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A Preliminary Report on the Effect of Laser Therapy on the Healing of Cutaneous Surgical Wounds as a Consequence of an Inversely Proportional Relationship between Wavelength and Intensity: Histological Study in Rats.

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Objective: The objective of the present investigation was to assess the histological effects of different wavelengths and intensities on the healing process of cutaneous wounds.

Background Data: Tissue repair is a dynamic interactive process which involves mediators, cells and extra-cellular matrix. Several reports on the use of laser therapy have shown that the healing process is positively affected when the correct parameters are used.

Methods: Eighteen standardized wounds were surgically created on the dorsum of male and female Wistar rats, which were subsequently divided into two experimental groups according to wavelength used (λ .670 or λ 685 nm) for lasertherapy (LLLT). Each group was divided into three subgroups of three animals according to the intensity of the applied irradiation (2, 15, or 25 mW). Twelve animals were used as untreated controls and were not irradiated. The irradiation was carried out during seven consecutive days. The animals were sacrificed eight days after surgery. The specimens were removed, kept in 4% formaldehyde for 24 h, routinely prepared to wax, stained with H&E, and analyzed under light microscopy.

Results: For both groups, light microscopy showed a substitution repair process; however, when LLLT was used, a positive biomodulatory effect was detectable, chiefly associated with shorter wavelength and low intensity.

Conclusions: The results of the present study indicate that LLLT improved cutaneous wound repair and that the effect is a result of an inversely proportional relationship between wavelength and intensity, with treatment more effective when combining higher intensity with short wavelength or lower intensity with higher wavelength.