Linealux cosmedical

Rosso

Informações Técnicas

Bibliografia

Terapia cicatricial com luz monocromática vermelha 650nm

Nos últimos anos as terapias com laser têm trazido grande avanço em várias áreas da medicina. As duas especialidades mais beneficiadas com a moderna fotomedicina até o momento foram a oftalmologia e a dermatologia.

Uma das modalidades de tratamento desta nova fototerapia é a Low Level Laser Therapy (Terapia com Laser de Baixa Potência) que tem como principais características: baixo risco de complicações; permite a associação com outros tratamentos e poder ser mantida por longos períodos. Os LED´s, devido a sua semelhança com os lasers, no que diz respeito a pureza da emissão eletromagnética, tornaram possível a elaboração de aparelhos para uso domiciliar. A LLLT foi usada inicialmente pela NASA para acelerar ferimentos no espaço, e desde então tem recebido inúmeras citações bibliográficas apontando sua eficiência como acelerador do processo cicatricial, melhorando as características da cicatriz, reduzindo a incidência de quelóide, cicatriz hipertrófica, retração e fibrose. É indicada como auxiliar no tratamento da dor crônica na ortopedia, reumatologia. Nas cirurgias, de forma geral, como antiinflamatório em diversas patologias; na queda de cabelos; rejuvenescimento; acne e psoríase.

Os dois parâmetros que definem os efeitos da terapia com laser de baixa potência são o comprimento de onda e a dose de luz. A escolha correta destes dois parâmetros otimiza os resultados da LLLT. As placas **Linealux Cosmedical** utilizam micro LED´s especiais (420nm, 480nm, 590nm e 650nm), sem emissão de UVB, portanto segura para uso domiciliar. A dose de irradiação por sessão de tratamento é de aproximadamente 2 a 5 J/cm2. Os efeitos da LLLT não são relacionados ao calor. Não há aumento de temperatura, não há dano celular.

Separamos uma bibliografia com as informações relevantes sobre o assunto, incluindo duas publicações referendadas pela NASA.

1. Bibliografia

1.1 Laser photobiomodulation of wound healing: a review of experimental studies in mouse and rat animal models.

Photomed Laser Surg. 2010 Jun;28(3):291-325.

Peplow PV, Chung TY, Baxter GD.

Source Department of Anatomy & Structural Biology, University of Otago, Dunedin, New Zealand.

Abstract

OBJECTIVES: This investigation reviewed experimental studies of laser irradiation of wound healing in mice and rats published from 2003 to August 2008, respectively, to assess putative stimulatory effects of this treatment.

BACKGROUND: Animal models, including rodents, attempt to reflect human wound healing and associated problems such as dehiscence, ischemia, ulceration, infection, and scarring. They have played a key role in furthering understanding of underlying mechanisms involved in impaired wound healing, and in testing new therapeutic strategies including laser irradiation.

METHOD: Original research papers investigating effects of laser or monochromatic light therapy on wound healing in mice and rats and published from January 2003 to August 2008 were retrieved from library sources, PubMed and Medline databases, reference lists from retrieved papers, and hand searches of relevant journals. Papers were selected for this review with regard to specific inclusion and exclusion criteria. Studies were critically reviewed in terms of study design, methodology, and appropriateness of laser irradiation parameters.

RESULTS: The literature search identified eight studies in mice and 39 in rats. A variety of wound models were investigated, including acute-wound, impaired-healing, and chronic-wound models. Considerable variation was observed in research design, methodology, and irradiation parameters employed, limiting comparison of research findings between studies. Inadequate reporting of key experimental details, or errors in specification and/or calculation of key irradiation parameters was also found. Evidence from the studies reviewed suggested that use of red or infrared wavelength at a range of dosage parameters (median 4.2 J cm(-2)) results in significant benefits in measured parameters of wound healing. Interestingly, coherence does not seem essential to the photobiomodulatory effects of 'laser' phototherapy.

CONCLUSION: Studies reviewed consistently demonstrated the ability of laser or monochromatic light to photobiomodulate wound healing processes in experimental wounds in rats and mice, and strongly support the case for further controlled research in humans.

1.2 Effect of NASA light-emitting diode irradiation on molecular changes for wound healing in diabetic mice.

J Clin Laser Med Surg. 2003 Apr;21(2):67-74.

Whelan HT, Buchmann EV, Dhokalia A, Kane MP, Whelan NT, Wong-Riley MT, Eells JT, Gould LJ, Hammamieh R, Das R, Jett M.

Source Department of Neurology, Medical College of Wisconsin, Milwaukee, Wisconsin 53226, USA. hwhelan@mcw.edu

Abstract

OBJECTIVE: The purpose of this study was to assess the changes in gene expression of near-infrared light therapy in a model of impaired wound healing. Background Data: Light-Emitting Diodes (LED), originally developed for NASA plant growth experiments in space, show promise for delivering light deep into tissues of the body to promote wound healing and human tissue growth. In this paper we present the effects of LED treatment on wounds in a genetically diabetic mouse model.

MATERIALS AND METHODS: Polyvinyl acetal (PVA) sponges were subcutaneously implanted in the dorsum of BKS.Cg-m +/+ Lepr(db) mice. LED treatments were given once daily, and at the sacrifice day, the sponges, incision line and skin over the sponges were harvested and used for RNA extraction. The RNA was subsequently analyzed by cDNA array.

RESULTS: Our studies have revealed certain tissue regenerating genes that were significantly upregulated upon LED treatment when compared to the untreated sample. Integrins, laminin, gap junction proteins, and kinesin superfamily motor proteins are some of the genes involved during regeneration process. These are some of the genes that were identified upon gene array experiments with RNA isolated from sponges from the wound site in mouse with LED treatment.

CONCLUSION: We believe that the use of NASA light-emitting diodes (LED) for light therapy will greatly enhance the natural wound healing process, and more quickly return the patient to a preinjury/illness level of activity. This work is supported and managed through the Defense Advanced Research Projects Agency (DARPA) and NASA Marshall Space Flight Center-SBIR Program.

1.3 Effect of NASA light-emitting diode irradiation on wound healing.

J Clin Laser Med Surg. 2001 Dec;19(6):305-14.

Whelan HT, Smits RL Jr, Buchman EV, Whelan NT, Turner SG, Margolis DA, Cevenini V, Stinson H, Ignatius R, Martin T, Cwiklinski J, Philippi AF, Graf WR, Hodgson B, Gould L, Kane M, Chen G, Caviness J.

Source

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Abstract

OBJECTIVE: The purpose of this study was to assess the effects of hyperbaric oxygen (HBO) and near-infrared light therapy on wound healing.

BACKGROUND DATA: Light-emitting diodes (LED), originally developed for NASA plant growth experiments in space show promise for delivering light deep into tissues of the body to promote wound healing and human tissue growth. In this paper, we review and present our new data of LED treatment on cells grown in culture, on ischemic and diabetic wounds in rat models, and on acute and chronic wounds in humans.

MATERIALS AND METHODS: In vitro and in vivo (animal and human) studies utilized a variety of LED wavelength, power intensity, and energy density parameters to begin to identify conditions for each biological tissue that are optimal for biostimulation. Results: LED produced in vitro increases of cell growth of 140-200% in mouse-derived fibroblasts, rat-derived osteoblasts, and rat-derived skeletal muscle cells, and increases in growth of 155-171% of normal human epithelial cells. Wound size decreased up to 36% in conjunction with HBO in ischemic rat models. LED produced improvement of greater than 40% in musculoskeletal training injuries in Navy SEAL team members, and decreased wound healing time in crew members aboard a U.S. Naval submarine. LED produced a 47% reduction in pain of children suffering from oral mucositis.

CONCLUSION: We believe that the use of NASA LED for light therapy alone, and in conjunction with hyperbaric oxygen, will greatly enhance the natural wound healing process, and more quickly return the patient to a preinjury/illness level of activity. This work is supported and managed through the NASA Marshall Space Flight Center-SBIR Program.