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Burns

J Photochem Photobiol B. 2005 Feb 1;78(2):171-7.

Effect of low-level laser therapy on the healing of second-degree burns in rats: a histological and microbiological study.

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This paper presents the results of a study on the effects of two different doses of low-level laser therapy on healing of deep second-degree burns. Sixty rats were randomly allocated to one of four groups. A deep second-degree burn was inflicted in each rat. In the control group burns remained untreated; in two laser treated groups the burns were irradiated daily with low-level helium-neon laser with energy densities of 1.2 and 2.4 J/cm2, respectively. In the fourth group the burns were treated topically with 0.2% nitrofurazone cream every day. The response to treatments was assessed histologically at 7, 16 and 30 days after burning, and microbiologically at Day 15. The number of macrophages at day 16, and the depth of new epidermis at day 30, was significantly less in the laser treated groups in comparison with control and nitrofurazone treated groups (P=0.000). Staphylococcus epidermidis was found in the 70% of rat wounds in the laser treated groups in comparison with 100% of rats in the control group. S. aureus was found in the 40% rat wounds in the nitrofurazone treated group, but there was not found in the wounds of laser treated, and control groups. It is concluded that low-level laser therapy of deep second-degree burn caused significant decrease in the number of macrophage and depth of new epidermis. In addition, it decreased incidence of S. epidermidis and S. aureus.

J Clin Laser Med Surg. 2004 Feb;22(1):59-66.

Effects of low-intensity polarized visible laser radiation on skin burns: a light microscopy study.

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OBJECTIVE: This study was carried out to investigate the influence of low-intensity polarized visible laser radiation on the acceleration of skin wound healing. Background Data: Low-level laser therapy (LLLT) at adequate wavelength, intensity, and dose can accelerate tissue repair. However, there is still unclear information about light characteristics, such as coherence and polarization. Some studies indicate that linearly polarized light can survive through long propagation distance in biological tissue. MATERIALS AND METHODS: Three burns about 6 mm in diameter were created on the back of rats with liquid N(2). Lesion "L(//)" was irradiated by He-Ne laser (lambda = 632.8 nm), D= 1.0 J/cm(2), with linear polarization parallel to the spinal column of the rat. Lesion "L(inverted v)" was irradiated using the same laser and dose, but the light polarization was aligned perpendicularly to the relative orientation. Lesion "C" was not irradiated in order to be considered as control. The animals were sacrificed at day 3-17 after lesion creation. Samples were collected and prepared for histological analysis. RESULTS: Histological analysis showed that the healing of irradiated wounds was faster than that of non-irradiated wounds. Moreover, it was observed that skin wound repair is dependent on polarization orientation with respect to a referential axis as the animal's spinal column. Consequently, "L(//)" was completely healed after 17 days, whereas "L (perpendicular) " showed a moderate degree of healing after the same period. CONCLUSIONS: These results indicate that the relative direction of the laser polarization plays an important role in the wound healing process when highly coherent He-Ne laser is used.