthanized on days 14 and 21 after the bone defects were established. Detailed descriptive histological evaluations were performed, followed by semi-quantitative histomorphometry. The results from days 14 and 21 showed that the irradiated groups presented increased density of osteoblasts, fibroblasts, and immature osteocytes on the tissue surface compared with the control (non-irradiated) groups (*p* < 0.05). Additionally, inflammatory infiltrate evaluations showed that LLLT decreased the accumulation of leukocytes when compared to the control treatment (*p* < 0.05). We concluded that, in our experimental model, both wavelengths (660-nm and 880-nm) inhibited the inflammatory process and induced the proliferation of cells responsible for bone remodeling and repair.

Keywords

Ovariectomy Low-level laser therapy Osteogenesis Fibroblasts Bone repair