



Low Level Laser Therapy & venous leg ulcers clinical research

The use of low energy photon therapy (LEPT) in venous leg ulcers: a double-blind, placebo-controlled study.

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BACKGROUND: Venous ulcers are estimated to be present in 0.2 to 0.4% of the population. Although new therapies have significant promise, nonhealing ulcers still represent a significant problem.

OBJECTIVE: To evaluate the efficacy of low energy photon therapy (LEPT) in the treatment of venous leg ulcers.

METHODS: A placebo-controlled, double-blind study using low energy photon therapy was performed in nine patients with 12 venous ulcers. Treatment was given three times a week for 10 weeks, using two monochromatic optical sources. One source provided a wavelength (λ) of 660 nm (red) while the second source delivered a wavelength of 880 nm (infrared). Two optical probes were used, one consisted of an array of 22 monochromatic sources, operating at a wavelength of 660 nm and covering an area 6 x 10 cm². The second probe had seven infrared sources, operating at a wavelength of 880 nm and covering an area of 4 cm². The above configuration of optical probes was selected to cover the majority of the ulcer area being treated. The patients who were randomized to placebo treatment received sham therapy from an identical-appearing light source from the same delivery system.

RESULTS: Nine patients with 12 venous ulcers were randomized to receive LEPT or placebo therapy. At the conclusion of the study, the percentage of the initial ulcer area remaining unhealed in the LEPT and placebo groups was 24.4% and 84.7%, respectively ($P = 0.0008$). The decrease in ulcer area (compared to baseline) observed in the LEPT and placebo groups was 193.0 mm² and 14.7 mm², respectively ($P = 0.0002$). One patient dropped out of the study, complaining of lack of treatment efficacy; he was found to be randomized to the placebo group. There were no adverse effects.

CONCLUSION: In this placebo-controlled, double-blind study LEPT was an effective modality for the treatment of venous leg ulcers.

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Reciprocity of exposure time and irradiance on energy density during photoradiation on wound healing in a murine pressure ulcer model.

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BACKGROUND: Energy density and exposure time reciprocity is assumed and routinely used in low-level light therapy (LLLT) regimens. This study examined dose reciprocity effects on wound healing.

METHODS: Pressure ulcers were created on seven groups of C57/BL mice (n = 18). Photoradiation was administered (18 days; 5 J/cm²/day @ 670 nm) using a custom LED apparatus and treatment matrix varying both intensity and exposure. Control animals were treated similarly, without photoradiation. Ulcer staging was performed using a standardized scale. Changes in stage, wound area and wound closure rates were measured. Histology was performed.

RESULTS: Photostimulatory effects at day 7 occurred with parameters of 125 seconds @ 40 mW x 1/day; 625 seconds @ 8 mWx1/day; 62.5 seconds @ 40 mWx2/day; and 312.5 seconds @ 8 mWx2/day; and at day 18 using 625 seconds @ 8 mW and 312.5 seconds @ 8 mWx2/day. Statistically significant increases in wound closure rates occurred using 625 seconds @ 8 mW; 62.5 seconds @ 40 mWx2/day; and 312.5 seconds @ 8 mWx2/day treatments. Mean ulcer grade scores were similar to controls.

CONCLUSIONS: Varying irradiance and exposure time to achieve a specified energy density affects phototherapy outcomes in this model. Variation of exposure time and irradiance may account for conflicting results in the literature. Further studies of these effects are warranted.

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Monochromatic phototherapy: effective treatment for grade II chronic pressure ulcers in elderly patients.

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BACKGROUND AND AIMS: Monochromatic pulsating light may have effects on wound healing. In an earlier study of grade II ulcers, there was a tendency toward better healing in the phototherapy group (p=0.06). The present study on patients with grade II ulcers was performed to verify these findings. Data from this study were pooled with data from the earlier study.

METHODS: Ninety-four patients were offered participation in the new study and 76 patients were evaluated. They were pooled with 87 patients from the earlier study, bringing the total to 163. All patients were treated with monochromatic pulsating light or placebo over the ulcerated area, according to a specified program up to 12 weeks.

RESULTS: The mean normalized reduction in pressure ulcer size at week 12 was 0.79 for the phototherapy group and 0.50 for the placebo group (95% confidence interval 0.01-0.53; $p=0.039$). No serious side-effects were noted.

CONCLUSIONS: Monochromatic pulsating light accelerates healing in grade II pressure ulcers in elderly patients.

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