Celluma - Low Level Light Therapy for Post Surgery Wound Healing & Joint/Muscle Repair in Animals

"Here's how the Celluma helped out "Brownie", a female pit bull. "Brownie" has had 3 separate surgeries on her hind knees for torn muscles. After the third surgery, "Brownie" was healing much slower than the previous two surgeries and she had a lot of pain and stiffness in her knees. We started using the Celluma on her knees on all 3 settings every week. Even after just one treatment, we noticed a huge improvement in her mobility and she was not in as much pain. Her wounds and scars healed much quicker after using the Celluma using the "Anti-Aging" setting. She also had an infection in one of the surgery sites and when we used the Celluma on the "Acne" setting it helped to clear up the infection much quicker. Brownie was not as stiff after using the Celluma on the "Aches and Pains" setting. Using the Celluma on "Brownie" has made a dramatic improvement in her recovery after having multiple knee surgeries." - **Debra Olson-Warford, DC, Certified Animal Chiropractor, Lancaster, CA**

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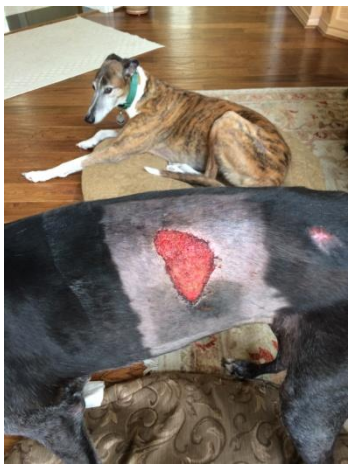
Case History – Greyhound Bitten by Black Widow Spider

April 25

April 25 - approx 70 sutures



May 5

May 13

Using Celluma

Early June

LED - Wound Healing Abstracts

(Celluma original research) Comparison of laser and diode sources for acceleration of in vitro wound healing by low-level light therapy

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Abstract.
Low-level light therapy has been shown to improve in vitro wound healing. However, well-defined parameters of different light sources for this therapy are lacking. The goal of this study was (1) to determine if the wavelengths tested are effective for in vitro wound healing and (2) to compare a laser and a light-emitting diode (LED) source at similar wavelengths. We show four wavelengths, delivered by either a laser or LED array, improved in vitro wound healing in A549, U2OS, and PtK2 cells. Improved wound healing occurred through increased cell migration demonstrated through scratch wound and transwell assays. Cell proliferation was tested by the (3-(4,5-dimethylthiazol-2-yl)-5-(3-car-boxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium) (MTS) assay and was found generally not to be involved in the wound healing process. The laser and LED sources were found to be comparable when equal doses of light were applied. The biological response measured was similar in most cases. We conclude that the laser at 652 (5.57 mW⁄cm2, 10.02 J⁄cm2) and 806 nm (1.30 mW⁄cm2, 2.334 J⁄cm2) (full bandwidth 5 nm), and LED at 637 (5.57 mW⁄cm2, 10.02 J⁄cm2) and 901 nm (1.30 mW⁄cm2, 2.334 J⁄cm2) (full bandwidth 17 and 69 nm respectively) induce comparable levels of cell migration and wound closure.

Effects of low-power light therapy on wound healing: LASER x LED

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CONCLUSION
The reviewed studies show that phototherapy, either by LASER or LED, is an effective therapeutic modality to promote healing of skin wounds. The biological effects promoted by these therapeutic resources are similar and are related to the decrease in inflammatory cells, increased fibroblast proliferation, angiogenesis stimulation, formation of granulation tissue and increased collagen synthesis. In addition to these effects, the irradiation parameters are also similar between LED and LASER. Importantly, the biological effects are dependent on such parameters, especially wavelength and dose, highlighting the importance of determining an appropriate treatment protocol.

THE USE OF NASA LIGHT-EMITTING DIODE NEAR-INFRARED TECHNOLOGY FOR BIOSTIMULATION

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Results and Discussion
Near infrared (IR) light has documented benefits promoting wound healing in human and animal studies. Our preliminary results have also demonstrated two to five-fold increases in growth-phase-specific DNA synthesis in normal fibroblasts, muscle cells, osteoblasts, and mucosal epithelial cells in tissue cultures treated with near-IR light. Our animal models treated with near-IR have included wound healing in diabetic mice and ischemic bipedical skin flap in rats. Near-IR induced a thirty percent increase in the rate of wound closure in these animal models. Dose- and time-dependent increases in vascular endothelial growth factor (VEGF) and fibroblast growth factor (FGF-2) occurred in animals treated with near-IR. Human studies have included the use of near-IR to prevent ulcerative mucositis resulting from high doses of chemotherapy and radiation. Widely published reports, including those from our laboratory, described accelerated recovery from musculoskeletal injuries, hypoxic-ischemic wounds, burns, lacerations, radiation necrosis, and diabetic ulcers with the use of near-IR. Lasers have some inherent characteristics, which make their use in a clinical setting problematic, including limitations in wavelength capabilities and beam width. The combined wavelengths of light optimal for wound healing cannot be efficiently produced, and the size of wounds which may be treated by lasers is limited. Light-emitting diodes (LEDs) developed for NASA crewed spaceflight experiments offer an effective alternative to lasers. These diodes can be made to produce multiple wavelengths, and can be arranged in large, flat arrays allowing treatment of large wounds.

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