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Analysis of the Systemic Effect of Red and Infrared Laser Therapy on Wound Repair

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Abstract

Objective: To evaluate, using histological analysis, the systemic action and repair process of wounds produced on the back of rats and treated with red, infrared, or both lasers applied directly or indirectly to the wounds.

Background Data: Skin tissue repair and wound healing are complex processes that involve a series of dynamic events. Many benefits are associated with biomodulation using laser therapy. **Methods:** Thirty-six male Wistar rats were divided into four groups: control (without laser), red laser (aluminium gallium indium phosphide (AlGaInP); $\lambda = 685$ nm; $\varphi = 0.0314$ cm²; CW; P = 30 mW; D = 20 J, time of irradiation = 667 sec), infrared laser (gallium-aluminum-arsenide (GaAlAs); $\lambda = 830$ nm; $\varphi = 0.0314$ cm²; CW; P = 50 mW; D = 20 J, time of irradiation = 401 sec), and both lasers (infrared laser: GaAlAs; $\lambda = 830$ nm; $\varphi = 0.0314$ cm²; CW; P = 50 mW; D = 10 J, time of irradiation = 201 sec + red laser: AlGaInP; $\lambda = 685$ nm; $\varphi = 0.0314$ cm²; CW; P = 30 mW; D = 10 J, time of irradiation = 334 sec; total dose = 20 J). Three subgroups were formed according to observation time points. Three wounds were produced on the back of each animal. Only the wound closest to the head was irradiated in the experimental groups. For the evaluation of skin reaction and wound healing, three animals of each group were killed at 3, 5, and 7 days postoperatively. The irradiation protocol established 48-hour intervals between applications, with the first application immediately after the surgical procedure. **Results:** In the red and infrared laser group, healing was more advanced in the wound located furthest from the point of laser application. The most effective healing of a proximal wound was verified in the control group on the 7th postoperative day. **Conclusion:** The combined application of red and infrared lasers resulted in the most evident systemic effect on the repair of skin wounds produced in rats.

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