21. Low level laser therapy reduces inflammation in activated Achilles tendinitis

NASA Astrophysics Data System (ADS)
Bjordal, Jan M.; Iversen, Vegard; Lopes-Martins, Rodrigo Alvaro B.
2006-02-01

Objective: Low level laser therapy (LLLT) has been forwarded as therapy for osteoarthritis and tendinopathy. Results in animal and cell studies suggest that LLLT may act through a biological mechanism of inflammatory modulation. The current study was designed to investigate if LLLT has an anti-inflammatory effect on activated tendinitis of the Achilles tendon. Methods: Seven patients with bilateral Achilles tendinitis (14 tendons) who had aggravated symptoms by pain-inducing activity immediately prior to the study. LLLT (1.8 Joules for each of three points along the Achilles tendon with 904nm infrared laser) and placebo LLLT were administered to either Achilles tendons in a random order to which patients and therapist were blinded. Inflammation was examined by 1) mini-invasive microdialysis for measuring the concentration of inflammatory marker PGE II in the peritendinous tissue, 2) ultrasound with Doppler measurement of peri- and intratendinous blood flow, 3) pressure pain algometry and 4) single hop test. Results: PGE 2- levels were significantly reduced at 75, 90 and 105 minutes after active LLLT compared both to pre-treatment levels (p=0.026) and to placebo LLLT (p=0.009). Changes in pressure pain threshold (PPT) were significantly different (P=0.012) between groups. PPT increased by a mean value of 0.19 kg/cm2 [95%CI:0.04 to 0.34] after treatment in the active LLLT group, while pressure pain threshold was reduced by -0.20 kg/cm2 [95%CI:-0.45 to 0.05] after placebo LLLT. Conclusion: LLLT can be used to reduce inflammatory musculoskeletal pain as it reduces inflammation and increases pressure pain threshold levels in activity-induced pain episodes of Achilles tendinopathy.

22. Effect of LLLT on the level of ATP and ROS from organ of corti cells

NASA Astrophysics Data System (ADS)
Rhee, ChungKu; Chang, So-Young; Ahn, Jin-Chul; Suh, Myung-Whan; Jung, Jae Yun
2014-03-01

It is well established that ototoxic antibiotics and acoustic trauma can damage cochlear hair cells and cause hearing loss. Previous studies using transcanal LLLT (Low level laser therapy) showed that LLLT can promote recovery of hearing thresholds and cochlear hair cells. However, its mechanism has not been studied. Aim: The aim of this study is to investigate the mechanism of hearing recovery from gentamicin induced ototoxic hearing loss by LLLT. Methods: HEI-OC1 (House ear institute organ of Corti) cells were cultured for 18 hours and ototoxicity was induced by gentamicin (GM) treatment to the cells. Cultured cells were divided into 6 groups, No treatment control, LLLT only, GM 6.6 mM and GM 13.1 mM, GM 6.6 mM+LLLT and GM 13.1 mM+LLLT cells. LD laser 808 nm, 15 mW, was irradiated to the cultured cells for 15 min, at 4 hours after GM treatment to the cells. ATP was assayed using the ATP assay Kit. ROS was measured using confocal microscope after application of H2DCFDA dye. Results: ATP was decreased in GM 13.1 mM cells and increased in LLLT only cells and GM 13.1 mM+LLLT cells compared to control and 13.1 mM cells. ROS was increased in GM 6.6 mM and GM 13.1 mM cells, and decreased in GM 6.6 mM+LLLT and GM 13.1 mM+LLLT cells compared to GM 6.6 and 13.1 mM cells immediately after laser irradiation. Conclusion: This study demonstrated that LLLT on GM treated HEI-OC1 cells increased ATP and decreased ROS that may contribute to the recovery of hearing.


PubMed
Huang, Ying-Ying; Gupta, Asheesh; Vecchio, Daniela; de Arce, Vida J Bil; Huang, Shih-Fong; Xuan, Weijun; Hamblin, Michael R
2012-11-01

We review the use of transcranial low-level laser (light) therapy (LLLT) as a possible treatment for traumatic-brain injury (TBI). The basic mechanisms of LLLT at the cellular and molecular level and its effects on the brain are outlined. Many interacting processes may contribute to the beneficial effects in TBI including neuroprotection, reduction of inflammation and stimulation of neurogenesis. Animal studies and clinical trials of transcranial-LLLT for ischemic stroke are summarized. Several laboratories have shown that LLLT is
effective in increasing neurological performance and memory and learning in mouse models of TBI. There have been case report papers that show beneficial effects of transcranial-LLLT in a total of three patients with chronic TBI. Our laboratory has conducted three studies on LLLT and TBI in mice. One looked at pulsed- vs- continuous wave laser-irradiation and found 10 Hz to be superior. The second looked at four different laser-wavelengths (660, 730, 810, and 980 nm); only 660 and 810 nm were effective. The last looked at different treatment repetition regimens (1, 3 and 14-daily laser-treatments). PMID:22807422

24. Transcranial Low-Level Laser Therapy Improves Neurological Performance in Traumatic Brain Injury in Mice: Effect of Treatment Repetition Regimen
E-print Network
Hamblin, Michael R.
Low-level laser (light) therapy (LLLT) has been clinically applied around the world for a spectrum of disorders requiring healing, regeneration and prevention of tissue death. One area that is attracting growing interest ...

25. Effects of 810-nm Laser on Murine Bone-Marrow-Derived Dendritic Cells
E-print Network
Chen, Aaron Chih-Hao
Objective: The purpose of this study was to Investigate the effect of 810-nm low level laser therapy (LLLT) on dendritic cells (DC) in vitro. Background data: LLLT can enhance wound healing and increase cell proliferation ...

26. Evaluation of Low-Level Laser Therapy in TMD Patients
PubMed Central
Ayyildiz, Simel; Emir, Faruk; Sahin, Cem
2015-01-01
Light amplification by stimulated emission of radiation (laser) is one of the most recent treatment modalities in dentistry. Low-level laser therapy (LLLT) is suggested to have biostimulating and analgesic effects through direct irradiation without causing thermal response. There are few studies that have investigated the efficacy of laser therapy in temporomandibular disorders (TMD), especially in reduced mouth opening. The case report here evaluates performance of LLLT with a diode laser for temporomandibular clicking and postoperative findings were evaluated in two cases of TMD patients. First patient had a history of limited mouth opening and pain in temporomandibular joint (TMJ) region since nine months. Second patient's main complaint was his restricted mouth opening, which was progressed in one year. LLLT was performed with a 685?nm red probed diode laser that has an energy density of 6.2?J/cm2, three times a week for one month, and application time was 30 seconds (685?nm, 25?mW, 30?s, 0.02?Hz, and 6.2?J/cm2) (BTL-2000, Portative Laser Therapy Device). The treatment protocol was decided according to the literature. One year later patients were evaluated and there were no changes. This application suggested that LLLT is an appropriate treatment for TMD related pain and limited mouth opening and should be considered as an alternative to other methods. PMID:26587294

27. Role of Low-Level Laser Therapy in Neurorehabilitation
PubMed Central
Hashmi, Javad T.; Huang, Ying-Ying; Osmani, Bushra Z.; Sharma, Sulbha K.; Naeser, Margaret A.; Hamblin, Michael R.
2011-01-01
This year marks the 50th anniversary of the discovery of the laser. The development of lasers for medical use, which became known as low-level laser therapy (LLLT) or photobiomodulation, followed in 1967. In recent years, LLLT has become an increasingly mainstream modality, especially in the areas of physical medicine and rehabilitation. At first used mainly for wound healing and pain relief, the medical applications of LLLT have broadened to include diseases such as stroke, myocardial infarction, and degenerative or traumatic brain disorders. This review will cover the mechanisms of LLLT that operate both on a cellular and a tissue level. Mitochondria are thought to be the principal photoreceptors, and increased adenosine triphosphate, reactive oxygen species, intracellular calcium, and release of nitric oxide are the initial events. Activation of transcription factors then leads to expression of many protective, anti-apoptotic, anti-oxidant, and pro-proliferation gene products. Animal studies and human clinical trials of LLLT for indications with relevance to neurology, such as stroke, traumatic brain injury, degenerative brain disease, spinal cord injury, and peripheral nerve regeneration, will be covered. PMID:21172691

28. Low level laser (light) therapy and photobiomodulation: the path forward
NASA Astrophysics Data System (ADS)
Hamblin, Michael R.; Pires de Sousa, Marcelo V.; Arany, Praveen R.; Carroll, James D.; Pathhoff, Donald
2015-03-01
Low level laser (light) therapy (LLLT) also known as photobiomodulation (PBM) therapy has been practiced for almost fifty years, and hundreds of positive clinical trials and thousands of laboratory studies have been published. Despite these impressive accomplishments LLLT has still not reached the stage of acceptance by mainstream medicine. The reasons for this were discussed at a recent Optical Society of America (OSA) Incubator meeting in Washington DC in 2014. Uncertainty about mechanisms was highlighted, and this paper will describe the current thinking. To drive LLLT towards mainstream medicine, we need better guidelines with standardized protocols and consistent parameters. Studies should be published in higher impact scientific and medical journals. Companies should avoid false promises and deceptive marketing, and physicians should receive a clearly defined return on investment with insurance reimbursement.

29. Steroids block the anti-inflammatory effects of low level laser therapy  
ASA Astrophysics Data System (ADS)  
Lopes-Martins, Rodrigo Alvaro B.; Albertini, Regiane; Lopes-Martins, Patricia Sardinha L.; Iversen, Vegard V.; Bjordal, Jan M.  
2006-02-01  
Objective: Concomitant use of multiple therapies is common in musculoskeletal and airway disorders. Low level laser therapy (LLLT) is considered a promising therapy in arthritis, tendinopathies and rhinitis. We designed two animal studies to assess if the expected anti-inflammatory effect LLLT could be affected by resection of the adrenal gland or concomitant use of the cortisol antagonist mifepristone. Methods: Two studies were performed, with 40 male Wistar rats and with 40 Balb C male mice respectively.. In both studies, four groups received carrageenan and one control group received saline. At 1, 2, and 3 hours after injections, LLLT irradiation was performed with a dose of 7.5 J/cm2. In the rat study, two of the carrageenan groups had the adrenal gland dissected. In the mice study, two of the carrageenan-injected groups were in addition pre-treated with orally administered mifepristone. Results: In the rat paw study, LLLT reduced edema significantly compared to the carrageenan only group (1.5 vs 0.9 ml, p< 0.05), but LLLT failed to inhibit edema formation in the group which had the adrenal gland resected. In carrageenan-induced pleurisy, LLLT significantly reduced the number of leukocyte cells ( p<0.0001, Mean 34.5 [95%CI: 32.8 - 36.2] versus 87.7 [95%CI: 81.0 - 94.4]), and that the effect of LLLT could be totally blocked by adding the cortisol antagonist mifepristone ( p<0.0001, Mean 34.5 [95%CI: 32.1 - 36.9] versus 82.9 [95%CI: 70.5 - 95.3]). Conclusion: Steroid therapy should not be used concomitantly with LLLT, as the anti-inflammatory effect of LLLT is lost if cortisol receptors are downregulated.

30. Evidence for benefits of intervention with LLLT in children's asthma  
ASA Astrophysics Data System (ADS)  
Ailioaie, C.; Ailioaie, Laura  
2001-06-01  
Asthma is a clinical syndrome characterized by increased responsiveness of the tracheo-bronchial tree to a variety of stimuli. Because of ongoing inflammation even in mild asthmatics, we applied as a new modality of treatment, LLLT and a leukotriene antagonist, in order to maximize lung functions and minimize symptomatology in children's asthma. A group of 21 children with mild persistent, moderate or severe asthma were followed for 12 months. The patients were randomly divided into 2 groups. Group 1 (11 patients) received laser therapy combined with Singulair. LLLT was performed with two GaAlAs diode lasers (670 and 830 nm, max output power 50 mW, respectively 300 mW), in cw or pulsed mode using extrameridian acupuncture points and scanning technique, 3 times a week, during 6 weeks. The treatment was repeated after one month-break, for 2 times. Group 2 (10 patients) was administered placebo laser and Singulair, following the same protocol of treatment. The clinical improvement and the immunological characteristics were significantly better in group 1, than in placebo laser group. LLLT and Singulair improve the long-term prognosis and at least partially reverse the natural history of the disease. We strongly recommend it as the most appropriate therapy for asthmatic children.

31. Effect of LLLT on autogenous bone grafts in the repair of critical size defects in the calvaria of immunosuppressed rats.  
PubMed  
Garcia, Valdir Gouveia; Sahyon, Angelita Strazza; Longo, Mariêllen; Fernandes, Leandro Araújo; Gualberto Junior, Erivan Clementino; Novaes, Vivian Cristina Noronha; Ervolino, Edilson; de Almeida, Juliano Milanezi; Theodoro, Letícia Helena  
2014-10-01  
The aim of this study was to evaluate the effects of low-level laser therapy (LLLT) on the bone repair of critical size defects (CSDs) filled with autogenous bone in the calvaria of immunosuppressed rats. A 5 mm-diameter CSD was created in the calvaria of 30 rats. The animals were divided into 5 groups (n = 6): Control (C)--the defect was filled with a blood clot; Dexamethasone (D)--dexamethasone treatment, and the defect was
filled with a blood clot; Autogenous bone (AB)--dexamethasone treatment, and the defect was filled with autogenous bone; LLLT--dexamethasone treatment, and the defect received LLLT (660 nm; 35 mW; 24.7 J/cm²); and AB + LLLT--dexamethasone treatment, and the defect was filled with autogenous bone and received LLLT. All animals were euthanized at 30 postoperative days. Histometric and histological analyses were performed. The new bone area (NBA) was calculated as the percentage of the total area of the original defect. Data were analysed statistically (an analysis of variance and Tukey’s test; P < 0.05). The AB + LLLT group showed the largest NBA of all groups (P < 0.05). The use of LLLT with AB effectively stimulated bone formation in CSDs in the calvaria of immunosuppressed rats. PMID:24657115

32. Low level laser therapy for traumatic brain injury

NASA Astrophysics Data System (ADS)
Wu, Qiue; Huang, Ying-Ying; Dhital, Saphala; Sharma, Sulbha K.; Chen, Aaron C.-H.; Whalen, Michael J.; Hamblin, Michael R.
2010-02-01
Low level laser (or light) therapy (LLLT) has been clinically applied for many indications in medicine that require the following processes: protection from cell and tissue death, stimulation of healing and repair of injuries, and reduction of pain, swelling and inflammation. One area that is attracting growing interest is the use of transcranial LLLT to treat stroke and traumatic brain injury (TBI). The fact that near-infrared light can penetrate into the brain would allow non-invasive treatment to be carried out with a low likelihood of treatment-related adverse events. LLLT may have beneficial effects in the acute treatment of brain damage injury by increasing respiration in the mitochondria, causing activation of transcription factors, reducing key inflammatory mediators, and inhibiting apoptosis. We tested LLLT in a mouse model of TBI produced by a controlled weight drop onto the skull. Mice received a single treatment with 660-nm, 810-nm or 980-nm laser (36 J/cm²) four hours post-injury and were followed up by neurological performance testing for 4 weeks. Mice with moderate to severe TBI treated with 660- nm and 810-nm laser had a significant improvement in neurological score over the course of the follow-up and histological examination of the brains at sacrifice revealed less lesion area compared to untreated controls. Further studies are underway.

33. The Effect of Low-Level Laser Therapy on Hearing

PubMed Central
Goodman, Shawn S.; Bentler, Ruth A.; Mertes, Ian B.
2013-01-01
One purported use of low-level laser therapy (LLLT) is to promote healing in damaged cells. The effects of LLLT on hearing loss and tinnitus have received some study, but results have been equivocal. The purpose of this study was to determine if LLLT improved hearing, speech understanding, and/or cochlear function in adults with hearing loss. Using a randomized, double-blind, placebo-controlled design, subjects were assigned to a treatment, placebo, or control group. The treatment group was given LLLT, which consisted of shining low-level lasers onto the outer ear, head, and neck. Each laser treatment lasted approximately five minutes. Three treatments were applied within the course of one week. A battery of auditory tests was administered immediately before the first treatment and immediately after the third treatment. The battery consisted of pure-tone audiometry, the Connected Speech Test, and transient-evoked otoacoustic emissions. Data were analyzed by comparing pre- and posttest results. No statistically significant differences were found between groups for any of the auditory tests. Additionally, no clinically significant differences were found in any individual subjects. This trial is registered with ClinicalTrials.gov (NCT01820416). PMID:24024040

34. Low Level Laser Therapy Reduces the Development of Lung Inflammation Induced by Formaldehyde Exposure

PubMed Central
Miranda da Silva, Cristiane; Peres Leal, Mayara; Brochetti, Robson Alexandre; Braga, Tácio; Vitoretti, Luana Beatriz; Saraiva Câmara, Niels Olsen; Damazo, Amílcar Sabino; Ligeiro-de-Oliveira, Ana Paula; Chavantes, Maria Cristina; Lino-dos-Santos-Franco, Adriana
2015-01-01
Lung diseases constitute an important public health problem and its growing level of concern has led to efforts for the development of new therapies, particularly for the control of lung inflammation. Low Level Laser Therapy (LLLT) has been highlighted as a non-invasive therapy with few side effects, but its mechanisms need to be better understood and explored. Considering that pollution causes several harmful effects on human health, including lung inflammation, in this study, we have used formaldehyde (FA), an environmental and occupational pollutant, for the induction of neutrophilic lung inflammation. Our objective was to investigate the local and systemic effects of LLLT after FA exposure. Male Wistar rats were exposed to FA (1%) or vehicle (distilled water) during 3 consecutive days and treated or not with LLLT (1 and 5 hours after each FA exposure). Non-manipulated rats were used as control. 24 h after the last FA exposure, we analyzed the
local and systemic effects of LLLT. The treatment with LLLT reduced the development of neutrophilic lung inflammation induced by FA, as observed by the reduced number of leukocytes, mast cells degranulated, and a decreased myeloperoxidase activity in the lung. Moreover, LLLT also reduced the microvascular lung permeability in the parenchyma and the intrapulmonary bronchi. Alterations on the profile of inflammatory cytokines were evidenced by the reduced levels of IL-6 and TNF-α and the elevated levels of IL-10 in the lung. Together, our results showed that LLLT abolishes FA-induced neutrophilic lung inflammation by a reduction of the inflammatory cytokines and mast cell degranulation. This study may provide important information about the mechanisms of LLLT in lung inflammation induced by a pollutant. PMID:26569396

35. Results of the trials and light-delivery evaluation at low-level laser therapy of acute and chronic pain
NASA Astrophysics Data System (ADS)
Roeva, Tatiana; Petrov, Todor S.; Minkovski, Nikolai I.
2004-06-01
Although the low-level laser therapy (LLLT) is accepted in the clinical practice, its efficiency is still questionable because of the unclear mechanisms of LLLT action. This work presents the results of LLLT applied to volunteers who need recovery from trauma or suffer from rheumatic diseases, inflammatory disorders, etc. The control group we used for comparison consisted of patients being treated by conventional therapy that included massage and acupuncture needles. The effectiveness of the LLLT was graded under four categories. Short-term and long-term side effects as well as conditions responding only to LLLT were recorded. The successful treatments were up to 70%, which coincided with the result of the control group. The LLLT was performed with a GaAs laser system SIX LASER IR - Bulgaria provided with additional set of six light CW emitting diodes to scan a larger area of a tissue surface. To evaluate the light delivery inside the tissue, the spatial maps of the light spot at the laser output in different operating regimes were measured. On their basis, the absorbed dose was calculated both in the boundary layer under the tissue surface and in depth using a reduced variance Monte-Carlo code.

PubMed
Alves, Agnelo Neves; Fernandes, Kristianne Porta Santos; Deana, Alessandro Melo; Bussadori, Sandra Kalil; Mesquita-Ferrari, Raquel Agnelli
2014-12-01
A review of the literature was performed to demonstrate the most current applicability of low-level laser therapy (LLLT) for the treatment of skeletal muscle injuries, addressing different lasers, irradiation parameters, and treatment results in animal models. Searches were performed in the PubMed/MEDLINE, SCOPUS, and SPIE Digital Library databases for studies published from January 2006 to August 2013 on the use of LLLT for the repair of skeletal muscle in any animal model. All selected articles were critically appraised by two independent raters. Seventeen of the 36 original articles on LLLT and muscle injuries met the inclusion criteria and were critically evaluated. The main effects of LLLT were a reduction in the inflammatory process, the modulation of growth factors and myogenic regulatory factors, and increased angiogenesis. The studies analyzed demonstrate the positive effects of LLLT on the muscle repair process, which are dependent on irradiation and treatment parameters. The findings suggest that LLLT is an excellent therapeutic resource for the treatment of skeletal muscle injuries in the short-term. PMID:25122099

PubMed
Farfara, Dorit; Toby, Hana; Trudler, Dorit; Doron-Mandel, Ella; Maltz, Lidya; Vassar, Robert J; Frenkel, Dan; Oron, Uri
2015-02-01
Low-level laser therapy (LLLT) has been used to treat inflammation, tissue healing, and repair processes. We recently reported that LLLT to the bone marrow (BM) led to proliferation of mesenchymal stem cells (MSCs) and their homing in the ischemic heart suggesting its role in regenerative medicine. The aim of the present study was to investigate the ability of LLLT to stimulate MSCs of autologous BM in order to affect neurological behavior and ?-amyloid burden in progressive stages of Alzheimer's disease (AD) mouse model. MSCs from wild-type mice stimulated with LLLT showed to increase their ability to mature towards a monocyte lineage and to increase phagocytosis activity towards soluble amyloid beta (A?). Furthermore, weekly LLLT to BM of AD mice for 2 months, starting at 4 months of age (progressive stage of AD), improved cognitive capacity and spatial learning, as compared to sham-treated AD mice. Histology revealed a significant reduction in A? brain burden. Our results suggest the use of LLLT as a therapeutic application in progressive stages of AD and imply its role in mediating MSC therapy in brain amyloidogenic diseases. PMID:24994540
38. **Low-Level Laser Therapy Attenuates LPS-Induced Rats Mastitis by Inhibiting Polymorphonuclear Neutrophil Adhesion**

PubMed Central

WANG, Yueqiang; HE, Xianjing; HAO, Dandan; YU, Debin; LIANG, Jianbin; QU, Yanpeng; SUN, Dongbo; YANG, Bin; YANG, Keli; WU, Rui; WANG, Jianfa

2014-01-01

**ABSTRACT** The aim of this study was to investigate the effects of low-level laser therapy (LLLT) on a rat model of lipopolysaccharide (LPS)-induced mastitis and its underlying molecular mechanisms. The rat model of mastitis was induced by inoculation of LPS through the canals of the mammary gland. The results showed that LPS-induced secretion of IL-1β and IL-8 significantly decreased after LLLT (650 nm, 2.5 mW, 30 mW/cm²). LLLT also inhibited intercellular adhesion molecule-1 (ICAM-1) expression and attenuated the LPS-induced decrease of the expression of CD62L and increase of the expression of CD11b. Moreover, LLLT also suppressed LPS-induced polymorphonuclear neutrophils (PMNs) entering the alveoli of the mammary gland. The number of PMNs in the mammary alveolus and the myeloperoxidase (MPO) activity were decreased after LLLT. These results suggested that LLLT therapy is beneficial in decreasing the somatic cell count and improving milk nutritional quality in cows with an intramammary infection. PMID:25452258

39. **Results of the trials and light delivery evaluation on low-level laser therapy of acute and chronic pain**

NASA Astrophysics Data System (ADS)

Stoykova, Elena V.; Roeva, Tatiana; Petrova, Kremena S.; Petrov, Todor S.; Minkovski, Nikolai

2003-11-01

Although the low-level laser therapy (LLLT) has been accepted in the clinical practice, its efficiency is still questionable because of the unclear mechanisms of LLLT action. This work presents the results of LLLT applied to volunteers who need recovery from trauma or suffer from rheumatic diseases, inflammatory disorders, etc. The control group we used for comparison consisted of patients being treated by conventional therapy that included massage and acupuncture needles. The effectiveness of the LLLT was graded under four categories. Short-term and long-term side effects as well as conditions responding only to LLLT were recorded. The successful treatments were up to 70%, which coincided with the result of the control group. The LLLT was performed with a GaAs laser system provided with additional set of six light CW emitting diodes to scan a larger area of a tissue surface. To evaluate the light delivery inside the tissue, the spatial energy distribution within the laser beam was measured with a CCD camera. On its basis, the light dose absorbed in the tissue was calculated both in the boundary layer under the surface and in depth using a reduced variance Monte-Carlo code.

40. **Effect of Prophylactic Low Level Laser Therapy on Oral Mucositis: A Systematic Review and Meta-Analysis**

PubMed Central

Oberoi, Sapna; Zamperlini–Netto, Gabriele; Beyene, Joseph; Treister, Nathaniel S.; Sung, Lillian

2014-01-01

Background Objective was to determine whether prophylactic low level laser therapy (LLLT) reduces the risk of severe mucositis as compared to placebo or no therapy. Methods MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials were searched until February 2014 for randomized controlled trials (RCTs) comparing prophylactic LLLT with placebo or no therapy in patients with cancer or undergoing hematopoietic stem cell transplantation (HSCT). All analyses used random effects models. Results Eighteen RCTs (1144 patients) were included. Prophylactic LLLT reduced the overall risk of severe mucositis (risk ratio (RR) 0.37, 95% confidence interval (CI) 0.20 to 0.67; P<.001). LLLT also reduced the following outcomes when compared to placebo/no therapy: severe mucositis at the time of anticipated maximal mucositis (RR 0.34, 95% CI 0.20 to 0.59), overall mean grade of mucositis (standardized mean difference ±1.49, 95% CI ±2.02 to ±0.95), duration of severe mucositis (weighted mean difference ±5.32, 95% CI ±9.45 to ±1.19) and incidence of severe pain (RR 0.26, 95% CI 0.18 to 0.37). Conclusion Prophylactic LLLT reduced severe mucositis and pain in patients with cancer and HSCT recipients. Future research should identify the optimal characteristics of LLLT and determine feasibility in the clinical setting. PMID:25198431

**Sample records for laser therapy LLLt**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40
41. Low-Level Laser Therapy in the Treatment of Recurrent Aphthous Ulcers: A Systematic Review
PubMed Central
Vale, Fernando Alves; de Almeida, Fernanda Campos Souza
2015-01-01
Recurrent aphthous ulcers (RAUs) are the most common lesion found in the oral cavity. There is no definitive cure for RAUs and current treatments are aimed at minimizing symptoms. Since low-level laser therapy (LLLT) modulates inflammatory responses, and promotes pain reduction and cellular biostimulation, LLLT can be suggested as an alternative treatment for RAUs. The literature concerning the potential of LLLT in the treatment of RAUs was evaluated. A systematic literature review identified 22 publications, of which only 2 studies were adopted. The eligibility criteria consisted of randomized controlled trials (RCTs). Both RCTs achieved significant results concerning LLLT and pain-level reductions and reduced healing times. Despite the variance in irradiation conditions applied in both studies, very similar wavelengths were adopted. There is accordingly strong evidence that wavelength plays an important role in RAU treatment. Taking into account the different parameters applied by selected RCTs, it is not possible to suggest that a specific protocol should be used. However, in light of the significant results found in both studies, LLLT can be suggested as an alternative for RAU treatment. Additional RCTs should be performed in order to reach a clinical protocol and better understand the application of LLLT in RAU treatment. PMID:25879049

42. Does low-level laser therapy have an antianesthetic effect? A review.
PubMed
Aras, Mutan Hamdi; Omezli, Mehmet Melih; Güngörmü?, Metin
2010-12-01
Because local anesthetics are vasodilators, they tend to be absorbed into the bloodstream from the operative field as a result of the vasodilatation of peripheral arterioles. To counteract this vasodilatation, vasoconstrictive agents are often included in local anesthetic solutions to provide a longer duration of anesthesia. Low-level laser therapy (LLLT) has the same benefits, such as microcirculation activation and more-efficient tissue metabolism, analgesic effects, and vasodilatation. If LLLT is used to prevent pain postoperatively, improvements in local circulation and increased vasodilatation may increase the absorption of a local anesthetic agent. This may reduce the duration of the anesthesia, thereby allowing postoperative pain management to begin sooner. The maximal intensity of pain occurs during the first hours after surgery, when the local anesthetic has worn off. Theoretically, postoperative pain control can be increased with the use of a local anesthetic with a more-prolonged action. If a treatment method has both analgesic and antianesthetic effects, then the method may block its own effects. We review whether LLLT applied postoperatively to operated-on areas has an antianesthetic effect, that is, whether pain in the first hours after surgery was greater for patients who received LLLT than for control patients. Not too much evidence supports the antianesthetic effects of LLLT. However, additional experimental and clinical studies must be performed to investigate the effects of LLLT on the duration of anesthesia. PMID:20973738

43. Fluence-dependent effects of low-level laser therapy in myofascial trigger spots on modulation of biochemicals associated with pain in a rabbit model.
PubMed
Hsieh, Yueh-Ling; Hong, Chang-Zern; Chou, Li-Wei; Yang, Shun-An; Yang, Chen-Chia
2015-01-01
Evidence strongly supports that low-level laser therapy (LLLT) is an effective physical modality for the treatment of pain associated with myofascial trigger points (MTrP). However, the effect of laser fluence (energy intensity in J/cm(2)) on biochemical regulation related to pain is unclear. To better understand the biochemical mechanisms modulated by high- and low-fluence LLLT at myofascial trigger spots (MTrSs; similar to human MTrPs) in skeletal muscles of rabbits, the levels of ?-endorphin (?-ep), substance P (SP), tumor necrosis factor-? (TNF-?), and cyclooxygenase-2 (COX-2) were investigated in this study. New Zealand rabbits (2.5-3.0 kg in weight) were used in this study. High-fluence LLLT (27 J/cm(2)), low-fluence LLLT (4.5 J/cm(2)), or sham operations were applied on MTrSs of biceps femoris of rabbits for five sessions (one session per day). Effects of LLLT at two different fluences on biceps femoris, dorsal root ganglion (DRG), and serum were determined by ?-ep, SP, TNF-?, and COX-2 immunoassays. LLLT irradiation with fluences of 4.5 and 27 J/cm(2) at MTrSs can significantly reduce SP level in DRG. LLLT with lower fluence of 4.5 J/cm(2) exerted lower levels of TNF-? and COX-2 expression in laser-treated muscle, but LLLT with higher fluence of 27 J/cm(2) elevated the levels of ?-ep in serum, DRG, and muscle. This study demonstrated fluence-dependent biochemical effects of LLLT in an animal model on management of myofascial pain. The findings can contribute to the development of dosage guideline for LLLT for treating MTrP-induced pain. PMID:25190639

44. Effect of low level laser therapy on chronic compression of the dorsal root ganglion.
PubMed
Chen, Yi-Jen; Wang, Yan-Hsiung; Wang, Chau-Zen; Ho, Mei-Ling; Kuo, Po-Lin; Huang, Mao-Hsiung; Chen, Chia-Hsin
2014-01-01
Dorsal root ganglia (DRG) are vulnerable to physical injury of the intervertebral foramen, and chronic compression of the DRG (CCD) an result in nerve root damage with persistent morbidity. The purpose of this study was to evaluate the effects of low level laser therapy (LLLT) on the DRG in a CCD model and to determine the mechanisms underlying these effects. CCD rats had L-shaped stainless-steel rods inserted into the fourth and fifth lumbar intervertebral foramen, and the rats were then subjected to 0 or 8 J/cm² LLLT for 8 consecutive days following CCD surgery. Pain and heat stimuli were applied to test for hyperalgesia following CCD. The levels of TNF-α, IL-1β and growth-associated protein-43 (GAP-43) mRNA expression were measured via real-time PCR, and protein expression levels were analyzed through immunohistochemical analyses. Our data indicate that LLLT significantly decreased the tolerable sensitivity to pain and heat stimuli in the CCD groups. The expression levels of the pro-inflammatory cytokines TNF-α and IL-1β were increased following CCD, and we found that these increases could be reduced by the application of LLLT. Furthermore, the expression of GAP-43 was enhanced by LLLT. In conclusion, LLLT was able to enhance neural regeneration in rats following CCD and improve rat ambulatory behavior. The therapeutic effects of LLLT on the DRG during CCD may be exerted through suppression of the inflammatory response and induction of neuronal repair genes. These results suggest potential clinical applications for LLLT in the treatment of compression-induced neuronal disorders. PMID:24594641

Amelioration of Cardiac Function and Activation of Anti-Inflammatory Vasoactive Peptides Expression in the Rat Myocardium by Low Level Laser Therapy
PubMed Central
Manchini, Martha Trindade; Serra, Andrey Jorge; Feliciano, Regiane dos Santos; Santana, Eduardo Tadeu; Antônio, Ednei Luis; de Tarso Camillo de Carvalho, Paulo; Montemor, Jairo; Crajoinas, Renato Oliveira; Girardi, Adriana Castello Costa; Tucci, Paulo José Ferreira; Silva, José Antônio
2014-01-01
Low-level laser therapy (LLLT) has been used as an anti-inflammatory treatment in several disease conditions, even when inflammation is a secondary consequence, such as in myocardial infarction (MI). However, the mechanism by which LLLT is able to protect the remaining myocardium remains unclear. The present study tested the hypothesis that LLLT reduces inflammation after acute MI in female rats and ameliorates cardiac function. The potential participation of the Renin-Angiotensin System (RAS) and Kallikrein-Kinin System (KKS) vasoactive peptides was also evaluated. LLLT treatment effectively reduced MI size, attenuated the systolic dysfunction after MI, and decreased the myocardial mRNA expression of interleukin-1 beta and interleukin-6 in comparison to the non-irradiated rat tissue. In addition, LLLT treatment increased protein and mRNA levels of the Mas receptor, the mRNA expression of kinin B2 receptors and the circulating levels of plasma kallikrein compared to non-treated post-MI rats. On the other hand, the kinin B1 receptor mRNA expression decreased after LLLT. No significant changes were found in the expression of vascular endothelial growth factor (VEGF) in the myocardial remote area between laser-irradiated and non-irradiated post-MI rats. Capillaries density also remained similar between these two experimental groups. The mRNA expression of the inducible nitric oxide synthase (iNOS) was increased three days after MI, however, this effect was blunted by LLLT. Moreover, endothelial NOS mRNA content increased after LLLT. Plasma nitric oxide metabolites (NOx) concentration was increased three days after MI in non-treated rats and increased even further by LLLT treatment. Our data suggest that LLLT diminishes the acute inflammation in the myocardium, reduces infarct size and attenuates left ventricle dysfunction post-MI and increases vasoactive peptides expression and nitric oxide (NO) generation. PMID:24991808

Effect of low level laser therapy and high intensity laser therapy on endothelial cell proliferation in vitro: preliminary communication
NASA Astrophysics Data System (ADS)
Łukowicz, Małgorzata; Szymanska, Justyna; Goralczyk, Krzysztof; Zajac, Andrzej; Ro??, Danuta
2013-01-01
Background: The main purpose of this study was to analyze the influence of power intensity and wavelength of Low Level Laser Therapy (LLLT) and HILT (High Intensity Laser Therapy) on endothelial cell proliferation. Material and methods: The tests were done on human umbilical vein endothelial cells (HUVECs). Cultures were exposed to laser irradiation of 660 nm and 670 nm at different dosages, power output was 10 – 40 mW as well as 820 nm with power 100 mW and 808 nm with power 1500 mW. Energy density was from 0.28 to 11.43 J/cm². Cell proliferation of a control and tested culture was evaluated with a colorimetric device to detect live cells. The tests were repeated 8 times. Results: We observed good effects of
LLLT on live isolated ECs and no effects in experiments on previous deep-frozen cultures. Also HILT stimulated the proliferation of HUVEC. **Conclusion:** Endothelial cells play a key role in vascular homeostasis in humans. We observed the stimulatory effect of LLLT and HILT on proliferation of HUVEC. Many factors influence the proliferation of EC, so it is necessary to continue the experiment with different doses, intensity and cell concentration.

47. **Effect of low-level laser therapy (808 nm) on skeletal muscle after endurance exercise training in rats**

PubMed Central
Assis, Livia; Yamashita, Fernanda; Magri, Angela M. P.; Fernandes, Kelly R.; Yamauchi, Liria; Renno, Ana C. M.
2015-01-01
**BACKGROUND:** Low-level laser therapy (LLLT) has been demonstrated to be effective in optimizing skeletal muscle performance in animal experiments and in clinical trials. However, little is known about the effects of LLLT on muscle recovery after endurance training. **OBJECTIVE:** This study evaluates the effects of low-level laser therapy (LLLT) applied after an endurance training protocol on biochemical markers and morphology of skeletal muscle in rats. **METHOD:** Wistar rats were divided into control group (CG), trained group (TG), and trained and laser irradiated group (TLG). The endurance training was performed on a treadmill, 1 h/day, 5 days/wk, for 8 wk at 60% of the maximal speed reached during the maximal effort test (Tmax) and laser irradiation was applied after training. **RESULTS:** Both trained groups showed significant increase in speed compared to the CG. The TLG demonstrated a significantly reduced lactate level, increased tibialis anterior (TA) fiber cross-section area, and decreased TA fiber density. Myogenin expression was higher in soleus and TA muscles in both trained groups. In addition, LLLT produced myogenin downregulation in the TA muscle of trained animals. **CONCLUSION:** These results suggest that LLLT could be an effective therapeutic approach for stimulating recovery during an endurance exercise protocol. **PMID:** 26647747

48. **Low level laser therapy reduces oxidative stress in cortical neurons in vitro**

NASA Astrophysics Data System (ADS)
Huang, Ying-Ying; Tedford, Clark E.; McCarthy, Thomas; Hamblin, Michael R.
2012-03-01
It is accepted that the mechanisms of low level laser therapy (LLLT) involves photons that are absorbed in the mitochondria of cells and lead to increase of mitochondrial metabolism resulting in more electron transport, increase of mitochondrial membrane potential, and more ATP production. Intracellular calcium changes are seen that correlate with mitochondrial stimulation. The situation with two other intermediates is more complex however: reactive oxygen species (ROS) and nitric oxide (NO). Evidence exists that low levels of ROS are produced by LLLT in normal cells that can be beneficial by (for instance) activating NF-kB. However high fluences of light can produce large amounts of ROS that can damage the cells. In oxidatively stressed cells the situation may be different. We exposed primary cultured cortical neurons to hydrogen peroxide (H2O2) or cobalt chloride (CoCl2) oxidative insults in the presence or absence of LLLT (810-nm laser at 0.3 or 3 J/cm2). Cell viability of cortical neurons was determined by lactate dehydrogenase assay. ROS in neurons was detected using an ROS probe, MitoRox with confocal microscopy. Results showed that LLLT dose-dependently reversed ROS production and protected cortical neurons against H2O2 or CoCl2 induced oxidative injury in cultured cortical neurons. **Conclusion:** LLLT can protect cortical neurons against oxidative stress by reversing the levels of ROS.

49. **Hemodynamic effect of laser therapy in spontaneously hypertensive rats.**

PubMed
Tomimura, Suely; Silva, Bianca Passos Assumpção; Sanches, Iris Callado; Canal, Marina; Consolim-Colombo, Fernanda; Conti, Felipe Fernandes; De Angelis, Katia; Chavantes, Maria Cristina
2014-08-01
Systemic arterial hypertension (SAH) is considered to be the greatest risk factor for the development of neurocardiovascular pathologies, thus constituting a severe Public Health issue in the world. The Low-Level Laser Therapy (LLLT), or laser therapy, activates components of the cellular structure, therefore converting luminous energy into photochemical energy and leading to biophysical and biochemical reactions in the mitochondrial respiratory chain. The LLLT promotes cellular and tissue photobiomodulation by means of changes in metabolism, leading to molecular, cellular and systemic changes. The objective of this study was to analyze the action of low-level laser in the hemodynamic modulation of spontaneously hypertensive rats, in the long term. Animals (n = 16) were randomly divided into the Laser Group (n = 8), which received three weekly LLLT irradiations for seven weeks, and into the Sham Group (n = 8), which received three weekly simulations of laser for seven weeks, accounting for 21 applications in each group. After seven weeks, animals were cannulated by the implantation of a catheter in the left carotid artery. On the following day, the systemic
arterial pressure was recorded. The Laser Group showed reduced levels of mean blood pressure, with statistically significant reduction (169 ± 4 mmHg* vs. 182 ± 4 mmHg from the Sham Group) and reduced levels of diastolic pressure (143 ± 4 mmHg* vs. 157 ± 3 mmHg from the Sham Group), revealing a 13 and 14 mmHg decrease, respectively. Besides, there was a concomitant important decline in heart rate (312 ± 14 bpm vs. 361 ± 13 bpm from the Sham Group). Therefore, laser therapy was able to produce hemodynamic changes, thus reducing pressure levels in spontaneously hypertensive rats. PMID:25211315

50. The nuts and bolts of low-level laser (light) therapy. PubMed Chung, Hoon; Dai, Tianhong; Sharma, Sulbha K; Huang, Ying-Ying; Carroll, James D; Hamblin, Michael R 2012-02-01 Soon after the discovery of lasers in the 1960s it was realized that laser therapy had the potential to improve wound healing and reduce pain, inflammation and swelling. In recent years the field sometimes known as photobiomodulation has broadened to include light-emitting diodes and other light sources, and the range of wavelengths used now includes many in the red and near infrared. The term "low level laser therapy" or LLLT has become widely recognized and implies the existence of the biphasic dose response or the Arndt-Schulz curve. This review will cover the mechanisms of action of LLLT at a cellular and at a tissular level and will summarize the various light sources and principles of dosimetry that are employed in clinical practice. The range of diseases, injuries, and conditions that can be benefited by LLLT will be summarized with an emphasis on those that have reported randomized controlled clinical trials. Serious life-threatening diseases such as stroke, heart attack, spinal cord injury, and traumatic brain injury may soon be amenable to LLLT therapy. PMID:22045511

51. A histological evaluation of a low-level laser therapy as an adjunct to periodontal therapy in patients with diabetes mellitus. PubMed Obradovi?, Radmila; Kesi?, Ljiljana; Mihailovi?, Dragan; Anti?, Slobodan; Jovanovi?, Goran; Petrovi?, Aleksandar; Peševska, Snežana 2013-01-01 Diabetes mellitus (DM) and chronic periodontitis are common chronic diseases in adults in the world population. DM has a strong influence on the oral cavity and represents a risk factor for gingivitis and periodontitis. Low-level laser therapy (LLLT) has proven effective in the reduction of inflammation and swelling. The aim of the present study was to evaluate the efficacy of LLLT in diabetic periodontitis through histological analysis. A total of 300 diabetics with chronic periodontal disease and teeth indicated for extraction were assigned into six equal groups. In the groups 1 and 4, indicated teeth were extracted before treatment, and in the rest of the groups upon completion of the entire treatment. All patients received oral hygiene instructions and full-mouth conservative periodontal treatment. In groups 3 and 6, LLLT was applied (670 nm, 5 mW, 2 J/cm(2), 16 min, 5 days). Histologic findings of gingival tissue treated with LLLT showed expressed healing, as is evident by the absence of inflammatory cells. Tissue edema could not be seen, and the number of blood vessels was reduced. In the gingival lamina, propriana pronounced collagenization and homogenization were present. It can be concluded that LLLT has shown efficacy in the treatment of periodontitis in diabetics. Because of more pronounced alterations of periodontium in diabetics, the use of LLLT is of particular importance. PMID:22311659

52. Effect of low-level laser therapy on irradiated parotid glands—study in mice NASA Astrophysics Data System (ADS) Acauan, Monique Dossena; Gomes, Ana Paula Neutziling; Braga-Filho, Aroldo; de Figueiredo, Maria Antonia Zancanaro; Cherubini, Karen; Salum, Fernanda Gonçalves 2015-10-01 The objective of this study was to evaluate the effect of low-level laser therapy (LLLT) on radiotherapy-induced morphological changes and caspase-3 immunodetection in parotids of mice. Forty-one Swiss mice were divided into control, radiotherapy, 2- and 4-J laser groups. The experimental groups were exposed to ionizing radiation in a single session of 10 Gy. In the laser groups, a GaAlAs laser (830 nm, 100 mW, 0.028 cm2, 3.57 W/cm2) was used on the region corresponding to the parotid glands, with 2-J energy (20 s, 71 J/cm2) or 4 J (40 s, 135 J/cm2) per point. LLLT was performed immediately before and 24 h after radiotherapy. One point was applied in each parotid gland. The animals were euthanized 48 h or 7 days after radiotherapy and parotid glands were dissected for morphological analysis and immunodetection of caspase-3. There was no significant difference between groups in the immunodetection of caspase-3, but the laser groups had a lower percentage compared to the radiotherapy group. LLLT promoted the preservation of acinar structure, reduced the occurrence of vacuolation, and stimulated parotid gland vascularization. Of the two LLLT protocols, the one using 4 J of energy showed better results.
53. Low-Level Laser Therapy for Fat Layer Reduction: A Comprehensive Review
PubMed Central
Avci, Pinar; Nyame, Theodore T.; Gupta, Gaurav K.; Sadasivam, Magesh; Hamblin, Michael R.
2013-01-01
Background and Objective Low-level laser (light) therapy (LLLT) is a noninvasive, nonthermal approach to disorders requiring reduction of pain and inflammation and stimulation of healing and tissue regeneration. Within the last decade, LLLT started being investigated as an adjuvant to liposuction, for noninvasive body contouring, reduction of cellulite, and improvement of blood lipid profile. LLLT may also aid autologous fat transfer procedures by enhancing the viability of adipocytes. However, the underlying mechanism of actions for such effects still seems to be unclear. It is important, therefore, to understand the potential efficacy and proposed mechanism of actions of this new procedure for fat reduction. Materials and Methods A review of the literature associated with applications of LLLT related to fat layer reduction was performed to evaluate the findings from pre-clinical and clinical studies with respect to the mechanism of action, efficacy, and safety. Results The studies as of today suggest that LLLT has a potential to be used in fat and cellulite reduction as well as in improvement of blood lipid profile without any significant side effects. One of the main proposed mechanism of actions is based upon production of transient pores in adipocytes, allowing lipids to leak out. Another is through activation of the complement cascade which could cause induction of adipocyte apoptosis and subsequent release of lipids. Conclusion Although the present studies have demonstrated safety and efficacy of LLLT in fat layer reduction, studies demonstrating the efficacy of LLLT as a stand-alone procedure are still inadequate. Moreover, further studies are necessary to identify the mechanism of action.
PMID:23749426

54. Expression of DMP-1 in the human pulp tissue using low level laser therapy
NASA Astrophysics Data System (ADS)
Lourenço Neto, Natalino; Teixeira Marques, Nádia Carolina; Fernandes, Ana Paula; Oliveira Rodini, Camila; Cruvinel Silva, Thiago; Moreira Machado, Maria Aparecida Andrade; Marchini Oliveira, Thais
2015-09-01
This study aimed to evaluate the effects of low-level laser therapy (LLLT) on DMP-1 expression in pulp tissue repair of human primary teeth. Twenty mandibular primary molars were randomly assigned into the following groups: Group I—Buckley’s Formocresol (FC); Group II—Calcium Hydroxide (CH); Group III—LLLT + CH and Group IV—LLLT + Zinc oxide/Eugenol. The teeth at the regular exfoliation period were extracted for histological analysis and immunolocalization of DMP-1. Descriptive analysis was performed on the dentin pulp complex. Histopathological assessment showed internal resorption in group FC. Groups CH and LLLT + CH provided better pulpal repair due to the absence of inflammation and the formation of hard tissue barrier. These two groups presented odontoblastic layer expressing DMP-1. According to this study, low level laser therapy preceding the use of calcium hydroxide exhibited satisfactory bio-inductive activity on pulp tissue repair of human primary teeth. However, other histological and cellular studies are needed to confirm the laser tissue action and efficacy.

55. Effect of low-level laser therapy on mesenchymal stem cell proliferation: a systematic review.
PubMed
Ginani, Fernanda; Soares, Diego Moura; Barreto, Mardem Portela E Vasconcelos; Barboza, Carlos Augusto Galvão
2015-11-01
Low-level laser therapy (LLLT) has been used in several in vitro experiments in order to stimulate cell proliferation. Cells such as fibroblasts, keratinocytes, lymphocytes, and osteoblasts have shown increased proliferation when submitted to laser irradiation, although little is known about the effects of LLLT on stem cells. This study aims to assess, through a systematic literature review, the effects of LLLT on the in vitro proliferation of mesenchymal stem cells. Using six different terms, we conducted an electronic search in PubMed/Medline database for articles published in the last twelve years. From 463 references obtained, only 19 papers met the search criteria and were included in this review. The analysis of the papers showed a concentration of experiments using LLLT on stem cells derived from bone marrow, dental pulp, periodontal ligament, and adipose tissue. Several protocols were used to irradiate the cells, with variations on wavelength, power density, radiation time, and state of light polarization. Most studies demonstrated an increase in the proliferation rate of the irradiated cells. It can be concluded that the laser therapy positively influences the in vitro proliferation of stem cells studied, being necessary to carry out further experiments on other cell types and to uniform the methodological designs. PMID:25764448

56. Low-level laser therapy promotes dendrite growth via upregulating brain-derived neurotrophic factor expression
NASA Astrophysics Data System (ADS)
Meng, Chengbo; He, Zhiyong; Xing, Da
2014-09-01
Downregulation of brain-derived neurotrophic factor (BDNF) in the hippocampus occurs early in the progression of Alzheimer's disease (AD). Since BDNF plays a critical role in neuronal survival and dendrite growth, BDNF upregulation may contribute to rescue dendrite atrophy and cell loss in AD. Low-level laser therapy (LLLT) has been demonstrated to regulate neuronal function both in vitro and in vivo. In the present study, we found that LLLT rescued neurons loss and dendritic atrophy via the increase of both BDNF mRNA and protein expression. In addition, dendrite growth was improved after LLLT, characterized by upregulation of PSD95 expression, and the increase in length, branching, and spine density of dendrites in hippocampal neurons. Together, these studies suggest that upregulation of BDNF with LLLT can ameliorate A?−induced neurons loss and dendritic atrophy, thus identifying a novel pathway by which LLLT protects against A?-induced neurotoxicity. Our research may provide a feasible therapeutic approach to control the progression of Alzheimer's disease.

57. Five-day, low-level laser therapy for sports-related lower extremity periostitis in adult men: a randomized, controlled trial. PubMed
Chang, Cheng-Chiang; Ku, Chih-Hung; Hsu, Wei-Chun; Hu, Yu-An; Shyu, Jia-Fwu; Chang, Shin-Tsu
2014-07-01
Periostitis in the lower leg caused by overexercise is a universal problem in athletes and runners. The purpose of this study was to observe the functional improvement of the lower limbs upon rehabilitation low-level laser therapy (LLLT). All medical data were gathered from enrolled adults with sports-related lower leg pain. A total of 54 patients underwent triple-phase bone scans using skeletal nuclear scintigraphy, which confirmed periostitis in their lower limbs. The patients were then randomly divided into two groups: one group received laser therapy (N?=?29) and the other group (N?=?25) received an equivalent placebo treatment (a drug or physical therapy). Treatment protocol commenced with rehabilitation intervention and LLLT was performed three times daily for 5 days at a dosage of 1.4 J/cm(2). A Likert-type pain scale was used to evaluate the severity of pain. Balance function, including postural stability testing (PST) and limits of stability (LOS), was also performed to evaluate the function outcome. Patients experienced a significant improvement in pain by day 2 or day 5 after starting LLLT, but here was no significant difference in pain scale between the measurements before (baseline) and after LLLT. Comparing the PST, the group differences of dynamic vs. static testings ranged from -18.54 to -50.22 (compared 12, 8, 4, 3, 2, 1 to 0, all p?LLLT were 3.73 units (p?=0.0258) lower than those of before LLLT. Comparing the LOS, the group differences of dynamic vs. static testing were similar to those in PST, and the relationship between LOS and groups only varied with the direction control during dynamic testing in direction at backward/right vs. right (p?LLLT had a positive effect on proprioception in patients with lower limb periostitis. Larger, better controlled studies are needed to determine what specific effects LLLT has on the function of proprioception. PMID:24622816

58. The use of low level laser therapy in the treatment of temporomandibular joint disorders. Review of the literature PubMed Central
Herranz-Aparicio, Judit; Vázquez-Delgado, Eduardo; Arnabat-Domínguez, Josep; España-Tost, Antoni
2013-01-01
Introduction: The temporomandibular disorders (TMDs) have been identified as the most important cause of pain in the facial region. The low level laser therapy (LLLT) has demonstrated to have an analgesic, anti-inflammatory and biostimulating effects. The LLLT is a noninvasive, quick and safe, non-pharmaceutical intervention that may be beneficial for patients with TMDs. However the clinical efficiency of LLLT in the treatment of this kind of disorders is controversial. Objectives: Literature review in reference to the use of LLLT in the treatment of TMDs, considering the scientific evidence level of the published studies. Material and Methods: A MEDLINE and COCHRANE database search was made for articles. The keywords used were “temporomandibular disorders” and “low level laser therapy” or “phototherapy” and by means of the Boolean operator “AND”. The search provided a bank of 35 articles, and 16 relevant articles were selected to this review. These articles were critically analyzed and classified according to their level of scientific evidence. This analysis produced 3 literature review articles and 13 are clinical trials. The SORT criteria (Strength of Recommendation Taxonomy) was used to classify the articles. Results: Only one article presented an evidence level 1, twelve presented an evidence level 2, and three presented an evidence level 3. According to the principle of evidence-based dentistry, currently there is a scientific evidence level B in favor of using LLLT for treatment of TMDs. Discussion and conclusions: Publications on the use of LLLT for treatment of TMDs are limited making difficult to compare the different studies due to the great variability of the studied variables and the selected laser parameters. The great majority of the studies concluded that the results should be taken
with caution due to the methodological limitations. Key words: Low level laser therapy; phototherapy; temporomandibular joint disorders. PMID: 23722130

59. Effects of LLLT on the periarthritis of the shoulder: a clinical study on different treatments with corticosteroid injections or a wait-and-see policy.
NASA Astrophysics Data System (ADS)
Tam, Giuseppe
2005-11-01
The aim of this study was to compare the efficacy of three types of treatments in the periarthritis of the shoulder: corticosteroid injections, Low Level Laser Therapy (LLLT) or wait-and-see-policy.
BACKGROUND DATA: Low level laser therapy is a treatment method widely used in medical science. Many disorders, such as osteoarthritis and musculoskeletal conditions with pain, have been treated with LLLT.
METHODS: Patients, suffering from periarthritis of the shoulder of at least 6 weeks’ duration, were recruited by family doctors. We randomly allocated eligible patients to 6 weeks of treatment n. 20 (33%) with corticosteroid injection, n. 21 (35%) with LLLT and with wait-and-see policy n.19 (31%). We applied a number of 12 sessions with infrared Diode Laser Ga-As (904 nm), 60 W maximum power, peak power per pulse 27 W, pulse frequency 1280 Hz, average point region 2-8 J; dose/point = 3-4 J; total energy density 24 J/cm2. Outcome measures included general improvement, severity of the main complaint, pain, shoulder disability, and patient satisfaction. Severity of shoulder complaints, abduction and elevation of the arm, and the pressure pain threshold were assessed. The principal analysis was done on an intention treatment basis. We assessed all outcomes at 3.6, 12, 26, 52 weeks. RESULTS: We randomly assigned 60 patients. At 6 weeks, corticosteroid injections were significantly better than all other therapy options for all outcome measures. Success rates were 90% (18) compared with 52% (11) for LLLT and 35% (7) for wait-and-see policy. Long-term differences between injections and LLLT were significantly in favour of LLLT. Success rate at 52 weeks were 14 (70%) for injections, 19 (90.5%) for LLLT, and 16 (84%) for wait-and-see policy. LLLT had better results than a wait-and-see policy, but differences were not significant ( p < 0.0001). CONCLUSIONS: Patients should be properly informed about the advantages and disadvantages of the treatment options for the periarthritis of the shoulder. The decision to treat with LLLT or to adopt a wait-and-see policy might depend on available resources, since the relative gain of LLLT is better, but also small at long-term.

60. Modulating nitric oxide levels in dorsal root ganglion neurons of rat with low-level laser therapy
NASA Astrophysics Data System (ADS)
Zheng, Li-qin; Wang, Yu-hua; He, Yi-peng; Zhou, Jie; Yang, Hong-qin; Zhang, Yan-ding; Xie, Shu-sen
2015-05-01
Nitric oxide (NO) and nitric oxide synthase (NOS) have an important role in pain signaling transmission in animal models. Low-level laser therapy (LLLT) is known to have an analgesic effect, but the mechanism is unclear. The aim of the study is to investigate the influence of LLLT on NO release and NOS synthesis in dorsal root ganglion (DRG) neurons, in order to find whether LLLT can ameliorate pain through modulating NO production at the cellular level. The results show that in stress conditions, the laser irradiation at 658 nm can modulate NO production in DRG neurons with some diameter of about 20 μm in a short time after illumination, and affect NOS synthesis in a dose-dependent manner. It is demonstrated that LLLT might treat pain by altering NO release directly and indirectly in DRG neurons.

61. Is LLLT effective in the management of TMJ pain?
NASA Astrophysics Data System (ADS)
Pinheiro, Antonio L. B.; Alves, Marcos J.; Ramos, Ezenildes; Manzi, Cecilia T.; Rolim, Aluizio B.; Vieira, Alessandro L. B.
1999-02-01
The authors report on the effects of LLLT in the treatment of TMJ pain. This paper reports the results of the use of LLLT on the treatment of TMJ pain and presents LLLT as an effective method of treating such problem. One hundred forty six female and 24 male patients aged between 7 and 81 years old (average 38.6 years old) suffering TMJ pain were treated with 632.8, 670, and 830 nm diodes Lasers at the Laser Center of the UFPE.
The treatment consisted of a series of 12 applications twice a week. Patients were treated with an average dose of 2.4 J/cm². One hundred twenty eight out of 180 patients were asymptomatic at the end of the treatment, 26 improved considerably and 26 were symptomatic. These results show although LLLT does not cure TMJ disorders it is effective in reducing TMJ pain.

62. Use of Low-Level Laser Therapy as Monotherapy or Concomitant Therapy for Male and Female Androgenetic Alopecia

PubMed Central
Munck, Andrésía; Gavazzoni, Maria Fernanda; Trüeb, Ralph M
2014-01-01

Background: Androgenetic alopecia (AGA) is the most common form of hair loss in men and in women. Currently, minoxidil and finasteride are the treatments with the highest levels of medical evidence, but patients who exhibit intolerance or poor response to these treatments are in need of additional treatment modalities.

Objective: The aim was to evaluate the efficacy and safety of low-level laser therapy (LLLT) for AGA, either as monotherapy or as concomitant therapy with minoxidil or finasteride, in an office-based setting. Materials and Methods: Retrospective observational study of male and female patients with AGA, treated with the 655 nm-HairMax Laser Comb® in an office-based setting. Efficacy was assessed with global photographic imaging. Results: Of 32 patients (21 female, 11 male), 8 showed significant, 20 moderate, and 4 no improvement. Improvement was seen both with monotherapy and with concomitant therapy. Improvement was observed as early as 3 months and was sustained up to a maximum observation time of 24 months. No adverse reactions were reported. Conclusions: LLLT represents a potentially effective treatment for both male and female AGA, either as monotherapy or concomitant therapy. Combination treatments with minoxidil, finasteride, and LLLT may act synergistic to enhance hair growth. PMID:25191036

63. Low-Level Laser Therapy with 810?nm Wavelength Improves Skin Wound Healing in Rats with Streptozotocin-Induced Diabetes

PubMed Central
Dancáková, Ludmila; Vasilenko, Tomáš; Kovář, Ivan; Jakub?ová, Katarína; Hollý, Martin; Revajová, Viera; Sabol, František; Tomori, Zoltán; Iversen, Marjolein; Gál, Peter
2014-01-01

Abstract Objective: The aim of present study was to evaluate whether low-level laser therapy (LLLT) can reverse the impaired wound healing process in diabetic rats. Background data: Impaired wound healing in diabetic patients represents a major health problem. Recent studies have indicated that LLLT may improve wound healing in diabetic rats, but the optimal treatment parameters are still unknown. Materials and methods: Male Sprague–Dawley rats (n=21) were randomly divided into three groups: a healthy control group, a diabetic sham-treated group, and a diabetic LLLT-treated group. Diabetes mellitus was then induced by streptozotocin administration to the two diabetic groups. One 4?cm long full thickness skin incision and one full thickness circular excision (diameter=4?mm) were performed on the back of each rat. An infrared 810?nm laser with an output of 30?mW, a power density of 30?mW/cm², and a spot size of 1?cm² was used to irradiate each wound for 30?sec (daily dose of 0.9?J/cm²/wound/day). Results: In diabetic rats, the histology of LLLT-treated excisions revealed a similar healing response to that in nondiabetic controls, with significantly more mature granulation tissue than in the sham-treated diabetic control group. LLLT reduced the loss of tensile strength, and increased the incision wound stiffness significantly compared with sham-irradiated rats, but this did not achieve the same level as in the nondiabetic controls. Conclusions: Our study demonstrates that infrared LLLT can improve wound healing in diabetic rats. Nevertheless, further research needs to be performed to evaluate the exact underlying mechanism and to further optimize LLLT parameters for clinical use. PMID:24661084

64. Efficacy of LLLT in swelling and pain control after the extraction of lower impacted third molars

PubMed Central
Vescovi, Paolo; Margalit, Meirav; Ricotti, Enrico; Stea, Stefano; Meletti, Marco; Manfredi, Maddalena; Fornaini, Carlo
2015-01-01

Introduction and aim: Low Level Laser Therapy (LLLT) can facilitate wound healing stimulating a more rapid resolution and an earlier start for the proliferation phase. The purpose of this study is to evaluate the effects of LLLT on postoperative pain and oedema following the removal of impacted lower third molars. Materials and methods: Fifty-nine patients, who were to undergo surgical removal of their lower third molars, were studied. Patients were randomly allocated to one of three groups: 17 patients LLLT + traditional drug treatment17 patients traditional drug treatment as control group25 patients treated with LLLT only on one side + traditional drug treatment. The laser we have used for this study is a diode laser, GaAs, which delivers both in the infrared band at the wavelength of 910 nanometers (pulsed and superpulsed source), and in the visible (continuous
source) at the wavelength of 650 nanometers (red). LLLT was performed just after the intervention and approximately 12 hours after surgery delivering 240 J in 15 minutes with theoretical fluence values of 480 J/cm² and 31 J/cm² for every minute of irradiation. We considered and signed with a label constant landmarks on both sides of the face of each patient; measurements were taken: before the surgery, after the surgery right after the 1st laser treatment, after approximately 24 hours after the 2nd laser treatment. Results: We collected all the values of the edema measurements and the VAS and performed a statistical analysis by means One-way Analysis of Variance (ANOVA) test: for the evaluated values (X, Y, Z) an extremely significant difference was found with p values of 0.003 for Y at the first evaluation (pre-12 hours) and less than 0.001 for the other evaluations. A significant result was obtained for VAS recorded at hospital discharge (p<0.0001).

Conclusions: This study demonstrates that LLLT is effective on postoperative pain and edema accelerating healing time and reducing patients distress. PMID:25941424

65. Effect of Low-Level Laser Therapy on Incorporation of Block Allografts
PubMed Central
Valiati, Renato; Paes, Jefferson Viapiana; de Moraes, Aury Nunes; Gava, Aldo; Agostini, Michelle; Masiero, Anelise Viapiana; de Oliveira, Marilja Gerhardt; Pagnoncelli, Rogério Miranda
2012-01-01
Objective To assess the effect of low-level laser therapy (LLLT) on the incorporation of deep-frozen block allografts in a rabbit model. Background Data Studies have shown that LLLT has beneficial effects on tissue repair and new bone formation. Methods Bone tissue was harvested from two rabbits, processed by deep-freezing and grafted into the calvaria of 12 animals, which were then randomly allocated into two groups: experimental (L) and control (C). Rabbits in group L were irradiated with an aluminum gallium arsenide diode laser (AlGaAs; wavelength 830 nm, 4 J/cm²), applied to four sites on the calvaria, for a total dose of 16 J/cm² per session. The total treatment dose after eight sessions was 128 J/cm². Animals were euthanized at 35 (n = 6) or 70 days (n = 6) postoperatively. Results Deep-freeze-processed block allografts followed by LLLT showed incorporation at the graft-host interface, moderate bone remodeling, partial filling of osteocyte lacunae, less inflammatory infiltrate in the early postoperative period, and higher collagen deposition than the control group. Conclusion Optical microscopy and scanning electron microscopy showed that allograft bone processed by deep-freezing plus LLLT is suitable as an alternative for the treatment of bone defects. Use of the deep-freezing method for processing of bone grafts preserves the structural and osteoconductive characteristics of bone tissue. PMID:23155359

66. Comparison of the analgesic effect of ultrasound and low-level laser therapy in patients suffering from plantar fasciitis (calcars calcanei)
NASA Astrophysics Data System (ADS)
Navratil, Leos; Skopek, Jiri; Hronkova, Hana; Kymplova, Jaroslava; Knizek, Jiri
2001-10-01
To compare the effectiveness of the two therapeutic approaches, ultrasound and low level laser (LLLT) used in 181 patients suffering from calcars calcanei-plantar fasciitis. The effectiveness of the treatment was determined according to the evaluation of the patient using certain criteria described in the table. The complete disappearance of pain was seen in 50% of 60 patients treated with US and partial improvement in 16.6% and 69 patients were treated with LLLT from which 67% described complete pain relief, and 20% partial improvement. The results show that the LLLT is a good therapeutic approach in the treatment of pain in patients suffering from calcars calcanei-plantar fasciitis. The treatment with laser was significantly more successful then the ultrasound therapy, which is currently the most common therapy used for plantar fasciiti.

67. Laser Therapy in the Treatment of Achilles Tendinopathy: A Randomised Controlled Trial
NASA Astrophysics Data System (ADS)
Tumilty, Steve; Munn, Joanne; Haxby Abbott, J.; Mcdonough, Suzanne; Hurley, Deirdre A.; Basford, Jeffrey R.; David Baxter, G.
2010-05-01
Background: Low Level Laser Therapy (LLLT) has emerged as a possible treatment modality for tendinopathies. Human studies have investigated LLLT for Achilles Tendinopathy and the effectiveness remains contentious. Purpose: To assess the clinical effectiveness of Low-Level Laser Therapy (LLLT) in the management of Achilles Tendinopathy. Method: Forty patients were randomised into an active laser or placebo group; all patients, therapists and investigator were blinded to allocation. All patients were given an eccentric exercise program and irradiated 3 times per week for 4 weeks with either an active or placebo laser at 6 standardized points over the affected tendons. Irradiation parameters in the active laser group were: 810 nm, 100 mW, applied to 6 points on the tendon for 30 seconds giving a dose of 3 J per point and 18 J per session; power density 100 mW/cm². Outcome measures were the VISA-A questionnaire and a visual analogue scale of pain. Patients were measured before treatment, at 4 and 12 weeks. ANCOVA was used to analyze data,
using the effects of baseline measurements as a covariate. Results: Within groups, there were significant improvements (p<0.05) at 4 and 12 weeks for all outcome measures, except pain for the laser group at 4 weeks (p = 0.13). Between groups differences at both 4 and 12 weeks showed no significant difference between groups (p>0.05). Conclusion: This use of the above parameters demonstrated no added benefit of LLLT over that of eccentric exercise in the treatment of Achilles Tendinopathy.

68. Low-Level Lasers as an Adjunct in Periodontal Therapy in Patients with Diabetes Mellitus
PubMed Central
Kesi?, Ljiljana; Mihailovii?, Dragan; Jovanovi?, Goran; Anti?, Slobodan; Brki?, Zlata
2012-01-01
Abstract Background Diabetes mellitus (DM) increases the risk of periodontitis, and severe periodontitis often coexists with severe DM. The proposed dual pathway of tissue destruction suggests that control of chronic periodontal infection and gingival inflammation is essential for achieving long-term control of DM. The purpose this study is to evaluate the effects of low-level laser therapy (LLLT) by exfoliative cytology in patients with DM and gingival inflammation. Subjects and Methods Three hundred patients were divided in three equal groups: Group 1 consisted of patients with periodontitis and type 1 DM, Group 2 of patients with periodontitis and type 2 DM, and Group 3 of patients with periodontitis (control group). After oral examination, smears were taken from gingival tissue, and afterward all of the patients received oral hygiene instructions, removal of dental plaque, and full-mouth scaling and root planing. A split-mouth design was applied; on the right side of jaws GaAlAs LLLT (670?nm, 5?mW, 14?min/day) (model Mils 94; Optica Laser, Sofia, Bulgaria) was applied for five consecutive days. After the therapy was completed, smears from both sides of jaws were taken. The morphometric analysis was done using the National Institutes of Health Image software program and a model NU2 microscope (Carl Zeiss, Jena, Germany). Results Investigated parameters were significantly lower after therapy compared with values before therapy. After therapy on the side subjected to LLLT, there was no significantly difference between patients with DM and the control group. Conclusions It can be concluded that LLLT as an adjunct in periodontal therapy reduces gingival inflammation in patients with DM and periodontitis. PMID:22928615

69. Low-level laser therapy of myofascial pain syndromes of patients with osteoarthritis of knee and hip joints
NASA Astrophysics Data System (ADS)
Gasparyan, Levon V.
2001-04-01
The purpose of the given research is the comparison of efficiency of conventional treatment of myofascial pain syndromes of patients with osteoarthritis (OA) of hip and knee joints and therapy with additional application of low level laser therapy (LLLT) under dynamic control of clinical picture, rheovasographic, electromyographic examinations, and parameters of peroxide lipid oxidation. The investigation was made on 143 patients with OA of hip and knee joints. Patients were randomized in 2 groups: basic group included 91 patients, receiving conventional therapy with a course of LLLT, control group included 52 patients, receiving conventional treatment only. Transcutaneous ((lambda) equals 890 nm, output peak power 5 W, frequency 80 - 3000 Hz) and intravenous (lambda) equals 633 nm, output 2 mW in the vein) laser irradiation were used for LLLT. Studied showed, that clinical efficiency of LLLT in the complex with conventional treatment of myofascial pain syndromes at the patients with OA is connected with attenuation of pain syndrome, normalization of parameters of myofascial syndrome, normalization of the vascular tension and parameters of rheographic curves, as well as with activation of antioxidant protection system.

70. Transcranial low-level laser therapy increases memory, learning, neuroprogenitor cells, BDNF and synaptogenesis in mice with traumatic brain injury
NASA Astrophysics Data System (ADS)
Xuan, Weijun; Huang, Liyi; Vatansever, Fatma; Agrawal, Tanupriya; Hamblin, Michael R.
2015-03-01
Increasing concern is evident over the epidemic of traumatic brain injury in both civilian and military medicine, and the lack of approved treatments. Transcranial low level laser therapy (tLLLT) is a new approach in which near infrared laser is delivered to the head, penetrates the scalp and skull to reach the brain. We asked whether tLLLT at 810-nm could improve memory and learning in mice with controlled cortical impact traumatic brain injury. We investigated the mechanism of action by immunofluorescence studies in sections from brains of mice sacrificed at different times. Mice with TBI treated with 1 or 3 daily laser applications performed better on Morris Water Maze test at 28 days. Laser treated mice had increased BrdU incorporation into NeuN positive cells in the dentate gyrus and subventricular zone indicating formation of neuroprogenitor cells at 7 days and less at 28 days. Markers of neuron migration (DCX and Tuj1) were also increased, as was the neurotrophin, brain derived neurotrophic factor (BDNF) at 7 days. Markers of synaptogenesis (formation of new connections between existing neurons) were increased in the perilesional cortex at 28 days. tLLLT is
proposed to be able to induce the brain to repair itself after injury. However its ability to induce neurogenesis and synaptogenesis suggests that LLLT may have much wider applications to neurodegenerative and psychiatric disorders.

71. Low-level laser therapy of acute and chronic pain: results of the trials and light delivery optimization

NASA Astrophysics Data System (ADS)
Stoykova, Elena V.; Roeva, Tatiana
2003-09-01
The work presents the results of the low-level laser therapy (LLLT) of two groups of volunteers with a variety of conditions performed with a GaAs-system. The volunteers were randomly selected among the patients who were usually treated by conventional therapy that included massage and acupuncture needles. The LLLT was proposed to the first group as extension of conventional treatment. The second group underwent only the LLLT. The effectiveness of the therapy was graded under four categories. Short-term and long-term side effects as well as conditions responding only to LLLT were recorded. The successful treatments were up to 70% for both groups, which coincided with the result of the control group treated by the conventional therapy. For optimization of the light delivery, the spatial maps of the absorbed dose in a homogeneous medium, both in the proximity of the light source and at a distance from it, were compared for collimated and divergent light beams using a reduced variance Monte-Carlo code.

72. Pre-Conditioning with Low-Level Laser (Light) Therapy: Light Before the Storm
PubMed Central
Agrawal, Tanupriya; Gupta, Gaurav K.; Rai, Vikrant; Carroll, James D.; Hamblin, Michael R.
2014-01-01
Pre-conditioning by ischemia, hyperthermia, hypothermia, hyperbaric oxygen (and numerous other modalities) is a rapidly growing area of investigation that is used in pathological conditions where tissue damage may be expected. The damage caused by surgery, heart attack, or stroke can be mitigated by pre-treating the local or distant tissue with low levels of a stress-inducing stimulus, that can induce a protective response against subsequent major damage. Low-level laser (light) therapy (LLLT) has been used for nearly 50 years to enhance tissue healing and to relieve pain, inflammation and swelling. The photons are absorbed in cytochrome(c) oxidase (unit four in the mitochondrial respiratory chain), and this enzyme activation increases electron transport, respiration, oxygen consumption and ATP production. A complex signaling cascade is initiated leading to activation of transcription factors and up- and down-regulation of numerous genes. Recently it has become apparent that LLLT can also be effective if delivered to normal cells or tissue before the actual insult or trauma, in a pre-conditioning mode. Muscles are protected, nerves feel less pain, and LLLT can protect against a subsequent heart attack. These examples point the way to wider use of LLLT as a pre-conditioning modality to prevent pain and increase healing after surgical/medical procedures and possibly to increase athletic performance. PMID:25552961

73. Effect of 830 nm low-level laser therapy applied before high-intensity exercises on skeletal muscle recovery in athletes.
PubMed
Leal Junior, Ernesto Cesar Pinto; Lopes-Martins, Rodrigo Alvaro Brandão; Baroni, Bruno Manfredini; De Marchi, Thiago; Taufer, Daiana; Manfro, Débora Sgandella; Rech, Morgana; Danna, Vanessa; Grosselli, Douglas; Generosi, Rafael Abeche; Marcos, Rodrigo Labat; Ramos, Luciano; Bjordal, Jan Magnus
2009-11-01
Our aim was to investigate the immediate effects of bilateral, 830 nm, low-level laser therapy (LLLT) on high-intensity exercise and biochemical markers of skeletal muscle recovery, in a randomised, double-blind, placebo-controlled, crossover trial set in a sports physiotherapy clinic. Twenty male athletes (nine professional volleyball players and eleven adolescent soccer players) participated. Active LLLT (830 nm wavelength, 100 mW, spot size 0.0028 cm(2), 3-4 J per point) or an identical placebo LLLT was delivered to five points in the rectus femoris muscle (bilaterally). The main outcome measures were the work performed in the Wingate test: 30 s of maximum cycling with a load of 7.5% of body weight, and the measurement of blood lactate (BL) and creatine kinase (CK) levels before and after exercise. There was no significant difference in the work performed during the Wingate test (P > 0.05) between subjects given active LLLT and those given placebo LLLT. For volleyball athletes, the change in CK levels from before to after the exercise test was significantly lower (P = 0.0133) for those given active LLLT (2.52 U l(-1) +/- 7.04 U l(-1)) than for those given placebo LLLT (28.49 U l(-1) +/- 22.62 U l(-1)). For the soccer athletes, the change in blood lactate levels from before exercise to 15 min after exercise was significantly lower (P < 0.01) in the group subjected to active LLLT (8.55 mmol l(-1) +/- 2.14 mmol l(-1)) than in the group subjected to placebo LLLT (10.52 mmol l(-1) +/- 1.82 mmol l(-1)). LLLT irradiation before the Wingate test seemed to inhibit an expected post-exercise increase in
CK level and to accelerate post-exercise lactate removal without affecting test performance. These findings suggest that LLLT may be of benefit in accelerating post-exercise recovery. PMID:19057981

74. Effects of polarization in low-level laser therapy of spinal cord injury in rats
NASA Astrophysics Data System (ADS)
Ando, Takahiro; Sato, Shunichi; Kobayashi, Hiroaki; Nawashiro, Hiroshi; Ashida, Hiroshi; Hamblin, Michael R.; Obara, Minoru
2012-03-01
Low-level laser therapy (LLLT) is a promising approach to treat the spinal cord injury (SCI). Since nerve fibers have optical anisotropy, propagation of light in the spinal tissue might be affected by its polarization direction. However, the effect of polarization on the efficacy of LLLT has not been elucidated. In the present study, we investigated the effect of polarization on the efficacy of near-infrared LLLT for SCI. Rat spinal cord was injured with a weight-drop device. The lesion site was irradiated with an 808-nm diode laser beam that was transmitted through a polarizing filter immediately after injury and daily for five consecutive days. The laser power at the injured spinal cord surface was 25 mW, and the dosage per day was 9.6 J/cm² (spot diameter, 2 cm; irradiation duration, 1200 s). Functional recovery was assessed daily by an open-field test. The results showed that the functional scores of the SCI rats that were treated with 808-nm laser irradiation were significantly higher than those of the SCI alone group (Group 1) from day 5 after injury, regardless of the polarization direction. Importantly, as compared to the locomotive function of the SCI rats that were treated with the perpendicularly-polarized laser parallel to the spinal column (Group 2), that of the SCI rats that were irradiated with the linearly aligned polarization (Group 3) was significantly improved from day 10 after injury. In addition, the ATP contents in the injured spinal tissue of Group 3, which were measured immediately after laser irradiation, were moderately higher than those of Group 2. These observations are attributable to the deeper penetration of the parallel-polarized light in the anisotropic spinal tissue, suggesting that polarization direction significantly affects the efficacy of LLLT for SCI.

75. Comparative clinical study of the effect of LLLT in the immediate and late treatments of hypoesthesia due to surgical procedures
NASA Astrophysics Data System (ADS)
Ladalardo, Thereza C.; Brugnera, Aldo, Jr.; Pinheiro, Antonio L. B.; Castanho Garrini, Ana E.; Bologna, Elisangela D.; Takamoto, Marcia; Siqueira, Jose T.; Dias, Pedro; Campos, Roberto A. d. C.
2002-06-01
We evaluated the effect of LLLT in 68 patients who presented hypoesthesia due to odontological surgery procedures: dental implant surgeries (N=51); extraction of impacted lower third molars (N=10); endodontics in lower first molars (N=7). Lesions treated within 30 days after the nerve injury had occurred were part of the immediate group, and lesions with more than 30 days from the occurrence of the injury were part of the late group. Treatments were carried out with an infrared diode laser of 40 mW-830nm, continuous wave emission, spot size 3 mm², and a total dosage of 18 joules per session in a contact mode of application, 20 sessions altogether. The efficacy of laser therapy in peripheral nerve regeneration is also related to the degree of the peripheral nerve lesion, and not only to the lesion duration. LLLT resulted in neurosensory functional improvement in both immediate and late treatments of hypoesthesia.

76. Transcranial low-level laser therapy enhances learning, memory, and neuroprogenitor cells after traumatic brain injury in mice
PubMed Central
Xuan, Weijun; Vatansever, Fatma; Huang, Liyi; Hamblin, Michael R.
2014-01-01
Abstract. The use of transcranial low-level laser (light) therapy (tLLLT) to treat stroke and traumatic brain injury (TBI) is attracting increasing attention. We previously showed that LLLT using an 810-nm laser 4 h after controlled cortical impact (CCI)-TBI in mice could significantly improve the neurological severity score, decrease lesion volume, and reduce Fluoro-Jade staining for degenerating neurons. We obtained some evidence for neurogenesis in the region of the lesion. We now tested the hypothesis that tLLLT can improve performance on the Morris water maze (MWM, learning, and memory) and increase neurogenesis in the hippocampus and subventricular zone (SVZ) after CCI-TBI in mice. One and (to a greater extent) three daily laser treatments commencing 4-h post-TBI improved neurological performance as measured by wire grip and motion test especially at 3 and 4 weeks post-TBI. Improvements in visible and hidden platform latency and probe tests in MWM were seen at 4 weeks. Caspase-3 expression was lower in the lesion region at 4 days post-TBI. Double-stained BrdU-NeuN (neuroprogenitor cells) was increased in the dentate gyrus and SVZ. Increases in double-cortin (DCX) and TUJ-1 were also seen. Our study results suggest that tLLLT may improve TBI both by reducing cell death in the lesion and by stimulating neurogenesis. PMID:25292167
77. Transcranial low-level laser therapy enhances learning, memory, and neuro progenitor cells after traumatic brain injury in mice.
PubMed
Xuan, Weijun; Vatansever, Fatma; Huang, Liyi; Hamblin, Michael R
2014-01-01
The use of transcranial low-level laser (light) therapy (tLLLT) to treat stroke and traumatic brain injury (TBI) is attracting increasing attention. We previously showed that LLLT using an 810-nm laser 4 h after controlled cortical impact (CCI)-TBI in mice could significantly improve the neurological severity score, decrease lesion volume, and reduce fluoro-Jade staining for degenerating neurons. We obtained some evidence for neurogenesis in the region of the lesion. We now tested the hypothesis that tLLLT can improve performance on the Morris water maze (MWM, learning, and memory) and increase neurogenesis in the hippocampus and subventricular zone (SVZ) after CCI-TBI in mice. One and (to a greater extent) three daily laser treatments commencing 4-h post-TBI improved neurological performance as measured by wire grip and motion test especially at 3 and 4 weeks post-TBI. Improvements in visible and hidden platform latency and probe tests in MWM were seen at 4 weeks. Caspase-3 expression was lower in the lesion region at 4 days post-TBI. Double-stained BrdU-NeuN (neuroprogenitor cells) was increased in the dentate gyrus and SVZ. Increases in doublecortin (DCX) and TUJ-1 were also seen. Our study results suggest that tLLLT may improve TBI both by reducing cell death in the lesion and by stimulating neurogenesis. PMID:25292167

78. Transcranial low-level laser therapy enhances learning, memory, and neuro progenitor cells after traumatic brain injury in mice
NASA Astrophysics Data System (ADS)
Xuan, Weijun; Vatansever, Fatma; Huang, Liyi; Hamblin, Michael R.
2014-10-01
The use of transcranial low-level laser (light) therapy (tLLLT) to treat stroke and traumatic brain injury (TBI) is attracting increasing attention. We previously showed that LLLT using an 810-nm laser 4 h after controlled cortical impact (CCI)-TBI in mice could significantly improve the neurological severity score, decrease lesion volume, and reduce fluoro-Jade staining for degenerating neurons. We obtained some evidence for neurogenesis in the region of the lesion. We now tested the hypothesis that tLLLT can improve performance on the Morris water maze (MWM, learning, and memory) and increase neurogenesis in the hippocampus and subventricular zone (SVZ) after CCI-TBI in mice. One and (to a greater extent) three daily laser treatments commencing 4-h post-TBI improved neurological performance as measured by wire grip and motion test especially at 3 and 4 weeks post-TBI. Improvements in visible and hidden platform latency and probe tests in MWM were seen at 4 weeks. Caspase-3 expression was lower in the lesion region at 4 days post-TBI. Double-stained BrdU-NeuN (neuroprogenitor cells) was increased in the dentate gyrus and SVZ. Increases in doublecortin (DCX) and TUJ-1 were also seen. Our study results suggest that tLLLT may improve TBI both by reducing cell death in the lesion and by stimulating neurogenesis.

79. Inhomogeneity in optical properties of rat brain: a study for LLLT dosimetry
NASA Astrophysics Data System (ADS)
Sousa, Marcelo V. P.; Prates, Renato; Kato, Ilka T.; Sabino, Caetano P.; Yoshimura, Tania M.; Suzuki, Luis C.; Magalhães, Ana C.; Yoshimura, Elisabeth M.; Ribeiro, Martha S.
2013-03-01
Over the last few years, low-level light therapy (LLLT) has shown an incredible suitability for a wide range of applications for central nervous system (CNS) related diseases. In this therapeutic modality light dosimetry is extremely critical so the study of light propagation through the CNS organs is of great importance. To better understand how light intensity is delivered to the most relevant neural sites we evaluated optical transmission through slices of rat brain point by point. We experimented red (? = 660 nm) and near infrared (? = 808 nm) diode laser light analyzing the light penetration and distribution in the whole brain. A fresh Wistar rat (Rattus norvegicus) brain was cut in sagittal slices and illuminated with a broad light beam. A high-resolution digital camera was employed to acquire data of transmitted light. Spatial profiles of the light transmitted through the sample were obtained from the images. Peaks and valleys in the profiles show sites where light was less or more attenuated. The peak intensities provide information about total attenuation and the peak widths are correlated to the scattering coefficient at that individual portion of the sample. The outcomes of this study provide remarkable information for LLLT dose-dependent studies involving CNS and highlight the importance of LLLT dosimetry in CNS organs for large range of applications in animal and human diseases.

80. Efficacy of low-level laser therapy for the treatment of burning mouth syndrome: a randomized, controlled trial
NASA Astrophysics Data System (ADS)
The aim of the present study was to assess the effect of low-level laser therapy (LLLT) in the treatment of burning mouth syndrome (BMS). A diode laser was used in 78 BMS patients who were randomly assigned into four groups: IR1W, \( n = 20 \) (830 nm, 100 mW, 5 J, 176 J/cm², 50 s, LLLT weekly sessions, 10 sessions); IR3W, \( n = 20 \) (830 nm, 100 mW, 5 J, 176 J/cm², 50 s, three LLLT weekly sessions, 9 sessions); red laser, \( n = 19 \) (685 nm, 35 mW, 2 J, 72 J/cm², 58 s, three LLLT weekly sessions, 9 sessions); and control group (CG), \( n = 19 \). Symptoms were assessed at the end of the treatment and eight weeks later; quality of life related to oral health was assessed using the Oral Health Impact Profile (OHIP-14). Statistical analysis was carried out using repeated measures analysis of variance followed by the posthoc Tukey test. There was significant reduction of the symptoms in all groups at the end of the treatment, which was maintained in the follow-up. The scores of the IR1W and IR3W laser groups differed significantly from those of the CG. There was also a decrease in the OHIP-14 scores in the four groups. The IR3W laser group scores differed significantly from those of the CG. LLLT reduces the symptoms of BMS and may be an alternative therapeutic strategy for the relief of symptoms in patients with BMS.

81. **Efficacy of low-level laser therapy for the treatment of burning mouth syndrome: a randomized, controlled trial.**
PubMed
Spanemberg, Juliana Cassol; López López, José; de Figueiredo, Maria Antonia Zancanaro; Cherubini, Karen; Salum, Fernanda Gonçalves
2015-09-01
The aim of the present study was to assess the effect of low-level laser therapy (LLLT) in the treatment of burning mouth syndrome (BMS). A diode laser was used in 78 BMS patients who were randomly assigned into four groups: IR1W, \( n = 20 \) (830 nm, 100 mW, 5 J, 176 J/cm², 50 s, LLLT weekly sessions, 10 sessions); IR3W, \( n = 20 \) (830 nm, 100 mW, 5 J, 176 J/cm², 50 s, three LLLT weekly sessions, 9 sessions); red laser, \( n = 19 \) (685 nm, 35 mW, 2 J, 72 J/cm², 58 s, three LLLT weekly sessions, 9 sessions); and control group (CG), \( n = 19 \). Symptoms were assessed at the end of the treatment and eight weeks later; quality of life related to oral health was assessed using the Oral Health Impact Profile (OHIP-14). Statistical analysis was carried out using repeated measures analysis of variance followed by the posthoc Tukey test. There was significant reduction of the symptoms in all groups at the end of the treatment, which was maintained in the follow-up. The scores of the IR1W and IR3W laser groups differed significantly from those of the CG. There was also a decrease in the OHIP-14 scores in the four groups. The IR3W laser group scores differed significantly from those of the CG. LLLT reduces the symptoms of BMS and may be an alternative therapeutic strategy for the relief of symptoms in patients with BMS.

82. **Is LLLT effective in the management of TMJ pain?**
NASA Astrophysics Data System (ADS)
Pinheiro, Antonio L. B.; Manzi, Cecilia T.; Rolim, Aluizio B.; Vieira, Alessandro L. B.
1999-05-01
This paper reports the result of the use of LLLT on the treatment of TMJ pain and present LLLT as an effective method of treating such problem. One hundred and eighty one female and 23 male patients aged between 7 and 81 years old (average 36.9 years old) suffering TMJ pain were treated with 632.8, 670, and 830nm diodes lasers at the Laser Center of the UFPE. The treatment consisted of a series of 12 applications twice a week. Patients were treated with an average dose of 3 J/cm². One hundred forty one out of 204 patients were asymptomatic at the end of the treatment, 37 improved considerably and 26 were symptomatic. These result show although LLLT does not cure TMJ disorders it is effective in reducing TMJ pain.

83. **Is it possible to prevent morbidity on post cardiovascular surgery applying low level laser therapy?**
NASA Astrophysics Data System (ADS)
Background and Objective: Complications following cardiovascular surgery incision are common in mediastinitis and wound dehiscence form, a 47% mortality rate remaining. Low Level Laser Therapy (LLLT) has been employed mainly to its effectiveness analgesic and anti-inflammatory actions, aiding the tissue repair process. The aim of this study was to evaluate infrared LLLT onto surgical incision in patients submitted to cardiovascular surgery. Materials and Methods: 40 patients were divided in two groups: Placebo Group (G1) - conventional therapy + "Laser pointer" and Laser Group (G2) - conventional therapy + Infrared Laser irradiation on surgical incision. Diode Laser was employed, C.W. mode, around the surgical wound bed, on immediate Post Operative (PO), 1st PO and 3rd PO with the following parameters: wavelength (λ): 830nm, P=35mW, E=0,75J. Results: G2 didn't present any complication and 5% of patients in G1 developed incision dehiscence and infection. On 7thPO, still a large amount of G1 patients showed pain and unquestionable inflammatory signs surrounding the surgical wound, when compared to G2. Besides, hospital stay in Laser Group was 2 times shorter than in Placebo Group (p-value=0.001). Conclusion: Infrared Laser denoted to be safe and exceptionally valuable tools in preventing morbidities on post cardiovascular surgeries.

84. Modern retinal laser therapy
PubMed
Kozak, Igor; Luttrull, Jeffrey K
2015-01-01
Medicinal lasers are a standard source of light to produce retinal tissue photocoagulation to treat retinovascular disease. The Diabetic Retinopathy Study and the Early Treatment Diabetic Retinopathy Study were large randomized clinical trials that have shown beneficial effect of retinal laser photocoagulation in diabetic retinopathy and have dictated the standard of care for decades. However, current treatment protocols undergo modifications. Types of lasers used in treatment of retinal diseases include argon, diode, dye and multicolor lasers, micropulse lasers and lasers for photodynamic therapy. Delivery systems include contact lens slit-lamp laser delivery, indirect ophthalmoscope based laser photocoagulation and camera based navigated retinal photocoagulation with retinal eye-tracking. Selective targeted photocoagulation could be a future alternative to panretinal photocoagulation. PMID:25892934

85. Modern retinal laser therapy
PubMed Central
Kozak, Igor; Luttrull, Jeffrey K.
2014-01-01
Medicinal lasers are a standard source of light to produce retinal tissue photocoagulation to treat retinovascular disease. The Diabetic Retinopathy Study and the Early Treatment Diabetic Retinopathy Study were large randomized clinical trials that have shown beneficial effect of retinal laser photocoagulation in diabetic retinopathy and have dictated the standard of care for decades. However, current treatment protocols undergo modifications. Types of lasers used in treatment of retinal diseases include argon, diode, dye and multicolor lasers, micropulse lasers and lasers for photodynamic therapy. Delivery systems include contact lens slit-lamp laser delivery, indirect ophthalmoscope based laser photocoagulation and camera based navigated retinal photocoagulation with retinal eye-tracking. Selective targeted photocoagulation could be a future alternative to panretinal photocoagulation. PMID:25892934

86. Comparison of Low-Level Laser Therapy versus Ozone Therapy in the Treatment of Oral Lichen Planus
PubMed Central
Erisen, Merve
2015-01-01
Background The treatment options for oral lichen planus (OLP) are numerous and include topical and systemic agents. Intralesion and systemic corticosteroids are used; however, the therapeutic results are often disappointing. Objective To compare the influence of ozone, laser, and topical corticosteroid therapies in the treatment of OLP. Methods One hundred twenty adult patients with ?3 cm atrophic-erosive biopsy-proven OLPs in the tongue or buccal mucosa were recruited into the study. They were randomly assigned, by preoperative envelope drawing, to be treated with low-level laser therapy (LLLT group), ozone therapy (ozonated group), and topical corticosteroid therapy (positive control group). A placebo treatment containing base ointment without the active corticosteroid component was administered to patients in the negative control group. Response rate scores were determined on the basis of changes in the appearance score and pain score of the lesions between baseline and after each treatment. Results The study subjects consisted of 56 male and 64 female OLP patients with a combined mean age of 42.6±8.3 years (range, 28–55 years). No statistically significant difference was detected in clinical severity among the groups. The sign scores decreased in almost
all scoring groups; however, statistically significant improvement was found in the ozonated and corticosteroid-treated groups. Symptom improvement was achieved after treatment with LLLT, ozone, and corticosteroid (p<0.05). The efficacy indices were significantly higher in the ozonated and corticosteroid-treated groups. Conclusion Ozone and corticosteroid therapies were more effective than 808-nm LLLT in the treatment of OLP. PMID:26512161

87. Laser therapy for periodontitis
NASA Astrophysics Data System (ADS)
Efanov, O. I.
2001-04-01
An investigation was made of applying pulsed (lambda) equals 0.89 micrometers laser radiation in the treatment for early diagnosed periodontitis. The investigation was made on 65 patients (47 patients constituted the experimental group and 18 patients constituted a control group) affected by periodontitis. Clinical and functional tests revealed that laser therapy produced a string effect on the course of the illness. It reduced bleeding, inflammation, and pruritus. However, it did not produce an affect on electroexicitation. Biomicroscopic examinations and periodontium rheography revealed that the gingival blood flow became normal after the course of laser therapy. The capillary permeability and venous congestion decreased, which was confirmed by the increased time of vacuum tests, raised gingival temperature, reduced tissue clearance, and increased oxygen tension. Apart from that, laser therapy subsided fibrinolysis, proteolytic tissue activity, and decreased the exudative inflammation of periodontium.

88. Effect of low-level laser therapy on lung injury induced by hindlimb ischemia/reperfusion in rats.
PubMed
Ashrafzadeh Takhtfooladi, Mohammad; Ashrafzadeh Takhtfooladi, Hamed; Sedaghatfar, Hamidreza; Shabani, Samaneh
2015-08-01
To investigate the effect of low-level laser therapy (LLLT 650 nm) on the lung remote organ injury induced by hindlimb ischemia/reperfusion (I/R). The experiments were performed on 50 healthy mature male Wistar rats weighing mean 230±20 g. The rats were randomly allocated into five equal groups as follows: normal group (animals nonmanipulated), sham group (operated with no ischemia), laser group (animals nonmanipulated and irradiated with laser), I/R group, and I/R + LLLT group. Rats were prepared for sterile surgery, and then, right hindlimbs were subjected to I/R induced by the femoral artery occlusion for duration of 120 min, followed by a 60-min reperfusion. The LLLT (K30 handheld probe, AZOR, Technica, Russia, 650 nm, 30 mW, surface area?=71 cm(2), 60 S/cm(2), energy density?=1.8 J/cm(2)) was carried out by irradiating the rats over a unique point on the skin over the right upper bronchus for 5 and 15 min after initiating reperfusion for 3 min. At the end of the trial, rats were euthanized under deep anesthesia and the right lung tissues were removed. Myeloperoxidase (MPO) and superoxide dismutase (SOD) activities and nitric oxide (NO), malondialdehyde (MDA), and glutathione (GSH) levels were measured in the lung tissues. The tissue samples were further examined histopathologically under light microscopy. It was found that I/R elevated MPO activity, MDA, and NO levels accompanied by a reduction in SOD activities and GSH levels (P?LLLT restored MDA and NO levels, MPO and SOD activity, GSH levels, and lung injury scores (P?LLLT has alleviated the lung tissue injuries after skeletal muscle I/R in this experimental model. PMID:26155904

89. The influence of low-level laser therapy with alendronate irrigation on healing of bone defects in rats.
PubMed
Akyol, Utkan Kamil; Sipal, Sare; Demirci, Elif; Gungormus, Metin
2015-04-01
The aim of this study was to investigate the effects of alendronate (Aln) irrigation with low-level laser therapy (LLLT) on the healing of bone defects in rats. Sixty Wistar rats weighing 250 to 300 g were randomly divided into three groups of 20 animals each: (1) control group, (2) Aln group, and (3) Aln with LLLT group. The distal epiphysis of all rats was perforated with a surgical bone drill. Twenty rats served as control. The bone defects of 40 rats received local alendronate sodium trihydrate irrigation (1 mg/ml) at the time of surgery. LLLT was applied to the bone defects of 20 rats immediately after Aln irrigation, and repeated on days 2, 4, 6, and 8 with a total dose of 10 J/cm(2) (2 J/cm(2)×5). Continuous wave of GaAlAs laser (808 nm) was used with a power density of 0.1 W/cm(2). Laser energy was applied for 20 s (0.1 W×20 s/1 cm(2)) per session. Control group, Aln group, and Aln with LLLT group rats were sacrificed at days 10 and 20 to compare the bone healing of each group histologically. There were significant differences between the three groups regarding union, substantia spongiosa, cortex formation, and in sum of histologic scores on days 10 and 20 (P?LLLT on bone healing in rats. It was concluded that combining LLLT (808 nm laser at 10 J/cm(2)) with Aln irrigation has a beneficial effect in bone repair. It was demonstrated experimentally that Aln irrigation during the surgery had a significant effect to enhance bone formation, and LLLT significantly potentiated the
osseous healing effects of Aln on bone defects. This administration method is able to minimize the dose of Aln in order to avoid both systemic and local adverse effects as well as the local injection times during the bone healing process. PMID:25686915

90. Effect of low level laser therapy on revascularization of free gingival graft using ultrasound Doppler flowmetry
PubMed Central
Arunachalam, Lalitha T.; Sudhakar, Uma; Janarthanam, Akila Sivaranjani; Das, Nimisha Mithra
2014-01-01
Low level laser therapy (LLLT) is widely used during the post-operative period to accelerate the healing process. It promotes beneficial biological action on neovascularization with anti-inflammatory and analgesic effects. Two systemically healthy patients with Miller’s grade II recession on 33 and 41, respectively, were treated with free gingival graft. After surgery, second patient received LLLT using a 830 nm diode laser, with output power of 0.1 W on the first day half hour following surgery, on the third day, seventh day, and lastly on the ninth day. Both the patients were asked to assess the pain on second, fourth and tenth day using a Numerical Rating Scale and revascularization of the grafted area was assessed using a color Doppler ultrasound imaging on the fourth and the ninth day. Neovascularization was noted in both the patients but the second patient elicited marked increase in vascularity on the fourth as well as the tenth day and drastic reduction in pain on day four, with no change on the tenth day. The results showed that LLLT was an effective adjunctive treatment in promoting revascularization and pain control during early healing of free gingival graft. PMID:25024560

91. Low-level laser therapy on MCF-7 cells: a micro-Fourier transform infrared spectroscopy study
NASA Astrophysics Data System (ADS)
Magrini, Taciana D.; dos Santos, Nathália Villa; Milazzotto, Marcella Pecora; Cerchiaro, Giselle; da Silva Martinho, Herculano
2012-10-01
Low-level laser therapy (LLLT) is an emerging therapeutic approach for several clinical conditions. The clinical effects induced by LLLT presumably scale from photobiostimulation/photobioinhibition at the cellular level to the molecular level. The detailed mechanism underlying this effect remains unknown. This study quantifies some relevant aspects of LLLT related to molecular and cellular variations. Malignant breast cells (MCF-7) were exposed to spatially filtered light from a He-Ne laser (633 nm) with fluences of 5, 28.8, and 1000 mJ/cm2. The cell viability was evaluated by optical microscopy using the Trypan Blue viability test. The micro-Fourier transform infrared technique was employed to obtain the vibrational spectra of each experimental group (control and irradiated) and identify the relevant biochemical alterations that occurred due to the process. It was observed that the red light influenced the RNA, phosphate, and serine/threonine/tyrosine bands. We found that light can influence cell metabolism depending on the laser fluence. For 5 mJ/cm2, MCF-7 cells suffer bioinhibition with decreased metabolic rates. In contrast, for the 1 J/cm2 laser fluence, cells present biostimulation accompanied by a metabolic rate elevation. Surprisingly, at the intermediate fluence, 28.8 mJ/cm2, the metabolic rate is increased despite the absence of proliferative results. The data were interpreted within the retrograde signaling pathway mechanism activated with light irradiation.

92. Low-level laser therapy (810 nm) protects primary cortical neurons against excitotoxicity in vitro
PubMed
Huang, Ying-Ying; Nagata, Kazuya; Tedford, Clark E; Hamblin, Michael R
2014-08-01
Excitotoxicity describes a pathogenic process whereby death of neurons releases large amounts of the excitatory neurotransmitter glutamate, which then proceeds to activate a set of glutamatergic receptors on neighboring neurons (glutamate, N-methyl-D-aspartate (NMDA), and kainate), opening ion channels leading to an influx of calcium ions producing mitochondrial dysfunction and cell death. Excitotoxicity contributes to brain damage after stroke, traumatic brain injury, and neurodegenerative diseases, and is also involved in spinal cord injury. We tested whether low level laser (light) therapy (LLLT) at 810 nm could protect primary murine cultured cortical neurons against excitotoxicity in vitro produced by addition of glutamate, NMDA or kainate. Although the prevention of cell death was modest but significant, LLLT (3 J/cm(2) delivered at 25 mW/cm(2) over 2 min) gave highly significant benefits in increasing ATP, raising mitochondrial membrane potential, reducing intracellular calcium concentrations, reducing oxidative stress and reducing nitric oxide. The action of LLLT in abrogating excitotoxicity may play a role in explaining its beneficial effects in diverse central nervous system pathologies. PMID:24127337

93. It is time to test low level laser therapy in Great Britain
PubMed Central
Moshkovska, T; Mayberry, J
Low level laser therapy (LLLT) has been used in Eastern Europe and Asia for the treatment of a wide range of conditions for many years. Its continued acceptance in these populations reflects the efficacy with which it is regarded both by clinicians and their patients. Although there have been a substantial number of reports on its clinical benefit and some practitioners have used the technique in North America and Australasia it has yet to be subjected to detailed assessment through randomised clinical trials. The purpose of this review is to stimulate interest in the technique and to encourage rigorous research into its potential value. PMID:15998818

Systemic effects of LLLT on bone repair around PLLA-PGA screws in the rabbit tibia. PubMed
Coelho, Rodrigo Carvalho Pinto; Zerbinati, Lívia Prates Soares; de Oliveira, Marília Gerhardt; Weber, João Batista Blessmann 2014-03-01
To evaluate the systemic effects of low level laser therapy (LLLT) on the early stages of bone repair after implantation of poly-L-lactic/polyglycolic acid (PLLA-PGA) screws 24 rabbits were randomly allocated to one of two groups, experiment or control. Each animal underwent implantation of one 57×1.5 mm PLLA-PGA screw in each tibia (right and left). The experiment group received infrared laser irradiation (830 nm, 4 J, 100 mW, 10.1 s) over the right paw immediately after implantation and every 48 h thereafter, for a maximum of seven sessions. The control group was not irradiated. Both groups were divided into three subgroups according to the observation period (5, 15, or 30 days), after which animals were euthanized. The results observed in the left paw of experimental animals were compared with the left paws of control animals. We also compared the right and left paws of experimental animals so as to compare local and potential systemic effects. Bone specimens were analyzed to assess the extent of peri-implant bone formation, quantitative analysis revealed greater bone formation in the left tibia of experimental animals as compared to controls on 5-day follow-up. Descriptive analysis revealed slightly larger and thicker trabeculae in the irradiated animals at 5 days post-procedure. There were no significant differences at any other point in time. As used in this study, LLLT had a positive systemic effect on the early stages of bone formation. PMID:23832178

The venous ulcer represents approximately 70% to 90% of inferior member ulcers, and the most common etiological factor is venous insufficiency, triggered by venous hypertension. Currently in Brazil there are several types of lasers used in physiotherapy, which benefit biological potential, emitting low power radiation, with anti-inflammatory, analgesic, healing and circulatory effects. This study aimed at the analysis of low level laser therapy effects (LLLT) on the process of tissue repair in chronic venous ulcers. We conducted a case study of a patient with a venous ulcer in the lateral region of the right inferior member. The patient underwent LLLT, which used a GaAlInP diode laser, with a wavelength of 660?nm and energy density of 4?J?cm-2 applied punctually at the edges of the wound, with an average distance of 1?cm between the points with a pen-laser perpendicular wrapped in paper and a plastic wrap, keeping contact with the tissue. After four months of therapy and a total of 21 sessions, an improvement was noticeable in the gross appearance of the wound, but after a month and a half without therapy, the dimensions of the wound increased in length and width. Analyzing the results of this case study allows us to conclude that the LLLT GaAlInP (660?nm) with an energy density of 4?J?cm-2, was not successful in the healing of venous ulcers.

Preliminary study on radio-chemo-induced oral mucositis and low level laser therapy NASA Astrophysics Data System (ADS) Merigo, Elisabetta; Fontana, Matteo; Fornaini, Carlo; Clini, Fabio; Cella, Luigi; Vescovi, Paolo; Oppici, Aldo 2012-09-01
Background: Oral mucositis remains one of the most common and troubling side effects of antineoplastoc radiation and drug therapy: its incidence in onco-hematological radio-chemotreated patients is variable between 50 and 100% and its impact on this populations is directly linked with the experience of intense pain causing reduction and modification of therapy regimens, decreased survival rates and increased cost of care. Purpose: Aim of this study is the preliminary evaluation of a Low Level Laser therapy (LLLT) protocol on healing process of oral mucositis and on pain and quality of life of patients experiencing this dramatic side-effect. Materials and methods: Patients were evaluated and treated at the Unità Operativa Semplificata Maxillo-Facciale di Odontostomatologia e Chirurgia Maxillo-Facciale of the Hospital of Piacenza were they were treated for primary disease with protocols of chemotherapy and/or radiotherapy. LLLT protocol was performed with a diode laser (808 nm -XD Smile - Fotona -Slovenia) on a two weeks-6 treatments schedule with power of 0.5 W and application of 30 seconds. Mucositis grading was scored on the basis of WHO
classification by two blind operators at each treatment and at 1 and 2 weeks after treatment. Pain and capability of deglutition were described by patients by means questionnaires based on Visual Analogue Scale, Numerical Rating Scale and Quality of Life. Results: A relevant improvement of healing of oral mucositis, in terms of reduction of grading score, and of pain, swallowing discomfort and quality of life was recorded. Discussion and conclusion: Results of this preliminary study are encouraging for the realization of larger studies focused on the application of LLLT protocols in management of radio-chemotreated patients with oral mucositis.

97. Photobiomodulation of Surgical Wound Dehiscence in a Diabetic Individual by Low-Level Laser Therapy Following Median Sternotomy
PubMed Central
Dixit, Snehil; Maiya, Arun; Umakanth, Shashikiran; Borkar, Shirish
2013-01-01
In this single case study, we attempt to outline the possible effect of low-level laser therapy (LLLT) on delayed wound healing and pain in chronic dehiscent sternotomy of a diabetic individual. The methods that were employed to evaluate changes pre and post irradiation were wound photography, wound area measurement, pressure ulcer scale of healing (PUSH), and visual analogue scale (VAS) for pain. After irradiation, proliferation of healthy granulation tissue was observed with decrease in scores of PUSH for sternal dehiscence and VAS for bilateral shoulders and sternal dehiscence. We found that LLLT irradiation could be a novel method of treatment for chronic sternal dehiscence following coronary artery bypass grafting, as it augments wound healing with an early closure of the wound deficit. Hence, this might be translated into an early functional rehabilitation and decreased pain perception of an individual following surgical complication.
PMID:23766600

98. Photobiomodulation of Surgical wound dehiscence in a diabetic individual by low-level laser therapy following median sternotomy
PubMed
Dixit, Snehil; Maiya, Arun; Umakanth, Shashikiran; Borkar, Shirish
2013-01-01
In this single case study, we attempt to outline the possible effect of low-level laser therapy (LLLT) on delayed wound healing and pain in chronic dehiscent sternotomy of a diabetic individual. The methods that were employed to evaluate changes pre and post irradiation were wound photography, wound area measurement, pressure ulcer scale of healing (PUSH), and visual analogue scale (VAS) for pain. After irradiation, proliferation of healthy granulation tissue was observed with decrease in scores of PUSH for sternal dehiscence and VAS for bilateral shoulders and sternal dehiscence. We found that LLLT irradiation could be a novel method of treatment for chronic sternal dehiscence following coronary artery bypass grafting, as it augments wound healing with an early closure of the wound deficit. Hence, this might be translated into an early functional rehabilitation and decreased pain perception of an individual following surgical complication.
PMID:23766600

99. Effects of 660 nm low-level laser therapy on muscle healing process after cryolesion
PubMed
Rodrigues, Natalia C; Assis, Lívia; Fernandes, Kelly R; Magri, Angela; Ribeiro, Daniel A; Brunelli, Roberta; Abreu, Daniela C C; Renno, Ana Cláudia M
2013-01-01
The aim of this study was to evaluate the effects of 660 nm low-level laser therapy (LLLT) on muscle regeneration after cryolesion in rat tibialis anterior muscle. Sixty-three Wistar rats were divided into a control group, 10 J/cm(2) laser-treated group, and 50 J/cm(2) laser-treated group. Each group formed three subgroups (n = 7 per group), and the animals were sacrificed 7, 14, or 21 d after lesion. Histopathological findings revealed a higher inflammatory process in the laser-treated groups after 7 d. After 14 d, irradiated animals at both fluences showed higher granulation tissue, new muscle fibers, and organized muscle structure. After 21 d, full tissue repair was observed in all groups. Moreover, irradiated animals at both fluences showed smaller necrosis area in the first experimental period evaluated. MyoD immunoeexpression was observed in both treated groups 7 d postinjury. Myogenin immunoeexpression was detected after 7 and 14 d. The higher fluence increased the number of blood vessels after 14 and 21 d. These results suggest that LLLT, at both fluences, positively affects injured skeletal muscle in rats, accelerating the muscle-regeneration process.
PMID:24301435

100. Vibrational spectroscopy characterization of low level laser therapy on mammary culture cells: a micro-FTIR study
NASA Astrophysics Data System (ADS)
Magrini, Taciana D.; Villa dos Santos, Nathalia; Pecora Milazzotto, Marcella; Cerchiaro, Giselle; da Silva Martinho, Herculano
Low level laser therapy (LLLT) is an emerging therapeutic approach for several clinical conditions. The clinical effects induced by LLLT presumably go from the photobiostimulation/photobiomodulation at cellular level to the molecular level. The detailed mechanism underlying this effect is still obscure. This work is dedicated to quantify some relevant aspects of LLLT related to molecular and cellular variations. This goal was attached by exposing malignant breast cells (MCF7) to spatially filtered light of a He-Ne laser (633 nm) with 28.8 mJ/cm2 of fluency. The cell viability was evaluated by microscopic observation using Trypan Blue viability test. The vibrational spectra of each experimental group (micro-FTIR technique) were used to identify the relevant biochemical alterations occurred due the process. The red light had influence over RNA, phosphate and serine/threonine/tyrosine bands. Light effects on cell number or viability were not detected. However, the irradiation had direct influence on metabolic activity of cells.

- LLLT activates NF-κB via generation of reactive oxygen species in mouse embryonic fibroblasts

**PubMed**
Xuan, Weijun; Agrawal, Tanupriya; Huang, Liyi; Gupta, Gaurav K; Hamblin, Michael R
2015-06-01
Transcranial low-level laser (light) therapy (LLLT) is a new non-invasive approach to treating a range of brain disorders including traumatic brain injury (TBI). We (and others) have shown that applying near-infrared light to the head of animals that have suffered TBI produces improvement in neurological functioning, lessens the size of the brain lesion, reduces neuroinflammation, and stimulates the formation of new neurons. In the present study we used a controlled cortical impact TBI in mice and treated the mice either once (4 h post-TBI, 1-laser), or three daily applications (3-laser) with 810 nm CW laser 36 J/cm2 at 50 mW/cm2 (2). Similar to previous studies, the neurological severity score improved in laser-treated mice compared to untreated TBI mice at day 14 and continued to further improve at days 21 and 28 with 3-laser being better than 1-laser. Mice were sacrificed at days 7 and 28 and brains removed for immunofluorescence analysis. Brain-derived neurotrophic factor (BDNF) was significantly upregulated by laser treatment in the dentate gyrus of the hippocampus (DG) and the subventricular zone (SVZ) but not in the perilesional cortex (lesion) at day 7 but not at day 28. Synapsin-1 (a marker for synaptogenesis, the formation of new connections between existing neurons) was significantly upregulated in lesion and SVZ but not DG, at 28 days but not 7 days. The data suggest that the benefit of LLLT to the brain is partly mediated by stimulation of BDNF production, which may in turn encourage synaptogenesis. Moreover the pleiotropic benefits of BDNF in the brain suggest LLLT may have wider applications to neurodegenerative and psychiatric disorders. Neurological Severity Score (NSS) for TBI mice. PMID:25196192

**NASA Astrophysics Data System (ADS)**
Chen, Aaron Chih-Hao; Arany, Praveen R.; Huang, Ying-Ying; Tomkinson, Elizabeth M.; Saleem, Taimur; Yull, Fiona E.; Blackwell, Timothy S.; Hamblin, Michael R.
2009-02-01
Despite over forty years of investigation on low-level light therapy (LLLT), the fundamental mechanisms underlying photobiomodulation remain unclear. In this study, we isolated murine embryonic fibroblasts (MEF) from transgenic NF-kB luciferase reporter mice and studied their response to 810-nm laser radiation. Significant activation of NFκB was observed for fluences higher than 0.003 J/cm2. NF-kB activation by laser was detectable at 1-hour time point. Moreover, we demonstrated that laser phosphorylated both IKKα/β and NF-kB 15 minutes after irradiation, which implied that laser activates NF-kB via phosphorylation of IKKα/β. Suspecting mitochondria as the source of NF-kB activation signaling pathway, we demonstrated that laser increased both intracellular reactive oxygen species (ROS) by fluorescence microscopy with dichlorodihydrofluorescein and ATP synthesis by luciferase assay. Mitochondrial inhibitors, such as antimycin A, rotenone and paraquat increased ROS and NF-kB activation but had no effect on ATP. The ROS quenchers N-acetyl-L-cysteine and ascorbic acid abrogated laser-induced NF-kB and ROS but not ATP. These results
suggested that ROS might play an important role in the signaling pathway of laser induced NF-kB activation. However, the western blot showed that antimycin A, a mitochondrial inhibitor, did not activate NF-kB via serine phosphorylation of IKK ?/? as the laser did. On the other hand, LLLT, unlike mitochondrial inhibitors, induced increased cellular ATP levels, which indicates that light also upregulates mitochondrial respiration. ATP upregulation reached a maximum at 0.3 J/cm² or higher. We conclude that LLLT not only enhances mitochondrial respiration, but also activates the redox-sensitive transcription factor NF-kB by generating ROS as signaling molecules.

103. Self-organizing phenomena at membrane level and low-level laser therapy of rhinitis
NASA Astrophysics Data System (ADS)
Ailioaie, Laura; Ailioaie, C.; Topoliceanu, Fl.
2000-06-01
Allergic rhinitis is the most common allergic disease affecting many people worldwide. Low level laser therapy (LLLT) was applied as monotherapy to 32 children, under placebo controlled conditions. There have been used two GaAlAs diode lasers. The density of energy and the frequency 2 sessions daily - were applied under a special experimental protocol of treatment, including endonasal regions treated with an optical fiber and the extrameridian acupuncture points for rhinitis, 10 days monthly, three months consecutively. The initial investigations with fiberoptic rhinoscope revealed a swollen, pale and edematous mucosa, with increased nasal sections, which may be watery to mucoid. At the end of LLLT, the symptoms of rhinitis like sneezing, nasal congestion, stuffy nose, mouth breathing, snoring - have disappeared and the aspect of nasal mucosa was normal. The results could be explained in the new scenario of self-organizing phenomena at membrane level. The physiological beneficial effects may be correlated and possibly explained by self-organizing paradigms. Our result warrant that LLL is a very good therapy modality for children suffering from allergic rhinitis.

104. Enhanced angiogenic effect of adipose-derived stromal cell spheroid with low-level light therapy in hindlimb ischemia mice
NASA Astrophysics Data System (ADS)
Park, In-Su; Ahn, Jin-Chul; Chung, Phil-Sang
2014-02-01
Adipose-derived stromal cells (ASCs) are attractive cell source for tissue engineering. However, one obstacle to this approach is that the transplanted ASC population can decline rapidly in the recipient tissue. The aim of this study was to investigate the effects of low-level laser therapy (LLLT) on transplanted human ASCs (hASCs) spheroid in a hindlimb ischemia animal model. LLLT, hASCs spheroid and hASCs spheroid transplantation with LLLT (spheroid + LLLT) were applied to the ischemic hindlimbs in athymic mice. The survival, differentiation and secretion of vascular endothelial growth (VEGF) of spheroid ASCs were evaluated by immunohistochemistry. The spheroid + LLLT group enhanced the tissue regeneration, including angiogenesis, compared with other groups. The spheroid contributed tissue regeneration via differentiation and secretion of growth factors. In the spheroid + LLLT group, the survival of spheroid hASCs was increased by the decreased apoptosis of spheroid hASCs in the ischemic hindlimb. The secretion of growth factors was stimulated in the spheroid + LLLT group compared with the ASCs group and spheroid group. These data suggest that LLLT is an effective biostimulator of spheroid hASCs in tissue regeneration that enhances the survival of ASCs and stimulates the secretion of growth factors in the ischemic hindlimb.

105. Low-level laser therapy and light-emitting diode effects in the secretion of neuropeptides SP and CGRP in rat skin
PubMed
Hochman, Bernardo; Pinfieldi, Carlos E; Nishioka, Michele A; Furtado, Fabianne; Bonatti, Silvilena; Monteiro, Paola K P; Antunes, Arainy S; Quieregatto, Paulo R; Liebano, Richard E; Chadi, Gerson; Ferreira, Lydia Masako
2014-05-01
The phototherapy effects in the skin are related to biomodulation, usually to accelerate wound healing. However, there is no direct proof of the interrelation between the effects of low-level laser therapy (LLLT) and light-emitting diode (LED) in neuropeptide secretion, these substances being prematurely involved in the neurogenic inflammation phase of wound healing. This study therefore focused on investigating LLLT and LED in Calcitonin gene-related peptide (CGRP) and substance P (SP) secretion in healthy rat skin. Forty rats were randomly distributed into five groups with eight rats each: Control Group, Blue LED Group (470 nm, 350 mW power), Red LED Group (660 nm, 350 mW power), Red Laser Group (660 nm, 100 mW power), and Infrared Laser Group (808 nm, 100 mW power) (DMC® Equipamentos Ltda., São Carlos, São Paulo, Brazil). The skin of the animals in the experimental groups was irradiated using the punctual contact technique, with a total energy of 40 J, single dose, standardized at one point in the dorsal region. After 14 min of irradiation, the skin samples were collected for CGRP and SP quantification using western blot analysis. SP was released in
Infrared Laser Group (p = 0.01); there was no difference in the CGRP secretion among groups. Infrared (808 nm) LLLT enhances neuropeptide SP secretion in healthy rat skin. PMID:2433794

Kadhim-Saleh, Amjed; Maganti, Harinad; Ghert, Michelle; Singh, Sheila; Farrokhyar, Forough 2013-10-01
The aim of this study is to determine the efficacy of low-level laser therapy (LLLT) in reducing acute and chronic neck pain as measured by the visual analog scale (VAS). A systematic search of nine electronic databases was conducted to identify original articles. For study selection, two reviewers independently assessed titles, abstracts, and full text for eligibility. Methodological quality was assessed using the Detsky scale. Data were analyzed using random-effects model in the presence of heterogeneity and fixed-effect model in its absence. Heterogeneity was assessed using Cochran’s Q statistic and quantifying I(2). Risk ratios (RR) with 95 % confidence intervals (CI) were reported. Eight randomized controlled trials involving 443 patients met the strict inclusion criteria. Inter-rater reliability for study selection was 92.8 % (95 % CIs 80.9-100 %) and for methodological quality assessment was 83.9 % (95 % CIs 19.4-96.8 %). Five trials included patients with cervical myofascial pain syndrome (CMPS), and three trials included different patient populations. A meta-analysis of five CMPS trials revealed a mean improvement of VAS score of 10.54 with LLLT (95 % CI 0.37-20.71; Heterogeneity I(2) = 65 %, P = 0.02). This systematic review provides inconclusive evidence because of significant between-study heterogeneity and potential risk of bias. The benefit seen in the use of LLLT, although statistically significant, does not constitute the threshold of minimally important clinical difference. PMID:23579335

107. Laser therapy (image) MedlinePLUS
A laser is used for many medical purposes. Because the laser beam is so small and precise, it enables ... without injuring surrounding tissue. Some uses of the laser are retinal surgery, excision of lesions, and cauterization ...

Xuan, Weijun; Vatansever, Fatma; Huang, Liyi; Wu, Qiuhe; Xuan, Yi; Dai, Tianhong; Ando, Takahiro; Xu, Tao; Huang, Ying-Ying; Hamblin, Michael R 2013-01-01
Low-level laser (light) therapy (LLLT) has been clinically applied around the world for a spectrum of disorders requiring healing, regeneration and prevention of tissue death. One area that is attracting growing interest in this scope is the use of transcranial LLLT to treat stroke and traumatic brain injury (TBI). We developed a mouse model of severe TBI induced by controlled cortical impact and explored the effect of different treatment schedules. Adult male BALB/c mice were divided into 3 broad groups (a) sham-TBI sham-treatment, (b) real-TBI sham-treatment, and (c) real-TBI active-treatment. Mice received active-treatment (transcranial LLLT by continuous wave 810 nm laser, 25 mW/cm(2), 18 J/cm(2), spot diameter 1 cm) while sham-treatment was immobilization only, delivered either as a single treatment at 4 hours post TBI, as 3 daily treatments commencing at 4 hours post TBI or as 14 daily treatments. Mice were sacrificed at 0, 4, 7, 14 and 28 days post-TBI for histology or histomorphometry, and injected with bromodeoxyuridine (BrdU) at days 21-27 to allow identification of proliferating cells. Mice with severe TBI treated with 1-laser Tx (and to a greater extent 3-laser Tx) had significant improvements in neurological severity score (NSS), and wire-grip and motion test (WGMT). However 14-laser Tx provided no benefit over TBI-sham control. Mice receiving 1- and 3-laser Tx had smaller lesion size at 28-days (although the size increased over 4 weeks in all TBI-groups) and less Fluoro-Jade staining for degenerating neurons (at 14 days) than in TBI control and 14-laser Tx groups. There were more BrDU-positive cells in the lesion in 1- and 3-laser groups suggesting LLLT may increase neurogenesis. Transcranial NIR laser may provide benefit in cases of acute TBI provided the optimum treatment regimen is employed. PMID:23308226

109. Transcranial Low-Level Laser Therapy Improves Neurological Performance in Traumatic Brain Injury in Mice: Effect of Treatment Repetition Regimen PubMed Central
Huang, Liyi; Wu, Qiuhe; Xuan, Yi; Dai, Tianhong; Ando, Takahiro; Xu, Tao; Huang, Ying-Ying; Hamblin, Michael R. 2013-01-01
Low-level laser (light) therapy (LLLT) has been clinically applied around the world for a spectrum of disorders requiring healing, regeneration and prevention of tissue death. One area that is attracting growing
interest in this scope is the use of transcranial LLLT to treat stroke and traumatic brain injury (TBI). We developed a mouse model of severe TBI induced by controlled cortical impact and explored the effect of different treatment schedules. Adult male BALB/c mice were divided into 3 broad groups (a) sham-TBI shamtreatment, (b) real-TBI sham-treatment, and (c) real-TBI active-treatment. Mice received active-treatment (transcranial LLLT by continuous wave 810 nm laser, 25 mW/cm², 18 J/cm², spot diameter 1 cm) while sham-treatment was immobilization only, delivered either as a single treatment at 4 hours post TBI, as 3 daily treatments commencing at 4 hours post TBI or as 14 daily treatments. Mice were sacrificed at 0, 4, 7, 14 and 28 days post-TBI for histology or histomorphometry, and injected with bromodeoxyuridine (BrdU) at days 21–27 to allow identification of proliferating cells. Mice with severe TBI treated with 1-laser Tx (and to a greater extent 3-laser Tx) had significant improvements in neurological severity score (NSS), and wire-grip and motion test (WGMT). However 14-laser Tx provided no benefit over TBI-sham control. Mice receiving 1- and 3-laser Tx had smaller lesion size at 28-days (although the size increased over 4 weeks in all TBI-groups) and less Fluoro-Jade staining for degenerating neurons (at 14 days) than in TBI control and 14-laser TxBgroups. There were more BrdU-positive cells in the lesion in 1- and 3-laser groups suggesting neurogenesis. Transcranial NIR laser may provide benefit in cases of acute TBI provided the optimum treatment regimen is employed. PMID:23308226

Cafaro, Adriana; Arduino, Paolo Giacomo; Massolini, Gianluca; Romagnoli, Ercole; Broccoletti, Roberto 2014-01-01
Oral lichen planus (OLP) is an inflammatory disease that can be painful, mainly in the atrophic and erosive forms. Numerous drugs have been used with dissimilar results, but most treatments are empirical. However, to date, the most commonly employed and useful agents for the treatment of OLP are topical corticosteroids. The study objective was to detail the clinical effectiveness of low-level laser therapy (LLLT) for the management of OLP unresponsive to standard topical therapy. The authors studied a prospective cohort of 30 patients affected by OLP, who received biostimulation with a 980-nm gallium-aluminum-arsenide (GaAlAs) diode laser (DM980, distributed by DMT S.r.l., Via Nobel 33, 20035, Lissone, Italy). Outcome variables, statistically evaluated, were: the size of lesions; visual analogue score of pain and stability of the therapeutic results in the follow-up period. Eighty-two lesions were treated. We reported significant reduction in clinical scores of the treated lesions and in reported pain. No detailed complications or therapy side effects were observed during the study. As previously reported by our group with a preliminary report, this study suggests that LLLT could be a possible treatment choice for patients with unresponsive symptomatic OLP, also reducing the possible invasiveness correlated with other therapies. PMID:23549680

Aimbire, Flávio; de Lima, Flávia Mafra; Costa, Maricilia S; Albertini, Regiane; Correa, João Carlos; Iversen, Vegard V; Bjordal, Jan M 2009-07-01
The objective of this study was to investigate whether low level laser therapy (LLLT) could reduce bronchial hyper-responsiveness (BHR) induced by tumour necrosis factor-alpha (TNF-alpha) modulating the metabolism of inositol phosphate (IP) in bronchial smooth muscle cells (BSMCs). The study was on 28 Wistar rats, randomly divided into four groups. Irradiation (1.3 J/cm²) was administered 5 min and 4 h after bronchial smooth muscle (BSM) had been suspended in TNF-alpha baths, and the contractile response-induced calcium ion (Ca²⁺) sensitization was measured. The BSMCs were isolated, and the IP accumulation was measured before and after TNF-alpha immersion in the groups that had been irradiated or not irradiated. BSM segments significantly increased contraction 24 h after TNF-alpha immersion when exposed to carbamol (CCh) as Ca²⁺, but it was significantly reduced by 64% and 30%, respectively, after laser treatment. The increase in IP accumulation induced by CCh after TNF-alpha immersion was reduced in the BSMCs by LLLT. The dose of 2.6 J/cm² reduced BHR and IP accumulation in the rats' inflammatory BSMCs. PMID:19005736

Ridner, Sheila H.; Poage-Hooper, Ellen; Kanar, Collin; Doersam, Jennifer K.; Bond, Stewart M.; Dietrich, Mary S. 2013-01-01
Purpose/Objectives To examine the impact of advanced practice nurse (APN) administered low level laser therapy (LLLT) as both a stand-alone and complementary treatment for arm volume, symptoms, and quality of life (QOL) in women with breast cancer related lymphedema. Design A three-group, pilot, randomized clinical
trial. Setting A private rehabilitation practice with two locations in the southwestern United States. Sample 46 breast cancer survivors with treatment related lymphedema. Methods Patients were screened for eligibility and then randomized to either manual lymphatic drainage (MLD) for 40 minutes, LLLT for 20 minutes, or, 20 minutes of MLD followed by 20 minutes of LLLT. Compression bandaging was applied after each treatment. Data were collected pre-treatment, daily, weekly, and at the end of treatment. Main Research Variables Independent variables consisted of three types of APN administered lymphedema treatment. Outcome variables included limb volume, extracellular fluid, psychological and physical symptoms, and QOL. Findings No statistically significant between group differences were found in volume reduction; however, all groups had clinically and statistically significant reduction in volume. No group differences were noted in psychological and physical symptoms, or QOL; however, treatment related improvements were noted in symptom burden within all groups. Skin improvement was noted in each group that received LLLT. Conclusions LLLT with bandaging may offer a time saving therapeutic option to conventional MLD. Alternatively compression bandaging alone could account for the demonstrated volume reduction. Implications for Nursing APNs can effectively treat lymphedema. APNs in private healthcare practices can serve as valuable research collaborators. PMID:23803270

113. **Low level laser therapy reduces acute lung inflammation in a model of pulmonary and extrapulmonary LPS-induced ARDS.**

PubMed

Oliveira, Manoel Carneiro; Greiffo, Flávia Regina; Rigonato-Oliveira, Nicole Cristine; Custódio, Ricardo Wesley Alberca; Silva, Vanessa Roza; Damaceno-Rodrigues, Nilsa Regina; Almeida, Francine Maria; Albertini, Regiane; Lopes-Martins, Rodrigo Alvaro B; de Oliveira, Luis Vicente Franco; de Carvalho, Paulo de Tarso Camillo; Ligeiro de Oliveira, Ana Paula; Leal Jr, Ernesto César P; Vieira, Rodolfo P

2014-05-01

The present study aimed to investigate the effects low level laser therapy (LLLT) in a LPS-induced pulmonary and extrapulmonary acute respiratory distress syndrome (ARDS) in BALB/c mice. Laser (830nm laser, 9J/cm(2), 35mW, 80s per point, 3 points per application) was applied in direct contact with skin, 1h after LPS administration. Mice were distributed in control (n=6; PBS), ARDS IT (n=7; LPS orotracheally 10(7)g/mouse), ARDS IP (n=7; LPS intra-peritoneally 100(7)g/mouse), ARDS IT+Laser (n=9; LPS intra-tracheally 10(7)g/mouse), ARDS IP+Laser (n=9; LPS intra-peritoneally 100(7)g/mouse). Twenty-four hours after last LPS administration, mice were studied for pulmonary inflammation by total and differential cell count in bronchoalveolar lavage (BAL), cytokines (IL-1beta, IL-6, KC and TNF-alpha) levels in BAL fluid and also by quantitative analysis of neutrophils number in the lung parenchyma. LLLT significantly reduced pulmonary and extrapulmonary inflammation in LPS-induced ARDS, as demonstrated by reduced number of total cells (p<0.001) and neutrophils (p<0.001) in BAL, reduced levels of IL-1beta, IL-6, KC and TNF-alpha in BAL fluid and in serum (p<0.001), as well as the number of neutrophils in lung parenchyma (p<0.001). LLLT is effective to reduce pulmonary inflammation in both pulmonary and extrapulmonary model of LPS-induced ARDS. PMID:24792475

114. **Evaluation of dental pulp repair using low level laser therapy (688 nm and 785 nm) morphologic study in capuchin monkeys**

NASA Astrophysics Data System (ADS)

Prete1, H.; Oliveira, J. A.; Lizarelli, R. F. Z.; Ramalho, L. T. O.

2009-02-01

The aim of this study was to evaluate the hypothesis that low-level laser therapy (LLLT) 688 nm and 785 nm accelerate dentin barrier formation and repair process after traumatic pulp exposure. The sample consisted of 45 premolars of capuchin monkeys (Cebus apella) with pulp exposure Class V cavities. All premolars were treated with calcium hydroxide (Ca(OH)2), divided in groups of 15 teeth each, and analyzed on 7th, 25th, and 60th day. Group GI - only Ca(OH)2, GH - laser 688 nm, and GIII - laser 785 nm. Laser beam was used in single and punctual dose with the parameters: continuous, 688 nm and 785 nm wavelength, tip's area of 0.00785 cm2, power 50 mW, application time 20 s, dose 255 J/cm2, energy 2 J. Teeth were capped with Ca(OH)2, Ca(OH)2 cement and restored with amalgam. All groups presented pulp repair. On 25th day the thickness of the formed dentin barrier was different between the groups GI and GH (p < 0.05) and between groups GI and GIII (p < 0.01). On 60th day there was difference between GI and GIII (p < 0.01). It may be concluded that, LLLT 688 nm and 785 nm accelerated dentin barrier formation and consequently pulp repair process, with best results using infrared laser 785 nm.

115. **Evaluation of low level laser therapy irradiation parameters on rat muscle inflammation through systemic blood cytokines**

NASA Astrophysics Data System (ADS)

Mantineo, Matias; Pinheiro, João. P.; Morgado, António M.
Low level laser therapy (LLLT) has been used for inflammation treatment. Here, we evaluate the effect of different doses, using continuous (830 and 980 nm) and pulsed illumination (830 nm), in the treatment of inflammation induced in the gastrocnemius muscle of Wistar rats, through cytokines concentration in systemic blood and histological analysis of muscle tissue. Animals were randomly divided into five groups per wavelength (5 animals per group: 10, 20, 30, 40 and 50 mW) plus a control group. LLLT was applied during five days, with constant exposure time and irradiated area (3 minutes; 0.5026 cm²). Blood was collected on days 0, 3 and 6. TNF-?, IL-1?, IL-2 and IL-6 cytokines were quantified by ELISA. Rats were killed on day 6. Muscle inflammatory cells were counted using optical microscopy. Treatment effects occurred for all applied doses (largest effect at 40 mW: 7.2 J, 14 J/cm² per irradiation), with reduction of proinflammatory TNF-?, IL-1? and IL-6 cytokines and lower number of inflammatory cells. Results were better for 830 nm. Identical methodology was used with pulsed illumination. Average power (40 mW) and duty cycle were kept constant (80%) at five frequencies (5, 25, 50, 100 and 200 Hz). Treatment effects were observed at higher frequencies, with no significant differences between them. However, the treatment effect was lower than for continuous illumination. LLLT effect on inflammation treatment can be monitored by measuring systemic blood cytokines. A larger treatment effect was observed with continuous illumination, where results seem to be compatible with a biphasic dose response.

**116. Two-year follow-up of low-level laser therapy for elderly with painful adhesive capsulitis of the shoulder**

Ip, David; Fu, Nga-Yue
2015-01-01

Introduction This paper reports on the medium-term mean 2-year prospective follow-up of a patient cohort of 35 unselected elderly patients with mean age of 65 years who visited our tertiary referral pain center for painful adhesive capsulitis of the shoulder managed with low-level laser therapy (LLLT). Materials and methods All patients in this prospective cohort study had documentation of the diagnosis by contrast-enhanced magnetic resonance imaging before study entry and all had failed to respond to a combination of conventional physical therapy and nonsteroidal anti-inflammatory medications for not fewer than 4 weeks. LLLT, at a wavelength of 810 nm emitted from a GaAlAs semiconductor laser device with 5.4 J per point and a power density of 20 mW/cm², was employed to irradiate six predetermined anatomic points and two acupuncture points. The treatment regimen consisted of three sessions of treatment per week for 8 consecutive weeks. Each treatment session lasted 180 seconds. Serial clinical assessment was undertaken using the Constant–Murley shoulder score. Results A total of 50 painful shoulder joints were treated, as a number of elderly presented with bilateral symptoms. All but four painful shoulders showed significant improvement in Constant–Murley shoulder score at the end of 8-weeks’ LLLT treatment and, surprisingly, the improvement was found maintained at follow-up assessments at 1 year and 2 years. Conclusion We conclude that LLLT is a viable option in the conservative treatment of shoulder pain arising from adhesive capsulitis of the shoulder in the elderly, with a positive clinical result of more than 90% and with clinical efficacy both in the short-term and the medium-term. PMID:26045677

**117. Effects of LLLT for pain: a clinical study on different pain types**

Tam, Giuseppe
2002-10-01

Objective: The aim of this clinical study is to determine the efficacy of the JR diode laser 904 nm pulsed on pain reduction therapy. Summary Background Data: With respect to pain, the existence of a filter (Rolando's substantia gelatinosa) in the spinal marrow is fundamental. Opening or closing, this filter is able to block transmission of pain impulses to a higher cerebral center. This is in proportion with the A big fibres and C small fibres. The action of the laser influences this mechanism. Additionally, laser interferes in the cytokines (TNF-?, interleukin-1 and interleukin-6) that drive inflammation in the arthritis and are secreted from CD4 e T cells. Low power density laser increases the endorphin synthesis in the dorsal posterior horn of the spinal cord. Besides, laser causes local vasodilatation of the capillaries and an improved circulation of drainage liquids in interstitial space causing an analgesic effect. Method: Treatment was carried out on 482 cases and 464 patients (274 women and 190 men) in the period between 1987 and 2000. The patients, whose age ranged from 25 to 70, with a mean age of 45 years, were suffering from rheumatic, degenerative and traumatic pathologies as well as cutaneous ulcers. The majority of the patients had been seen by orthopaedists and rheumatologists and had undergone x-ray, ultrasound scanning, TAC, RM examination. All patients had previously received drug-based treatment and/or physiotherapy with poor results. Two thirds were experiencing acute symptomatic pain, while the others presented a chronic pathology with recurrent crises. We used a pulsed JR diode laser, GaAs 904 nm wavelength. Results: In the evaluation of the results the following parameters have been
considered: disappearance of spontaneous and induced pain, anatomic and functional evaluation of the joints, muscular growth, verbal rating scales, hand dynamometer, patient's pain diary. Very good results were achieved especially with cases of symptomatic osteoarthritis of the cervical vertebrae, with sport-related injuries, with epicondylitis, tendinitis, periartthritis and neuritis. The total relief of pain was achieved in 82% of acute and 65% of chronic cases. Conclusions: Treatment with 904 nm JR diode laser interrupts the "circulus vitiosus" of the different pains (neuropathic, metabolic, traumatic, toxic, immune-mediated, ischemic) and its development. LLLT brings a normal physiological condition back to the tissue, thus myofascial pain relief, decreases tension and substantially reduces the symptoms as well as improves the quality of life of the patients. Our fourteen years of experience indicates that LLLT is a low cost, non-invasive method and easy to be applied.

118. Low-level laser therapy on skeletal muscle inflammation: evaluation of irradiation parameters
NASA Astrophysics Data System (ADS)
Mantíneo, Matías; Pinheiro, João P.; Morgado, António M.
2014-09-01
We evaluated the effect of different irradiation parameters in low-level laser therapy (LLLT) for treating inflammation induced in the gastrocnemius muscle of rats through cytokines concentration in systemic blood and analysis of muscle tissue. We used continuous (830 and 980 nm) and pulsed illuminations (830 nm). Animals were divided into five groups per wavelength (10, 20, 30, 40, and 50 mW), and a control group. LLLT was applied during 5 days with a constant irradiation time and area. TNF-α, IL-1β, IL-2, and IL-6 cytokines were quantified by ELISA. Inflammatory cells were counted using microscopy. Identical methodology was used with pulsed illumination. Average power (40 mW) and duty cycle were kept constant (80%) at five frequencies (5, 25, 50, 100, and 200 Hz). For continuous irradiation, treatment effects occurred for all doses, with a reduction of TNF-α, IL-1β, and IL-6 cytokines and inflammatory cells. Continuous irradiation at 830 nm was more effective, a result explained by the action spectrum of cytochrome c oxidase (CCO). Best results were obtained for 40 mW, with data suggesting a biphasic dose response. Pulsed wave irradiation was only effective for higher frequencies, a result that might be related to the rate constants of the CCO internal electron transfer process.

119. Laser therapy in cardiovascular disease
NASA Astrophysics Data System (ADS)
Rindge, David
2009-02-01
Cardiovascular disease is the number one cause of death worldwide. It is broadly defined to include anything which adversely affects the heart or blood vessels. One-third of Americans have one or more forms of it. By one estimate, average human life expectancy would increase by seven years if it were eliminated. The mainstream medical model seeks mostly to "manage" cardiovascular disease with pharmaceuticals or to surgically bypass or reopen blocked vessels via angioplasty. These methods have proven highly useful and saved countless lives. Yet drug therapy may be costly and ongoing, and it carries the risk of side effects while often doing little or nothing to improve underlying health concerns. Similarly, angioplasty or surgery are invasive methods which entail risk. Laser therapy I regenerates tissue, stimulates biological function, reduces inflammation and alleviates pain. Its efficacy and safety have been increasingly well documented in cardiovascular disease of many kinds. In this article we will explore the effects of laser therapy in angina, atherosclerosis, coronary artery disease, hypertension, hyperlipidemia, myocardial infarction, stroke and other conditions. The clinical application of various methods of laser therapy, including laserpuncture and transcutaneous, supravascular and intravenous irradiation of blood will be discussed. Implementing laser therapy in the treatment of cardiovascular disease offers the possibility of increasing the health and wellbeing of patients while reducing the costs and enhancing safety of medical care.

120. In vivo studies of low level laser (light) therapy for traumatic brain injury
NASA Astrophysics Data System (ADS)
Xuan, Weijun; Wu, Qiuhe; Huang, Ying-Ying; Ando, Takahiro; Huang, Liyi; Hamblin, Michael R.
2012-03-01
Low-level laser (or light) therapy (LLLT) is attracting growing interest to treat both stroke and traumatic brain injury (TBI). The fact that near-infrared light can penetrate into the brain allows non-invasive treatment to be carried out with a low likelihood of treatment-related adverse events. It is proposed that red and NIR light is absorbed by chromophores in the mitochondria of cells leading to changes in gene transcription and upregulation of proteins involved in cell survival, antioxidant production, collagen synthesis, reduction of chronic inflammation and cell migration and proliferation. We developed a mouse model of controlled cortical impact (CCI) TBI and examined the effect of 0, 1, 3, and 14 daily 810-nm CW laser treatments in the CCI model as measured by neurological severity score and wire grip and motion test. 1 laser Tx gave a significant
improvement while 3 laser Tx was even better. Surprisingly 14 laser Tx was no better than no treatment. Histological studies at necropsy suggested that the neurodegeneration was reduced at 14 days and that the cortical lesion was repaired by BrdU+ve neural progenitor (stem) cells at 28 days. Transcranial laser therapy is a promising treatment for acute (and chronic TBI) and the lack of side-effects and paucity of alternative treatments encourages early clinical trials

121. **Low level laser therapy activates NF-kB via generation of reactive oxygen species in mouse embryonic fibroblasts**
   
   E-print Network
   
   Hamblin, Michael R.

   Despite over forty years of investigation on low-level light therapy (LLLT), the fundamental mechanisms underlying photobiomodulation remain unclear. In this study, we isolated murine embryonic fibroblasts (MEF) from ...

122. **Effect of Nd:YAG Low Level Laser Therapy on Human Gingival Fibroblasts**
   
   PubMed Central
   
   Gkogkos, Andreas S.; Karoussis, Ioannis K.; Prevezanos, Ioannis D.; Marcopoulou, Kleopatra E.; Kyriakidou, Kyriaki; Vrotsos, Ioannis A.

   2015-01-01

   Aim. To evaluate the effect of Low Level Laser Therapy (LLLT) on human gingival fibroblasts in terms of proliferation and growth factors' secretion (EGF, bFGF, and VEGF). Materials and Methods. Primary cultures of keratinized mucosa fibroblasts were irradiated by a Nd:YAG laser 1064?nm with the following energy densities: 2.67J/cm2, 5.37J/cm2, 7.97J/cm2, and 15.87J/cm2. Controls were not irradiated. Cultures were examined for cell proliferation and growth factors' secretion after 24, 48, and 72 hours. All experimental procedures were performed in duplicate. Data were analyzed by Student's t-test (p < 0.05). Results. All laser-irradiation doses applied promoted a higher cell proliferation at 48 hours in a dose-response relationship compared to controls. This difference reached statistical significance for the cultures receiving 15.87J/cm2 (p = 0.03). Regarding EGF, all laser irradiation doses applied promoted a higher secretion at 48 hours in a reverse dose-response pattern compared to controls. This difference reached statistical significance for the cultures receiving 2.67J/cm2 (p = 0.04). EGF levels at the other time points, bFGF, and VEGF showed a random variation between the groups. Conclusion. Within the limits of this study, LLLT (Nd:YAG) may induce gingival fibroblasts' proliferation and upregulate the secretion of EGF. Further studies are needed to confirm these results. PMID:26504463

123. **In vitro transdentinal effect of low-level laser therapy**
   
   NASA Astrophysics Data System (ADS)
   

   2013-05-01

   Low-level laser therapy (LLLT) has been used for the treatment of dentinal hypersensitivity. However, the specific LLL dose and the response mechanisms of these cells to transdentinal irradiation have not yet been demonstrated. Therefore, this study evaluated the transdentinal effects of different LLL doses on stressed odontoblast-like pulp cells MDPC-23 seeded onto the pulpal side of dentin discs obtained from human third molars. The discs were placed in devices simulating in vitro pulp chambers and the whole set was placed in 24-well plates containing plain culture medium (DMEM). After 24 h incubation, the culture medium was replaced by fresh DMEM supplemented with either 5% (simulating a nutritional stress condition) or 10% fetal bovine serum (FBS). The cells were irradiated with doses of 15 and 25 J cm-2 every 24 h, totaling three applications over three consecutive days. The cells in the control groups were removed from the incubator for the same times as used in their respective experimental groups for irradiation, though without activating the laser source (sham irradiation). After 72 h of the last active or sham irradiation, the cells were evaluated with respect to succinic dehydrogenase (SDH) enzyme production (MTT assay), total protein (TP) expression, alkaline phosphatase (ALP) synthesis, reverse transcriptase polymerase chain reaction (RT-PCR) for collagen
that the low intensity He laser microstructure differed dramatically at different time pointed along the wound healing. Our observation shows that the low intensity He laser microstructure differed dramatically at different time pointed along the wound healing. Our observation shows therapy (LLLT) The dynamic changes and wound healing processes were observed with nonlinear spectral imaging techniques. Monitoring the effect of low-level laser therapy on cochlea hair-cell recovery after ototoxic hearing loss NASA Astrophysics Data System (ADS) Rhee, Chung-Ku; He, Peijie; Jung, Jae Yun; Ahn, Jin-Chul; Chung, Phil-Sang; Lee, Min Young; Suh, Myung-Whan 2013-12-01 The primary cause of hearing loss includes damage to cochlear hair cells. Low-level laser therapy (LLLT) has become a popular treatment for damaged nervous systems. Based on the idea that cochlear hair cells and neural cells are from same developmental origin, the effect of LLLT on hearing loss in animal models is evaluated. Hearing loss animal models were established, and the animals were irradiated by 830-nm diode laser once a day for 10 days. Power density of the laser treatment was 900 mW/cm2, and the fluence was 162 to 194 J. The tympanic membrane was evaluated after LLLT. Thresholds of auditory brainstem responses were evaluated before treatment, after gentamicin, and after 10 days of LLLT. Quantitative scanning electron microscopic (SEM) observations were done by counting remaining hair cells. Tympanic membranes were intact at the end of the experiment. No adverse tissue reaction was found. On SEM images, LLLT significantly increased the number of hair cells in middle and basal turns. Hearing was significantly improved by laser irradiation. After LLLT treatment, both the hearing threshold and hair-cell count significantly improved. Monitoring the effect of low-level laser therapy in healing process of skin with second harmonic generation imaging techniques NASA Astrophysics Data System (ADS) Zhang, Xiaoman; Yu, Biying; Weng, Cuncheng; Li, Hui 2014-11-01 The 632nm wavelength low intensity He-Ne laser was used to irradiated on 15 mice which had skin wound. The dynamic changes and wound healing processes were observed with nonlinear spectral imaging technology. We observed that:(1)The wound healing process was accelerated by the low-level laser therapy (LLLT);(2)The new tissues produced second harmonic generation (SHG) signals. Collagen content and microstructure differed dramatically at different time pointed along the wound healing. Our observation shows that the low intensity He-Ne laser irradiation can accelerate the healing process of skin wound in mice, and
SHG imaging technique can be used to observe wound healing process, which is useful for quantitative characterization of wound status during wound healing process.

127. Effect of photon energy in collagen generation by interstitial low level laser stimulation
NASA Astrophysics Data System (ADS)
Jun, Eunkwon; Ha, Myungjin; Lee, Sangyeob; Radfar, Edalat; Park, Jihoon; Jung, Byungjo
2015-03-01
Although the mechanism of low level laser therapy (LLLT) is unclear, many studies demonstrated the positive clinical performance of LLLT for skin rejuvenation. An increase in dermal collagen plays an important role in skin rejuvenation and wound healing. This study aimed to investigate collagen generation after interstitial low level laser stimulation (ILLS). Rabbits were divided into two groups: surface irradiation and minimally invasive irradiation. 660nm diode laser of 20mW with 10J, 13J and 15J was applied to the backside of rabbits. Collagen formation was evaluated with ultrasound skin scanner every 12 hours. Results shows that ILLS groups have denser collagen density than surface groups.

128. Laser therapy and macular degeneration
NASA Astrophysics Data System (ADS)
Menchini, Ugo; Virgili, Gianni; Giansanti, Fabrizio; Giacomelli, Giovanni; Cappelli, Stefania
2001-10-01
Among macular diseases, choroidal neovascularization (CNV) is one of the most common causes of visual loss, especially in the form associated with age-related macular degeneration and pathologic myopia. Research on these diseases has recently evaluated new treatment modalities that use laser light differently; among these, photodynamic therapy (PDT) has been introduced in the clinical practice, allowing us to expand the possibility of reducing visual loss in patients affected by CNV. With PDT, a photosensitizer (verteporfin, VisudyneTM) is injected intravenously, and it selectively binds to new vessels; low-power laser light exposure then activates the drug, leading to oxidative damage of the endothelium and new vessels thrombosis. Yet, other therapies, such as transpupillary thermotherapy, or the use of photocoagulation to cause feeder-vessel occlusion, could prove effective, but they need further investigation.

129. Effect of red and near-infrared wavelengths on low-level laser (light) therapy-induced healing of partial-thickness dermal abrasion in mice
PubMed
Gupta, Asheesh; Dai, Tianhong; Hamblin, Michael R
2014-01-01
Low-level laser (light) therapy (LLLT) promotes wound healing, reduces pain and inflammation, and prevents tissue death. Studies have explored the effects of various radiant exposures on the effect of LLLT; however, studies of wavelength dependency in in vivo models are less common. In the present study, healing effects of LLLT were evaluated in a mouse model of partial thickness dermal abrasion. Wavelengths of 635, 730, 810 nm were found to be effective in promoting the healing of dermal abrasions. However, treatment using 730- and 980-nm wavelengths showed no sign of stimulated healing. Healing was maximally augmented in mice treated with an 810-nm wavelength, as evidenced by significant wound area reduction (p < 0.05), enhanced collagen accumulation, and complete re-epithelialization as compared to other wavelengths and non-illuminated controls. Significant acceleration of re-epithelialization and cellular proliferation revealed by immunofluorescence staining for cytokeratin-14 and proliferating cell nuclear antigen (p < 0.05) was evident in the 810-nm wavelength compared with other groups. Photobiomodulation mediated by red (635 nm) and NIR (810 nm) light suggests that the biological response of the wound tissue depends on the wavelength employed. The effectiveness of 810-nm wavelength agrees with previous publications and, together with the partial effectiveness of 635 nm and the ineffectiveness of 730 and 980 nm wavelengths, can be explained by the absorption spectrum of cytochrome c oxidase, the candidate mitochondrial chromophore in LLLT.
PMID:23619627

130. Effect of red and near infrared wavelengths on low-level laser (light) therapy-induced healing of partial-thickness dermal abrasion in mice
PubMed Central
Gupta, Asheesh; Dai, Tianhong; Hamblin, Michael R.
2013-01-01
Low-level laser (light) therapy (LLLT) promotes wound healing, reduces pain and inflammation, and prevent tissue death. Studies have explored the effects of various radiant exposures on the effect of LLLT; however studies of wavelength dependency in in vivo models are less common. In the present study, healing effects of LLLT mediated by different wavelengths of light in the red and near infrared (NIR) wavelength region (635, 730, 810
and 980 nm) delivered at constant fluence (4 J/cm2) and fluence rate (10 mW/cm2) were evaluated in a mouse model of partial-thickness dermal abrasion. 635 and 810 nm wavelengths were found to be effective in promoting healing of dermal abrasions. However, treatment using 730 and 980 nm wavelengths showed no sign of stimulated healing. Healing was maximally augmented in mice treated with 810 nm as evidenced by a significant wound area reduction (p < 0.05), enhanced collagen accumulation, and complete re-epithelialization as compared to other wavelengths and non-illuminated controls. A significant acceleration of re-epithelialization and cellular proliferation revealed by immunofluorescence staining for cytokeratin-14 and proliferating cell nuclear antigen (PCNA) (p < 0.05) was evident in 810 nm compared with other groups. Photobiomodulation mediated by red (635 nm) and NIR (810 nm) light suggests that the biological response of the wound tissue depends on the wavelength employed. The effectiveness of 810 nm agrees with previous publications, and together with the partial effectiveness of 635 nm and ineffectiveness of 730 and 980 nm can be explained by the absorption spectrum of cytochrome c oxidase, the candidate mitochondrial chromophore in LLLT. PMID:23619627

131. Low-level light therapy for zymosan-induced arthritis in rats
NASA Astrophysics Data System (ADS)
Castano, Ana P.; Dai, Tianhong; Demidova-Rice, Tatiana N.; Salomatina, Elena V.; Yaroslavsky, Anna N.; Yaroslavsky, Ilya; Cohen, Richard; Apruzzese, William A.; Smotrich, Michael H.; Hamblin, Michael R.
2007-02-01
It has been known for many years that low level laser (or light) therapy (LLLT) can ameliorate the pain, swelling and inflammation associated with various forms of arthritis. Light is absorbed by mitochondrial chromophores leading to an increase in ATP, reactive oxygen species and/or cyclic AMP production and consequent gene transcription via activation of transcription factors. However, despite many reports about the positive effects of LLLT in medicine, its use remains controversial. Our laboratory has developed animal models designed to objectively quantify response to LLLT and compare different light delivery regimens. In the arthritis model we inject zymosan into rat knee joints to induce inflammatory arthritis. We have compared illumination regimens consisting of a high and low fluence (3 J/cm2 and 30 J/cm2), delivered at a high and low irradiance (5 mW/cm2 and 50 mW/cm2) using 810-nm laser light daily for 5 days, with the effect of conventional corticosteroid (dexamethasone) therapy. Results indicated that illumination with 810-nm laser is highly effective (almost as good as dexamethasone) at reducing swelling and that longer illumination time was more important in determining effectiveness than either total fluence delivered or irradiance. Experiments carried out using 810-nm LLLT on excisional wound healing in mice also confirmed the importance of longer illumination times. These data will be of value in designing clinical trials of LLLT.

132. Effect of 940 nm low-level laser therapy on osteogenesis in vitro
PubMed
Jawad, Mohammed Mahmood; Husein, Adam; Azlina, Ahmad; Alam, Mohammad Khursheed; Hassan, Rozita; Shaari, Rumaizi
2013-12-01
Bone regeneration is essential in medical treatment, such as in surgical bone healing and orthodontics. The aim of this study is to examine the effect of different powers of 940 nm diode low-level laser treatment (LLLT) on osteoblast cells during their proliferation and differentiation stages. A human fetal osteoblast cell line was cultured and treated with LLLT. The cells were divided into experimental groups according to the power delivered and periods of exposure per day for each laser power. The (3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyl tetrazolium bromide) (MTT) assay was used to determine cell proliferation. Both alkaline phosphatase and osteocalcin activity assays were assessed for cell differentiation. All treatment groups showed a significant increase in cell proliferation and differentiation compared to the control group. Regarding the exposure time, the subgroups treated with the LLLT for 6 min showed higher proliferation and differentiation rates for the powers delivered, the 300-mW LLLT group significantly increased the amount of cell proliferation. By contrast, the 100 and 200 mW groups showed significantly greater amounts of cell differentiation. These results suggest that the use of LLLT may play an important role in stimulating osteoblast cells for improved bone formation. PMID:24337495

133. Effect of 940 nm low-level laser therapy on osteogenesis in vitro
NASA Astrophysics Data System (ADS)
Jawad, Mohammed Mahmood; Husein, Adam; Azlina, Ahmad; Alam, Mohammad Khursheed; Hassan, Rozita; Shaari, Rumaizi
2013-12-01
Bone regeneration is essential in medical treatment, such as in surgical bone healing and orthodontics. The aim of this study is to examine the effect of different powers of 940 nm diode low-level laser treatment (LLLT) on osteoblast cells during their proliferation and differentiation stages. A human fetal osteoblast cell line was
cultured and treated with LLLT. The cells were divided into experimental groups according to the power delivered and periods of exposure per day for each laser power. The (3-(4,5-dimethylthiazol-2-yl)-2,5 diphenyl tetrazolium bromide) (MTT) assay was used to determine cell proliferation. Both alkaline phosphatase and osteocalcin activity assays were assessed for cell differentiation. All treatment groups showed a significant increase in cell proliferation and differentiation compared to the control group. Regarding the exposure time, the subgroups treated with the LLLT for 6 min showed higher proliferation and differentiation rates for the powers delivered, the 300-mW LLLT group significantly increased the amount of cell proliferation. By contrast, the 100 and 200 mW groups showed significantly greater amounts of cell differentiation. These results suggest that the use of LLLT may play an important role in stimulating osteoblast cells for improved bone formation.

134. Effects of low-level laser therapy on the expression of osteogenic genes related in the initial stages of bone defects in rats

NASA Astrophysics Data System (ADS)
Fernandes, Kelly Rossetti; Ribeiro, Daniel Araki; Rodrigues, Natália Camargo; Tim, Carla; Santos, Anderson Amaro; Parizotto, Nivaldo Antônio; de Araújo, Heloisa Selistre; Driusso, Patrícia; Renô, Ana Claudia Muniz
2013-03-01
We evaluate the effects of low-level laser therapy (LLLT) on the histological modifications and temporal osteogenic genes expression during the initial phase of bone healing in a model of bone defect in rats. Sixty-four Wistar rats were divided into control and treated groups. Noncritical size bone defects were surgically created at the upper third of the tibia. Laser irradiation (Ga-Al-As laser 830 nm, 30 mW, 0.028 cm², 1,071 W/cm², 1 min and 34 s, 2.8 Joules, 100 J/cm²) was performed for 1, 2, 3, and 5 sessions. Histopathology revealed that treated animals presented higher inflammatory cells recruitment, especially 12 and 36 h postsurgery. Also, a better tissue organization at the site of the injury, with the presence of granulation tissue and new bone formation was observed on days three and five after surgery in the treated animals. The quantitative real time polymerase chain reaction showed that LLLT produced a significantly increase in mRNA expression of Runx-2, 12 h and three days post-surgery, a significant upregulation of alkaline phosphatase mRNA expression after 36 h and three days post-surgery and a significant increase of osteocalcin mRNA expression after three and five days. We concluded that LLLT modulated the inflammatory process and accelerated bone repair, and this advanced repair pattern in the laser-treated groups may be related to the higher mRNA expression of genes presented by these animals.

135. Laser-mediated photodynamic therapy

PubMed
Alexiades-Armenakas, Macrene
2006-01-01
Photodynamic therapy (PDT) has evolved since its inception at the beginning of the 20th century, when it was defined as an oxygen-dependent reaction between a photosensitizing dye and light. Photosensitizers and light sources have since been continually optimized for distinct applications and tissues. Systemic porphyrins, such as hematoporphyrin, were the first photosensitizers to be used, mostly to treat tumors. The first light sources used were broad-band, noncoherent lights, such as quartz, xenon, tungsten, or halogen lamps. The wavelengths of light chosen were based upon the absorption spectrum of porphyrins: blue because the largest peak is at 400 nm (the Soret band) and red because of its greater penetration depth but lesser absorption at 650 nm (a Q band). Systemic photosensitizers caused prolonged photosensitivity, and broad-band light sources had limitations and side effects. The development of topical photosensitizers, such as 5-aminolevulinic acid, and the advent of lasers in recent years have advanced PDT for cutaneous use. In the 1990s, red lasers were applied to PDT because of their increased skin penetration despite lesser absorption by porphyrins. Broad-band blue light and red light have been studied extensively, the former achieving Food and Drug Administration approval in combination with topical aminolevulinic acid for the treatment of actinic keratoses in 1997. These lasers and light sources caused significant side effects, such as discomfort, erythema, crusting, blistering, and dyspigmentation. The recent application of the long-pulsed pulsed dye laser (595 nm) after topical aminolevulinic acid greatly minimized side effects without compromising efficacy. Long-pulsed pulsed dye laser-mediated PDT has since been shown to be effective in treatment of actinic keratosis, actinic cheilitis, sebaceous hyperplasia, lichen sclerosus, and, most recently, acne vulgaris. Finally, intense pulsed light sources have been introduced to PDT for the treatment of photodamage and acne, offering advantages of versatility in wavelengths and applications. PMID:16427502

136. Proximal Priority Laser Therapy: PPLT
NASA Astrophysics Data System (ADS)
Ohshiro, Toshio
2004-09-01
The author has, in the past, classified treatment methods for pain geometrically as point, line, two-dimensional, three-dimensional treatment and has used these over the years. However as a practitioner of western medicine, the author originally treated pain only directed at the painful site, and encountered cases where local treatment did not suffice. The author proved with SPECT and the Rand Phantom that treating the neck which is the midpoint of the brain, the center of the nervous system and the heart, the center of circulation, increased cerebral blood flow and also that laser emitted to neck will reach the spinal chord no matter from where on the neck the laser is emitted. From such research and 25 years of clinical experience, the author has created an anatomy based, systemic treatment method called the Proximal Priority Laser Therapy (PPLT) where not only the cerebrum cortex, spinal chord and peripheral nerves are treated but also the tracts of blood vessels and lymph ducts are treated as well. Treatment method and cases are presented herein.

137. **Biome: A Patented Ultra-Low-Level Laser-Therapy Device for Treating Musculoskeletal Pain and Associated Impairments.**

**PubMed**

Gallamini, Michele; D'Angelo, Giovanni; Belloni, Gabriele
2015-08-01

After an excursus on state-of-the-art knowledge for low-level laser therapy (LLLT), Biome, a patented ultra-low-level laser therapy device used to treat musculoskeletal pain and associated impairments, is presented. The application protocols include short stimulation of sequences of acupuncture points. The observed effects seem, however, to be far from those that might be expected after acupuncture. The primary effect seems more likely to be an extracellular soft-tissue matrix reaction. The development of the technique, the studies performed, and the evidence collected over > 10 years suggest that specifically modulated laser light can interact with human tissues at light fluences well under those previously considered as being capable of having any effect.

Musculoskeletal pain very often becomes an autonomous dysfunction that is independent of the original injury and that can be effectively treated using specific peripheral acupuncture-like stimulation. Because such acupuncture is capable of reducing motor control "interferences" from noxious stimuli, it can improve motor control performance, thereby reducing the risk of falls in the elderly individuals. The proposal of acupuncture-derived protocols to be applied by Western physiotherapists using an ultra-low-level laser therapy device is a further "bridge" between two different, and sometimes very different, clinical worlds to better serve our patients. PMID:26276452

138. **He-Ne laser extravascular irradiation therapy**

**NASA Astrophysics Data System (ADS)**

Chen, Rong; Chen, Huifang; Xie, Shusen; Chen, Yanjiao; Zhang, Yanrong
2000-10-01

Based on the study of tissue optics related with the laser irradiation blood therapy, a new treatment method, extravascular low-level laser irradiation therapy (ELLLI) is developed. The veins of 30 patients with cerebrovascular disease combined with diabetes, asthma were treated by He-Ne laser (632.8nm, 25mW) which was delivered by an optics fiber. The fiber was outside the patient's skin and the laser irradiated on the blood vessel perpendicularly. The therapy time was 60 minutes each time and about 7-10 times a course of the treatment. The values of blood sugar, blood- fat and hemorrhheology were measured as the effective indexes. After the treatment the effective indexes and the symptoms of the patients were all improved. With the advantages of simplicity and safety (no medical infection), laser extravascular irradiation therapy is likely to be a new medical method for heart brain and other diseases.

139. **Diode-laser-based therapy device**

**NASA Astrophysics Data System (ADS)**

Udrea, Mircea V.; Nica, Adriana S.; Florian, Mariana; Poenaru, Daniela; Udrea, Gabriela; Lungeanu, Mihaela; Sporea, Dan G.; Vasiliu, Virgil V.; Vieru, Roxana
2004-10-01

A new therapy laser device is presented. The device consists of a central unit and different types of laser probes. The laser probe model SL7-650 delivers seven red (650 nm), 5 mW diode lasers convergent beams. The beams converge at about 30 cm in front of the laser probe and the irradiated area might be varied by simple displacement of the laser probe with respect to the target. The laser probe SL1-808 emits single infrared laser beam up to 500 mW. The efficiency of the use of this device in physiotherapy, and rheumatology, has been put into evidence after years of testing. Dermatology and microsurgery are users of infrared powerful laser probes. The device has successfully passed technical and clinical tests in order to be certified. The laser device design and some medical results are given.

140. **Effect of low level laser therapy on hair cell regeneration following gentamicin induced ototoxicity in postnatal organotypic culture of rat cochlea**

**NASA Astrophysics Data System (ADS)**
Aim: To investigate effects of low level laser therapy (LLLT) on hair cell regeneration following gentamicin ototoxicity in organotypic culture of rat cochlea. Methods: Organotypic cultures of cochlea in culture medium were allowed to grow for 17 days (C group). The organotypic cultures were irradiated daily with 808 nm LD laser, at 28.8 J/cm² (L group). The organotypic culture were exposed to 1 mM of gentamicin for 48 hr and allowed to recover (G group) or allowed to recover in the culture medium with daily LLLT at 28.8 J/cm² (GL group) for 17 days. The cochleae were stained with FM1-43. The number of hair cells was counted in each group serially for 17 days. Results: While the C group kept on losing hair cells in vitro culture, the hair cells remained rather stationary in the L group. The number of hair cells revealed significantly larger number of hair cells in the L group compared to the C group (p=0.05). And the group × time interaction was also significant (p=0.04). That is, the number of hair cells in the C group showed decreasing tendency which was significantly different from the L group. In G group, the initial number of hair cells decreased to 37.2% of that of the gentamicin non-exposed groups. While the G group kept on losing hair cells, the number of hair cells increased in the GL group. The number of hair cells revealed significantly larger in the GL group (p=0.01) compared to G group. And the group × time interaction was also significant (p=0.01). Also, the number of hair cells in the GL group showed increasing tendency which was significantly different from the G group. Conclusion: These results suggest that LLLT promotes hair cell regeneration following gentamicin damage in cochlear explants.

141. Defining a therapeutic dosage window for transmeatal-LLLT applied to the rats with NIHL to Ameliorate NIHL.
NASA Astrophysics Data System (ADS)
Rhee, ChungKu; Song, Kevin; Chang, So-Young; Jung, Jae Yun; Lim, Sung-Kyoo; Chung, Phil-Sang; Suh, Myung-Whan
2015-02-01
Aim: The LLLT was found to recover NIHL and ototoxicity induced hearing loss in rats but the optimal LLLT laser dosage to treat NIHL needs to be determined. The aim of this study was to find the optimal laser dosage to recover a NIHL with transmeatal-LLLT. Methods: Bilateral ears of rats were exposed to noise (narrow band noise, 120 dB, 16 kHz, 6 h). Left ears of the rats were irradiated with transmeatal-LLLT (830 nm) of 50, 100, 150, 200, 250, 300 mW for 60 minutes per day for 12 days, starting 1 day post induction of NIHL. Right ears were not irradiated and used as control ears. The hearing levels were measured at each frequency of 8, 12, and 32 kHz before the noise exposure, 1, 3, 8, and 12 days post noise exposure. The differences of hearing levels between left treated ear and right controlled ear at each frequency of different laser dosages (50-300 mW) were compared to see the most effective laser dosages to treat NIHL. Results: Hearing levels were most improved by 150 mW, slightly improved by 200 mW, not improved by 50 and 250 mW, and became worse by 300 mW. Conclusion: The results of this study suggest that most effective therapeutic laser dosage window to treat NIHL with transmeatal-LLLT was 150 mW for 12 days and it was not effective by 50, 250, and 300 mW.

142. The low level laser therapy in the management of neurological burning mouth syndrome. A pilot study
PubMed Central
Romeo, Umberto; Del Vecchio, Alessandro; Capocci, Mauro; Maggiore, Claudia; Ripari, Maurizio
2010-01-01
Summary Background and objective. Burning Mouth Syndrome (BMS) is a common disease but still a diagnostic and therapeutic challenge for clinicians. Despite many studies its nature remains obscure and controversial; nowadays there is no consensus about definition, diagnosis and classification. BMS is characterized clinically by burning sensations in the tongue or other oral sites, often without clinical and laboratory findings. According to the etiology, BMS cases should be subdivided into three subtypes: BMS by local factors (lfBMS), BMS by systemic factors (sfBMS) and neurological BMS (nBMS), the most frequent, in which the symptom is caused by central or peripheral neurological malfunctions affecting in particular the taste pathway. To establish the type of BMS, both anamnesis and clinical examination, including laboratory tests, are necessary; nBMS cases will be recognized by exclusion of any other type. In case of lfBMS or
sFBMS, the treatment of the main pathology will be resolutive; in nBMS cases many Authors proposed different pharmacological trials without satisfactory results and the current opinion is that a multidisciplinary approach is required to keep the condition under control. This pilot study aimed to investigate whether the biostimulative effect of Low Level Laser Therapy (LLLT) could enhance the symptoms of nBMS cases, improving patients’ quality of life. Study design/materials and methods. Among 160 patients affected by oral burning sensation attending to the Oral Pathology Complex Operative Unit of the Department of Stomatological Sciences of Sapienza University of Rome, 77 resulted affected by nBMS. Twenty-five of these patients, 16 females and 9 males, were randomly selected for low level laser applications. All the patients were irradiated with a double diode laser (Lumix 2 Prodent, Italy) emitting contemporarily at 650 nm and 910 nm, with a fluence of 0.53 J/cm² for 15 minutes twice a week for 4 weeks. The areas of irradiation were the sides of the tongue on the path of taste fibers. A NRS (numerical rating scale) evaluation of maximum and minimum pain was registered before and after the treatment. In each case to the total value of NRS rates registered before the treatment was deducted the total NRS rate registered after the treatment. The difference was estimated effective if over two points. The Kruskall-Wallis test revealed the significance of the study (p<0.0001) and the Dunn’s Multiple Comparison test, applied to compare NRS rates before and after the treatment, showed that there is not a statistically relevant difference between min NRS ratings before and after treatment, while there are statistically significant differences between max NRS ratings (p<0.05). Results All the patients agreed the treatment confirming the general good compliance related to laser treatments. No side effects were registered and all the patients completed the therapy without interruption. Seventeen patients (68%) had relevant benefits from the treatment with valid reduction of NRS ratings. In 8 cases the differences of NRS rates were not relevant being under the limit of reliability established in study design. In no case there was a worsening of the symptoms. Conclusions: According to the results of this pilot study it is reasonable to suppose that LLLT may play an important role in the management of nBMS cases, more investigations are needed to clarify, by a greater number of cases and a placebo control group, the real effectiveness of this innovative LLLT application. PMID:22238700

143. Modulation of Extracellular ATP Content of Mast Cells and DRG Neurons by Irradiation: Studies on Underlying Mechanism of Low-Level-Laser Therapy
PubMed Central
Hu, Lei; Grygorczyk, Ryszard; Shen, Xueyong; Schwarz, Wolfgang
2015-01-01
Low-level-laser therapy (LLLT) is an effective complementary treatment, especially for anti-inflammation and wound healing in which dermis or mucus mast cells (MCs) are involved. In periphery, MCs crosstalk with neurons via purinergic signals and participate in various physiological and pathophysiological processes. Whether extracellular ATP, an important purine in purinergic signaling, of MCs and neurons could be modulated by irradiation remains unknown. In this study, effects of red-laser irradiation on extracellular ATP content of MCs and dorsal root ganglia (DRG) neurons were investigated and underlying mechanisms were explored in vitro. Our results show that irradiation led to elevation of extracellular ATP level in the human mast cell line HMC-1 in a dose-dependent manner, which was accompanied by elevation of intracellular ATP content, an indicator for ATP synthesis, together with [Ca²⁺] Increases, a trigger signal for exocytotic ATP release. In contrast to MCs, irradiation attenuated the extracellular ATP content of neurons, which could be abolished by ARL 67156, a nonspecific ecto-ATPases inhibitor. Our results suggest that irradiation potentiates extracellular ATP of MCs by promoting ATP synthesis and release and attenuates extracellular ATP of neurons by upregulating ecto-ATPase activity. The opposite responses of these two cell types indicate complex mechanisms underlying LLLT. PMID:25691809

144. Treating bulimia with hypnosis and low-level light therapy: a case report
NASA Astrophysics Data System (ADS)
Laser, Eleanor; Sassack, Michael
2012-03-01
This case report describes an effort to control bulimia nervosa by combining low-level laser therapy (LLLT)-the application of red and near-infrared light to specific body points—and hypnosis. A 29-year old female with a 14-year history of bulimia received one session of LLLT combined with hypnosis. Two weeks later, following a measurable decrease in bulimic episodes (purging), a session of psychotherapy and hypnosis was administered. Six months post-treatment, the patient has experienced a complete cessation of purging activities without recurrence. LLLT, when used in conjunction with hypnosis and psychotherapy, was effective in managing bulimia and may prove useful in treating other eating disorders.

145. Low-level laser therapy improves bone formation: stereology findings for osteoporosis in rat model.
PubMed
Low-level laser therapy (LLLT) benefits bone metabolism, but its use needs to be standardized. We evaluated the effects of LLLT on bone defects in calvaria of ovariectomized rats. Stereology was used to calculate tissue repair volume (V tr), density of trabecular bone volume (Vv t), total volume of newly formed trabecular bone (Vtot), and the area occupied by collagen fibers (A C). Fifty-four Wistar rats were submitted to bilateral ovariectomy, and bone defects were created in calvaria after 150 days. The animals were divided into nine groups (n=6), and 24 h after defects, the treatment started with a 780-nm low-intensity GaAlAs laser: G1, G2, and G3 received 3 sessions of 0, 20, and 30 J/cm(2) respectively; G4, G5, and G6 received 6 sessions of 0, 20, and 30 J/cm(2), respectively; and G7, G8, and G9 received 12 sessions of 0, 20, and 30 J/cm(2), respectively. A normal distribution was found for all of the data. The test used to verify the normality was the Kolmogorov-Smirnov (KS, p>0.05). The one-way ANOVA followed by Tukey's post hoc test was used for data processing. A difference of p?

146. Effect of low-level laser therapy after implantation of poly-L-lactic/polyglycolic acid in the femurs of rats.
PubMed
Freddo, Angelo Luiz; Rodrigo, Simone Marja; Massotti, Fabrício Poletto; Etges, Adriana; de Oliveira, Marília Gerhardt
2009-09-01
This study evaluated the use of red and infrared lasers on tissue surrounding the femurs of 60 rats randomly divided into three groups after implantation of bioabsorbable plates. The control group were not subjected to laser irradiation; group A was treated with red laser [indium-gallium-aluminum-phosphide (InGaAlP) laser, wavelength 685 nm, 35 mW, continuous wave (CW), Ø = 0.06 cm, 2.23 min], and group B was subjected to infrared laser [gallium-aluminum-arsenium (GaAlAs) laser, wavelength 830 nm, 50 mw, CW, Ø = 0.06 cm, 1.41 min], both at 10 J/cm(2). Samples were stained with hematoxylin and eosin (H&E) and examined microscopically. Results showed that the laser irradiation had had a positive photobiomodulation effect on inflammation, confirmed by a better histologic pattern than that of the control group at 3 days and 7 days. Semiquantitative analysis revealed that groups A and B had a histologic score significantly greater than that of the control group at 3 days. At 21 days, histomorphometric analysis revealed a more intense inflammation in the red laser group than in the other groups. We concluded that low-level laser therapy (LLLT) has positive effects on the photobiomodulation of inflammation in the tissues surrounding the poly-L-lactic/polyglycolic acid (PLLA/PGA) bioabsorbable plate. It stimulated vascularization, fibroblast proliferation, and collagen deposition. PMID:19011949

147. Effects of 810 nm laser on mouse primary cortical neurons
NASA Astrophysics Data System (ADS)
Kharkwal, Gitika B.; Sharma, Subbha K.; Huang, Ying-Ying; De Taboada, Luis; McCarthy, Thomas; Hamblin, Michael R.
2011-03-01
In the past four decades numerous studies have reported the efficacy of low level light (laser) therapy (LLLT) as a treatment for diverse diseases and injuries. Recent studies have shown that LLLT can biomodulate processes in the central nervous system and has been extensively studied as a stroke treatment. However there is still a lack of knowledge on the effects of LLLT at the cellular level in neurons. The present study aimed to study the effect of 810 nm laser on several cellular processes in primary cortical neurons cultured from mouse embryonic brains. Neurons were irradiated with light dose of 0.03, 0.3, 3, 10 and 30 J/cm2 and intracellular levels of reactive oxygen species, nitric oxide and calcium were measured. The changes in mitochondrial function in response to light were studied in terms of adenosine triphosphate (ATP) and mitochondrial membrane potential (MMP). Light induced a significant increase in calcium, ATP and MMP at lower fluences and a decrease at higher fluence. ROS was induced significantly by light at all light doses. Nitric oxide levels also showed an increase on treatment with light. The results of the present study suggest that LLLT at lower fluences is capable of inducing mediators of cell signaling process which in turn may be responsible for the biomodulatory effects of the low level laser. At higher fluences beneficial mediators are reduced but potentially harmful mediators are increased thus offering an explanation for the biphasic dose response.

148. Brief review on the effect of low-power laser irradiation on neutrophils with emphasis on emerging fungal infections
NASA Astrophysics Data System (ADS)
Polymorphonuclear neutrophils (PMN) participate in an active way in the innate immunity developed after the fungal infection paracoccidioidomycosis (PCM). Nevertheless, the sole participation of neutrophils is not sufficient to eradicate PCM’s pathogenic fungus: Paracoccidioides brasiliensis (Pb). In that way, we aimed to develop a treatment capable of stimulating PMN to the site of injury through low-level laser therapy (LLLT). (LLLT) is safe to use and has not been linked to microorganism resistance so far; in addition, based on previous studies we understand that LLLT may be useful to treat several medical conditions through the stimulation and activation of certain types of cells. This brief review is based on the novel attempt of activating PMN against a fungal infection.

**Pulsed laser radiation therapy of skin tumors**

SciTech Connect

Kozlov, A.P.; Moskalik, K.G.

1980-11-15

Radiation from a neodymium laser was used to treat 846 patients with 687 precancerous lesions or benign tumors of the skin, 516 cutaneous carcinomas, 33 recurrences of cancer, 51 melanomas, and 508 metastatic melanomas in the skin. The patients have been followed for three months to 6.5 years. No relapses have been observed during this period. Metastases to regional lymph nodes were found in five patients with skin melanoma. Pulsed laser radiation may be successfully used in the treatment of precancerous lesions and benign tumors as well as for skin carcinoma and its recurrences, and for skin melanoma. Laser radiation is more effective in the treatment of tumors inaccessible to radiation therapy and better in those cases in which surgery may have a bad cosmetic or even mutilating effect. Laser beams can be employed in conjunction with chemotherapeutic or immunotherapy.

**Effect of low-level pulsed laser 890-nm on lumbar spondylolisthesis: a case report**

NASA Astrophysics Data System (ADS)

Mortazavi, Seyed M. J.; Afsharpad, Mitra; Djavid, Gholam-reza E.

2002-10-01

Objective: Evaluating the effectiveness of low-level laser therapy (LLLT) in alleviating the symptoms of lumbar spondylolisthesis. Materials and Methods: Laser was irradiated for 2 mm at six symmetric points along the lumbosacral spine and 5 points along the referred point of pain, six times a week for 2 weeks (890 nm; 8 J/cm2; pulsed at 1500 Hz). Perception of benefit, level of function was assessed by the Oswestry disability index, lumbar mobility range of motion and low back pain intensity. Results and Discussion: Results showed a complete reduction in pain and improvement in function in the patient. This case report suggests that low-level laser therapy (LLLT) could play a role in conservative management of low-grade lumbar spondylolisthesis.

**The Assessments of the Intracellular Antioxidant Protection of the Organism after LLLT Irradiation**

SciTech Connect

Freitinger-Skalicka, Zuzana; Navratil, Leos; Zolzer, Friedo; Hon, Zdenek

2009-06-19

The antioxidants are chemical compounds that can bind to free oxygen radicals preventing these radicals from damaging healthy cells. Low levels of antioxidants, or inhibition of the antioxidant enzymes causes oxidative stress and may damage or kill cells. The purpose of this project was to establish the changes at intracellular antioxidant protection of the organism after LLLT irradiation. We used female mice of the strain CD1. The mice were exposed in the abdomen region to laser light. From the blood was assessment the Glutathione peroxidase, Reduced Glutathione and Plasma Antioxidant Capacity. The results obtained in the present study demonstrated that in vivo irradiation of the mice with low level lasers did not cause any statistically significant changes in superoxide dismutase and Glutathione peroxidase but we found changes in Reduced Glutathione and Plasma Antioxidant Capacity after exposing the mice to the LLLT during the 30 minutes after irradiation, as well on the 4th day. Do not replace the word “abstract,” but do replace the rest of this text. If you must insert a hard line break, please use Shift+Enter rather than just tapping your “Enter” key. You may want to print this page and refer to it as a style sample before you begin working on your paper.

**The hypoalgesic effects of low-intensity infrared laser therapy: a study on 555 cases**

NASA Astrophysics Data System (ADS)

Tam, Giuseppe

2004-09-01

Objective: Low energy lasers are widely used to treat a variety of musculoskeletal conditions. The aim of this clinical study is to determine the action of the IR diode laser 904 nm pulsed on pain reduction therapy. Summary Background Data: With respect to pain, has been shown the Low power density laser increases the endorphin synthesis in the dorsal posterior horn of the spinal cord stopping the production of bradykinin and serotonin. Besides laser causes local vasodilatation of the capillaries and an improved circulation of drainage
153. Effects of LLLT on the proliferation of HEp2 cells: study in vitro
NASA Astrophysics Data System (ADS)
2000-03-01
LLLT has been used successfully in biomedicine and some of the results are thought to be related to cell proliferation. The effects of LLLT on cell proliferation is debatable because different studies found either increase or decrease on proliferation of cell cultures. Cell culture is an excellent method to assess both effects and dose of treatment. The aim of this study was to assess the effect off 635 and 670 nm laser irradiation of H.Ep.2 cells In Vitro using MTT. The cells were obtained from SCC of the larynx were routinely processed from defrost to the experimental condition. Twenty four hours after transplantation the cells were irradiated with doses ranging from 0.03 a 0.6 J/cm² during seven days. The results showed that 635 nm laser light does not stimulate significantly the proliferation of H.Ep.2 cells in doses ranging from 0.04J/cm² to 0.488J/cm². However 670 nm laser irradiation resulted in an increased cell proliferation when compared to both control and 635 nm irradiated cells. It is concluded that irradiation of H.Ep.2 cells with 670 nm laser results in an increased cell proliferation; best observation of cell proliferation was found on 670 nm laser irradiated cultures exposed from doses of 0.075 J/cm²; both dose and wavelengths are factors which may affect cell proliferation of H.Ep.2 cells; doses of 635 nm laser light up to 0.48J/cm² did not interfere with H.Ep.2 cell proliferation; and that the MTT was effective on the detection of H.Ep.2 cells proliferation on both irradiated and non-irradiated cell cultures.

154. A new diode laser acupuncture therapy apparatus
NASA Astrophysics Data System (ADS)
Li, Chengwei; Huang, Zhen; Li, Dongyu; Zhang, Xiaoyuan
2006-06-01
Since the first laser-needles acupuncture apparatus was introduced in therapy, this kind of apparatus has been well used in laser biomedicine as its non-invasive, pain-free, non-bacterium, and safetool. The laser acupuncture apparatus in this paper is based on single-chip microcomputer and associated by semiconductor laser technology. The function like traditional moxibustion including reinforcing and reducing is implemented by applying chaos method to control the duty cycle of moxibustion signal, and the traditional lifting and thrusting of acupuncture is implemented by changing power output of the diode laser. The radiator element of diode laser is made and the drive circuit is designed. And chaos mathematic model is used to produce deterministic class stochastic signal to avoid the body adaptability. This function covers the shortages of continuous irradiation or that of simple disciplinary stimulate signal, which is controlled by some simple electronic circuit and become easily adjusted by human body. The realization of reinforcing and reducing of moxibustion is technological innovation in traditional acupuncture coming true in engineering.

155. Laser scattering by transcranial rat brain illumination
NASA Astrophysics Data System (ADS)
Due to the great number of applications of Low-Level-Laser-Therapy (LLLT) in Central Nervous System (CNS), the study of light penetration through skull and distribution in the brain becomes extremely important. The aim is to analyze the possibility of precise illumination of deep regions of the rat brain, measure the penetration and distribution of red ($\lambda = 660$ nm) and Near Infra-Red (NIR) ($\lambda = 808$ nm) diode laser light and compare optical properties of brain structures. The head of the animal (Rattus Norvegicus) was epilated and divided by a sagittal cut, 2.3 mm away from mid plane. This section of rat's head was illuminated with red and NIR lasers in points above three anatomical structures: hippocampus, cerebellum and frontal cortex. A high resolution camera, perpendicularly positioned, was used to obtain images of the brain structures. Profiles of scattered intensities in the laser direction were obtained from the images. There is a peak in the scattered light profile corresponding to the skin layer. The bone layer gives rise to a valley in the profile indicating low scattering coefficient, or frontal scattering. Another peak in the region related to the brain is an indication of high scattering coefficient ($\%$) for this tissue. This work corroborates the use of transcranial LLLT in studies with rats which are subjected to models of CNS diseases. The outcomes of this study point to the possibility of transcranial LLLT in humans for a large number of diseases.

156. Decreased Bone Volume and Bone Mineral Density in the Tibial Trabecular Bone Is Associated with Per2 Gene by 405 nm Laser Stimulation

PubMed Central
Yoo, Yeong-Min; Lee, Myung-Han; Park, Ji Hyung; Seo, Dong-Hyun; Lee, Sangyeob; Jung, Byungjo; Kim, Han Sung; Bae, Kiho
2015-01-01
Low-level laser therapy/treatment (LLLT) using a minimally invasive laser needle system (MILNS) might enhance bone formation and suppress bone resorption. In this study, the use of 405 nm LLLT led to decreases in bone volume and bone mineral density (BMD) of tibial trabecular bone in wild-type (WT) and Per2 knockout (KO) mice. Bone volume and bone mineral density of tibial trabecular bone was decreased by 405 nm LLLT in Per2 KO compared to WT mice at two and four weeks. To determine the reduction in tibial bone, mRNA expressions of alkaline phosphatase (ALP) and Per2 were investigated at four weeks after 405 nm laser stimulation using MILNS. ALP gene expression was significantly reduced in the LLLT-stimulated right tibial bone of WT and Per2 KO mice compared to the non-irradiated left tibia (p < 0.001). Per2 mRNA expression in WT mice was significantly reduced in the LLLT-stimulated right tibial bone compared to the non-irradiated left tibia (p < 0.001). To identify the decrease in tibial bone mediated by the Per2 gene, levels of runt-related transcription factor 2 (Runx2) and ALP mRNAs were determined in non-irradiated WT and Per2 KO mice. These results demonstrated significant downregulation of Runx2 and ALP mRNA levels in Per2 KO mice (p < 0.001). Therefore, the reduction in tibial trabecular bone resulting from 405 nm LLLT using MILNS might be associated with Per2 gene expression. PMID:26580614

Choi, Bernard
2009-01-01
-friendly laser speckle imaging (LSI) instrument was developed to provide the clinician with real-time images-Liss, Inc. Key words: laser Doppler perfusion imaging; laser speckle contrast analysis (LASCA); laserLasers in Surgery and Medicine 41:563571 (2009) Blood Flow Dynamics After Laser Therapy of Port

158. Laser effect in photodynamic therapy of tumors
NASA Astrophysics Data System (ADS)
Ion, Rodica-Mariana; Brezoi, Dragos-Viorel; Neagu, Monica; Manda, Gina; Constantin, Carolina
2007-03-01
Photodynamic therapy is a method that provides a reasonable alternative to other treatment modalities for patients with certain cancers, and in some cases may be the preferred treatment. The therapy implies the intravenous administration of a light-sensitive substance, the photosensitizer. The used sensitizer must absorb at long wavelength. For these purposes, the carbon dioxide laser, He-Ne and the argon laser are particularly suitable. In this study we evaluate in vitro the cytotoxic activity of three synthesized metallo-phthalocyanines with absorption bands in the red part of the spectrum: zinc-di-sulphonated phthalocyanine (ZnS IIIPc), zinc-tri-sulphonated phthalocyanine (ZnS 3Pc) and zinc-tetrasulphonated phthalocyanine (ZnS 4Pc). Some cellular models have been used in this paper, in order to optimize the conditions of this method, as we are presenting in this paper (LSR-SF(SR) - transplantable sarcoma in rat induced by Rous sarcoma virus strain Schmidt-Ruppin; LSCC-SF(Mc29) - transplantable chicken hepatoma induced by the myelocytomatosis virus Mc29, MCF-7 cell
line (human breast adenocarcinoma) derived from a patient with metastatic breast cancer, 8-MG-BA -
glioblastoma multiforme 8-MG-BA, K562 - lymphoblastic human cell line, LLC-WRC 256 - Walker epithelial
carcinoma. Activation of these photosensitizers retained in the cancerous cells, by red light emitted from a He-
Ne laser at ≈ 632.8 nm laser system, or by a diode laser emitting at 672 nm, produces a photochemical
reaction that results in the selective destruction of tumor cells.

159. Is there a stimulation of blood microcirculation at low level laser irradiation
NASA Astrophysics Data System (ADS)
Rogatkin, Dmitry; Dunaev, Andrey
2014-05-01
In 1980-2000 besides the laser surgery an intensive evolution of Low Level Laser Therapy (LLLT) had started
in medicine, especially in Russia as well as in several other East-European countries. At the same time the
biophysical mechanisms of LLLT are still the subject of disputes. One of the most popular clinical effects at
Low Level Laser Irradiation (LLLI) being mentioned in medical publications for justification of the LLLT
healing outcome is a stimulation of blood microcirculation in irradiated area. It was declared a priori at a dawn
of LLLT and is now a basis of medical interpretation of healing mechanisms of LLLT at least in Russia. But in
past 20 years a lot of investigation was carried out on optical registration of microhaemodynamic parameters in
vivo as well as a number of noninvasive diagnostic tools was created for that. So, today it is possible to
experimentally check the blood microcirculation stimulation hypothesis. Our study was aimed on that during
the past 10 years. The most precision and accurate experiments we have carried out recently using simultaneoulsy three different noninvasive diagnostic techniques: Laser Doppler Flowmetry, Tissue
Reflectance Oximetry and Infrared Thermography. All these methods didn't confirm the effect on the blood
microcirculation stimulation in skin or mucosa at irradiation with the power density below 50 mW/cm² and
irradiation time up to 5-6 minutes. Above this threshold the heating on 0.8…1 °C of tissue in the field of
irradiation and the corresponding synchronous increase of all parameters of microhemodynamics were
observed.

160. Neurological and psychological applications of transcranial lasers and LEDs.
Pmed
Rojas, Julio C; Gonzalez-Lima, F
2013-08-15
Transcranial brain stimulation with low-level light/laser therapy (LLLT) is the use of directional low-power
and high-fluency monochromatic or quasimonochromatic light from lasers or LEDs in the red-to-near-infrared
wavelengths to modulate a neurobiological function or induce a neurotherapeutic effect in a nondestructive and
non-thermal manner. The mechanism of action of LLLT is based on photon energy absorption by cytochrome
oxidase, the terminal enzyme in the mitochondrial respiratory chain. Cytochrome oxidase has a key role in
neuronal physiology, as it serves as an interface between oxidative energy metabolism and cell survival
signaling pathways. Cytochrome oxidase is an ideal target for cognitive enhancement, as its expression reflects
the changes in metabolic capacity underlying higher-order brain functions. This review provides an update on
new findings on the neurotherapeutic applications of LLLT. The photochemical mechanisms supporting its
cognitive-enhancing and brain-stimulatory effects in animal models and humans are discussed. LLLT is a
potential non-invasive treatment for cognitive impairment and other deficits associated with chronic
neurological conditions, such as large vessel and lacunar hypoperfusion or neurodegeneration. Brain
photobiomodulation with LLLT is paralleled by pharmacological effects of low-dose USP methylene blue, a
non-photic electron donor with the ability to stimulate cytochrome oxidase activity, redox and free radical
processes. Both interventions provide neuroprotection and cognitive enhancement by facilitating mitochondrial
respiration, with hormetic dose-response effects and brain region activation specificity. This evidence
supports enhancement of mitochondrial respiratory function as a generalizable therapeutic principle relevant to
highly adaptable systems that are exquisitely sensitive to energy availability such as the nervous system.
PMID:23806754

161. Immunodeficiency and laser magnetic therapy in urology
NASA Astrophysics Data System (ADS)
The importance of immunodeficiency problem has increased last time not only due to AIDS appearance, but also to a great extent as a result of the development and active practical use of the methods of immunology parameters investigations. Al great pharmaceutical firms are organizing the process of creating the drugs, influencing on the different phases of immunity, but unfortunately, the problem of their adverse effect and connected complications is till today a milestone.

A great number of investigations, proving a good effect of laser-magnetic therapy concerning immune system have been done today. There is, in particular, changing of blood counts and immunologic tests after intravenous laser irradiation of blood. Intravenous laser irradiation of blood results in increasing of lymphocytes, T-immuno stimulation, stabilization of T-lymphocyte subpopulation, increasing of T-lymphocyte helper activity and decreasing of suppressor one. Under this laser action number of circulating immune complexes is decreased, and blood serum bactericide activity and lisozyme number are increased.

162. **Low level laser therapy in healing tendon**

*NASA Astrophysics Data System (ADS)*

Carvalho, P. T. C.; Batista, Cheila O. C.; Fabiola, C.

2005-11-01

This study aims to verify the effects of AsGa Laser in the scarring of tendon lesion in rats with low nourishment condition and to analyze the ideal light density by means of histopathologic findings highlighted by light microscopy. After the proposed nutritional condition was verified the animals were divided into 3 groups denominated as follows: GI control group, GII laser 1 J/sq.cm. and GIII laser 4 J/sq.cm. The lesions were induced by means of routine surgical process for tendon exposure: There was a crushing process with Allis pincers followed by saturated incision. The data obtained in relation to the amount of macrophage, leukocyte, fibroblast, vessel neoformation, fibrosis and collagen were submitted to parametric statistic procedures of variance analysis and "Tukey" Test and the result obtained was p < 0.05. According to the obtained results it can be concluded that low power laser therapy proved to be efficient in tendon repairing even though the animals suffered from malnutrition as well as the 1 J energy density proved to be more efficient in this case.

163. **Laser therapy in general dental practice**

*NASA Astrophysics Data System (ADS)*

Darbar, Arun A.

2006-02-01

This is a clinical presentation on the use of laser therapy in a private dental practice using a 810nm diode. A wide range of conditions involving pain management, treatment and as an adjunct to procedures to enhance patient comfort and experience. This will include cases treated for TMD (Temporo mandibular dysfunction), aphous ulcers, angular cheilitis, cold sores, gingival retraction, periodontal treatment and management of failing dental implants. The case presentation will include the protocols used and some long term reviews. The results have been very positive and will be shared to enable this form of treatment to be used more frequently and with confidence within dental practice.

164. **Current and long-term technologies of laser therapy**

*NASA Astrophysics Data System (ADS)*

Ulashcyk, Vladimir S.; Volotovskaya, Anna V.

2007-06-01

Laser therapy, using low-energy laser radiation, is being more and more applied. The most applied technology is transcutaneous radiation of tissues by laser radiation. Originally, a direct action on a pathological site was mostly used, but recently more attention is given to reflectogenic areas, acupuncture points, and endocrine organ projection sites. The development of light-conductive engineering made it possible to practically apply intraorgan laser therapy. This technology is widely spread in gynecology, otorhinolaryngology, urology, gastroenterology, etc. Close to it are different versions of intratissue laser therapy (intraosteo, periosteal, myofascial). A special kind of laser therapy is laser hemotherapy. Depending on the techniques and protocol of its application, there are extracorporeal, intravascular, and supravenous ways of action. According to our comparative investigations, supravenous hemotherapy by its therapeutice efficicy and major medicinal effects can be well compared with intravascular laser hemotherapy. With good prospects and efficiency is laser therapy as a combination of laser and other physical factors. Magnetolaser therapy has been scientifically substantiated and practically applied so far. Theoretically and experimentally substantiated is a combined application of laser radiation and physical factors such as ultrasound, direct current field, vacuum, cryotherapy, etc. Experimental research and few so far clinical observations are indicative of prospects of a complex application of laser radiation and drugs. To improve light absorption, laser radiation is combined with different
dyes. Photodynamic therapy, originally used in oncology, is applied today in treating different diseases. We showed a possibility of using a number of drugs possessing simultaneously photosensitizing properties to this end. Laser radiation significantly influences pharmacokinetics and pharmacodynamics of drugs, which gives reason to practically implement laser technologies, based on pharmacomodulating action of laser radiation, to practical medicine.

165. *Simulation of laser propagation through a three-layer human skin model in the spectral range from 1000 to 1900 nm.*

PubMed
Nasouri, Babak; Murphy, Thomas E; Berberoglu, Halil
2014-01-01
For understanding the mechanisms of low-level laser/light therapy (LLLT), accurate knowledge of light interaction with tissue is necessary. We present a three-dimensional, multilayer reduced-variance Monte Carlo simulation tool for studying light penetration and absorption in human skin. Local profiles of light penetration and volumetric absorption were calculated for uniform as well as Gaussian profile beams with different spreads over the spectral range from 1000 to 1900 nm. The results showed that lasers within this wavelength range could be used to effectively and safely deliver energy to specific skin layers as well as achieve large penetration depths for treating deep tissues, without causing skin damage. In addition, by changing the beam profile from uniform to Gaussian, the local volumetric dosage could increase as much as three times for otherwise similar lasers. We expect that this tool along with the results presented will aid researchers in selecting wavelength and laser power in LLLT. PMID:25003752

166. *Simulation of laser propagation through a three-layer human skin model in the spectral range from 1000 to 1900 nm.*

NASA Astrophysics Data System (ADS)
Nasouri, Babak; Murphy, Thomas E; Berberoglu, Halil
2014-07-01
For understanding the mechanisms of low-level laser/light therapy (LLLT), accurate knowledge of light interaction with tissue is necessary. We present a three-dimensional, multilayer reduced-variance Monte Carlo simulation tool for studying light penetration and absorption in human skin. Local profiles of light penetration and volumetric absorption were calculated for uniform as well as Gaussian profile beams with different spreads over the spectral range from 1000 to 1900 nm. The results showed that lasers within this wavelength range could be used to effectively and safely deliver energy to specific skin layers as well as achieve large penetration depths for treating deep tissues, without causing skin damage. In addition, by changing the beam profile from uniform to Gaussian, the local volumetric dosage could increase as much as three times for otherwise similar lasers. We expect that this tool along with the results presented will aid researchers in selecting wavelength and laser power in LLLT.

167. *Displacement Correction Scheme for MR-Guided Interstitial Laser Therapy.*

E-print Network
van Vliet, Lucas J.
Displacement Correction Scheme for MR-Guided Interstitial Laser Therapy S. Suprijanto1 , M.W. Vogel
interstitial laser therapy can be used to monitor the extent of tumor tissue coagulation during thermal treatment based on a temperature map. In a non-stationary object that was influenced by respiratory motion

168. *Meta-Analysis of Pain Relief Effects by Laser Irradiation on Joint Areas.*

PubMed Central
Jang, Ho
2012-01-01
Abstract Background: Laser therapy has been proposed as a physical therapy for musculoskeletal disorders and has attained popularity because no side effects have been reported after treatment. However, its true effectiveness is still controversial because several clinical trials have reported the ineffectiveness of lasers in treating pain. Methods: In this systematic review, we investigate the clinical effectiveness of low-level laser therapy (LLLT) on joint pain. Clinical trials on joint pain satisfying the following conditions are included: the laser is irradiated on the joint area, the PEDro scale score is at least 5, and the effectiveness of the trial is measured using a visual analogue scale (VAS). To estimate the overall effectiveness of all included clinical trials, a mean weighted difference in change of pain on VAS was used. Results: MEDLINE is the main source of the literature search. After the literature search, 22 trials related to joint pain were selected. The average methodological quality score of the 22 trials consisting of 1014 patients was 7.96 on the PEDro scale; 11 trials reported positive effects and 11 trials reported negative effects. The mean weighted difference in change of pain on VAS was 13.96\(\text{mm} (95\% \text{ CI}, 7.24–20.69)\) in favor of the active LLLT groups. When we only considered the clinical trials in which the energy dose was within the dose range suggested in the review by
Bjordal et al. in 2003 and in World Association for Laser Therapy (WALT) dose recommendation, the mean effect sizes were 19.88 and 21.05?mm in favor of the true LLLT groups, respectively. Conclusions: The review shows that laser therapy on the joint reduces pain in patients. Moreover, when we restrict the energy doses of the laser therapy into the dose window suggested in the previous study, we can expect more reliable pain relief treatments. PMID:22747309

169. Ophthalmic Laser Therapy: Mechanisms and Applications Daniel Palanker
SciTech Connect

Palanker, Daniel
1 Ophthalmic Laser Therapy: Mechanisms and Applications Daniel Palanker Department of Ophthalmology is an abbreviation which stands for Light Amplification by Stimulated Emission of Radiation. The laser is a source of coherent, directional, monochromatic light that can be precisely focused into a small spot. The laser

170. The Dose That Works: Low Level Laser Treatment of Tendinopathy
SciTech Connect

Tumilty, Steve; Munn, Joanne; David Baxter, G.; McDonough, Suzanne; Hurley, Deirdre A.; Basford, Jeffrey R.
2010-05-31
Background: Low Level Laser Therapy (LLLT) is used in the treatment of tendon injuries. However, the clinical effectiveness of this modality remains controversial with limited agreement on the most efficacious dosage and parameter choices. Purpose: To assess the clinical effectiveness of LLLT in the treatment of tendinopathy and the validity of current dosage recommendations for treatment. Method: Medical databases were searched from inception to 1st August 2008. Controlled clinical trials evaluating LLLT as a primary intervention for any tendinopathy were included in the review. Methodological quality was classified using the PEDro scale. Appropriateness of treatment parameters were assessed using established guidelines. Results: Twenty five trials met the inclusion criteria. There was conflicting findings from multiple trials: 12 showed positive effects and 13 were inconclusive or showed no effect. Dosages used in the 12 positive studies support the existence of an effective dosage window that closely resembled current guidelines. Where pooling of data was possible, LLLT showed a positive effect size; in high quality studies of lateral epicondylitis, participants' grip strength was 9.59 Kg higher than the control group; for participants with Achilles tendinopathy, the effect was 13.6 mm less pain on a 100 mm visual analogue scale. Conclusion: This study found conflicting evidence as to the effectiveness of LLLT in the treatment of tendinopathy. However, an effective dosage window emerged showing benefit in the treatment of tendinopathy. Strong evidence exists from the 12 positive studies that positive outcomes are associated with the use of current dosage recommendations for the treatment of tendinopathy.

171. The Dose That Works: Low Level Laser Treatment of Tendinopathy
NASA Astrophysics Data System (ADS)

Tumilty, Steve; Munn, Joanne; McDonough, Suzanne; Hurley, Deirdre A.; Basford, Jeffrey R.; David Baxter, G.
2010-05-01
Background: Low Level Laser Therapy (LLLT) is used in the treatment of tendon injuries. However, the clinical effectiveness of this modality remains controversial with limited agreement on the most efficacious dosage and parameter choices. Purpose: To assess the clinical effectiveness of LLLT in the treatment of tendinopathy and the validity of current dosage recommendations for treatment. Method: Medical databases were searched from inception to 1st August 2008. Controlled clinical trials evaluating LLLT as a primary intervention for any tendinopathy were included in the review. Methodological quality was classified using the PEDro scale. Appropriateness of treatment parameters were assessed using established guidelines. Results: Twenty five trials met the inclusion criteria. There was conflicting findings from multiple trials: 12 showed positive effects and 13 were inconclusive or showed no effect. Dosages used in the 12 positive studies support the existence of an effective dosage window that closely resembled current guidelines. Where pooling of data was possible, LLLT showed a positive effect size; in high quality studies of lateral epicondylitis, participants' grip strength was 9.59 Kg higher than the control group; for participants with Achilles tendinopathy, the effect was 13.6 mm less pain on a 100 mm visual analogue scale. Conclusion: This study found conflicting evidence as to the effectiveness of LLLT in the treatment of tendinopathy. However, an effective dosage window emerged showing benefit in the treatment of tendinopathy. Strong evidence exists from the 12 positive studies that positive outcomes are associated with the use of current dosage recommendations for the treatment of tendinopathy.

172. Low intensity laser therapy: the clinical approach
NASA Astrophysics Data System (ADS)

Kahn, Fred
Recently, there has been significant improvement in the process of research and application of Low Intensity Laser Therapy (LILT). Despite this positive direction, a wide discrepancy between the research component and clinical understanding of the technology remains. In our efforts to achieve better clinical results and more fully comprehend the mechanisms of interaction between light and cells, further studies are required. The clinical results presented in this paper are extrapolated from a wide range of musculoskeletal problems including degenerative osteoarthritis, repetitive motion injuries, sports injuries, etc. The paper includes three separate clinical studies comprising 151, 286 and 576 consecutive patient discharges at our clinic. Each patient studied received a specific course of treatment that was designed for that individual and was modified on a continuing basis as the healing process advanced. On each visit, clinical status correlation with the duration, dosage and other parameters was carried out. The essentials of the treatment consisted of a three stage approach. This involved a photon stream emanating from a number of specified gallium-aluminum-arsenide diodes; stage one, red light array, stage two consisting of an array of infrared diodes and stage three consisting of the application of an infrared laser diode probe. On average, each of these groups required less than 10 treatments per patient and resulted in a significant improvement / cure rate greater than 90% in all conditions treated. This report clearly demonstrates the benefits of LILT, indicating that it should be more widely adapted in all medical therapeutic settings.


PubMed
Moosavi, H.; Maleknejad, F.; Sharifi, M.; Ahhari, F.; Farzaneh, M.
2015-05-01
This study aimed to investigate the efficacy of low-level laser irradiation when applied just before placement of resin composite on reducing postoperative sensitivity of class V lesions. In this randomized clinical trial, 31 patients with 62 class V cavities were included (two teeth in each participant). The teeth were randomly assigned into laser and placebo groups. After cavity preparation, the teeth in the experimental group were subjected to irradiation from a low-power red laser (630 nm, 28 mW, continuous wave, 60 s, 1.68 J), which was applied for 1 min on the axial wall of the cavity. In the control group, the same procedure was performed but with laser simulation. Then, a self-etch adhesive was applied and the cavities were restored with a microhybrid resin composite. Before treatment and on days 1, 14, and 30 after treatment, tooth sensitivity to a cold stimulus was recorded using a visual analogue scale. Data were analyzed by Friedman and Wilcoxon signed-rank tests (p?laser group compared to the placebo application (p?laser than the placebo group (p?laser therapy (LLLT) before placement of resin composite could be suggested as a suitable approach to reduce postoperative sensitivity in class V restorations. PMID:24811085

174. Intravascular laser therapy in different forms of lung diseases

NASA Astrophysics Data System (ADS)
Kirillov, M. N.; Reshetnikov, V. A.; Kazhekin, O. A.; Shepelenko, A. F.
1993-06-01
The potenions of laser intravascular therapy in elimination of pyogenic and inflammatory intoxication in cases of acute pneumonia, pyo-destructive diseases (including posttraumatic diseases) of the lungs are studied clinically.

175. Effects of Low Level Laser Therapy on Orthodontic Pain

E-print Network
Buchwald, Bradley
2014-04-28
Purpose: To determine the effectiveness of low level laser therapy applied extra orally on the reduction of orthodontic pain. Materials and Methods: Sixty dental students were voluntarily recruited for this randomized, double-blinded, placebo...

176. Trans-canal laser irradiation reduces tinnitus perception of salicylate treated rat.

PubMed
Park, Y. W.; Na, W.; Sung, P.; Il Yong; Suh, M.; Whan; Rhee, C.-K.; Chung, P.-S.; Jung, J. Y.
2013-06-01
The aim of this study was to find out the effect of low-level laser therapy (LLLT) on salicylate-induced tinnitus in the rat model. Fourteen Sprague-Dawley rats (8 weeks; 240-280 gm) were divided into 2 groups (study group, control group). Rats of both groups were treated with 400 mg/kg/day of sodium salicylate for 8 consecutive days. Tinnitus was monitored using GPIAS (Gap Prepulse Inhibition of Acoustic Startle) 2 h after first salicylate treatment, and every 24 h during 9 days of treatment. Rats in laser group were irradiated to each...
ear with wavelength of 830 nm diode laser (165 mW/cm(2)) for 30 min daily for 8 days. During salicylate treatment, rats of study group irradiated with low level laser showed significantly higher GPIAS values throughout the experiment. Therapeutic effect of LLLT is demonstrated in animal tinnitus model by means of GPIAS. Further experimental studies are needed to find possible mechanisms and better methods to improve LLLT efficacy. PMID:23583341

177. Multiwave low-laser therapy in the pain treatment

NASA Astrophysics Data System (ADS)

Moldovan, Cornelius I.; Antipa, Ciprian; Bratila, Florin; Brukner, Ion; Vasiliu, Virgil V.

1995-03-01

Sixteen patients with knee pain, 17 patients with low back pain and 23 patients with vertebral pain were randomly allocated to multiwave laser therapy (MWL). The MWL was performed through an original method by a special designed laser system. The stimulation parameters adaptably optimized in a closed loop by measuring the reflected laser radiation. A control group of 11 patients was conventionally treated with a single infrared laser system. All patients were assessed by single observer using a visual analogue scale in a controlled trial. Our results indicate that the treatment with different laser wavelengths, different output power and frequencies, simultaneously applied through optic-fibers, has significant effects on the pain when compared with the common low laser therapy.

178. Clinical applications of laser therapy on the dental practice

NASA Astrophysics Data System (ADS)

Pinheiro, Antônio L. B.

2004-09-01

Dental practice consists of a series of laboring procedures which demands the use of several types of equipment and materials. Usually patient’s fears brings additional burden to the Dentists. The use of Lasers for treating and diagnosis in Dentistry is quite new comparing to other medical areas. Initially Laser technology was used as an alternative method for treating dental caries in order to substitute the use of the drill. Lately surgical Lasers have shown themselves very useful for treating several pathologies and began to be used as a powerful tool on the treatment of several conditions affecting the maxillofacial complex and later on, the era of the use of Laser therapy began. The advent of the diode Lasers made possible the introduction of small units at the dental office and Laser therapy was used to improve healing and later included also caries diagnosis. This paper discuss the use of Laser therapy on Restorative Dentistry, Periodontology, Oral and Maxillofacial Surgery, Oral implantology and other. Clinical and laboratory experience has demonstrated that Laser therapy does improve the healing of both mineralized and soft tissues, reduces pain and inflammation, and also reduces both cost and length of the dental treatment.

179. Effectiveness of the use of LLLT on disorders of the maxillofacial region

NASA Astrophysics Data System (ADS)

Soares, Luiz G. P.; Carvalho, Carolina M.; Marques, Aparecida M. C.; Cangussú, Maria Cristina T.; Pinheiro, Antônio L. B.

2012-03-01

Dentistry has traditionally depended on science and technology for improvement of diagnostic tools and treatment options. The impact of using light sources in clinical Dentistry has been significantly higher than in clinical Medicine and Surgery. Light sources have been used as a therapeutic agent for many centuries. The major use of light for therapeutic applications in health care sciences was noticeably initiated after the development of lasers in 1960. The aim of this study was to evaluate the effectiveness of LLLT on treating disorders of the maxillofacial region. For this, the records of patients treated at the Laser Center of the School of Dentistry of the Federal University of Bahia were revised. We analyzed 867 treatment cycles in 572 patients. The mean age of the patients was 53.5 years old, most were females. Majority of them complained of some pain. G50.0 and K07.6 were the most frequent diagnostics. The mean energy density per session was 18.36 +/- 14.6 J/cm2 and mean treatment one 176.4 +/- 132.4 J/cm2. IR laser was the most frequently used wavelength. Most patients were asymptomatic or improved at discharge. Improved or asymptomatic patients had a mean age of 50.9 years old. For these, the mean number of sessions was 13, the total mean session energy density was 16.6 J/cm2 and mean total energy density treatment was 169.5 J/cm2. For symptomatic patients, the mean age was 56.4 years old. The mean number of sessions was 10. The mean energy density per session on these patients was 20.6 J/cm2 and mean total treatment energy density was 210.9
The results of this study are indicative that the use of LLLT for treating different disorders of the maxillofacial region is effective and well accepted by the patients.

180. **Treatment of bronchial asthma with low-level laser in attack-free period at children**

NASA Astrophysics Data System (ADS)

Ailioaie, C.; Ailioaie, Laura

2000-06-01

Bronchial asthma is a common disease in both the pediatric and adult populations, characterized by wide variations over short periods of time in resistance to airflow in intrapulmonary airways. A primary goal in the use of low-level laser therapy (LLLT) was the safe, effective and rapid palliation of symptoms owing to tracheal or bronchial obstruction. We have investigated the effects of LLLT comparatively with other modality trials in children's asthma. In the study were included 98 patients aged 10-18 years diagnosed with moderate or severe asthma, in attack-free period. The patients were divided into 3 groups. Group 1 received only laser therapy using extra meridian acupuncture points and scanning technique. Group 2 was treated only with inhaled Serevent 2 X 25 micrometers, two times daily, 3 months. Group 3 was treated with Theophylline retard in dosage of 15-mg/kg/12 h, 3 months. At the end of treatment we remarked a noticeable improvement of the clinical, functional and immunological characteristics at 83 percent of patients in group 1, comparatively with only 70 percent (group 2) and 53 percent (group 3). The LLLT had a very good action on bronchial patency, displayed an immunocorrecting action and is recommended in attack-free periods at children.

181. **Benefits of Laser Therapy in Postmenopausal Vaginal Atrophy**

NASA Astrophysics Data System (ADS)

Brînzan, Daniela; P?iu?an, Lucian; Da?c?u, Voicu; Fur?u, Gheorghe

2011-08-01

Maybe the worst aspect of menopause is the decline of the quality of the sexual life. The aim of the study is to demonstrate the beneficial effects of laser therapy in comparison with topical application of estrogen preparations, for the treatment of vaginal atrophy and sexual dysfunctions induced by menopause. A total of 50 menopausal patients were examined during a one year period. The methods used for objectifying vaginal atrophy and sexual dysfunctions were history taking, local clinical exam and PAP smear. From this group, 40 patients had vaginal atrophy with sexual dysfunctions. They have been treated differently, being included in four groups: patients treated with local estrogens, patients treated with intravaginal laser therapy, patients treated with both laser therapy and estrogens, patients treated with estrogens and placebo laser therapy. Therapeutic benefit, improvement of vaginal atrophy and quality of sexual life, were objectified by anamnesis (questionnaire), local and general clinical examination and PAP smear. The best results have been obtained, by far, in the 3rd group, followed by the women treated only with laser. In conclusion, we can say that laser therapy is the best way for solving the sexual inconveniences of menopause.

182. **Genitourinary syndrome of menopause and the use of laser therapy.**

PubMed

Hutchinson-Colas, Juana; Segal, Saya

2015-12-01

Genitourinary syndrome of menopause is a common condition that left untreated can progress and negatively affect quality of life and sexual function. Laser therapy has a therapeutic role for several gynecologic conditions and most recently has gained interest as a non-hormonal treatment for genitourinary syndrome of menopause (GSM). The laser is well tolerated and may increase thickness of the squamous epithelium and improve vascularity of the vagina. These morphological changes presumably alleviate symptoms of dryness, dyspareunia, and irritation. However, the duration of therapeutic effects and safety of repeated applications at this point is not clear. Further research is needed in the form of controlled studies of the laser and other non-hormonal GSM therapies. The objective of this paper is to review the existing literature describing laser therapy for GSM. PMID:26323234

183. **Influence Of Low Intensity Laser Therapy On Diabetic Polyneuropathy**

NASA Astrophysics Data System (ADS)
Diabetic peripheral neuropathy is a consequence of diabetes-mediated impairment of blood flow, and resultant hypoxia of nerves that may develop within 10 years of the onset of diabetes in 40-50% of people with type 1 or type 2 diabetes. Low Intensity Laser Therapy (LILT) has been advocated for the treatment of chronic pain disorders as blood flow is an important determinant for pain relief. Comparing the effect of Helium-Neon Laser therapy versus Infrared laser therapy on blood vessels diameter and flow as well as level of sensation for neuropathy. Twenty diabetic patients suffering from neuropathy were enrolled in the study with age 45-55 years. They were assigned randomly into two equal groups in number; Group A underwent an application of He-Neon laser while Group B underwent an application of Infrared laser. Both groups received laser for 2 months. Blood flow velocity, and blood vessel diameter were investigated by using duplex Doppler ultrasound and peripheral neuropathy parameters were investigated by Semmes-Weinstein monofilament assessment. The results revealed that He-Neon laser as well as Infrared laser groups showed significant improvement in blood flow velocity, blood vessel diameter & neuropathy tested parameters after treatment but there was no significance difference between the two types of LILT. LILT is a safe, non-invasive and drug free method for improving blood flow & sensation in patients suffering from diabetic polyneuropathy in addition to preventing one of the most threatening microvascular complications of diabetes.

**184. Perendoscopic Nd:YAG laser therapy of colorectal neoplasms**

NASA Astrophysics Data System (ADS)
Norberto, Lorenzo; Ranzato, Riccardo; Marino, Saverio; Erro, F.; Angriman, Imerio; Donadi, Michele; Paratore, S.; Scuderi, G.; D’Amico, D. F. 1996-01-01

The range of application of Nd:YAG laser is now wide and of particular interest in the treatment of neoplastic lesions of the large bowel, both benign and malignant, which, besides the debilitating of vegetative lesions, may also provide a good hemostasis of the bleeding ones. Yag laser treatment of malignancies is indicated in patients not suitable for surgery due to the extent of the disease or to the high anesthesiologic/surgical risk. The treatment of choice for benign neoplasms is represented by endoscopic polypectomy, being Yag laser therapy reserved to patients with very large polyps and with a high anesthesiologic risk. Yag laser therapy is also recommended in teleangiectasies with active or previous bleeding, since it allows the complete ablation of such lesions with subsequent outstanding hemostasis. Furthermore this treatment may be advantageously associated to other operative endoscopic procedures, such as diathermotherapy, dilatation and injection therapy. It is also to be outlined that Yag laser therapy is currently used to cure benign diseases and for the palliation of advanced cancer in inoperable patients. Our laser instrument is an Nd:Yag laser MBB Medilas 2 with maximum power of 100 watts at the tip, with 'non-contact' laser fibers. We use flexible optic fiberendoscopes of several sizes, according to the type of lesion to be treated. Moreover we have employed both Savary dilators of progressive caliber from 5 to 15 mm and Rigiflex pneumatic balloons. Adequate bowel preparation by means of isosmotic solution was achieved in patients with non stenotic neoplasm, or evacuative enemas and fluid diet in patients with bowel neoplastic stenoses. The patients were premedicated with benzodiazepines. Stenotic malignant lesions have been treated with endoscopic dilatation before laser treatment. At each session 4,000 - 8,000 joules of energy were administered; all patients received an average of 5 - 6 laser sessions. Followup laser sessions have then been preformed every 2 months. From November 1st, 1992 to February 28th, 1995, 130 patients (78 males and 52 females) with an average age of 65 years (range 39 - 91) underwent Nd:Yag laser therapy of the large bowel for a total of 722 laser sessions. In 91 patients suffering from colorectal cancer with a mean extension of 5 cm 492 Nd:Yag laser sessions were performed with an average of 5.4 sessions per patient (range 1 - 19).

**185. CO2 laser therapy of rhinophyma**

NASA Astrophysics Data System (ADS)
Voigt, Peggy; Jovanovic, Sergije; Sedlmaier, Benedikt W. 2000-06-01

Laser treatment of skin changes has become common practice in recent years. High absorption of the CO2 laser wavelength in water is responsible for its low penetration dpt in biological tissue. Shortening the tissue exposure time minimizes thermic side effects of laser radiation such as carbonization and coagulation. This can be achieved with scanner systems that move the focused laser beam over a defined area by microprocessor-controlled rapidly rotating mirrors. This enables controlled and reliable removal of certain dermal lesions, particularly hypertrophic scars, scars after common acne, wrinkles and rhinophyma. Laser ablation of rhinophyma is a stress-minimizing procedure for the surgeon and the patient, since it is nearly bloodless and can be performed under local anesthesia. Cosmetically favorable reepithelization of the lasered surfaces is achieved within a very short period of time.
186. Prospects For and Progress Towards Laser-Driven Particle Therapy Accelerators
SciTech Connect
2010-11-04
Recent advances in laser-ion acceleration have motivated research towards laser-driven compact accelerators for medical therapy. Realizing laser-ion acceleration for medical therapy will require adapting the medical requirements to the foreseeable laser constraints, as well as advances in laser-acceleration physics, beam manipulation and delivery, real-time dosimetry, treatment planning and translational research into a clinical setting.

187. Leg ulcer plastic surgery descent by laser therapy
NASA Astrophysics Data System (ADS)
Telfer, Jacqui; Filonenko, Natalia; Salansky, Norman M.
1994-02-01
Low energy laser therapy (LELT) was used to treat chronic leg ulcers. Seven patients, aged 59 to 96 years, with 11 leg ulcers were referred for laser therapy by plastic surgeons. They had a history of ulceration of 3 - 50 years and five of the patients had breakdown of previous skin grafts. Laser treatments were administered with a microprocessor-controlled device. A 22 red (\(\lambda\) equals 660 nm) laser head was utilized to provide a dose of (4 - 6) J/cm2 and 7 infrared (\(\lambda\) equals 880 nm) head to provide a dose of (4 - 8) J/cm2. The patients were treated three to five times per week, 25 - 30 treatments per course. Three patients underwent two courses of laser therapy with three weeks interval between them. All patients, after 5 - 10 laser treatments, have gotten relief of pain and decreased the amount of analgesics used. All ulcers in six patients were completely healed and two ulcers in the seventh patient decreased in size by 75%. One may conclude the developed laser methodology might be used as a preventative measure to avoid plastic surgery or improve its success.

188. Human Tubal-Derived Mesenchymal Stromal Cells Associated with Low Level Laser Therapy Significantly Reduces Cigarette Smoke–Induced COPD in C57BL/6 mice
PubMed Central
Peron, Jean Pierre Schatzmann; de Brito, Auriléia Aparecida; Pelatti, Mayra; Brandão, Wesley Nogueira; Vitoretti, Luana Beatriz; Greiffio, Flávia Regina; da Silveira, Elaine Cristina; Oliveira-Junior, Manuel Carneiro; Maluf, Mariangela; Evangelista, Lucila; Halperrn, Silvio; Nisenbaum, Marcelo Gil; Perin, Paulo; Czersnia, Carlos Eduardo; Câmara, Niels Olsen Saraiva; Aimbire, Flávio; Vieira, Rodolfo de Paula; Zatz, Mayana; Ligeiro de Oliveira, Ana Paula
2015-01-01
Cigarette smoke-induced chronic obstructive pulmonary disease is a very debilitating disease, with a very high prevalence worldwide, which results in a expresssive economic and social burden. Therefore, new therapeutic approaches to treat these patients are of unquestionable relevance. The use of mesenchymal stromal cells (MSCs) is an innovative and yet accessible approach for pulmonary acute and chronic diseases, mainly due to its important immunoregulatory, anti-fibrogenic, anti-apoptotic and pro-angiogenic. Besides, the use of adjuvant therapies, whose aim is to boost or synergize with their function should be tested. Low level laser (LLL) therapy is a relatively new and promising approach, with very low cost, no invasiveness and no side effects. Here, we aimed to study the effectiveness of human tube derived MSCs (htMSCs) cell therapy associated with a 30mW/3J—660 nm LLL irradiation in experimental cigarette smoke-induced chronic obstructive pulmonary disease. Thus, C57BL/6 mice were exposed to cigarette smoke for 75 days (twice a day) and all experiments were performed on day 76. Experimental groups receive htMSCs either intraperitoneally or intranasally and/or LLL irradiation either alone or in association. We show that co-therapy greatly reduces lung inflammation, lowering the cellular infiltrate and pro-inflammatory cytokine secretion (IL-1\(\beta\), IL-6, TNF-\(\alpha\) and KC), which were followed by decreased mucus production, collagen accumulation and tissue damage. These findings seemed to be secondary to the reduction of both NF-\(\kappa\)B and NF-AT activation in lung tissues with a concomitant increase in IL-10. In summary, our data suggests that the concomitant use of MSCs + LLLT may be a promising therapeutic approach for lung inflammatory diseases as COPD. PMID:26322981

189. Human Tubal-Derived Mesenchymal Stromal Cells Associated with Low Level Laser Therapy Significantly Reduces Cigarette Smoke-Induced COPD in C57BL/6 mice
PubMed
Peron, Jean Pierre Schatzmann; de Brito, Auriléia Aparecida; Pelatti, Mayra; Brandão, Wesley Nogueira; Vitoretti, Luana Beatriz; Greiffio, Flávia Regina; da Silveira, Elaine Cristina; Oliveira-Junior, Manuel
Cigarette smoke-induced chronic obstructive pulmonary disease is a very debilitating disease, with a very high prevalence worldwide, which results in a expressive economic and social burden. Therefore, new therapeutic approaches to treat these patients are of unquestionable relevance. The use of mesenchymal stromal cells (MSCs) is an innovative and yet accessible approach for pulmonary acute and chronic diseases, mainly due to its important immunoregulatory, anti-fibrogenic, anti-apoptotic and pro-angiogenic. Besides, the use of adjuvant therapies, whose aim is to boost or synergize with their function should be tested. Low level laser (LLL) therapy is a relatively new and promising approach, with very low cost, no invasiveness and no side effects. Here, we aimed to study the effectiveness of human tube derived MSCs (htMSCs) cell therapy associated with a 30mW/3J-660 nm LLL irradiation in experimental cigarette smoke-induced chronic obstructive pulmonary disease. Thus, C57BL/6 mice were exposed to cigarette smoke for 75 days (twice a day) and all experiments were performed on day 76. Experimental groups receive htMSCS either intraperitoneally or intranasally and/or LLL irradiation either alone or in association. We show that co-therapy greatly reduces lung inflammation, lowering the cellular infiltrate and pro-inflammatory cytokine secretion (IL-1?, IL-6, TNF-? and KC), which were followed by decreased mucus production, collagen accumulation and tissue damage. These findings seemed to be secondary to the reduction of both NF-?B and NF-AT activation in lung tissues with a concomitant increase in IL-10. In summary, our data suggests that the concomitant use of MSCs + LLLT may be a promising therapeutic approach for lung inflammatory diseases as COPD. PMID:26322981

Stimulatory effect of low-level GaAlAs laser (808 nm) on bone defect created surgically in rabbit femur
NASA Astrophysics Data System (ADS)

Li, Qiushi; Zhou, Yanmin; Qu, Zhou; Zhang, Tianfu
2009-07-01

Recently, low-level laser therapy (LLLT) has been reported to have a photobiomodulation effect on biotissues. Our aim was to evaluate the effect of low level GaAlAs laser on bone regeneration around bone defect sites created surgically in rabbit femur. Thirty rabbits were randomly divided into an experimental and a control groups. A GaAlAs semiconductor diode laser was applied in the experimental group (? = 808nm, P = 75mW, (symbol) =0.4mm, t=5min, ?E=28J/cm2) immediately after surgery once a day for 3 consecutive days with no irradiation in the control group. Rabbits were sacrificed on the 7th, 14th, 21th days after surgery (DAS) and femur samples were prepared for bone histomorphometry analysis. The results showed that the bone volume, the osteoid volume, osteoblast surface and the mineral apposition rate in the laser group were higher statistically (P<0.05) than those indices in the control group at different periods. These data revealed that LLLT can enhance bone regeneration. LLLT seems to have a clinical application in promoting bone healing around implant in the future.

Effect of phototherapy (low-level laser therapy and light-emitting diode therapy) on exercise performance and markers of exercise recovery: a systematic review with meta-analysis.
PubMed

Leal-Junior, Ernesto Cesar Pinto; Vanin, Adriane Aver; Miranda, Eduardo Foschini; de Carvalho, Paulo de Tarso Camillo; Dal Corso, Simone; Bjordal, Jan Magnus
2015-02-01

Recent studies have explored if phototherapy with low-level laser therapy (LLLT) or narrow-band light-emitting diode therapy (LEDT) can modulate activity-induced skeletal muscle fatigue or subsequently protect against muscle injury. We performed a systematic review with meta-analysis to investigate the effects of phototherapy applied before, during and after exercises. A literature search was performed in Pubmed/Medline database for randomized controlled trials (RCTs) published from 2000 through 2012. Trial quality was assessed with the ten-item PEDro scale. Main outcome measures were selected as: number of repetitions and time until exhaustion for muscle performance, and creatine kinase (CK) activity to evaluate risk for exercise-induced muscle damage. The literature search resulted in 16 RCTs, and three articles were excluded due to poor quality assessment scores. From 13 RCTs with acceptable methodological quality (76 of 10 items), 12 RCTs irradiated phototherapy before exercise, and 10 RCTs reported significant improvement for the main outcome measures related to performance. The time until exhaustion increased significantly compared to placebo by 4.12 s (95% CI 1.21-7.02, p?lasers and LEDs) improves muscule performance and accelerate recovery mains when applied before exercise. PMID:24249354

367 cases of CO2 laser therapy on facial acne
NASA Astrophysics Data System (ADS)
Gao, Yunqing; Liu, Songhao; Zhang, You; Liu, T. C.
1996-09-01
Since 1989, we have cured 367 persons of facial acne of different course by using direct irradiation of high-power CO2 laser combing with operative therapy of low-power CO2 laser. The cure rate is 100 percent. In this paper, we stated the therapeutic approach. It was shown that this therapeutic approach is simple and effective, and its recurrence rate is zero. There are no cicatrices after healing. It is easy to accept it, and is worthy of extension.

193. Laser surgery and medicine including photodynamic therapy in China today
NASA Astrophysics Data System (ADS)
Li, Junheng
2000-10-01
The development of laser medicine in China is correlated with the development of laser science in China. After the first Chinese laser, ruby laser came into being in 1961, Chinese medical scientists began to do the studies about laser medicine in the middle 1960s. For example, ruby laser was adopted for the retina coagulation experiment in 1965. Since 1970s, through the free choice of utilizing Co2, He-Ne, Nd:YAG argon, ruby lasers, laser surgery and medicine has been widely applied to the treatment for diseases of the eyes, ENT, dermatology, surgery, gynecology, tumors and diseases suitable to physical therapy or acupuncture with satisfactory effects. In June 1977, a nation-wide laser medicine symposium was held at Wuhan, Hubei Province with 200 participants including medical doctors and laser technologies from 23 provinces and municipal towns. Till the end of seventies, utilization of lasers has been extended to Nd glass laser, N laser and tunable dye lasers. The scope covered most of the clinical sections. After Dr. Thomas J. Dougherty developed the PDT for cancers in Roswell Park Memorial Institute in Buffalo in late 1970s and Professor Yoshihiro Hayata successfully applied the PDT in clinical treatment for lung cancer in 1980, Chinese pharmacists successfully produced the Chinese HpD and the first case of PDT, a lower eyelid basal cell carcinoma patient was treated with the Chinese laser equipment in 1981 in Beijing. Its success brought attention establishing a research group supported by the government in 1982. The members of the group consisted the experts on preclinical and clinical research, pharmaceutical chemistry, laser physicists and technologists. A systemic research on PDT was then carried out and obvious result was achieved. The step taken for PDT also accelerated the researchers on other kinds of laser medicine and surgery because the medical doctors had begun to master the knowledge about laser science. The prosperous situation of rapid development of laser science, bio-medical lasers, laser medicine and surgery as well as PDT was prolonged in the whole nineteen eighties.

194. The laser therapy and laser acupuncture of patients with chronic recurrent aphthous stomatitis.
PubMed
Mikha?llova, R I; Terekhova, N V; Zemskaya, E A; Melkadze, N
1992-01-01
Laser therapy and laser acupuncture of the biologically active sites were administered to 24 patients with chronic recurrent aphthous stomatitis. The biologically active sites were selected individually with due consideration for the underlying somatic condition. Good results were achieved in the patients with the fibrous form of chronic aphthous stomatitis. Secretory and serum immunoglobulin levels were monitored over the course of laser treatment. PMID:1307148

195. Periodontal and peri-implant wound healing following laser therapy.
PubMed
Aoki, Akira; Mizutani, Koji; Schwarz, Frank; Sculean, Anton; Yukna, Raymond A; Takasaki, Aristeo A; Romanos, Georgios E; Taniguchi, Yoichi; Sasaki, Katia M; Zeredo, Jorge L; Koshy, Geena; Coluzzi, Donald J; White, Joel M; Abiko, Yoshimitsu; Ishikawa, Isao; Izumi, Yuichi
2015-06-01
Laser irradiation has numerous favorable characteristics, such as ablation or vaporization, hemostasis, biostimulation (photobiomodulation) and microbial inhibition and destruction, which induce various beneficial therapeutic effects and biological responses. Therefore, the use of lasers is considered effective and suitable for treating a variety of inflammatory and infectious oral conditions. The CO2, neodymium-doped yttrium-aluminium-garnet (Nd:YAG) and diode lasers have mainly been used for periodontal soft-tissue management. With development of the erbium-doped yttrium-aluminium-garnet (Er:YAG) and erbium, chromium-doped yttrium-scandium-gallium-garnet (Er,Cr:YSGG) lasers, which can be applied not only on soft tissues but also on dental hard tissues, the application of lasers dramatically expanded from periodontal soft-tissue management to hard-tissue treatment. Currently, various periodontal tissues (such as gingiva, tooth roots and bone tissue), as well as titanium implant surfaces, can be treated with lasers, and a variety of dental laser systems are being employed for the management of periodontal and peri-implant diseases. In periodontics,
mechanical therapy has conventionally been the mainstream of treatment; however, complete bacterial eradication and/or optimal wound healing may not be necessarily achieved with conventional mechanical therapy alone. Consequently, in addition to chemotherapy consisting of antibiotics and anti-inflammatory agents, phototherapy using lasers and light-emitting diodes has been gradually integrated with mechanical therapy to enhance subsequent wound healing by achieving thorough debridement, decontamination and tissue stimulation. With increasing evidence of benefits, therapies with low- and high-level lasers play an important role in wound healing/tissue regeneration in the treatment of periodontal and peri-implant diseases. This article discusses the outcomes of laser therapy in soft-tissue management, periodontal nonsurgical and surgical treatment, osseous surgery and peri-implant treatment, focusing on postoperative wound healing of periodontal and peri-implant tissues, based on scientific evidence from currently available basic and clinical studies, as well as on case reports. PMID:25867988

196. Spectrophotometric characterization of useful dyes in laser photodynamic therapy
NASA Astrophysics Data System (ADS)
Danaila, Leon; Pascu, Mihail-Lucian; Popescu, Alina; Pascu, Mihaela O.; Ion, Rodica-Mariana
2000-02-01
This paper presents the physico-chemical properties of some synthetic porphyrin dyes obtained at ZECASIN SA. We have measured the absorption, excitation and fluorescence spectra of these dyes in different solvents. From them we have concluded that the most reliable dye for our studies concerning the photodynamic therapy with UV lasers is Zn II- tetrakis-sulfonatophenyl porphyrin.

197. Bioresonance information laser therapy of diabetes mellitus
NASA Astrophysics Data System (ADS)
Ramdawon, Pretidev
2002-10-01
Following the ethio-pathogenetic approach in the therapeutic management of any pathological process, and being armed with the latest information and practical experience in the newly-developing and very promising field of bioresonance information laser medicine, thereby arose the obvious aim to elaborate a highly effective method of treatment for insulin-dependent diabetes (IDD) or Type I diabetes and non-insulin-dependent diabetes (NIDDM) or Type II diabetes with the application of bioresonance information laser method of treatment, which involves the complex integrative use of low-level laser irradiation (LLLI), microwave resonance puncture (MRP) and light-emitting diode chromatherapy (LEDCT) that would free diabetic patients from life-long insulin injections or hypoglycemic tables and enable them to lead a normal life with a normal or not severely restrained diet.

198. Randomized trial comparing exercise therapy, alternating cold and hot therapy, and low intensity laser therapy for chronic lumbar muscle strain
NASA Astrophysics Data System (ADS)
Li, Xiaoguang; Li, Jie; Liu, Timon Chengyi; Yuan, Jianqin; Luo, Qingming
2008-12-01
The purpose of this study was to compare the effects of exercise therapy, alternating cold and hot (ACH) therapy and low intensity laser (LIL) therapy in patients with chronic lumbar muscle strain (CLMS). Thirty-two patients were randomly allocated to four groups: exercise group, ACH group, LIL group, and combination group of exercise, ACH and LIL, eight in each group. Sixteen treatments were given over the course of 4 weeks. Lumbar muscle endurance, flexion and lateral flexion measures, visual analogue scale (VAS) and lumbar disability questionnaire (LDQ) were used in the clinical and functional evaluations before, immediately after, and 4 weeks after treatment. It was found that the values of endurance, VAS and LDQ in all groups were significantly improved from before to after treatment (P < 0.01). The combination group showed significantly larger reduction on pain level and functional disability than the other groups immediately and 4 weeks after treatment (P < 0.01). Pain level reduced significantly more in the ACH group than in the exercise group or the LIL group immediately and 4 weeks after treatment (P < 0.05). Lumbar muscle endurance and spinal ranges of motion in all groups were improved after treatment but there was no significant difference between any therapy groups. In conclusion, exercise therapy, ACH therapy and LIL therapy were effective in the treatment of CLMS. ACH therapy was more effective than exercise therapy or LIL therapy. The combination therapy of exercise, ACH and LIL had still better rehabilitative effects on CLMS.

199. Methylene blue photodynamic therapy in rats' wound healing: 21 days follow-up
NASA Astrophysics Data System (ADS)
Carneiro, Vanda Sanderana Macêdo; Catao, Maria Helena Chaves de Vasconcelos; Menezes, Rebeca Ferraz; Araújo, Natália Costa; Gerbi, Marleny Elizabeth Martinez
2015-06-01
The experimental evaluated the photodynamic therapy (PDT) in wound healing. It used 60 male rats, making two circular wounds at each animal. They were treated at 48hs intervals, with methylene blue (MB), low level laser treatment (LLLT) or both, thus resulting in PDT. The wounds were observed 01, 03, 07, 14 and 21 days after and then processed and subjected to HE staining to analyze granulation tissue, necrosis, epithelialization and collagen. After day 1, wounds treated with MB showed necrosis less intense than other groups, and the PDT group showed more intense granulation tissue. At day 3, reepithelialization was absent for half of injuries in the PDT group, and this group was also with lower collagen. However, at day 7, this same group presented reepithelialization more advanced than control group, which did not happen with those treated with MB or LLLT (p = 0.015). The results allow us to conclude that PDT difficulted reepithelization at 7th day and interfered in standard healing. However, when used separately, MB and LLLT interfered significantly compared to the control group, which did not happened to the PDT group. There was no significant difference between the treatment groups in other analysed times.

200. Effects of low-level laser therapy on the expression of osteogenic genes during the initial stages of bone healing in rats: a microarray analysis.

PubMed

Tim, Carla Roberta; Bossini, Paulo Sérgio; Kido, Hueliton Wilian; Malavazi, Iran; von Zeska Kress, Marcia Regina; Carazzolle, Marcelo Falsarella; Parizotto, Nivaldo Antonio; Rennô, Ana Cláudia

2015-12-01

This study evaluated the morphological changes produced by LLLT on the initial stages of bone healing and also studied the pathways that stimulate the expression of genes related to bone cell proliferation and differentiation. One hundred Wistar rats were divided into control and treated groups. Noncritical size bone defects were surgically created at the upper third of the tibia. Laser irradiation (Ga-Al-As laser 830 nm, 30 mW, 94 s, 2.8 J) was performed for 1, 2, 3, 5, and 7 sessions. Histopathology revealed that treated animals produced increased amount of newly formed bone at the site of the injury. Moreover, microarray analysis evidenced that LLLT produced a significant increase in the expression TGF-?, BMP, FGF, and RUNX-2 that could stimulate osteoblast proliferation and differentiation, which may be related to improving the deposition of newly formed bone at the site of the injury. Thus, it is possible to conclude that LLLT improves bone healing by producing a significant increase in the expression of osteogenic genes. PMID:26415929

202. Blue laser system for photo-dynamic therapy

PubMed

Dabu, R.; Carstocea, B.; Blanaru, C.; Pacala, O.; Stratian, A.; Ursu, D.; Stegaru, F.

2007-03-01
A blue laser system for eye diseases (age related macular degeneration, sub-retinal neo-vascularisation in myopia and presumed ocular histoplasmosis syndrome - POHS) photo-dynamic therapy, based on riboflavin as photosensitive substance, has been developed. A CW diode laser at 445 nm wavelength was coupled through an opto-mechanical system to the viewing path of a bio-microscope. The laser beam power in the irradiated area is adjustable between 1 mW and 40 mW, in a spot of 3-5 mm diameter. The irradiation time can be programmed in the range of 1-19 minutes. Currently, the laser system is under clinical tests.

203. **ICG laser therapy of acne vulgaris**
NASA Astrophysics Data System (ADS)
Tuchin, Valery V.; Altshuler, Gregory B.; Genina, Elina A.; Bashkatov, Alexey N.; Simonenko, Georgy V.; Odoevskaia, Olga D.; Yaroslavsky, Ilya V.
2004-07-01
The near-infrared (NIR) laser radiation due to its high penetration depth is widely used in phototherapy. In application to skin appendages a high selectivity of laser treatment is needed to prevent light action on surrounding tissues. Indocyanine Green (ICG) dye may provide a high selectivity of treatment due to effective ICG uploading by a target and its narrow band of considerable absorption just at the wavelength of the NIR diode laser. The goal of this study is to demonstrate the efficacy of the NIR diode laser phototherapy in combination with topical application of ICG suggested for soft and thermal treatment of acne vulgaris. 28 volunteers with facile or back-located acne were enrolled. Skin sites of subjects were stained by ICG and irradiated by NIR laser-diode light (803 or 809 nm). Untreated, only stained and only light irradiated skin areas served as controls. For soft acne treatment, the low-intensity (803 nm, 10-50 mW/cm², 5-10 min) or the medium-intensity (809 nm, 150-190 mW/cm², 15 min) protocols were used. The single and multiple (up to 8-9) treatments were provided. The individual acne lesions were photothermally treated at 18 W/cm² (803 nm, 0.5 sec) without skin surface cooling or at 200 W/cm² (809 nm, 0.5 sec) with cooling. The results of the observations during 1-2 months after the completion of the treatment have shown that only in the case of the multiple-wise treatment a combined action of ICG and NIR irradiation reduces inflammation and improves skin state during a month without any side effects. At high power densities (up to 200 W/cm²) ICG stained acne inflammatory elements were destructed for light exposures of 0.5 sec. Based on the concept that hair follicle, especially sebaceous gland, can be intensively and selectively stained by ICG due to dye diffusion through pilosebaceous canal and its fast uptake by living microorganisms, by vital keratinocytes of epithelium of the canal and sebaceous duct, and by rapidly proliferating sebocytes, new technologies of soft and thermal acne lesions treatment that could be used in clinical treatment of acne were proposed.

204. **Nd:YAG laser therapy in bronchogenic tumors**
NASA Astrophysics Data System (ADS)
Benov, Emil; Kostadinov, D.; Mitchev, K.; Vlasov, V.
1993-03-01
In 2 years 53 patients with tumors of the tracheobronchial tree have been treated by photocoagulation therapy. Forty cases of them were with different types of cancer and 13 cases with benign lesions of the trachea or bronchi. As a laser source we used an Nd:YAG laser, MBB, Germany. At first the tumor was irradiated with a power of 25 - 30 W, following power up to 90 W. The median energy dose was 3,500 J/sq cm for each patient. The treatment was executed under local anesthesia with a rigid or flexible bronchoscope. In all of the cases with benign tumors we obtained a stable positive effect. In 15 cases of carcinoma we attained a recanalization of the case of the tumor, and by rapidly proliferating sebocytes, new technologies of soft and thermal acne lesions treatment that could be used in clinical treatment of acne were proposed.

205. **Laser Assisted Non-Surgical Therapy**
E-print Network
Everett, Joseph Dylan
2015-05-12
that incorporate any alteration from the healthy state. The gateway into the body or oral cavity is no exception. There are many indications that any disease of the supporting structures of the dentition or periodontal disease was observed throughout man’s... principles, the use of lasers to treat periodontal disease will be illustrated as well. 1.2 Histology of the Periodontium 1.2.1 Bone The main supporting structure for the dentition is the jawbone itself. Although the portions of the bone can...

206. **Role of reactive oxygen species in low level light therapy**
E-print Network
Hamblin, Michael R.
This review will focus on the role of reactive oxygen species in the cellular and tissue effects of low level light therapy (LLLT). Coincidently with the increase in electron transport and in ATP, there has also been...

207. Limb Blood Flow After Class 4 Laser Therapy
PubMed Central
Larkin, Kelly A.; Martin, Jeffrey S.; Zeanah, Elizabeth H.; True, Jerry M.; Braith, Randy W.; Borsa, Paul A. 2012-01-01
Context: Laser therapy is purported to improve blood flow in soft tissues. Modulating circulation would promote healing by controlling postinjury ischemia, hypoxia, edema, and secondary tissue damage. However, no studies have quantified these responses to laser therapy. Objective: To determine a therapeutic dose range for laser therapy for increasing blood flow to the forearm. Design: Crossover study. Setting: Controlled laboratory setting. Patients or Other Participants: Ten healthy, college-aged men (age = 20.80 ± 2.16 years, height = 177.93 ± 3.38 cm, weight = 73.64 ± 9.10 kg) with no current history of injury to the upper extremity or cardiovascular conditions. Intervention(s): A class 4 laser device was used to treat the biceps brachii muscle. Each grid point was treated for 3 to 4 seconds, for a total of 4 minutes. Each participant received 4 doses of laser therapy: sham, 1 W, 3 W, and 6 W. Main Outcome Measure(s): The dependent variables were changes in blood flow, measured using venous occlusion plethysmography. We used a repeated-measures analysis of variance to analyze changes in blood flow for each dose at 2, 3, and 4 minutes and at 1, 2, 3, 4, and 5 minutes after treatment. The Huynh–Feldt test was conducted to examine differences over time. Results: Compared with baseline, blood flow increased over time with the 3-W treatment (F3,9 = 3.468, P < .011) at minute 4 of treatment (2.417 ± 0.342 versus 2.794 ± 0.351 mL/min per 100 mL tissue, P = .032), and at 1 minute (2.767 ± 0.358 mL/min per 100 mL tissue, P < .01) and 2 minutes (2.657 ± 0.369 mL/min per 100 mL tissue, P = .022) after treatment. The sham, 1-W, and 6-W treatment doses did not change blood flow from baseline at any time point. Conclusions: Laser therapy at the 3-W (360-J) dose level was an effective treatment modality to increase blood flow in the soft tissues. PMID:22488283

208. Tooth Movement Alterations by Different Low Level Laser Protocols: A Literature Review
PubMed Central
Seifi, Massoud; Vahid-Dastjerdi, Elahe 2015-01-01
Low-Level Laser Therapy (LLLT) provides several benefits for patients receiving orthodontic treatment. According to some literatures, Orthodontic Tooth Movement (OTM) can be enhanced but some investigators have reported contradictory results. This article reviews the literature regarding the different aspects of the use of LLLT on OTM and its alterations. The general data regarding the study design, sample size, wavelength (nm), power (mW), and duration were extracted and recorded independently. Electronic databases of PubMed and ScienceDirect from January 2009 to August 2014 were searched. Also Google Scholar and grey literature was searched for relevant references. Some investigators found that the amount of tooth movement in the Low-Energy Laser Irradiation (LELI) group was significantly greater than in the nonirradiation group by the end of the experimental period. Low-level laser irradiation accelerates the bone remodeling process by stimulating osteoblastic and osteoclastic cell proliferation and function during orthodontic tooth movement. But some researchers have reported that no statistical differences in the mean rate of tooth movement were noted between low energy and high energy experimental sides and their controls. Some evidence shows that low-level laser irradiation accelerates the bone remodeling process and some evidence shows that LLLT has not effect on OTM. In some investigations no statistical differences in the mean rate of tooth movement can be seen between low energy and high energy experimental sides and their controls. It has been shown by authors that laser irradiation can reduce the amount of OTM and a clinical usage for the inhibitory role of low level laser irradiation is enforcing the anchorage unit. PMID:25699160

209. Neuroprotective therapy for argon-laser-induced retinal injury
NASA Astrophysics Data System (ADS)
Belkin, Michael; Rosner, Mordechai; Solberg, Yoram; Turetz, Yosef 1999-06-01
Laser photocoagulation treatment of the central retina is often complicated by an immediate side effect of visual impairment, caused by the unavoidable laser-induced destruction of the normal tissue lying adjacent to the lesion and not affected directly by the laser beam. Furthermore, accidental laser injuries are at present untreatable. A neuroprotective therapy for salvaging the normal tissue might enhance the benefit obtained from treatment and allow safe perifoveal photocoagulation. We have developed a rat model for studying the efficacy of putative neuroprotective compounds in ameliorating laser-induced retinal damage. Four compounds were evaluated: the corticosteroid methylprednisolone, the glutamate-receptor blocker MK-801, the anti-oxidant enzyme superoxide dismutase, and the calcium-overload antagonist flunarizine. The study was carried out in two steps: in the first, the histopathological development of retinal laser injuries was studied. Argon laser
lesions were inflicted in the retinas of 18 pigmented rats. The animals were sacrificed after 3, 20 or 60 days and their retinal lesions were evaluated under the light microscope. The laser injury mainly involved the outer layers of the retina, where it destroyed significant numbers of photoreceptor cells. Over time, evidence of two major histopathological processes was observed: traction of adjacent normal retinal cells into the central area of the lesion forming an internal retinal bulging, and a retinal pigmented epithelial proliferative reaction associated with subretinal neovascularization and invasions of the retinal lesion site by phagocytes. The neuroprotective effects of each of the four compounds were verified in a second step of the study. For each drug tested, 12 rats were irradiated with argon laser inflections: six of them received the tested agent while the other six were treated with the corresponding vehicle. Twenty days after laser exposure, the rats were sacrificed and their lesions were subjected to image-analysis morphometry. The extent of retinal damage was assessed by measuring the lesion diameter and the amount of photoreceptor cell loss in the outer nuclear layer. Methylprednisolone and MI-801 were shown to ameliorate laser-induced retinal damage, whereas both superoxide dismutase and flunarizine were ineffective. Furthermore, MK-801 diminished the proliferative reaction of the retinal pigment epithelial cells. On the basis of our results we suggest that the pigmented rat model is suitable for studying and screening various compounds for their neuroprotective efficacy in treating retinal laser injury. We further suggest that glutamate might play a key role in mediating retinal injury induced by laser irradiation.

210. The effect of low level laser on anaplastic thyroid cancer
NASA Astrophysics Data System (ADS)
Rhee, Yun-Hee; Moon, Jeon-Hwan; Ahn, Jin-Chul; Chung, Phil-Sang
2015-02-01
Low-level laser therapy (LLLT) is a non-thermal phototherapy used in several medical applications, including wound healing, reduction of pain and amelioration of oral mucositis. Nevertheless, the effects of LLLT upon cancer or dysplastic cells have been so far poorly studied. Here we report that the effects of laser irradiation on anaplastic thyroid cancer cells leads to hyperplasia. 650nm of laser diode was performed with a different time interval (0, 15, 30, 60J/cm², 25mW) on anaplastic thyroid cancer cell line FRO in vivo. FRO was orthotopically injected into the thyroid gland of nude mice and the irradiation was performed with the same method described previously. After irradiation, the xenograft evaluation was followed for one month. The thyroid tissues from sacrificed mice were undergone to H&E staining and immunohistochemical staining with HIF-1?, Akt, TGF?1. We found the aggressive proliferation of FRO on thyroid gland with dose dependent. In case of 60 J/cm² energy density, the necrotic bodies were found in a center of the thyroid. The phosphorylation of HIF-1? and Akt was detected in the thyroid gland, which explained the survival signaling of anaplastic cancer cell was turned on the thyroid gland. Furthermore, TGF?1 expression was decreased after irradiation. In this study, we demonstrated that insufficient energy density irradiation occurred the decreasing of TGF-?1 which corresponding to the phosphorylation of Akt/ HIF-1?. This aggressive proliferation resulted to the hypoxic condition of tissue for angiogenesis. We suggest that LLLT may influence to cancer aggressiveness associated with a decrease in TGF-?1 and increase in Akt/HIF-1?.

211. Effects of a laser acupuncture therapy on treating pain
NASA Astrophysics Data System (ADS)
Wong, Wai-on; Xiao, Shaojun; Ip, Wing-Yuk; Guo, Xia
2001-10-01
Laser acupuncture (LA) has been utilized as a combined approach of Chinese traditional acupuncture and low-level laser therapy since its emergence in 1973. Its mechanisms are not well understood and the standardization of clinical protocols has not been established. In this study, we used a diode laser to irradiate on four acupuncture points for normal subjects to investigate the effect of LA. For each point, the irradiation lasted for three minutes. The median nerve conduction velocity was measured within a 30 minutes interval at day 1, day 5, and day 10 respectively. Patients with chronic carpal tunnel syndrome (CTS) were given LA therapy for three stages at most with a one-week interval between two stages. Treatment outcome measurements included patients' subjective feedback (McGill pain questionnaire, VAS) and objective measurements (physical examination, kinesiological properties and NCSs). It was a randomized single-blind controlled trial. For normal subjects, motor nerve fiber was sensitive to LA and the motor conduction velocity was decreased very significantly (p < 0.001). Besides, it was found that LA resulted that sensory nerve conduction velocity was decreased significantly when it was measured 30 minutes after the subject had received LA application. For CTS patients, the outcomes except pinch test indicated that LA could improve patient's conduction. These results suggested that LA could cause the change of nerve conduction.

212. Advances in endonasal low intensity laser irradiation therapy
NASA Astrophysics Data System (ADS)
Jiao, Jian-Ling; Liu, Timon C.; Liu, Jiang; Cui, Li-Ping; Liu, Song-hao
Endonasal low intensity laser therapy (ELILT) began in China in 1998. Now in China it is widely applied to treat hyperlipidemia and brain diseases such as Alzheimer's disease, Parkinson's disease, insomnia, poststroke depression, intractable headache, ache in head or face, cerebral thrombosis, acute ischemic cerebrovascular disease, migraine, brain lesion and mild cognitive impairment. There are four pathways mediating EILILT, Yangming channel, autonomic nervous systems and blood cells. Two unhealth acupoints of Yangming channal inside nose might mediate the one as is low intensity laser acupuncture. Unbalance autonomic nervous systems might be modulated. Blood cells might mediate the one as is intravascular low intensity laser therapy. These three pathways are integrated in ELILT so that serum amyloid α protein, malformation rate of erythrocyte, CCK-8, the level of viscosity at lower shear rates and hematocrit, or serum lipid might decrease, and melanin production/SOD activity or endorphin might increase after ELILT treatment. These results indicate ELILT might work, but it need to be verified by randomized placebo-controlled trial.

213. Low-level laser therapy for spinal cord injury in rats: effects of polarization
E-print Network
Ando, Takahiro
The effects of laser polarization on the efficacy of near-infrared low-level laser therapy for spinal cord injury (SCI) are presented. Rat spinal cords were injured with a weight-drop device, and the lesion sites were ...

PubMed
Morcos, Nadia; Omran, Manar; Ghanem, Hala; Elahdal, Mahmoud; Kamel, Nashwa; Attia, Elbatoul
2015-01-01
One inescapable feature of life on the earth is exposure to ionizing radiation. The thyroid gland is one of the most sensitive organs to gamma-radiation and endocrine disrupters. Low-level laser therapy (LLLT) has been used to stimulate tissue repair, and reduce inflammation. The aim of this study was to gauge the value of using Helium-Neon laser to repair the damaged tissues of thyroid gland after gamma-irradiation. Albino rats were used in this study (144 rats), divided into control, gamma, laser, and gamma plus laser-irradiated groups, each group was divided into six subgroups according to time of treatment (total six sessions). Rats were irradiated once with gamma radiation (6 Gy), and an external dose of laser (Wavelength 632.8 nm, 12 mW, CW, Illuminated area 5.73 cm², 2.1 mW cm⁻² 120 s, 1.4 J, 0.252 J cm⁻²) twice weekly localized on thyroid region of the neck, for a total of six sessions. Animals were sacrificed after each session. Analysis included thyroid function, oxidative stress markers, liver function and blood picture. Results revealed improvement in thyroid function, liver function and antioxidant levels, and the blood cells count after LLLT. PMID:25975382

215. Complex decongestive physical therapy and low-level laser therapy for the treatment of pediatric congenital lymphedema: a case report
PubMed Central
Hwang, Woon Taeuk; Chung, Sin Ho; Lee, Ju Sang
2015-01-01
[Purpose] We report the case of a pediatric patient with congenital lymphedema treated with complex decongestive physical therapy and low-level laser therapy. [Subjects and Methods] The patient was a 2?year-old girl who had lymphedema in the left upper limb since birth. Complex decongestive physical therapy and low-level laser therapy were administered for 7 sessions. [Results] The circumferences of the middle of the forearm, elbow joint, wrist, and hand of the left upper limb decreased 0.5, 3, 0.5, and 2?cm, respectively. The moisture content of the left upper limb decreased 70?mL (6.66%), while moisture ratio increased by 0.007%.
[Conclusion] Complex decongestive physical therapy and low-level laser therapy are effective for reducing lymphedema in pediatric patients. PMID:26180372

PubMed
Hwang, Woon Taeuk; Chung, Sin Ho; Lee, Ju Sang
2015-06-01
[Purpose] We report the case of a pediatric patient with congenital lymphedema treated with complex decongestive physical therapy and low-level laser therapy. [Subjects and Methods] The patient was a 2?year-old girl who had lymphedema in the left upper limb since birth. Complex decongestive physical therapy and low-level laser therapy were administered for 7 sessions. [Results] The circumferences of the middle of the forearm, elbow joint, wrist, and hand of the left upper limb decreased 0.5, 3, 0.5, and 2?cm, respectively. The moisture content of the left upper limb decreased 70?mL (6.66%), while moisture ratio increased by 0.007%.
[Conclusion] Complex decongestive physical therapy and low-level laser therapy are effective for reducing lymphedema in pediatric patients. PMID:26180372
217. Nd: YAG laser therapy of rectosigmoid bleeding due to radiation injury
SciTech Connect
Leuchter, R.S.; Pettrilli, E.S.; Dwyer, R.M.; Hacker, N.F.; Castaldo, T.W.; Lagasse, L.D.
1982-06-01
The Nd:YAG laser was used to treat a patient bleeding from the rectosigmoid as a result of radiation injury related to therapy for cervical carcinoma. Successful laser therapy was performed after a diverting colostomy failed to control persistent bleeding. Further surgical procedures were not required. Characteristics of Nd:YAG laser as compared with those of the carbon dioxide and argon lasers are considered.

218. Biostimulative laser therapy in difficult dentition of a lower wisdom tooth
NASA Astrophysics Data System (ADS)
Grzesiak-Janas, Grazyna
1996-03-01
In a group of 66 patients treated for difficult dentition of the lower wisdom tooth, 33 were subjected to biostimulative laser therapy. In this group 20 persons were treated conservatively together with laser therapy and 13 underwent surgical treatment together with exposure to laser irradiation. During the treatment a positive influence of the laser was found, i.e. a decrease in pain, edema, and trismus.

PubMed
Garcia, Valdir Gouveia; de Lima, Marcos Alcântara; Okamoto, Tetuo; Milanezi, Luís Alberto; Júnior, Erivan Clementino Gualberto; Fernandes, Leandro Araújo; de Almeida, Juliano Milanezi; Theodoro, Letícia Helena
2010-03-01
The aim of this study was to conduct a histological assessment of the effect of photodynamic therapy (PDT) on the repairing of third-degree-burn wounds made on the backs of rats with a heated scalpel. Ninety-six rats were divided into groups: G1, control (n = 24), cold scalpel; G2, burned, heated scalpel (n = 24); G3, low-level laser therapy (LLLT) (n = 24), on burns; and G4, photodynamic therapy (PDT) (n = 24), toluidine-O blue (100 microg/ml) and LLLT treatment on burns. The laser (685 nm) was applied in continuous mode, 50 mW, 4.5 J/cm(2), contact mode at nine points (9 s/point). Eight animals in each group were killed at 3 days, 7 days or 14 days after surgery, and tissue specimens containing the whole wounded area were removed and processed for histological analysis; the results were statistically analyzed with Kruskal-Wallis and Dunn's tests (P < 0.05). The results demonstrated significant differences between G2 and G3, and between G2 and G4, at both 3 days and 7 days, with regard to acute inflammation scores; G1 and G2 showed significant differences when compared with G4 at 3 days, with regard to neo-angiogenesis scores; G1 and G2 were statistically different from G3 and G4 at both 3 days and 7 days, with regard to re-epithelization scores; G2 showed statistically significant differences when compared with G3 and G4 with regard to collagen fiber scores at 7 days. LLLT and PDT acted as a biostimulating coadjuvant agent, balancing the undesirable effect of the burn on the wound healing process, acting mainly in the early healing stages, hastening inflammation and increasing collagen deposition. PMID:19533211

220. Basic investigation of laser therapy for the ureteral stricture using ultraviolet argon laser and multifiber catheter
NASA Astrophysics Data System (ADS)
Daidoh, Yuichiro; Arai, Tsunenori; Murai, Masaru; Suda, Akira; Kikuchi, Makoto; Nakamura, Hiroshi; Komime, Yukikuni; Utsumi, Atsushi
1992-06-01
In order to develop new, easy, and safe treatment for urinary tract stricture, we investigated the laser plasty using a combination of an uv Ar laser for ablation and a novel multi-fiber catheter for laser delivery. To investigate the characteristics of the uv Ar laser ablation to ureteral tissue, the experiment in vitro was performed. The ureter was clearly ablated with sufficient thin coagulation layer. The proper laser power for the tissue ablation was about 0.5 W for 0.4 mm core-diameter fiber. The multi-fiber catheter (1.6 mm in outer diameter) consisted of 13 pixels of silica glass fibers (0.2 mm in core diameter) for laser delivery and a through lumen (0.9 mm in inner diameter) for guidewire. The catheter was inserted into a canine ureter under the general anesthesia. The ureter and urinary tract were irradiated using about 0.6 W of laser power at the catheter tip with 40s duration. The irradiated urinary tract tissues were histologically investigated. The ureter was ablated up to the submucosa layer. The urinary tract endotherium was eliminated by the laser ablation without the carbonization. No perforation was found at various irradiation conditions. To investigate the ureteral tissue damage of the uv Ar laser irradiation, the serosa temperature was measured by a thermocouple. The temperature elevation of the serosa could be restricted up to 60 degree(s)C, at which the protein was not coagulated. We concluded that the combination of uv Ra laser and multi-fiber catheter offered easy, reliable therapy for coronary structure.
221. Study of Laser Reflectivity on Skin
SciTech Connect
Oidor-Garcia, J. J. J.; Trevino-Palacios, C. G.
2008-08-11
The response to the light on the skin can be manifested as temperature increase or creation of biochemical byproducts, in which further studies are required to assess the light effect. This response changes the average response over time and can produce discrepancies between similar studies. In this work we present a Low Level Laser Therapy (LLLT) study with feedback. We study the time response reflectivity of a 980 nm laser diode of 25 mW modulated at frequencies close to 40 kHz and detect the reflected light on a silicon photodiode, finding no direct correlation between different test points or individuals, while finding reproducible responses within the same individual and test point.

222. Biomodulatory effects of laser irradiation on dental pulp cells in vitro
NASA Astrophysics Data System (ADS)
Milward, Michael R.; Hadis, Mohammed A.; Cooper, Paul R.; Gorecki, Patricia; Carroll, James D.; Palin, William M.
2015-03-01
Low level laser/light therapy (LLLT) or photobiomodulation is a biophysical approach that can be used to reduce pain, inflammation and modulate tissue healing and repair. However, its application has yet to be fully realized for dental disease treatment. The aim of this study was to assess the modulation of dental pulp cell (DPC) responses using two LLLT lasers with wavelengths of 660 nm and 810 nm. Human DPCs were isolated and cultured in phenol-red-free MEM/10% FCS at 37°C in 5% CO2. Central wells of transparent black walled 96-microplates were seeded with DPCs (passages 2-4; 150 µL; 25,000 cell/ml). At 24h post-seeding, cultures were irradiated using a Thor Photomedicine LLLT device (THOR Photomedicine, UK) at 660 nm (3, 6 or 13s to give 2, 5 and 10 J/cm2) or 810 nm (for 1, 2 or 5 s to deliver 5, 10 and 20 J/cm2). Metabolic activity was assessed via a modified MTT assay 24h post-irradiation. Statistical differences were identified using analysis of variance and post-hoc Tukey tests (P=0.05) and compared with nonirradiated controls. Significantly higher MTT activity was obtained for both lasers (P<0.05) using the high and intermediate radiant exposure (5-20 J/cm2). The MTT response significantly decreased (P<0.05) at lower radiant exposures with no statistical significance from control (P>0.05). Consequently, enhanced irradiation parameters was apparent for both lasers. These parameters should be further optimised to identify the most effective for therapeutic application.

223. Statistical examination of laser therapy effects in controlled double-blind clinical trial
NASA Astrophysics Data System (ADS)
Boerner, Ewa; Podbielska, Halina
2001-10-01
For the evaluation of the therapy effects the double-blind clinical trial followed by statistical analysis was performed. After statistical calculations it was stated that laser therapy with IR radiation has a significant influence on the decrease of the level of pain in the examined group of patients suffering from various locomotive diseases. The level of pain of patients undergoing laser therapy was statistically lower than the level of pain of patients undergoing placebo therapy. It means that laser therapy had statistically significant influence on the decrease of the level of pain. The same tests were performed for evaluation of movement range. Although placebo therapy contributes to the increase of the range of movement, the statistically significant influence was stated in case of the therapeutic group treated by laser.

224. Modulation of Transgene Expression in Retinal Gene Therapy by Selective Laser Treatment
E-print Network
Palanker, Daniel
Retina Modulation of Transgene Expression in Retinal Gene Therapy by Selective Laser Treatment in a new era of promise for gene therapy of retinal diseases.1 Clinical experience with an adeno pigmentosa, retinoschisis, and Stargardt's disease.7 Gene therapy for retinal neovascular diseases, which
Intravascular low intensity laser therapy (ILILT) was originally put forward in USA in 1982, but popularized in Russia in 1980s and in China in 1990s, respectively. A randomized placebo-controlled study has shown ILILT clinical efficacy in patients suffering from rheumatoid arthritis. As Chinese therapeutic applications of ILILT were the most widely in the world, its basic research, such as intracellular signal transduction research, blood research in vitro, animal blood research in vivo, human blood research in vivo and traditional Chinese medicine research, was also very progressive in China. Its basic studies will be reviewed in terms of the biological information model of photobiomodulation in this paper. ILILT might work in view of its basic studies, but the further randomized placebo-controlled trial and the further safety research should be done.

Blood Saving Campaign is a campaign to lessen the risk of intra- and post-operative blood transfusion by decreasing the amount of blood loss during surgery and at the same time will lessen the risk of transmission of blood born diseases. The blood saved can be used to treat those afflicted with diseases such as hemophilia and aplastic anemia where blood transfusion is imperative for the survival of the patient. At the 7th forum of WFSLMS held in Germany 2003, the steering committee has evolved to an organizing committee of WFSLMS. The aim of WFSLMS is to contribute to the health and welfare of mankind through the merit of minimum tissue damage and high efficacy of hemostasis in laser medicine. Therefore we also organized a Laser Blood Saving Campaign (Laser B-SAC) committee within WFSLMS at the same congress. The methods of laser blood saving are divided into 4 categories. 1. Surgical Laser Treatment (HLLT). 2. Non-surgical Laser Therapy (LLLT). 3. Laser Treatment with Newly Developed Laser Machines. 4. Laser Treatment with Newly Developed Techniques. I will mention on the History of B-SAC, Action Plan of B-SAC and so on.

Hemangioma is a mesenchymal benign tumor formed by blood vessels. Anomalies affect up to 10% of children and they are more common in females than in males. The aim of our study was to compare the treatment efficacy, namely the curative effect and adverse events, such as loss of pigment and appearance of scarring, between classical surgery techniques and laser techniques. For that reason a group of 223 patients with hemangioma was retrospectively reviewed. For treatment, a pulsed dye laser (PDL) (Rhodamine G, wavelength 595 nm, pulselength between 0.45 and 40 ms, spot diameter 7 mm, energy density 9-11 J cm⁻²) was used and the results were compared with a control group treated with classical surgical therapy under general anesthesia. The curative effects, mainly number of sessions, appearance of scars, loss of pigment, and relapses were evaluated as a marker of successful treatment. From the results it was evident that the therapeutic effects of both systems are similar. The PDL was successful in all cases. The surgery patients had four relapses. Classical surgery is directly connected with the presence of scars, but the system is safe for larger hemangiomas. It was confirmed that the PDL had the optimal curative effect without scars for small lesions (approximately 10 mm). Surgical treatment under general anesthesia is better for large hemangiomas; the disadvantage is the presence of scars.

Low-level laser therapy for Peyronie's disease

We are reporting the preliminary results of a nonrandomized trial using a low-level gallium-aluminum-arsenide (GaAlAs) laser at a wavelength of 830 nm (Microlight 830, Lasermedics, Inc., Stafford, TX) to treat patients with symptomatic Peyronie's disease. All patients entered into the study had disease consisting of a well-defined fibrous plaque causing pain and/or curvature of the penile shaft on erection that interfered with satisfactory sexual intercourse. Treatment has consisted of 30 mW administered over a duty cycle of 100 seconds (3 J) beginning at the base of the penis and extending to the coronal sulcus over the dorsum of the penis at 0.5 cm intervals. An additional duty cycle of 100 seconds was delivered to each 0.5 cm of palpable plaque. The ability of the therapy to reduce the size of the fibrous plaque, the severity of the penile curvature,
and the severity of pain associated with penile erection and the treatment's effect on the patient's quality of life were assessed for each patient at completion of therapy and 6 weeks later.

229. Laser-Based Strategies to Treat Diabetic Macular Edema: History and New Promising Therapies
PubMed Central
Park, Young Gun; Kim, Eun Yeong; Roh, Young Jung
2014-01-01
Diabetic macular edema (DME) is the main cause of visual impairment in diabetic patients. The management of DME is complex and often various treatment approaches are needed. At the present time, despite the enthusiasm for evaluating several new treatments for DME, including the intravitreal pharmacologic therapies (e.g., corticosteroids and anti-VEGF drugs), laser photocoagulation still remains the current standard in DME. The purpose of this review is to update our knowledge on laser photocoagulation for DME and describe the developments in laser systems. And we will also discuss the new laser techniques and review the latest results including benefits of combined therapy. In this paper, we briefly summarize the major laser therapeutics for the treatment of diabetic macular edema and allude to some future promising laser therapies. PMID:25332833

230. A Novel 785-nm Laser Diode-Based System for Standardization of Cell Culture Irradiation
PubMed
Oliveira, Camila F.; Guimarães, Orlando C.C.; Costa, Carlos A. de Souza; Kurachi, Cristina; Bagnato, Vanderlei S.
2013-01-01
Abstract Objective: The purpose of this study was to develop a novel device that concatenates alignment of infrared lasers and parallel procedure of irradiation. The purpose of this is to seek standardization of in vitro cell irradiation, which allows analysis and credible comparisons between outcomes of different experiments. Background data: Experimental data obtained from infrared laser therapies have been strongly dependent upon the irradiation setup. Although further optical alignment is difficult to achieve, in contact irradiation it usually occurs. Moreover, these methods eventually use laser in a serial procedure, extending the time to irradiate experimental samples. Methods: A LASERTable (LT) device was designed to provide similar infrared laser irradiation in 12 wells of a 24 well test plate. It irradiated each well by expanding the laser beam until it covers the well bottom, as occurs with unexpanded irradiation. To evaluate the effectiveness of this device, the spatial distribution of radiation was measured, and the heating of plain culture medium was monitored during the LT operation. The irradiation of LT (up to 25?J/cm2 – 20?mW/cm2; 1.250?sec) was assessed on odontoblast-like cells adhered to the bottom of wells containing 1?mL of plain culture medium. Cell morphology and metabolism were also evaluated. Results: Irradiation with LT presented a Gaussian-like profile when the culture medium was not heated >1°C. It was also observed that the LT made it 10 times faster to perform the experiment than did serial laser irradiation. In addition, the data of this study revealed that the odontoblast-like cells exposed to low-level laser therapy (LLLT) using the LT presented higher metabolism and normal morphology. Conclusions: The experimental LASERTable assessed in this study provided parameters for standardization of infrared cell irradiation, minimizing the time spent to irradiate all samples. Therefore, this device is a helpful tool that can be effectively used to evaluate experimental LLLT protocols. PMID:24102164

PubMed
Xiuwen, Jiang; Jianguo, Tang
2015-04-01
Many methods have been used to treat venous malformations, including sclerotherapy, laser therapy, and surgery. Nowadays, endoscopic laser surgery has become a popular therapeutic modality for most of pharyngolaryngeal venous malformations. There are various kinds of lasers that have been applied, but Holmium:YAG laser (Ho laser) has not been reported yet. Ho laser is produced by a kind of iraser which is made of yttrium aluminum garnet mixed with holmium, chromium and thulium. Aim of the current work is to evaluate the efficacy and safety of Ho laser interstitial therapy in pharyngolaryngeal venous malformations in adults. The clinical data of 42 patients with pharyngolaryngeal venous malformation treated with endoscopic Ho laser interstitial therapy over a 12-year period were retrospectively reviewed and analyzed. The wave length of Ho laser was 2.1 µm and the diameter of optical fiber was 550 µm. The pulse energy was 0.5 J and the time of duration was 600 µs. The highest output power was 100 W. Outcomes were graded as cure (complete resolution), considerable reduction (>60-80 % reduction), and no obvious change (<50 % reduction). The lesions were well controlled without severe complications. Complete resolution of the lesion was observed in 95.1 % of the patients, while 4.9 % patients showed considerable reduction of the swelling. Complications occurred in 4.8 % of patients. No respiratory troubles or other severe complications occurred. Endoscopic Ho laser interstitial therapy is an effective and safe treatment modality for pharyngolaryngeal venous malformations in adults. PMID:25534288
232. **What is the ideal dose and power output of low-level laser therapy (810 nm) on muscle performance and post-exercise recovery? Study protocol for a double-blind, randomized, placebo-controlled trial**

*PubMed Central*

2014-01-01

Background Recent studies involving phototherapy applied prior to exercise have demonstrated positive results regarding the attenuation of muscle fatigue and the expression of biochemical markers associated with recovery. However, a number of factors remain unknown, such as the ideal dose and application parameters, mechanisms of action and long-term effects on muscle recovery. The aims of the proposed project are to evaluate the long-term effects of low-level laser therapy on post-exercise musculoskeletal recovery and identify the best dose and application power/irradiation time. Design and methods A double-blind, randomized, placebo-controlled clinical trial will be conducted. After fulfilling the eligibility criteria, 28 high-performance athletes will be allocated to four groups of seven volunteers each. In phase 1, the laser power will be 200 mW and different doses will be tested: Group A (2 J), Group B (6 J), Group C (10 J) and Group D (0 J). In phase 2, the best dose obtained in phase 1 will be used with the same distribution of the volunteers, but with different powers: Group A (100 mW), Group B (200 mW), Group C (400 mW) and Group D (0 mW). The isokinetic test will be performed based on maximum voluntary contraction prior to the application of the laser and after the eccentric contraction protocol, which will also be performed using the isokinetic dynamometer. The following variables related to physical performance will be analyzed: peak torque/maximum voluntary contraction, delayed onset muscle soreness (algometer), biochemical markers of muscle damage, inflammation and oxidative stress. Discussion Our intention is to determine optimal laser therapy application parameters capable of slowing down the physiological muscle fatigue process, reducing injuries or micro-injuries in skeletal muscle stemming from physical exertion and accelerating post-exercise muscle recovery. We believe that, unlike drug therapy, LLLT has a biphasic dose–response pattern. Trial registration The protocol for this study is registered with the Protocol Registry System, ClinicalTrials.gov identifier NCT01844271. PMID:24576321

233. **Several methods and apparatus of low-energy laser therapy in veterinary practice**

*NASA Astrophysics Data System (ADS)*

Svirin, Vaytcheslav N.; Rogatkin, Dmitrii A.; Barybin, Vitalii F.

1998-12-01

During same years various medical effect of low-energy laser therapy in veterinary were tested. We established that the laser low-energy therapy can be very effective for treatment such animal's diseases as mastitis and demodekose when certain combinations of laser beam parameters are used. This combinations were taken as the principle of a number of laser veterinary apparatus, which we started to produce at 'POLUS'. It is our series of apparatus 'VEGA-MB' and 'VETLAS-3', which is real used today for dogs and cows treatment in Russia.

234. **Laser therapy on points of acupuncture: Are there benefits in dentistry?**

*PubMed*

de Oliveira, Renata Ferreira; da Silva, Camila Vieira; Cersosimo, Maria Cecília Pereira; Borsatto, Maria Cristina; de Freitas, Patrícia Moreira

2015-10-01

Studies have shown the use of laser therapy at points of acupuncture as an alternative to metal needles. The scientific literature in the area of laser acupuncture is rather large; however, the actual mechanisms and effects have not yet been proven in detail. Therefore, the current manuscript reviews the existing literature regarding the effects of laser acupuncture in Dentistry, seeking treatment modalities in which this technique is used and which are able to generate positive clinical results. Thus, the literature survey was conducted in electronic databases - Medline/Pubmed, VHL and Science Direct - using the uniterms "alternative medicine", "low-power laser and acupuncture", "laser acupuncture and dentistry" and "laser therapy and acupuncture". Retrospective and prospective clinical studies were considered. According to the findings of the literature, laser therapy at points of acupuncture was effective for the treatment of various orofacial problems encountered in dentistry, but there are still many differences among the parameters used for irradiation and there is a lack of important information reported by the studies, such as the wavelength, dose, power density, irradiation time and frequency, points of acupuncture selected for irradiation and therapy outcomes. Although these results indicate the potential benefit of the use of laser therapy at points of acupuncture on Dentistry, further double-blinded, controlled clinical trials should be carried out in order to standardize protocols for clinical application. PMID:26188388

235. **Effective cancer laser-therapy design through the integration of nanotechnology and computational treatment planning models**

*NASA Astrophysics Data System (ADS)*
Laser therapies can provide a minimally invasive treatment alternative to surgical resection of tumors. However, the effectiveness of these therapies is limited due to nonspecific heating of target tissue which often leads to healthy tissue injury and extended treatment durations. These therapies can be further compromised due to heat shock protein (HSP) induction in tumor regions where non-lethal temperature elevation occurs, thereby imparting enhanced tumor cell viability and resistance to subsequent chemotherapy and radiation treatments. Introducing multi-walled nanotubes (MWNT) into target tissue prior to laser irradiation increases heating selectivity permitting more precise thermal energy delivery to the tumor region and enhances thermal deposition thereby increasing tumor injury and reducing HSP expression induction. This study investigated the impact of MWNT inclusion in untreated and laser irradiated monolayer cell culture and cell phantom model. Cell viability remained high for all samples with MWNT inclusion and cells integrated into alginate phantoms, demonstrating the non-toxic nature of both MWNTs and alginate phantom models. Following, laser irradiation samples with MWNT inclusion exhibited dramatic temperature elevations and decreased cell viability compared to samples without MWNT. In the cell monolayer studies, laser irradiation of samples with MWNT inclusion experienced up-regulated HSP27, 70 and 90 expression as compared to laser only or untreated samples due to greater temperature increases albeit below the threshold for cell death. Further tuning of laser parameters will permit effective cell killing and down-regulation of HSP. Due to optimal tuning of laser parameters and inclusion of MWNT in phantom models, extensive temperature elevations and cell death occurred, demonstrating MWNT-mediated laser therapy as a viable therapy option when parameters are optimized. In conclusion, MWNT-mediated laser therapies show great promise for effective tumor destruction, but require determination of appropriate MWNT characteristics and laser parameters for maximum tumor destruction.

**236. Laser treatment in modulation of TMJ inflammation**

NASA Astrophysics Data System (ADS)

Ross, Gerry
2011-03-01

Aim: The aim of this study was to evaluate the effectiveness of the laser in the treatment of hyperemia (edema) as assessed by a TMJ Doppler on 22 consecutive joints showing TMJ Hyperemia. Materials and Methods: The hyperemia of the joint was first evaluated using a TMJ Doppler device (Great Lakes Orthodontic Products - Buffalo NY) and it was recorded as severe, moderate or mild. The DioBeam 830 low level laser (830nm, 150mw continuous wave laser with a 1 cm beam, manufactured by CMS Dental Copenhagen, Denmark); 16 J/cm2 (8 J/cm2 with mouth open and 8 J/cm2 with the mouth closed). The treatment time was 2 minutes per joint. The hyperemia was assessed immediately following the treatment. Results: 22 joints have been evaluated on 16 patients. 12 had severe hyperemia, 9 had moderate hyperemia and 1 had mild hyperemia. All 22 joints showed complete resolution of the hyperemia immediately after laser therapy. There were no negative clinical results associated with the treatments. Conclusion: Low Level Laser Therapy (LLLT) was an effective tool in the treatment of hyperemia of the TMJ.

**237. The Disinfecting Efficacy of Root Canals with Laser Photodynamic Therapy**

PubMed Central

Xhevdet, Aliu; Stubljar, David; Kriznar, Igor; Jukic, Tomislav; Skvarc, Miha; Veranic, Peter
2014-01-01

Introduction: Infecting microorganisms of the root canals are difficult to eliminate during endodontic treatment. In this study the effect of root canal disinfection with photodynamic therapy (PDT) at different time intervals in comparison to 2.5% sodium hypochlorite (NaOCl) irrigation and passive ultrasonic irrigation (PUI) in extracted teeth colonized with Enterococcus faecalis and Candida albicans was tested to assess which treatment reaches the best disinfection rate. Methods: One hundred and fifty-six extracted single-rooted teeth were collected, sterilized, and incubated with Enterococcus faecalis (ATCC 29212) and Candida albicans (ATCC 60193). The two groups were further divided into 6 groups depending on the treatment mode; HELBO® Endo Blue photosensitizer dye application followed by HELBO laser irradiation, with the output power 100 mW and emission of 660 nm, for a 1, 3 and 5 minutes, irrigation with 2.5% NaOCl, 10 second PUI with 2.5% NaOCl and control group. Flow cytometry and scanning electron microscopic (SEM) analysis were used to determine the effectiveness of the different disinfecting methods. Results: The different disinfecting methods had a significantly different effect on the percent of dead cells (p<0.001). A statistical significance of dead cells between organisms (p<0.001) was observed. Interaction between the disinfecting method and both of organisms had shown the statistical significance (p=0.045). Percent of dead cells in treatment groups were significantly higher compared to control group for both organisms (p<0.001). Conclusions: PUI still remains the most effective method for disinfection of infected root canals in endodontics compared to hand
instrumentation for both microorganisms. SEM analysis only confirmed the results. Other results ex vivo suggested that prolonging the time from 1 to 5 minutes of PDT increased the number of killed microorganisms significantly, therefore longer times of photodynamic therapy were recommended. Irrigation with 2.5% NaOCl showed similar results to 5 min irradiation. PMID:25606335

238. He-Ne laser radiation in combined therapy of children's bronchial asthma
NASA Astrophysics Data System (ADS)
Zhilnikov, Dmitriy V.; Varavva, Andrey S.; Tarasova, Olga N.; Plaksina, Galina V.; Barybin, Vitaliy F.; Khlutkova, Svetlana N.
2004-02-01
In this paper the medical application of He-Ne lasers for the treatment of bronchial asthma is described. Research objective of this work was the development of a treatment method for children with bronchial asthma of heavy and medium-heavy forms, resistant to the base therapy, with the help of low-intensive laser radiation with wave length \( \lambda = 0.63 \) \( \mu \)m.

239. Study concerning the psychological profiles of patients who are responding to LLLT treatment
NASA Astrophysics Data System (ADS)
Antipa, A.; Trasa, L.; Pascu, Mihaela O.; Pasucu, Ruxandra
2000-06-01
It is well known, in the low level laser therapy, that an important number of patients exhibit positive results at PLACEBO treatment. That is why we decided to analyze the psychological profile of 156 patients presented rheumathical diseases, divided into tow groups: laser group and PLACEBO group. We applied the Woodworth-Mathews test to all patients before the laser treatment. This is a test for identification of the abnormal tendencies in the normal human behavior. Finally, following the PLACEBO exposure, we noticed that the patients' emotional tendencies and psychological instability had a strong influence on the obtained good results. We conclude that the Woodworth-Mathews test is useful to anticipate the possible false/positive results in the real treatment. Nevertheless it may also be used from the psychological point of view.

240. Near infrared laser penetration and absorption in human skin
NASA Astrophysics Data System (ADS)
Nasouri, Babak; Murphy, Thomas E.; Berberoglu, Halil
2014-02-01
For understanding the mechanisms of low level laser/light therapy (LLLT), accurate knowledge of light interaction with tissue is necessary. In this paper, we present a three dimensional, multi-layer Monte Carlo simulation tool for studying light penetration and absorption in human skin. The skin is modeled as a three-layer participating medium, namely epidermis, dermis, and subcutaneous, where its geometrical and optical properties are obtained from the literature. Both refraction and reflection are taken into account at the boundaries according to Snell's law and Fresnel relations. A forward Monte Carlo method was implemented and validated for accurately simulating light penetration and absorption in absorbing and anisotropically scattering media. Local profiles of light penetration and volumetric absorption densities were simulated for uniform as well as Gaussian profile beams with different spreads at 155 mW average power over the spectral range from 1000 nm to 1900 nm. The results show the effects of beam profiles and wavelength on the local fluence within each skin layer. Particularly, the results identify different wavelength bands for targeted deposition of power in different skin layers. Finally, we show that light penetration scales well with the transport optical thickness of skin. We expect that this tool along with the results presented will aid researchers resolve issues related to dose and targeted delivery of energy in tissues for LLLT.

241. Complete regression of a melanocytic nevus after epilation with diode laser therapy
PubMed Central
Boleira, Manuela; de Almeida Balassiano, Laila Klotz; Jeunon3, Thiago
2015-01-01
The use of lasers and intense pulsed light (IPL) technology has become an established practice in dermatology and aesthetic medicine. The use of laser therapy and IPL in the treatment of pigmented melanocytic lesions is a
controversial issue. We report clinical, dermoscopic and histological changes of a completely regressed pigmented melanocytic nevus after hair removal treatment with the LightSheer™ Diode Laser (Lumenis Ltd, Yokneam, Israel). PMID:26114064

242. Mechanism of low-intensity laser therapy as a different etiology for kidney lesion
NASA Astrophysics Data System (ADS)
Koulchtavenia, Ekaterina V.
2001-05-01
Urological diseases are widespread among the population. Both infectious-inflammatory and oncological diseases are often diagnosed. Modern antibiotics permit to eradicate infectious agent, but efficiency of therapy is insufficient because of reduction of organ function. Thus, besides aetiotropic therapy pathogenetic effect is necessary. Low- intensity laser therapy (LT) is best pathogenetic treatment, so far as it has a few contraindications, low cost and good tolerance. Our goal was to investigate the influence of LT on different aetiology kidney lesion.

243. Adipose-derived stromal cell cluster with light therapy enhance angiogenesis and skin wound healing in mice. PubMed
Park, In-Su; Chung, Phil-Sang; Ahn, Jin Chul
2015-07-01
Human adipose-derived mesenchymal stem cells (hASCs) are attractive cell source for skin tissue engineering. The aim of this study was to investigate the effects of low-level light therapy (LLLT) on transplanted cluster hASC in a skin wound animal model. The hASCs were cultured in monolayer or clusters. The LLLT, hASCs, hASC clusters, and hASC clusters transplantation with LLLT (cluster + LLLT) were applied to the wound bed in athymic mice. Wound healing was assessed by gross evaluation and by hematoxylin and eosin staining, and elastin van gieson histochemistry. The survival, differentiation, and secretion of vascular endothelial growth factor (VEGF), basic fibroblast growth factor (FGF), and hepatocyte growth factor (HGF) of the cluster ASC were evaluated by immunohistochemistry and Western blotting. The cluster + LLLT group enhanced the wound healing, including neovascularization and regeneration of skin appendages, compared with the cluster group. The secretion of growth factors was stimulated in the cluster + LLLT group compared with the ASCs and cluster group. These data suggest that LLLT is an effective biostimulator of cluster hASCs in wound healing that enhances the survival of hASCs and stimulates the secretion of growth factors in the wound bed. PMID:25911320

244. Second International Conference on Near-Field Optical Analysis: Photodynamic Therapy and Photobiology
Effects
NASA Technical Reports Server (NTRS)
Bulgher, Debra L. (Editor); Morrison, Dennis
2002-01-01
The International NASA/DARPA Photobiology Conference held at the Johnson Space Center in Houston/TX demonstrated where low level laser therapy (LLLT), respectively low intensity light activated biostimulation (LILAB) and nanotechnological applications employing photobiomodulation techniques will presumably go in the next ten years. The conference was a continuation of the 1st International Conference on Nearfield Optical Analysis organized by Andrei Sommer (ENSOMA Lab, University of Ulm, Germany) in November 2000 at Castle Reisenburg, Germany, which started with a group of ten scientists from eight different countries. The 1st conference was co-sponsored by the American Chemical Society to evaluate the molecular mechanism of accelerated and normal wound healing processes. The 2nd conference was co-sponsored by DARPA, NASA-JSC and the Medical College of Wisconsin. Despite the short time between events, the 2nd conference hosted 40 international experts form universities, research institutes, agencies and the industry. The materials published here are expected to become milestones forming a novel platform in biomedical photobiology. The multidisciplinary group of researchers focused on LLLT/LILAB-applications under extreme conditions expected to have beneficial effects particularly in space, on submarines, and under severe battlefield conditions. The group also focused on novel technologies with possibilities allowing investigating the interaction of light with biological systems, molecular mechanisms of wound healing, bone regeneration, nerve regeneration, pain modulation, as well as biomineralization and biofilm formulation processes induced by nanobacteria.

245. Efficacy of multiple exposure with low level He-Ne laser dose on acute wound healing: a pre-clinical study
NASA Astrophysics Data System (ADS)
Prabhu, Vijendra; Rao, Bola Sadashiva S.; Mahato, Krishna Kishore
2014-02-01
Investigations on the use of Low Level Laser Therapy (LLLT) for wound healing especially with the red laser light have demonstrated its pro-healing potential on a variety of pre-clinical and surgical wounds. However,
until now, in LLLT the effect of multiple exposure of low dose laser irradiation on acute wound healing on well-designed pre-clinical model is not much explored. The present study aimed to investigate the effect of multiple exposure of low dose Helium Neon laser on healing progression of full thickness excision wounds in Swiss albino mice. Further, the efficacy of the multiple exposure of low dose laser irradiation was compared with the single exposure of optimum dose. Full thickness excision wounds (circular) of 15 mm diameter were created, and subsequently illuminated with the multiple exposures (1, 2, 3, 4 and 5 exposure/ week until healing) of He-Ne (632.8 nm, 4.02 mWcm-2) laser at 0.5 Jcm-2 along with single exposure of optimum laser dose (2 J/cm-2) and un-illuminated controls. Classical biophysical parameters such as contraction kinetics, area under the curve and the mean healing time were documented as the assessment parameters to examine the efficacy of multiple exposures with low level laser dose. Experimental findings substantiated that either single or multiple exposures of 0.5 J/cm2 failed to produce any detectable alterations on wound contraction, area under the curve and mean healing time compared to single exposure of optimum dose (2 J/cm-2) and un-illuminated controls. Single exposure of optimum, laser dose was found to be ideal for acute wound healing.

246. **Combination of nitric oxide therapy, anti-oxidative therapy, low level laser therapy, plasma rich platelet therapy and stem cell therapy as a novel therapeutic application to manage the pain and treat many clinical conditions**

*NASA Astrophysics Data System (ADS)*

Halasa, Salaheldin; Dickinson, Eva

2014-02-01

From hypertension to diabetes, cancer to HIV, stroke to memory loss and learning disorders to septic shock, male impotence to tuberculosis, there is probably no pathological condition where nitric oxide does not play an important role. Nitric oxide is an analgesic, immune-modulator, vasodilator, anti-apoptotic, growth modulator, angiogenetic, anti-thrombotic, anti-inflammatory and neuro-modulator. Because of the above actions of nitric oxide, many clinical conditions associated with abnormal Nitric oxide (NO) production and bioavailability. Our novel therapeutic approach is to restore the homeostasis of nitric oxide and replace the lost cells by combining nitric oxide therapy, anti-oxidative therapy, low level laser therapy, plasma rich platelet therapy and stem cell therapy.

247. **[Changes in prostatic circulation in response to laser therapy and magnetic therapy in patients with benign prostatic hyperplasia](https://doi.org/10.1097/01.jlr.0000142516.37189.01)**

*PubMed*

2005-01-01

The results of preoperative preparation were analysed in 59 patients with prostatic benign hyperplasia (PBH) subjected to TUR. Treatment outcomes were assessed by transrectal ultrasound (color Doppler mapping) in two groups of patients. Group 1 received combined therapy including transrectal laser radiation of the prostate, group 2–transrectal magnetotherapy. The analysis showed that laser radiation reduced insignificantly the size of the prostate and adenomatous node, improved microcirculation and circulation in the prostate. This resulted in relief of inflammation and reduction of the number of postoperative inflammatory complications. Transrectal magnetotherapy has a positive effect on vascularization and hemodynamics of the prostate, local immunity, contamination of the tissues with pathogenic flora. PMID:16419474

248. **Meta-analysis on intravascular low energy laser therapy**

*NASA Astrophysics Data System (ADS)*

Zhao, Shu-Dong; Liu, Timon Cheng-Yi; Wang, Yan-Fang; Liu, Song-Hao

2008-12-01

Intravascular low energy laser therapy (ILELT) was put forward for cardiocirculatory diseases in USA in 1982, was popular in Russia in 1980s, and then in China in 1990s. The therapeutic effects of ILELT and drugs in comparison with drugs only on Chinese patients and their blood parameters were analyzed with meta-analyses and reported as (OR, 95%CI) for patient improvement and (WMD, 95% CI) for blood parameter improvement, where 95%CI, OR and WMD denoted 95% confidence intervals, odds ratio and weighted mean difference, respectively. It was found that the patients of cerebral infarction (2.39, 2.09–2.74) and cerebrovascular diseases (2.97, 1.69–2.53) were cured, respectively, (P < 0.01), and the symptom improvement of patients of cerebral infarction, cerebrovascular diseases and diabetes were significant (3.13, 2.79–3.51), (4.92, 3.39–7.14) and (3.80, 2.79–5.18), and mild (3.66, 3.15–4.24), (4.95, 2.77–8.84), and (7.11, 4.54–11.13), respectively, (P < 0.01). It was also found that the blood parameters such as cholesterol (-0.78, -1.32–0.24), total cholesterol (-1.08, -1.80–0.36), low density lipoprotein cholesterol (-0.6, -1.01–0.19), triacylglycerol (0.63, -0.83–0.42), high density lipoprotein (0.34, 0.10–0.59), erythrocyte aggregation index (-0.24, -0.27–0.21), erythrocyte Sedimentation Rate (-4.57, -7.26–1.89), fibrinogen (-0.76, -1.31–0.21), whole blood contrast viscosity (-0.40, -0.69–0.12), low cut blood viscosity (-1.2, -1.93–0.48), high cut blood viscosity (-0.62, -0.92–0.32), whole blood viscosity(-1.2, -1.85–0.54) and plasma blood contrast viscosity(-
0.07, -0.12~0.03) were found improved (P < 0.05). It is concluded that the patients of cerebral infarction, cerebrovascular diseases and diabetes might be improved with ILELT, which might be mediated by blood parameter improvement.

249. Role of laser therapy in benign prostate hyperplasia (BPH)
NASA Astrophysics Data System (ADS)
de Riese, Werner T.; Sharpe, Brent A.; Aronoff, David B.; Mittemeyer, Bernhard T.
2001-05-01
Benign prostatic hyperplasia (BPH) is a common disease in males older than 50 years of age. 75-80% of this population is considered to have some degree of BPH causing clinical symptoms and requiring urological treatment. Transurethral resection of the prostate (TUR-P) is currently the standard surgical treatment modality for BPH. In an attempt to minimize the need for hospitalization and the associated perioperative and postoperative morbidity, alternatives have been sought. Various types of laser techniques such as interstitial laser coagulation and side-firing technology have been proposed. Numerous studies have shown that laser procedures safely and effectively reduce the volume of the prostate. Intra- and postoperative bleeding are nearly unknown complications for laser procedures, whereas this is the most relevant complication for the TUR-P. Due to significant tissue edema after laser treatment, patients commonly show delayed time to void adequately and, therefore, catheter drainage is often necessary for 3 to 21 days. Retrograde ejaculation is reported to occur less (0-10%) compared to TUR-P (greater than 60%). Urinary tract infections are very common after interstitial laser coagulation. Although not many long-term clinical data are available, various studies have shown that BPH patients improve in symptom score, flow rate and post-void residual up to 3 years after laser treatment. This paper presents a concise review of efficacy, advantages and disadvantages of the most frequently used laser techniques as well as the long-term clinical data compared to TUR-P.

250. SU-E-T-484: A New Method of Aligning Patient Setup Lasers in Radiation Therapy
SciTech Connect
Hwang, U; Lim, Y; Cho, K; Jeong, C; Kim, M; Jeong, J; Park, J; Shin, D; Lee, S; Kim, J; Choi, S; Kwak, J; Yoon, K; Park, S; Kim, S
2014-06-01
Purpose: To develop a new method to align the patient setup lasers in radiation therapy and examine its validity and effectiveness. Methods: The new laser alignment method was realized by a device composed of both a metallic base plate and few acrylic transparent plates with a cross hair line on each of them. The holders of radiochromic films were prepared in the device to find a radiation isocenter. The right laser positions could be found optically by matching the shadows of all the cross hairs in the gantry head and the device. The repeatability and reproducibility (R and R) of laser alignments and the dependency of the alignment on the position error of the light source were evaluated by comparing the standard deviations and the means of the measured laser positions. After aligning the lasers optically, a radiation isocenter was found by a collimator spoke shot and the gantry spoke shot, and then the lasers were parallely translated to the isocenter. Results: In the R and R test, the standard deviation was 1.14 mm for the new method whereas it was 1.49 mm or 2.76 mm for the conventional method with either high- or low-precision levels. In the test of the dependency on the position error of the light source, the mean laser position was shifted by 5.3 mm corresponding to the shift of the light source, 4.8 mm for the new method, but for the conventional method the laser position was shifted more than 7 times than that. The positional shift could be corrected by a parallel translation to the isocenter in the new method. Conclusion: A new laser alignment method was devised for radiation therapy and tested successfully. The method enabled us to align the lasers easily and accurately without repetition, and all lasers could be finally aligned to the radiation isocenter.

251. Application of laser therapy in treating inherited forms of psychoverbal retardation in children
NASA Astrophysics Data System (ADS)
2001-04-01
An investigation was made of applying combined laser therapy in the treatment of 619 children (422 children constituted the experimental group and 197 children composed the control group) affected by inherited forms of psychoverbal retardation. It was found that low-intensity He-Ne laser radiation with the wavelength of 632.8 nm and the output power of 2 mW made it possible to improve the children's mental development. Moreover, it effectively increased their mental activities, such as speech, communication, arbitrary behavior regulation, and locomotory functions. Laser therapy applied in treating children affected by the arrested mental development aggravated by obesity additionally decreased their body weight, increased their field of vision, and eliminated dyslipidemia. It was also found that contraindications to He-Ne laser acupuncture included phenylketonuria-related noncorrected metabolic defects, convulsive syndromes, epileptic activities, convulsive readiness, and cerebrolysine intramuscular injections.
252. Laser therapy in the management of dental and oro-facial trauma
NASA Astrophysics Data System (ADS)
Darbar, Arun A.
2007-02-01
This is a clinical presentation demonstrating the efficacy of laser therapy in the treatment of patients presenting with trauma to both the hard and soft tissue in the orofacial region. The use of laser therapy aids the management of these cases where the patients often present with anxiety and a low pain threshold. The outcomes in these cases indicate good patient acceptance of the treatment, enhanced repair and tissue response suggesting that this form of treatment can be indicated for these patients. A combination of hard and soft lasers are used for the comprehensive dental management and treatment of these cases. The lasers used are a 810nm diode and an Er:Cr:YSGG.

253. Preconditioning and low level laser therapy and post-treatment management in dental practice
NASA Astrophysics Data System (ADS)
Darbar, Arun; Darbar, Rita
2011-03-01
For the last decade we have been applying the principles of Low level laser therapy and have broadened the concept for practical use before and after treatment with surgical lasers. The purpose of this clinical presentation is to demonstrate how this concept has improved treatment outcomes. Cases treated in our dental practice will be demonstrated with the protocols used. A look at the science behind this concept will be examined in an effort to explain the results and to open discussion.

254. Near "real" time magnetic resonance images as a monitoring system for interstitial laser therapy: experimental protocols
NASA Astrophysics Data System (ADS)
Castro, Dan J.; Farahani, Keyvan; Soudant, Jacques; Zwarun, Andrew A.; Lufkin, Robert B.
1992-06-01
The failure rate of cancer treatment remains unacceptably high, still being a leading cause of mortality in adults and children despite major advances over the past 50 years in the fields of surgery, radiation therapy and, more recently, chemo and immunotherapy. Surgical access to some deep tumors of the head and neck and other areas often require extensive dissections with residual functional and cosmetic deformities. Repeated treatment is not possible after maximum dose radiotherapy and chemotherapy is still limited by its systemic toxicity. An attractive solution to these problems would be the development of a new adjunctive method combining the best features of interstitial laser therapy for selective tumor destruction via minimally invasive techniques for access and 3-D magnetic resonance imaging (MRI) as a monitoring system for laser-tissue interactions. Interstitial laser therapy (ILT) via fiberoptics allow laser energy to be delivered directly into deeper tissues. However, this concept will become clinically useful only when noninvasive, accurate, and reproducible monitoring methods are developed to measure energy delivery to tissues. MRI has numerous advantages in evaluating the irreversible effects of laser treatment in tissues, since laser energy includes changes not only in the thermal motions of hydrogen protons within the tissue, but also in the distribution and mobility of water and lipids. These techniques should greatly improve the use of ILT in combination with MRI to allow treatment of deeper, more difficult to reach tumors of head and neck and other anatomical areas with a single needle stick.

255. Biostimulative effects of 809 nm diode laser on cutaneous skin wounds
NASA Astrophysics Data System (ADS)
Solmaz, Hakan; Gülsoy, Murat; Ülgen, Yekta
2015-03-01
The use of low-level laser therapy (LLLT) for therapeutic purposes in medicine has become widespread recently. There are many studies in literature supporting the idea of therapeutic effects of laser irradiation on biological tissues. The aim of this study is to investigate the biostimulative effect of 809nm infrared laser irradiation on the healing process of cutaneous incisional skin wounds. 3-4 months old male Wistar Albino rats weighing 300 to 350 gr were used throughout this study. Lowlevel laser therapy was applied through local irradiation of 809nm infrared laser on open skin incisional wounds of 1 cm length. Each animal had six identical incisions on their right and left dorsal region symmetrical to each other. The wounds were separated into three groups of control, 1 J/cm2 and 3 J/cm2 of laser irradiation. Two of these six wounds were kept as control group and did not receive any laser application. Rest of the incisions was irradiated with continuous diode laser of 809nm in wavelength and 20mW power output. Two of them were subjected to laser irradiation of 1 J/cm2 and the other two were subjected to laser light with energy density of 3 J/cm2. Biostimulation effects of irradiation were studied by means of tensile strength tests and histological examinations. Wounded skin samples were morphologically examined and removed for mechanical and histological examinations at
days 3, 5 and 7 following the laser applications. Three of the six fragments of skin incisions including a portion of peripheral healthy tissue from each animal were subjected to mechanical tests by means of a universal tensile test machine, whereas the other three samples were embedded in paraffin and stained with hematoxylin and eosin for histological examinations. The findings of the study show that tissue repair following laser irradiation of 809nm has been accelerated in terms of tissue morphology, strength and cellular content. These results seem to be consistent with the results of many researches previously published in literature and support the idea that LLLT has therapeutic effect on wound healing process.

256. **Adjunctive use of combination of super-pulsed laser and light-emitting diodes phototherapy on nonspecific knee pain: double-blinded randomized placebo-controlled trial.**

PubMed
Leal-Junior, Ernesto Cesar Pinto; Johnson, Douglas Scott; Saltmarche, Anita; Demchak, Timothy
2014-11-01
Phototherapy with low-level laser therapy (LLLT) and light-emitting diode therapy (LEDT) has arisen as an interesting alternative to drugs in treatments of musculoskeletal disorders. However, there is a lack of studies investigating the effects of combined use of different wavelengths from different light sources like lasers and light-emitting diodes (LEDs) in skeletal muscle disorders. With this perspective in mind, this study aimed to investigate the effects of phototherapy with combination of different light sources on nonspecific knee pain. It was performed a randomized, placebo-controlled, double-blinded clinical trial. Eighty-six patients rated 30 or greater on the pain visual analogue scale (VAS) were recruited and included in study. Patients of LLLT group received 12 treatments with active phototherapy (with 905 nm super-pulsed laser and 875 and 640 nm LEDs, Manufactured by Multi Radiance Medical, Solon, OH, USA) and conventional treatment (physical therapy or chiropractic care), and patients of placebo group were treated at same way but with placebo phototherapy device. Pain assessments (VAS) were performed at baseline, 4th, 7th, and 10th treatments, after the completion of treatments and at 1-month follow-up visit. Quality of life assessments (SF-36®) were performed at baseline, after the completion of treatments and at 1-month follow-up visit. Our results demonstrate that phototherapy significantly decreased pain (p?laser, red and infrared LEDs is effective to decrease pain and improve quality of life in patients with knee pain. PMID:24844921

257. **Helium-neon laser therapy in the treatment of hydroxyapatite orbital implant exposure: A superior option**

PubMed Central
XU, QI-HUA; ZHAO, CHEN; ZHU, JIAN-GANG; CHEN, MEI-JUAN; LIU, QING-HUAI
2015-01-01
The aim of the present study was to evaluate the efficacy of helium-neon laser therapy in the treatment of hydroxyapatite orbital implant exposure and compare the results with those of a combined drugs and surgery regimen. A total of 70 patients with hydroxyapatite orbital implant exposure in 70 eyes were randomly divided into two groups: Helium-neon laser therapy (group A) and drugs plus surgery (group B). Each group contained 35 patients. The healing rates and times of the conjunctival wound were recorded and compared following helium-neon laser treatment or the drugs plus surgery regimen. Changes in the hydroxyapatite orbital implant prior to and following helium-neon laser irradiation were analyzed. A similar animal study was conducted using 24 New Zealand white rabbits, which received orbital implants and were then received drug treatment or helium-neon therapy. In the human experiment, the rates for conjunctival wound healing were 97.14% in group A and 74.29% in group B, with a significant difference between the groups (?2=5.71, P<0.05). Patients with mild exposure were healed after 7.22±2.11 days of helium-neon laser therapy and 14.33±3.20 days of drugs plus surgery. A statistically significant difference was found between the groups (t=8.97, P<0.05). Patients with moderate to severe exposure were healed after 18.19±2.12 days of helium-neon laser therapy and 31.25±4.21 days of drugs plus surgery. The difference between the groups was statistically significant (t=7.91, P<0.05). Enhanced magnetic resonance imaging showed that the helium-neon laser therapy significantly promoted vascularization of the hydroxyapatite orbital implant. These results, combined with pathological findings in animals, which showed that a helium-neon laser promoted vascularization and had anti-inflammatory effects, suggest that helium-neon laser irradiation is an effective method for treating hydroxyapatite orbital implant exposure, thereby avoiding secondary surgery.

258. **Improved low-power semiconductor diode lasers for photodynamic therapy in veterinary medicine**

NASA Astrophysics Data System (ADS)
Lee, Susanne M.; Mueller, Eduard K.; Van de Workeen, Brian C.; Mueller, Otward M.
2001-05-01
Cryogenically cooling semiconductor diode lasers provides higher power output, longer device lifetime, and greater monochromaticity. While these effects are well known, such improvements have not been quantified, and thus cryogenically operated semiconductor lasers have not been utilized in photodynamic therapy (PDT). We report quantification of these results from laser power meter and photospectrometer data. The emission
wavelengths of these low power multiple quantum well semiconductor lasers were found to decrease and become more monochromatic with decreasing temperature. Significant power output improvements also were obtained at cryogenic temperatures. In addition, the threshold current, i.e. the current at which lasing begins, decreased with decreasing temperature. This lower threshold current combined with the increased power output produced dramatically higher device efficiencies. It is proposed that cryogenic operation of semiconductor diode lasers will reduce the number of devices needed to produce the requisite output for many veterinary and medical applications, permitting significant cost reductions.

259. **Comparison of High-Intensity Laser Therapy and Ultrasound Treatment in the Patients with Lumbar Discopathy**

PubMed Central

Boyraz, Ismail; Yildiz, Ahmet; Koc, Bunyamin

2015-01-01

The aim of the present study was to evaluate the efficiency of high intensity laser and ultrasound therapy in patients who were diagnosed with lumbar disc herniation and who were capable of performing physical exercises. 65 patients diagnosed with lumbar disc were included in the study. The patients were randomly divided into three groups: Group 1 received 10 sessions of high intensity laser to the lumbar region, Group 2 received 10 sessions of ultrasound, and Group 3 received medical therapy for 10 days and isometric lumbar exercises. The efficacy of the treatment modalities was compared with the assessment of the patients before the therapy at the end of the therapy, and in third month after the therapy. Comparing the changes between groups, statistically significant difference was observed in MH (mental health) parameter before treatment between Groups 1 and 2 and in MH parameter and VAS score in third month of the therapy between Groups 2 and 3. However, the evaluation of the patients after ten days of treatment did not show significant differences between the groups compared to baseline values. We found that HILT, ultrasound, and exercise were efficient therapies for lumbar discopathy but HILT and ultrasound had longer effect on some parameters.

PMID:25883952

260. **IR Laser Triggered Chemo-Photothermal Therapy of Doxorubicin Resistant Breast Cancer Cells**

E-print Network

Nanoeantennaes · Spherical core and sharp protrusions which captures tissue penetrating near-infrared (IR) light the first ten minutes · In the Near Infrared (IR) region, MGNs can absorb light, while body tissue and waterIR Laser Triggered Chemo-Photothermal Therapy of Doxorubicin Resistant Breast Cancer Cells Sharon

261. **Effectiveness of antimicrobial photodynamic therapy on staphylococcus aureus using phenothiazinium dye with red laser**

NASA Astrophysics Data System (ADS)

Monteiro, Juliana S. C.; de Oliveira, Susana C. P. S.; Pires-Santos, Gustavo M.; Sampaio, Fernando José P.; Zanin, Fátima Antônia A.; Pinheiro, Antônio L. B.

2015-03-01

The aim of this study was to evaluate in vitro the bactericidal effect of Antimicrobial Photodynamic Therapy - AmPDT using a phenothiazinium compound (toluidine blue O and methylene blue, 12.5 ?g/mL) on Staphylococcus aureus (ATCC 23529) irradiated or not with the red laser (? 660 nm, 12J/cm2). All tests were performed in triplicate and samples distributed into the following groups: Negative control, Laser, Photosensitizer, and AmPDT. Bactericidal effect of the Antimicrobial Photodynamic Therapy was assessed by counting of colony-forming units and analyzed statistically (ANOVA, Tukey test, p<0.05). The results showed, comparing the Laser group with Negative control, a statistically significant increase of counting on the Laser group (p = 0.003). The use of the photosensitizer alone reduced the mean number of CFU (64.8%) and its association with the Laser light resulted in 84.2% of inhibition. The results are indicative that the use of Antimicrobial Photodynamic Therapy presented in vitro bactericidal effect on Staphylococcus aureus.

262. **Effectiveness of a diode laser in addition to non-surgical periodontal therapy: study of intervention**

PubMed Central
Crispino, Antonio; Figliuzzi, Michele Mario; Iovane, Claudio; Del Giudice, Teresa; Lomanno, Simona; Pacifico, Delfina; Fortunato, Leonzio; Del Giudice, Roberto

Summary Background Chronic periodontitis affects 47% of adult population over the age of 30. The first phase of periodontal treatment is always represented by scaling and root planning (SRP), that is a causal, non-surgical therapy that recognizes as primary aims the control of bacterial infection and the reduction of periodontal plaque-associated inflammation. Yet, another innovative causal therapy is represented by the irradiation of periodontal pockets with laser. Aim To evaluate the effect of a 940-nm diode laser as an adjunct to SRP in patients affected by periodontitis. Materials and methods Sixty-eight adult patients with moderate-to-severe periodontitis were sequentially enrolled and undergone to periodontal examination (V1) in order to detect gingival index (GI), plaque index (PI) and probing depth (PD). The patients were randomly divided into two groups: the first (n=34) received SRP treatment alone, the control group (n=34) received SRP and 940-nm diode laser therapy. Results Data were analyzed by Student’s t-test, with two tails; for all clinical parameters, both groups reported statistically significant differences compared to basal values (p<0.0001). Both procedures were effective in improving GI, PI and PD, but the use of diode laser was associated with more evident results. Conclusions Considered the better clinical outcomes, diode laser can be routinely associated with SRP in the treatment of periodontal pockets of patients with moderate-to-severe periodontitis. PMID:26161248

263. A compact solution for ion beam therapy with laser accelerated protons
NASA Astrophysics Data System (ADS)
2014-10-01

The recent advancements in the field of laser-driven particle acceleration have made Laser-driven Ion Beam Therapy (L-IBT) an attractive alternative to the conventional particle therapy facilities. To bring this emerging technology to clinical application, we introduce the broad energy assorted depth dose deposition model which makes efficient use of the large energy spread and high dose-per-pulse of Laser Accelerated Protons (LAP) and is capable of delivering homogeneous doses to tumors. Furthermore, as a key component of L-IBT solution, we present a compact iso-centric gantry design with 360° rotation capability and an integrated shot-to-shot energy selection system for efficient transport of LAP with large energy spread to the patient. We show that gantry size could be reduced by a factor of 2-3 compared to conventional gantry systems by utilizing pulsed air-core magnets.

264. Optical diagnostic and therapy applications of femtosecond laser radiation using lens-axicon focusing.
PubMed
Parigger, Christian G; Johnson, Jacqueline A; Splinter, Robert
2013-01-01

Diagnostic modalities by means of optical and/or near infrared femtosecond radiation through biological media can in principle be adapted to therapeutic applications. Of specific interest are soft tissue diagnostics and subsequent therapy through hard tissue such as bone. Femto-second laser pulses are delivered to hydroxyapatite representing bone, and photo-acoustic spectroscopy is presented in order to identify the location of optical anomalies in an otherwise homogeneous medium. Imaging through bone is being considered for diagnostic, and potentially therapeutic, applications related to brain tumors. The use of mesomeric optics such as lens-axicon combinations is of interest to achieve the favorable distribution of focused radiation. Direct therapy by increasing local temperature to induce hyperthermia is one mode of brain tumor therapy. This can be enhanced by seeding the tumor with nanoparticles. Opto-acoustic imaging using femtosecond laser radiation is a further opportunity for diagnosis. PMID:24109702

265. Comparative Study of Cryostripping and Endovenous Laser Therapy for Varicose Veins: Mid-Term Results
PubMed Central
Lee, Kwang Hyoun; Chung, Jae Ho; Kim, Kwang Taik; Lee, Sung Ho; Son, Ho Sung; Jung, Jae Seung; Kim, Hee Jung; Lee, Seung Hun
2015-01-01

Background Conventional stripping is considered to be the standard procedure for great saphenous vein (GSV) varicosities, but many other alternative treatments such as cryostripping, endovenous laser therapy (EVLT), radio-frequency ablation, and ultrasound-guided foam sclerotherapy have been developed. Among them, both cryostripping and laser therapy have been reported to be less traumatic, with lower rates of complications and recurrences when compared to conventional stripping. To compare the efficacy of these treatments, we have analyzed and compared the mid-term clinical outcomes of cryostripping and EVLT. Methods Patients diagnosed with varicose veins of the GSV and treated with cryostripping or laser therapy between September 2008 and April 2013 were enrolled in this study. Duplex ultrasonography was used for the diagnosis and evaluation of varicosity and reflux, and the clinical-etiology-anatomy-pathophysiology classification was used
to measure the clinical severity. The symptoms, Venous Clinical Severity Score (VCSS), recurrence rates, and complication rates of the cryostripping and laser therapy groups were analyzed and compared. Results A total of 68 patients were enrolled in this study. 32 patients were treated with cryostripping, and 36 patients were treated with laser therapy. The median follow-up period was 29.6 months. Recurrence was noted in three patients from the cryostripping group and in two patients from the EVLT group. There was no difference in the VCSS score, operative time, duration of hospital stay, and complication rate between the cryostripping group and the EVLT group. Conclusion The mid-term clinical outcomes of cryostripping were not inferior to those of EVLT. Further, considering its cost-effectiveness, cryostripping seems to be a safe and feasible method for the treatment of varicose veins. PMID:26509128

266. Immunomodulating effect of laser therapy in patients with microbial eczema

Dudchenko, Mycola O.; Denisenko, Olga I.
1999-11-01
While examining 90 patients suffering the microbial eczema (ME), we revealed disorders of the immune system in the majority of them (3/4). It was established that the inclusion of percutaneous laser irradiation of the blood in a course of multimodality treatment of patients with ME caused an immunomodulating action which resulted in an improved ME course in these patients.

267. Low-powered laser therapy associated with oral implantology

Lizarelli, Rosane F. Z.; Ciconelli, Karen P. C.; Braga, Carlos A.; Berro, Renato J.
1999-05-01
The objective of this present work to evaluate in the level of pain and tumor the effect of the low-power density laser irradiation of GaAlAs 790 nm in implanted patients during the postoperative period. Forty five clinic situations were selected and divided in three different groups: Group I, control, without laser application, but with analgesic and anti-inflammatory medication; Group II, patients were irradiated on the day of the surgery, after the same concluded, and on the two subsequent days; and Group III, patients were irradiated on the day of the surgery, on the day of the surgery, before and after the end of the same, and in the two subsequent days after. All the applications were accomplished using the same energy parameters and by the same operator. The measures, with relationship to the pain and the tumor, they were accomplished in the immediate postoperative, in the postoperative (24 hours and also 72 hours after) always by the same examiner. The statistical analysis sustained the clinic observations. In our study, the low power density laser of GaAlAs 790 nm suggested the same clinical results when pain and tumor formation were controlled by analgesic and anti-inflammatory medication.

268. Application of laser therapy in the surgical treatment of periodontal osseous defects with the Bio-Oss Spongiosa

Uzunov, Tzonko T.; Uzunov, T.; Grozdanova, R.
2004-06-01
We have made an investigation on three-wall and four-wall osseous defects on which a surgical treatment was conducted with application of Bio-Oss (Geistlich) and laser therapy. After conducting of clinical oral hygiene to the patients and curettage with flap, a Bio-Oss Spongiosa of Geistlich is applied. We have conducted the laser therapy pre- and postoperative scanning with power density of 100 mW/cm2 on scheme. The patients were traced out within 1 year. The obtained results showed that the application of laser therapy gives anaesthetic, anti-inflammatory and regeneration stimulating effect.

269. Role of the scanning laser ophthalmoscope in photodynamic therapy of macular disease

Van de Velde, Frans J.
2000-06-01
Photodynamic therapy (PDT) is a new treatment modality for exudative forms of age-related maculopathy. It can be combined with others types of selective or conventional laser therapy. Imaging and functional testing with the scanning laser ophthalmoscope (SLO) are important for detailed diagnostic information as well as for the interpretation of the long term outcome of different treatment strategies. For example, infrared imaging in a confocal mode superbly outlines areas of minimal edema due to slow leakage and switching of wavelengths enables simultaneous and repeated angiographic studies of the retina with the same instrument. Visual acuities are strongly influenced by background illumination and binocular fixation patterns, and absolute but not incremental microperimetric thresholds measure correctly the functional status of the photoreceptor-pigment epithelium complex. The scanning laser ophthalmoscope has been adapted for use as a delivery system in microphotocoagulation and photodynamic therapy. A non-scanning external therapeutic laser source uses the
same Maxwellian view entrance location into the eye as the SLO. Advantages include a non-contact delivery, fixation control, registration of treatment locations, and the possibility to spatially modulate the area being treated.

270. The growth of human scalp hair in females using visible red light laser and LED sources PubMed Central
Lanzafame, Raymond J; Blanche, Raymond R; Chiacchierini, Richard P; Kazmirek, Eric R; Sklar, Jeffrey A
2014-01-01
Background and Objectives Low level laser (light) therapy (LLLT) has been demonstrated to promote hair growth in males. A double-blind randomized controlled trial was undertaken to define the safety and physiologic effects of LLLT on females with androgenic alopecia. Methods Forty-seven females (18–60 years old, Fitzpatrick I–IV, and Ludwig–Savin Baldness Scale I–2, I–3, I–4, II–1, II–2 baldness patterns) were recruited. A transition zone scalp site was selected; hairs were trimmed to 3?mm height; the area was tattooed and photographed. The active group received a “TOPHAT655” unit containing 21, 5?mW diode lasers (655?±?5?nm) and 30 LEDs (655?±?20?nm), in a bicycle-helmet like apparatus. The placebo group unit appeared identical, containing incandescent red lights. Patients treated at home every other day?×?16 weeks (60 treatments, 67?J/cm2 irradiance/25?minute treatment, 2.9?J dose), with follow up and photography at 16 weeks. A masked 2.85?cm2 photographic area was evaluated by another blinded investigator. The primary endpoint was the percent increase in hair counts from baseline. Results Forty-two patients completed the study (24 active, 18 sham). No adverse events or side effects were reported. Baseline hair counts were 228.2±133.4 (N?=?18) in the sham and 209.6±118.5 (N?=?24) in the active group (P?=0.642). Post Treatment hair counts were 252.1±143.3 (N?=?18) in the sham group and 309.9±166.6 (N?=?24) in the active group (P?=0.235). The change in hair counts over baseline was 23.9±30.1 (N?=?18) in the sham group and 100.3±153.4 (N?=?24) in the active group (P?LLLT of the scalp at 655?nm significantly improved hair counts in women with androgenetic alopecia at a rate similar to that observed in males using the same parameters. Lasers Surg. Med. 46:601–607, 2014. © 2014 The Authors. Lasers in Surgery and Medicine published by Wiley Periodicals, Inc. PMID:25124964

271. Light and laser therapies for the treatment of sebaceous gland hyperplasia: a review of the literature PubMed
Simmons, B J; Griffith, R D; Falto-Aizpurua, L A; Bray, F N; Nouri, K
2015-11-01
Sebaceous gland hyperplasia (SGH) is a benign cutaneous condition that presents primarily on the face and increases with UVB exposure and ageing. These lesions are a common cosmetic concern but are difficult to treat, as the entire sebaceous gland needs to be destroyed to prevent recurrence. Traditional treatment include: cryosurgery, electrodessication, curettage, shave excision and topical trichloroacetic acid. These methods have an increased risk of skin discoloration and scarring to the area of treatment that may lead to inferior cosmetic outcomes. Alternatively, oral isotretinoin can treat SGH, but is a known teratogen in pregnancy and has high relapse rates with discontinuation. A systematic review of the literature was performed to look at photodynamic therapy (PDT) and laser treatment for SGH. According to the results of this study, PDT, lasers and combinations of the two treatments were found to offer alternatives to the more conventional techniques with better outcomes. In particular, the use of wavelength-specific laser for the sebaceous gland of 1720 nm were found to have better outcomes and provide minimal damage to surrounding tissues. Additionally, combination PDT with aminolevulinic acid and pre-treatment with carbon dioxide laser ablation or pulse-dyed laser offered higher cure rates over stand-alone laser or PDT treatments in a shorter number of sessions with similar transient side-effects. However, further large-scale prospective studies with adequate follow-up are required to confirm these findings and those for sebaceous gland-specific lasers. PMID:25731611

272. Early experience in MRI-guided therapies of prostate cancer: HIFU, laser and photodynamic treatment PubMed Central
Da Rosa, M.R.; Trachtenberg, J.; Chopra, R.
2011-01-01
Abstract Prostate cancer screening has resulted in earlier diagnosis with lower-grade disease, leading to over-detection and over-treatment in a significant number of patients. Current whole-gland radical treatments are associated with significant rates of morbidity. The high prevalence of low-risk disease together with an inability to accurately identify those men harboring more aggressive cancers has led to tremendous research in low-morbidity focal therapies for prostate cancer. This review summarizes the early experiences with focal therapy with emphasis on early applications of laser, high-intensity focuses ultrasound, and photodynamic approaches. PMID:22187023

273. Application of laser therapy in the treatment of brain ischemia
The relationship between dental plaque and gingivitis was verified. Nonspecific gingivitis is an inflammatory process, frequently caused by enzymes and toxins liberate by bacteria form dental plaque. Loose plaque has come under a great deal of investigation because of its role in attachment loss. The current methods used in the treatment of non specific gingivitis encompass the use of antibiotics and conventional surgical techniques.
Treating gingivitis with laser energy may further reduce the gingival inflammation and decrease the wound healing time. The lack of correlation between the quantity of dental plaque and the intensity of gingivitis determined us to study the effect of Nd:YAG pulsed laser in reduction of gingival inflammation and wound healing. The aim of this work is to evaluate clinically the anti-inflammatory and wound healing effect of pulsed Nd:YAG laser and to compare the appearance and the levels of the bacteria in the supergingival and subgingival plaque in adolescents with tooth crowding after Nd:YAG laser. The experimental procedure consisted of a clinical and bacteriological study which was undertaken in 20 patients presenting moderate gingivitis. A group of 10 patients was the subject of a bacteriological study and the other group of 10 was used for clinical and histological examination. For each group the clinical criteria of evaluation were: the gingival index, papillary bleeding index, spontaneous aches. Each patient was tested before and after laser exposure or conventional therapy for bacteriological analyses. The results prove that early gingivitis exposure to laser registers a decrease of bacterial colony number and absence of loss of attachment as compared to the application of the conventional treatment. Clinical study has shown that the combination of scaling and root planning with laser therapy is enough to provide improvement in clinical indices and reduction in the number of bacterial colonies.

277. Efficacy of laser photoablative therapy and expandable metal stents for esophageal carcinoma
NASA Astrophysics Data System (ADS)
Balachandar, Gowra; Trowers, Eugene A.
2000-05-01
Malignant dysphagia is a serious condition in which 70% of patients die within one year, regardless of the treatment received. It provokes a rapid deterioration of a patient's physical condition and a significant worsening of quality of life. The surgical treatment of dysphagia is frequently complicated with technical difficulties, and often the tumors cannot be excised because of extensive invasion into adjacent structures. Furthermore, many patients are considered inoperable due to advanced age, associated diseases and malnutrition. Laser photoablative therapy coupled with expandable metal stents restores luminal patency in more than 80% of patients allowing them to eat liquids and soft foods. The efficacy of laser photoablative therapy and expandable metal stents for the palliation esophageal carcinoma will be critically reviewed.

278. Principles of reproducible irradiation in cold laser therapy
NASA Astrophysics Data System (ADS)
Grimblatov, Valentin M.
1998-07-01
Claims of different effects of cold laser (CL) irradiation may be attributable to the competition of different reaction channels activated by CL and/or the unreproducibility of irradiation conditions. This study is concerned about reproducibility of the conditions of irradiation. We present a comparative analysis of the correlation between irradiation characteristics and biostimulation parameters, and show that the leading cause of treatment unreproducibility is the discrepancy of therapeutical and true irradiation doses. We analyze different approaches of true dose determination, influence of blood content and microcirculation on dosage and describe principles of true doses generating. It is shown that only on-line regulation of both parameters of dosage, CL power and temporal mode of irradiation, allows the determination of individual true dose.
Problems of designing CL with feedback for on-line regulation of dosage parameters are also described.

279. Role of stents and laser therapy in biliary strictures
NASA Astrophysics Data System (ADS)
Chennupati, Raja S.; Trowers, Eugene A.
2001-05-01
The most frequent primary cancers causing malignant obstructive jaundice were pancreatic cancer (57%), hilar biliary cancer (19% including metastatic disease), nonhilar biliary cancer (14%) and papillary cancer (10%). Endoscopic stenting has widely replaced palliative surgery for malignant biliary obstruction because of its lower risk and cost. Self-expandable metal stents are the preferred mode of palliation for hilar malignancies. Plastic stents have a major role in benign biliary strictures. Major complications and disadvantages associated with metallic stents include high cost, cholangitis, malposition, migration, unextractability, and breakage of the stents, pancreatitis and stent dysfunction. Dysfunction due to tumor ingrowth can be relieved by thermal methods (argon plasma coagulator therapy). We present a concise review of the efficacy of metallic stents for palliation of malignant strictures.

280. PET/Computed Tomography and Thermoablation (Radiofrequency, Microwave, Cryotherapy, Laser Interstitial Thermal Therapy).
PubMed
Bonichon, Françoise; Godbert, Yann; Gangi, Afshin; Buy, Xavier; Palussière, Jean
2015-10-01
Thermal ablation (radiofrequency, microwave, cryosurgery, laser interstitial thermal therapy) is being used more frequently as a local treatment of secondary but also primary cancers and benign lesions. It has a low morbidity and is repeatable. The problem is that computed tomographic scan has limits, and RECIST criteria are not applicable. The objective of this article is to summarize the usefulness and pitfalls of PET/computed tomography in detecting a relapse after thermal ablation as soon as possible. PMID:26384598

- "
- "
- "
- "

281. Laser-driven beam lines for delivering intensity modulated radiation therapy with particle beams
SciTech Connect
Hofmann, K. M.; Schell, S.; Wilkens, J. J.
2013-07-26
Laser-accelerated particles can provide a promising opportunity for radiation therapy of cancer. Potential advantages arise from combining a compact, cost-efficient treatment unit with the physical advantages in dose delivery of charged particle beams. We consider different dose delivery schemes and the required devices to design a possible treatment unit. The secondary radiation produced in several beam line elements remains a challenge to be addressed.

282. Helium-3 and Helium-4 acceleration by high power laser pulses for hadron therapy
E-print Network
Bulanov, S S; Schroeder, C B; Leemans, W P; Bulanov, S V; Margarone, D; Korn, G; Haberer, T
2015-01-01
The laser driven acceleration of ions is considered a promising candidate for an ion source for hadron therapy of oncological diseases. Though proton and carbon ion sources are conventionally used for therapy, other light ions can also be utilized. Whereas carbon ions require 400 MeV per nucleon to reach the same penetration depth as 250 MeV protons, helium ions require only 250 MeV per nucleon, which is the lowest energy per nucleon among the light ions. This fact along with the larger biological damage to cancer cells achieved by helium ions, than that by protons, makes this species an interesting candidate for the laser driven ion source. Two mechanisms (Magnetic Vortex Acceleration and hole-boring Radiation Pressure Acceleration) of PW-class laser driven ion acceleration from liquid and gaseous helium targets are studied with the goal of producing 250 MeV per nucleon helium ion beams that meet the hadron therapy requirements. We show that He3 ions, having almost the same penetration depth as He4 with the ...

283. Efficacy of Low Level Laser Therapy After Hand Flexor Tendon Repair
SciTech Connect
Ayad, K. E.; Abd El Mejeed, S. F.; El Gohary, H. M.; Abd Elrahman, M.; Bekheet, A. B.
2009-09-27
Flexor tendon injury is a common problem requiring suturing repair followed by early postoperative mobilization. Muscle atrophy, joint stiffness, osteoarthritis, infection, skin necrosis, ulceration of joint cartilage and tendocutaneous adhesion are familiar complications produced by prolonged immobilization of surgically repaired tendon ruptures. The purpose of this study was to clarify the importance of low level laser therapy after hand flexor tendon repair in zone II. Thirty patients aging between 20 and 40 years were divided into two groups. Patients in group A (n = 15) received a conventional therapeutic exercise program while patients in group B (n = 15) received low level laser therapy combined with the same therapeutic exercise program. The results showed a statistically significant increase in total active motion of the proximal and distal interphalangeal joints as well as maximum hand grip strength at three weeks and three months postoperative, but improvement was more significant in group B. It was concluded that the combination of low level laser therapy and early therapeutic exercises was more effective than therapeutic exercises alone in improving total active motion of proximal and distal interphalangeal joints and hand grip strength after hand flexor tendon repair.

284. Intelligent Image Analysis for Image-Guided Laser Hair Removal and Skin Therapy
NASA Technical Reports Server (NTRS)
Walker, Brian; Lu, Thomas; Chao, Tien-Hsin
2012-01-01
We present the development of advanced automatic target recognition (ATR) algorithms for the hair follicles identification in digital skin images to accurately direct the laser beam to remove the hair. The ATR system first performs a wavelet filtering to enhance the contrast of the hair features in the image. The system then extracts the unique features of the targets and sends the features to an Adaboost based classifier for training and recognition operations. The ATR system automatically classifies the hair, moles, or other skin lesion and provides the accurate coordinates of the intended hair follicle locations. The coordinates can be used to guide a scanning laser to focus energy only on the hair follicles. The intended benefit would be to protect the skin from unwanted laser exposure and to provide more effective skin therapy.

285. Comparison possibilities of ultrasound and its combination with laser in surgery and therapy
NASA Astrophysics Data System (ADS)
Zharov, Vladimir P.; Menyaev, Yulian A.; Kabisov, Ruslan K.; Alkov, Sergey V.; Nesterov, A. V.;
Loshchilov, Vladimir I.; Suen, James Y.
2000-05-01
This article presents the further developments of combined laser-ultrasound medical technologies with paying attention the possibility ultrasound in surgery and therapy. The analyses of main effects at the low frequency ultrasonic treatment of biotissues including cavitation, acoustic streams, acoustic pressure, mechanical influence etc are analyzed. The main promising areas of application of low frequency ultrasound are considered including bactericidal treatment of infections wounds, spray treatment of wounds in head and neck surgery, tumor treatment etc. In particular the clinical result of using ultrasonic devices based on imposing ultrasonic oscillations in a range of 22-66 kHz on a cutting instrument with a special form, radiation intensity up to 10 W/cm2 and oscillation amplitude up to 40-60 micrometers with respect to oncology for halt bleeding from a tumor, liquidating pain, acoustic denervation are presented. Some limitation of medical application of ultrasound are discussed and perspective combination with laser for increasing efficiency of new combined technologies are found. Among them: combination photodynamic therapy and ultrasonic treatment of tumors, laser-ultrasonic treatment of infections wounds including using spray, laser-ultrasonic drug delivery. The preliminary result of experimental study of some of above-mentioned technologies are presented.

286. Image-guided macular laser therapy: design considerations and progress toward implementation
NASA Astrophysics Data System (ADS)
Berger, Jeffrey W.; Shin, David S.
1999-06-01
Laser therapy is currently the only treatment of proven benefit for exudative age related macular degeneration and diabetic retinopathy. To guide treatment for macular diseases, investigations were initiated to permit overlay of previously-stored angiographic images and image sequences superimposed onto the real-time biomicroscopic fundus image. Prior to treatment, a set of partially overlapping fundus images is acquired and montaged in order to provide a map for subsequent tracking operations. A binocular slit-lamp biomicroscope interfaced to a CCD camera, framegrabber board, and PC permits acquisition and rendering of retinal images. Computer-vision algorithms facilitate robust tracking, registration, and near-video-rate image overlap of previously-stored retinal photographic and angiographic images onto the real-time fundus image. Laser treatment is guided in this augmented reality environment where the borders of the treatment target—for example, the boundaries of a choroidal neovascularization complex—are easily identified through overlay of angiographic information superimposed on, and registered with, the real-time fundus image. During periods of misregistration as judged by the amplitude of the tracking similarity metric, laser function is disabled, affording additional safety. Image-guided macular laser therapy should facilitate accurate targeting of treatable lesions and less unintentional retinal injury when compared with standard techniques.

PubMed
Cialdai, Francesca; Landini, Ida; Capaccioli, Sergio; Nobili, Stefania; Mini, Enrico; Lulli, Matteo; Monici, Monica
2015-10-01
Clinical studies demonstrated the effectiveness of laser therapy in the management of postmastectomy lymphedema, a discomforting disease that can arise after surgery/radiotherapy and gets progressively worse and chronic. However, safety issues restrict the possibility to treat cancer patients with laser therapy, since the effects of laser radiation on cancer cell behavior are not completely known and the possibility of activating postmastectomy residual cancer cells must be considered. This paper reports the results of an in vitro study aimed to investigate the effect of a class IV, dual-wavelength (808 nm and 905 nm), NIR laser system on the behavior of two human breast adenocarcinoma cell lines (namely, MCF7 and MDA-MB361 cell lines), using human dermal fibroblasts as normal control. Cell viability, proliferation, apoptosis, cell cycle and ability to
form colonies were analyzed in order to perform a cell-based safety testing of the laser treatment in view of its potential application in the management of postmastectomy lymphedema. The results showed that, limited to the laser source, treatment conditions and experimental models used, laser radiation did not significantly affect the behavior of human breast adenocarcinoma cells, including their clonogenic efficiency. Although these results do not show any significant laser-induced modification of cancer cell behavior, further studies are needed to assess the possibility of safely applying NIR laser therapy for the management of postmastectomy lymphedema. PMID:26355716

Tepper, Michal; Barkai, Uri; Gannot, Israel
2015-05-01
Radiotherapy is one of the main methods to treat cancer. However, due to the propagation pattern of high-energy photons in tissue and their inability to discriminate between healthy and malignant tissues, healthy tissues may also be damaged, causing undesired side effects. A possible method for internal electron therapy, based on laser acceleration of electrons inside the patient's body, is suggested. In this method, an optical waveguide, optimized for high intensities, is used to transmit the laser radiation and accelerate electrons toward the tumor. The radiation profile can be manipulated in order to create a patient-specific radiation treatment profile by changing the laser characteristics. The propagation pattern of electrons in tissues minimizes the side effects caused to healthy tissues. A simulation was developed to demonstrate the use of this method, calculating the trajectories of the accelerated electron as a function of laser properties. The simulation was validated by comparison to theory, showing a good fit for laser intensities of up to $2 \times 10^{20}$ (W/cm²), and was then used to calculate suggested treatment profiles for two tumor test cases (with and without penetration to the tumor). The results show that treatment profiles can be designed to cover tumor area with minimal damage to adjacent tissues. PMID:25832860

289. Proposed method for internal electron therapy based on high-intensity laser acceleration. NASA Astrophysics Data System (ADS)
Tepper, Michal; Barkai, Uri; Gannot, Israel
2015-05-01
Radiotherapy is one of the main methods to treat cancer. However, due to the propagation pattern of high-energy photons in tissue and their inability to discriminate between healthy and malignant tissues, healthy tissues may also be damaged, causing undesired side effects. A possible method for internal electron therapy, based on laser acceleration of electrons inside the patient's body, is suggested. In this method, an optical waveguide, optimized for high intensities, is used to transmit the laser radiation and accelerate electrons toward the tumor. The radiation profile can be manipulated in order to create a patient-specific radiation treatment profile by changing the laser characteristics. The propagation pattern of electrons in tissues minimizes the side effects caused to healthy tissues. A simulation was developed to demonstrate the use of this method, calculating the trajectories of the accelerated electron as a function of laser properties. The simulation was validated by comparison to theory, showing a good fit for laser intensities of up to $2 \times 10^{20}$ (W/cm²), and was then used to calculate suggested treatment profiles for two tumor test cases (with and without penetration to the tumor). The results show that treatment profiles can be designed to cover tumor area with minimal damage to adjacent tissues.

290. A medical manipulator system with lasers in photodynamic therapy of port wine stains. PubMed
Wang, Xingtao; Tian, Chunlai; Duan, Xingguang; Gu, Ying; Huang, Naiyan
2014-01-01
Port wine stains (PWS) are a congenital malformation and dilation of the superficial dermal capillary. Photodynamic therapy (PDT) with lasers is an effective treatment of PWS with good results. However, because the laser density is uneven and nonuniform, the treatment is carried out manually by a doctor thus providing little accuracy. Additionally, since the treatment of a single lesion can take between 30 and 60 minutes, the doctor can become fatigued after only a few applications. To assist the medical staff with this treatment method, a medical manipulator system (MMS) was built to operate the lasers. The manipulator holds the laser fiber and, using a combination of active and passive joints, the fiber can be operated automatically. In addition to the control input from the doctor over a human-computer interface, information from a binocular vision system is used to guide and supervise the operation. Clinical results are compared in nonparametric values between treatments with and without the use of the MMS. The MMS, which can significantly reduce the workload of doctors and improve the uniformity of laser irradiation, was safely and helpfully applied in PDT treatment of PWS with good therapeutic results. PMID:25302297
291. Influence of low intensity laser therapy (AsGa) on the cicatrization process of mechanic tendon injury in wistar rats
NASA Astrophysics Data System (ADS)
2012-09-01
The aim of this study was to compare the effect of the low level Laser therapy (AsGa) in the experimental tendon injury. Low level Laser therapy has been used in several studies to observe the regenerative quality and tecidual cicatrization. Forty Wistar rats (male) were divided into 4 groups: control group (C-group); injury group (L-group); treated group with Laser therapy 3 J/cm2 (3J-group); and treated group with Laser therapy 6 J/cm2 (6J-group). Groups L, 3J, and 6J were submitted to a mechanic Achilles tendon injury with a Kocher Forceps for 10 s. The animals were sacrificed after ten days of treatment. Histopathological evaluation using hematoxylin-eosin and Picro-Sirius staining showed a decreased (p < 0.05) of collagen in L-group (353.12 ± 9.85 ?m2/field) compared to C-group (215.13 ± 22.63 ?m2/field). Animals treated with Laser showed a significant increase in collagen fibers despite the applied dosage (3J-group: 375.89 ± 26.99 ?m2/field; 6J group: 400.34 ± 62.92 ?m2/field; p < 0.05). These data suggest that low-level Laser therapy was efficient for the treatment of mechanics Achilles tendon injury in Wistar rats.

292. Enhancing laser thermal-therapy using ultrasound-microbubbles and gold nanorods; In vitro investigation
NASA Astrophysics Data System (ADS)
Tarapacki, Christine; Kumaradas, Carl; Karshafian, Raffi
2012-11-01
Gold nanorods (GNR) in laser-induced thermal therapy can significantly increase light absorption, leading to a local temperature increase and causing irreversible cell damage. One of the key challenges in using GNR as a thermal therapy agent is to deliver a concentration of GNR to generate sufficient heat and cause cell death. In this study, ultrasound and microbubble induced sonoporation is used to enhance intracellular uptake of GNR and improve the therapeutic outcome of laserinduced thermal therapy. Acute myeloid leukemia (AML) cells in suspension (0.6 mL) were treated with ultrasound and microbubbles (USMB) at 1 MHz frequency, 16 microseconds pulse duration, 1 kHz pulse repetition frequency, 1 minute insonation time, varying acoustic pressures (0, 1.26 and 1.73 MPa) and 10 ?L Definity microbubble agent with and without GNR (12 nm × 48 nm) at varying concentration (1.0x1010 to 2.5x1011 GNR/mL). The GNR were manufactured through wet chemical synthesis process and measured using Transmission Electron Microscopy (TEM) and Atomic Absorption Spectroscopy (AAS) for size and concentration respectively. Following ultrasound and microbubble treatment, cells were centrifuged to remove excess gold nanorods and treated in suspension with an 810 nm laser (Diomed 60 NIR) at 4 W for 5 minutes. A thermal camera (FLIR Thermovision A40) was positioned to monitor the sample temperature throughout laser treatment and cell viability was assessed using flow cytometry with propidium iodide. Cell viability of 18±2% was achieved with GNR+USMB (1.26 MPa) compared to 72±3% with GNR alone (12 hour incubation) and 99±0.2% with USMB (1.26 MPa) alone. With increasing GNR concentration during ultrasound and microbubble treatment, laser induced sample temperature increased and consequently cell viability decreased. Cell viability decreased from 92±1% at 1.0x1011 GNR/mL to 29±5% at 1.5x1011 GNR/mL concentration with corresponding maximum temperatures of 50°C and 54°C, respectively. The combined treatment of ultrasound-microbubble and gold nanorod laser induced thermal-therapy showed a synergistic enhancement of cell death in vitro. This study shows promise for an enhanced therapeutic effect with the combined treatment in vivo.

293. How low-level laser therapy can change mechanical properties of cells
NASA Astrophysics Data System (ADS)
de Magalhães, Ana Carolina; Martinez, Diana; Ferreira, Marcia Z. J.; Yoshimura, Elisabeth M.; Alencar, Adriano M.; Chavantes, Maria Cristina
2013-03-01
Low level laser therapy is used as a treatment of several conditions, including inflammatory processes and wound healing. Possible changes in mechanical properties of cells, caused by illumination, are investigated with optical magnetic twisting cytometry (OMTC), which is a technique used to evaluate mechanical properties in cell culture. Ferromagnetic micro beads are bound to cell cytoskeleton, the beads are magnetized vertically and a horizontal twisting magnetic field is applied causing a torque that moves the beads and deforms the cell, the beads rotate and displace. Based on the lateral displacement of the beads, elastic shear and loss moduli are obtained. Samples of human bronchial epithelial cell culture were divided in two groups: one was illuminated with a 660 nm red laser, 30 mW power, 0.75 W/cm² irradiance, during different time intervals, and the other one, the control group, was not illuminated. The values of the mechanical constants of the cells of the control group showed a tendency of increasing with the time out of the incubator. On the other hand, the illuminated group showed constancy on the behavior of both moduli, keeping the normal conditions.
of the cell culture. Those results indicate that illumination can induce cells to homeostasis, and OMTC is sensitive to observe departures from the steady conditions. Hence, OMTC is an important technique which can be used to aggregate knowledge on the light effect in cell cytoskeleton and even on the low level laser therapy mechanisms in inflammatory processes and/or wound healing.

294. Influence of laser light on AMPK as a factor in the laser therapy of diabetes

Makela, A. M.

2006-02-01

The use of light and laser in the treatment of diabetes has been under research and some controversy. The following paper explores some of the mechanisms involved in glucose level regulation in connection to light. Several researchers have found that laser irradiation can activate ATP production, influence redox values within cells, and have other effects which can (in)directly activate AMP-activated protein kinase (AMPK). The activation of AMPK plays an important, albeit not an exclusive, role in the induction of GLUT4 recruitment to the plasma membrane. In addition, there is some demonstration that AMPK may regulate glucose transport through GLUT1. Increased glucose uptake will result in an increase in glycolysis and ATP production.

295. Effect of low-level laser irradiation on odontoblast-like cells


2008-09-01

Low-level laser therapy (LLLT), also referred to as therapeutic laser, has been recommended for a wide array of clinical procedures, among which the treatment of dentinal hypersensitivity. However, the mechanism that guides this process remains unknown. Therefore, the objective of this study was to evaluate in vitro the effects of LLLT irradiation on cell metabolism (MTT assay), alkaline phosphatase (ALP) expression and total protein synthesis. The expression of genes that encode for collagen type-I (Col-1) and fibronectin (FN) was analyzed by RT-PCR. For such purposes, odontoblast-like cell line (MDPC-23) was previously cultured in Petri dishes (15000 cells/cm²) and submitted to stress conditions during 12 h. Thereafter, 6 applications with a monochromatic near infrared radiation (GaAlAs) set at predetermined parameters were performed at 12-h intervals. Non-irradiated cells served as a control group. Neither the MTT values nor the total protein levels of the irradiated group differed significantly from those of the control group (Mann-Whitney test; p > 0.05). On the other hand, the irradiated cells showed a decrease in ALP activity (Mann-Whitney test; p < 0.05). RT-PCR results demonstrated a trend to a specific reduction in gene expression after cell irradiation, though not significant statistically (Mann-Whitney test; p > 0.05). It may be concluded that, under the tested conditions, the LLLT parameters used in the present study did not influence cell metabolism, but reduced slightly the expression of some specific proteins.

296. Combination of low level light therapy and nitrosyl-cobinamide accelerates wound healing

Spitler, Ryan; Ho, Hsiang; Norpetlian, Frederique; Kong, Xiangduo; Jiang, Jingjing; Yokomori, Kyoko; Andersen, Bogi; Boss, Gerry R.; Berns, Michael W.

2015-05-01

Low level light therapy (LLLT) has numerous therapeutic benefits, including improving wound healing, but the precise mechanisms involved are not well established; in particular, the underlying role of cytochrome C oxidase (C-ox) as the primary photoacceptor and the associated biochemical mechanisms still require further investigation. We previously showed the nitric oxide (NO) donating drug nitrosyl-cobinamide (NO-Cbi) enhances wound healing through a cGMP/cGMP-dependent protein kinase/ERK1/2 mechanism. Here, we show that the combination of LLLT and NO-Cbi markedly improves wound healing compared to either treatment alone. LLLT-enhanced wound healing proceeded through an electron transport chain-C-ox-dependent mechanism with a reduction of reactive oxygen species and increased adenosine triphosphate production. C-ox was validated as the primary photoacceptor by three observations: increased oxygen consumption, reduced wound healing in the presence of sodium azide, and disassociation of cyanide, a known C-ox ligand, following LLLT. We conclude that LLLT and NO-Cbi accelerate wound healing through two independent mechanisms, the electron transport chain-C-ox pathway and cGMP signaling, respectively, with both resulting in ERK1/2 activation.

297. Simulation of nanosecond laser-induced thermal dynamics of hollow gold nanoshells for hyperthermia therapy

Hatf, Ali Fortin-Deschênes, Simon Meunier, Michel

2014-03-31

In this report, we investigate numerically the thermodynamics of hollow gold nanoshell (AuNS) irritated by near-infrared (NIR) light. Simulations are performed for the AuNS in aqueous medium. The nanostructure is
illuminated by a nanosecond pulsed laser at plasmonic resonance. The spatiotemporal evolution of the temperature profile inside and outside the AuNS is computed using a numerical framework based on the finite element method (FEM). In particular, we show how the temperature varies with the laser fluence and pulse duration. The aim of this study is to provide a description of the physics of heat release of AuNSs and useful insights for the development of these nanostructures for biomedical applications such as drug delivery, photothermal cancer therapy and optoporation of cells.

298. Simulation of nanosecond laser-induced thermal dynamics of hollow gold nanoshells for hyperthermia therapy
NASA Astrophysics Data System (ADS)
Hatuf, Ali; Fortin-Deshènes, Simon; Meunier, Michel
2014-03-01
In this report, we investigate numerically the thermodynamics of hollow gold nanoshell (AuNS) irritated by near-infrared (NIR) light. Simulations are performed for the AuNS in aqueous medium. The nanostructure is illuminated by a nanosecond pulsed laser at plasmonic resonance. The spatiotemporal evolution of the temperature profile inside and outside the AuNS is computed using a numerical framework based on the finite element method (FEM). In particular, we show how the temperature varies with the laser fluence and pulse duration. The aim of this study is to provide a description of the physics of heat release of AuNSs and useful insights for the development of these nanostructures for biomedical applications such as drug delivery, photothermal cancer therapy and optoporation of cells.

299. Modeling laser irradiation conditions for mucosal tissues in antimicrobial photodynamic therapy
NASA Astrophysics Data System (ADS)
Zalesskaya, G. A.; Astaf'eva, L. G.; Plavskii, V. Yu.
2012-05-01
We use computer modeling to analyze empirically selected conditions for antimicrobial photodynamic therapy of mucosal tissues. We calculate the optical and thermal fields for experimental conditions for low-intensity (cold) laser irradiation used in treatment of lesions in mucosal tissues stained by methylene blue: $\lambda = 670$ nm, power density $150-300$ mW/cm$^2$, doses $9-18$ J/cm$^2$; $\lambda = 632.8$ nm, $15$ mW/cm$^2$, dose $4.5$ J/cm$^2$. For numerical estimates, we used the optical characteristics of methylene blue and three layers of mucosal tissues at the laser radiation wavelengths, and also the thermal characteristics of the tissues. The experimental conditions were optimized using the ratio of the tissue penetration depth for the absorbed optical energy and the penetration depth of methylene blue into the lesion, while maintaining safe tissue heating temperatures.

300. Evaluation of photodynamic therapy using a diode laser and different photosensitizers against enterococcus faecalis.
PubMed
Silva, Emmanuel J; Coutinho-Filho, Wagner P; Andrade, Aurimar O; Herrera, Daniel R; Coutinho-Filho, Tauby S; Krebs, Renato L
2014-01-01
Photodynamic therapy (PDT) has been proven to be effective in disinfecting root canals. The aim of this present study was to evaluate the effects of PDT on the viability of Enterococcus faecalis using methylene blue (MB) and malachite green (MG) as photosensitizers. Solutions containing E. faecalis (ATCC 29212) were prepared and harvested by centrifugation to obtain cell suspensions, which were mixed with MB and MG. Samples were individually irradiated by the diode laser at a distance of 1mm for 30, 60, or 120 seconds. Colonyforming units (CFU) were determined for each treatment. PDT for 60 and 120 seconds with MG reduced E. faecalis viability significantly. Similar results were obtained when MB was used as photosensitizer. PDT using MB and MG have antibacterial effect against E. faecalis, showing potential to be used as an adjunctive antimicrobial procedure in endodontic therapy. PMID:25523956

301. Design of a protocol for combined laser hyperthermia-photodynamic therapy in the esophagus
SciTech Connect
London, R A; Eichler, J; Liebetrudt, J; Ziegenhagen, L
2000-02-01
Photodynamic laser therapy (PDT) for esophageal cancer has recently been studied in animal and clinical trials. In several animal experiments a synergetic effect was found by simultaneously applying PDT and hyperthermia (HT). In this paper an optical fiber system is described which can be used in the esophagus for combined PDT with a 1 W dye laser and HT with a 15–40 W Nd-YAG laser. Phantoms were developed to simulate the geometry of the esophagus using cow muscle. The spatial-temporal temperature field during HT was measured. The results were compared with calculations using a coupled Monte Carlo laser transport/finite difference heat transport model using the LATIS computer program. Measurements and calculations yield a realistic description of the temperature distribution during HT under various experimental conditions. The LATIS program allows the prediction of the effects of blood perfusion for in-vivo situations. The results show that the perfusion has considerable influence on the temperature field, which must be considered for in-vivo applications.

302. Effects of low-power light therapy on wound healing: LASER x LED*
PubMed Central
Chaves, Maria Emília de Abreu; de Araújo, Angélica Rodrigues; Piancastelli, André Costa Cruz; Pinotti, Marcos
2014-01-01
Several studies demonstrate the benefits of low-power light therapy on wound healing. However, the use of LED as a therapeutic resource remains controversial. There are questions regarding the equality or not of biological effects promoted by LED and LASER. One objective of this review was to determine the biological effects that support the use of LED on wound healing. Another objective was to identify LED’s parameters for the treatment of wounds. The biological effects and parameters of LED will be compared to those of LASER. Literature was obtained from online databases such as Medline, PubMed, Science Direct and Scielo. The search was restricted to studies published in English and Portuguese from 1992 to 2012. Sixty-eight studies in vitro and in animals were analyzed. LED and LASER promote similar biological effects, such as decrease of inflammatory cells, increased fibroblast proliferation, stimulation of angiogenesis, granulation tissue formation and increased synthesis of collagen. The irradiation parameters are also similar between LED and LASER. The biological effects are dependent on irradiation parameters, mainly wavelength and dose. This review elucidates the importance of defining parameters for the use of light devices. PMID:25054749

303. Possibilities of current use of noninvasive laser therapy and systemic enzymotherapy in stomatology
NASA Astrophysics Data System (ADS)
Navratil, Leos; Navratilova, Blanka; Knizek, Jiri; Fikackova, Hana; Erosova, Zuzana; Kymplova, Jaroslava
2002-10-01
There are no doubts about benefits of non-invasive laser therapy in treating surgical wounds thanks to its anti-inflammatory, stimulating and analgesic effects. Systemic enzymotherapy is particularly employed due to its thrombolytic, fibrinolytic and antiedema effects. Concurrent use of the two above mentioned treatment modalities exerts synergistic action. Thus, it is possible to reduce the persistence of the pain as well as duration of the post-operation period after surgical interventions in the mouth cavity at a statistically highly significant level. Thus, this approach can be recommended for achieving a favourable course in most post-operation conditions.

304. Non-damaging laser therapy of the macula: Titration algorithm and tissue response
NASA Astrophysics Data System (ADS)
Palanker, Daniel; Lavinsky, Daniel; Dalal, Roopa; Huie, Philip
2014-02-01
Retinal photocoagulation typically results in permanent scarring and scotomata, which limit its applicability to the macula, preclude treatments in the fovea, and restrict the retreatments. Non-damaging approaches to laser therapy have been tested in the past, but the lack of reliable titration and slow treatment paradigms limited their clinical use. We developed and tested a titration algorithm for sub-visible and non-damaging treatments of the retina with pulses sufficiently short to be used with pattern laser scanning. The algorithm based on Arrhenius model of tissue damage optimizes the power and duration for every energy level, relative to the threshold of lesion visibility established during titration (and defined as 100%). Experiments with pigmented rabbits established that lesions in the 50-75% energy range were invisible ophthalmoscopically, but detectable with Fluorescein Angiography and OCT, while at 30% energy there was only very minor damage to the RPE, which recovered within a few days. Patients with Diabetic Macular Edema (DME) and Central Serous Retinopathy (CSR) have been treated over the edematous areas at 30% energy, using 200?m spots with 0.25 diameter spacing. No signs of laser damage have been detected with any imaging modality. In CSR patients, subretinal fluid resolved within 45 days. In DME patients the edema decreased by approximately 150?m over 60 days. After 3-4 months some patients presented with recurrence of edema, and they responded well to
rereatment with the same parameters, without any clinically visible damage. This pilot data indicates a possibility of effective and repeatable macular laser therapy below the tissue damage threshold.

305. Low level laser therapy for healing acute and chronic wounds - the extendicare experience. PubMed
Saltmarche, Anita E
2008-06-01
The purpose of the study is to assess the effectiveness of low level laser therapy for wound healing when combined with the Extendicare Wound Prevention and Management Program. Sixteen residents at a Canadian Extendicare nursing home had a total of 27 sites treated consisting of 23 open wounds and 4 ‘at risk’ areas. Of the 23 open wounds, two wounds in between toes were not able to be ‘traced’ and deemed ‘immeasurable’ wounds, resulting in 21 open, measured wounds. The four ‘at risk’ (closed) areas were treated preventatively. Pressure, venous insufficiency and diabetic wounds were included. The majority (12/21) or 57.1%, of the wounds were chronic (≥3 months duration) and 42.9% were acute (<3 months duration). The primary outcome measures included the PUSH Tool score, EZ Graph tracings and photographs. Secondary outcome measures were employed to better understand potential barriers to successful integration into clinical practice. Feedback on the effectiveness of low level laser therapy, the education program and determinations of hands-on relevance was sought from staff. At the end of the 9-week trial, the majority (61.9%) of the 21 wounds achieved significant improvement (≥50% wound closure). Nine (42.8%) had 100% closure. Some improvement was seen in 14.3% and 23.8% of wounds demonstrated no change. Chronic and acute wounds had similar improvement. None of the wounds in this debilitated, frail population deteriorated during the study and no negative consequences of treatment were encountered. Without staff support, even if new technology has positive clinical outcomes, success would be limited. Staff rated low level laser, easy to learn and use, effective for the majority of their residents worth the additional time. Staff requested a continuation of low level laser even after study completion. PMID:18494640

306. Lasers in Cancer Treatment MedlinePLUS
... Cancer Treatment On This Page What is laser light? What is laser therapy, and how is it ... future hold for laser therapy? What is laser light? The term “laser” stands for light amplification by ...

Osti, Raffaella; Pari, Carlotta; Salvatori, Giada; Massari, Leo
2015-01-01
Low-back pain is very frequent, especially in active adult population. There are several different orthopaedic condition that can cause low-back pain, and the pain worsen the quality of life significantly. The treatments vary from drugs, physical therapies, kinesiology, local infiltrations, and so on. Laser therapy has an important role in the treatment of the inflammatory causes of pain, with several studies that demonstrate the efficacy of low and high energy laser therapy in the treatment of low-back pain. Sixty-six consecutive patients with low-back pain with or without leg pain were treated using a combination of Tri-length laser I-Triax® (Mectronic Medicale, Bergamo, Italy) and Pharon® tecar therapy (Mectronic Medicale, Bergamo, Italy). The patients were treated three times a week, every other day, for a total of 10 sessions. Clinical results were evaluated using visual analogic scale for individual pain (0 to 10) and the Oswestry disability scale (ODS). Tests started before the beginning of therapies and 8 weeks after the end of the therapies. Visual analogic scale (VAS) score significantly improved from an average value of 8.1±1.58 pre-treatment to an average value 8-weeks post-treatment of 2.63±2.74 (P?laser therapy. The conclusion of this study is that the association between laser therapy iLux-Triax® and tecar therapy Pharon® in the treatment of low-back pain, with or without leg pain, can significantly reduce pain and improve the quality of life in patients with degenerative and inflammatory problems. PMID:25376670

308. Nd:YAG laser in experimentally induced chronic degenerative osteoarthritis in broiler chickens: pilot study NASA Astrophysics Data System (ADS)
Fortuna, Damiano; Rossi, Giacomo; Bilotta, Teresa W.; Zati, Allesandro; Cardillo, Ilaria; Venturini, Antonio; Pinna, Stefania; Serra, Christian; Masotti, Leonardo
2002-10-01
The Low Level Laser Therapy (LLLT) has been widely tested in arthritis disorders, but there is still some disagreement in the results, therefore in this study we have investigated High Intensity Laser Therapy (HILT). The degenerative arthritis was induced in 18 chickens by intra-articular inoculation of Freund's complete adjuvant. Clinical studies were carried out (weight increase and grades of lameness) as well as morphological (macroscopic and histological) tests and seroassay (C Reactive Protein). The Nd:YAG pulsed wave was
employed. The serologic data revealed the anti-inflammatory effect on the laser, with a highly significant difference between those treated and the control group. No lesion on the skin, i.e., burn, or in depth has been observed in the Treated group. Heavy line of broiler chickens in growing age has been revealed a good animal model of O.A.. The Nd:YAG Pulsed Wave it is safe on these structures. The anti-inflammatory effect of the HILT it seems to contrast the destructive degenerative process.

309. **Kinetics of blood lipoprotein spectrum indices in patients with angina pectoris during and after low-intensity laser therapy as a paraclinical criterion for treatment efficiency**

  NASA Astrophysics Data System (ADS)

  Babushkina, G. V.; Kartelishev, A. V.

  2001-04-01

  An investigation was made of applying (lambda) equals 0.63 micrometers laser radiation in treating 403 patients affected by angina pectoris. The patients were administered a course of combined laser therapy consisting of the intravenous laser irradiation of blood combined with laser acupuncture. Apart from that, the patients took the maintenance doses of antiangiinal preparations and therapeutic doses of vitamins A and E. The blood lipoprotein spectrum revealed that this combined laser therapy was capable of producing an antiatherogenic effect. It was also found that the most effective exposure time of laser radiation was in the range of 10 to 15 min.

310. **Role of argon laser as an adjunctive therapy for treatment of resistant infected corneal ulcers**

  PubMed Central

  Khater, Mohammad M; Selima, Adel A; El-Shorbagy, Mohammad S

  2014-01-01

  Purpose To evaluate the role of argon laser as an adjunctive therapy in ten patients with resistant infected corneal ulcers with or without hypopyon. Methods The study included 20 patients, split into two groups of ten, with resistant infected corneal ulcers with or without hypopyon. One group was considered as the control group and treated with local and systemic specific antimicrobial drugs guided with culture and sensitivity tests. The other group started with the same specific therapy as the control group for 1 week with no obvious improvement and then was further treated with argon laser. The ten patients in the control group included five cases of fungal ulcers, three mixed (fungal and bacterial) ulcers, and two viral ulcers. The ten patients in the other group included three cases of fungal ulcers, three mixed (fungal and viral) ulcers, three viral ulcers, and one bacterial ulcer as proven with microbial culture and sensitivity tests. Eight cases of the control group and seven cases of the other group were associated with hypopyon. Before laser treatment, a drop of benoxinate hydrochloride 0.4% and a single drop of fluorescein sodium 0.25% were instilled. Argon laser irradiation of the affected cornea was performed using an argon 532 nm wavelength (Carl Zeiss LSL 532s AG; Carl Zeiss Meditec AG, Jena, Germany). A spot size of 500 µm, pulse duration of 0.2 seconds, and power of 900 mW were used. All cases were followed up for 3 months after healing was achieved. Results During the first 4 weeks after laser treatment, all patients showed complete healing of the epithelial defect and resolution of stromal infiltration with no adverse effects. In the control group, four cases needed an amniotic membrane graft due to thinning and the other six cases were healed in a duration that ranged from 3 to 7 weeks. Conclusion Argon laser phototherapy is useful as an adjunctive treatment for resistant infected corneal ulcers. More cases are needed to get more reliable results and to confirm our findings. PMID:24920878

311. **Laser Therapy**

  MedlinePLUS

  ... subspecialty, ASDS member dermatologists perform medically necessary and cosmetic procedures to improve the health, function and beauty ... to frown lines... Performing more than 5 million cosmetic procedures each year, ASDS member dermatologists offer many ...

312. **Analysis of flexible substrates for clinical translation of laser-generated shockwave therapy**

  PubMed

  Francis, Nathan C; Kassam, Imara; Nowroozi, Bryan; Grundfest, Warren S; Taylor, Zach D

  2015-03-01

  Bacteria biofilms in chronically infected wounds significantly increase the burden of healthcare costs and resources for patients and clinics. Because biofilms are such an effective barrier to standard antibiotic treatment, new methods of therapy need to be developed to combat these infections. Our group has demonstrated the potential of using Laser Generated Shockwaves as a potential therapy to mechanically disrupt the bacterial biofilms covering the wound. Previous studies have used rigid silica glass as the shockwave propagation medium, which is not compatible with the intended clinical application. This paper describes the exploration of five candidate flexible plastic films to replace the glass substrate. Each material measured 0.254 mm thick and was used to generate shockwaves of varying intensities. Shockwave characterization was performed using a high-speed Michelson displacement interferometer and peak stress
values obtained in the flexible substrates were compared to glass using one-way nested Analysis of Variance and Tukey HSD post-hoc analysis. Results demonstrate statistically significant differences between substrate material and indicate that polycarbonate achieves the highest peak stress for a given laser fluence suggesting that it is optimal for clinical applications. PMID:25798307

313. Analysis of flexible substrates for clinical translation of laser-generated shockwave therapy
PubMed Central
Bacteria biofilms in chronically infected wounds significantly increase the burden of healthcare costs and resources for patients and clinics. Because biofilms are such an effective barrier to standard antibiotic treatment, new methods of therapy need to be developed to combat these infections. Our group has demonstrated the potential of using Laser Generated Shockwaves as a potential therapy to mechanically disrupt the bacterial biofilms covering the wound. Previous studies have used rigid silica glass as the shockwave propagation medium, which is not compatible with the intended clinical application. This paper describes the exploration of five candidate flexible plastic films to replace the glass substrate. Each material measured 0.254 mm thick and was used to generate shockwaves of varying intensities. Shockwave characterization was performed using a high-speed Michelson displacement interferometer and peak stress values obtained in the flexible substrates were compared to glass using one-way nested Analysis of Variance and Tukey HSD post-hoc analysis. Results demonstrate statistically significant differences between substrate material and indicate that polycarbonate achieves the highest peak stress for a given laser fluence suggesting that it is optimal for clinical applications. PMID:25798307

314. Simultaneous photodynamic and photothermal therapy using photosensitizer-functionalized Pd nanosheets by single continuous wave laser
PubMed
Zhao, Zengxia; Shi, Saige; Huang, Yizhuan; Tang, Shaocheng; Chen, Xiaolan 2014-06-11
In this work, we prepared chlorin e6 (Ce6)-functionalized Pd nanosheets (Pd-PEI-Ce6) for the photodynamic and photothermal combined therapy that use a single laser. To fabricate the Pd-PEI-Ce6 nanocomposite, photosensitizer Ce6 were chemically conjugated to polyethylenimine (PEI) and the formed Ce6-PEI conjugates were then anchored onto Pd nanosheets by electrostatic and coordination interaction. The prepared Pd-PEI-Ce6 nanocomposite were about 4.5 nm in size, exhibited broad, and strong absorption from 450 to 800 nm, good singlet oxygen generation capacity and photothermal conversion efficiency, and excellent biocompatibility. Significantly greater cell killing was observed when HeLa cells incubated with Pd-PEI-Ce6 were irradiated with the 660 nm laser, attributable to both Pd nanosheets-mediated photothermal ablation and the photodynamic destruction effect of photosensitizer Ce6. The double phototherapy effect was also confirmed in vivo. It was found that the Pd-PEI-Ce6 treated tumor-bearing mice displayed the enhanced therapeutic efficiency compared to that of Pd-PEI, or Ce6-treated mice. Our work highlights the promise of using Pd nanosheets for potential multimode cancer therapies. PMID:24801639

315. Therapeutic and diagnostic set for irradiation the cell lines in low level laser therapy
NASA Astrophysics Data System (ADS)
Gryko, Lukasz; Zajac, Andrzej; Gilewski, Marian; Szymanska, Justyna; Goralczyk, Krzysztof 2014-05-01
In the paper is presented optoelectronic diagnostic set for standardization the biostimulation procedures performed on cell lines. The basic functional components of the therapeutic set are two digitally controlled illuminators. They are composed of the sets of semiconductor emitters - medium power laser diodes and high power LEDs emitting radiation in wide spectral range from 600 nm to 1000 nm. Emitters are coupled with applicator by fibre optic and optical systems that provides uniform irradiation of vessel with cell culture samples. Integrated spectrometer and optical power meter allow to control the energy and spectral parameters of electromagnetic radiation during the Low Level Light Therapy procedure. Dedicated power supplies and digital controlling system allow independent power of each emitter. It was developed active temperature stabilization system to thermal adjust spectral line of emitted radiation to more efficient association with absorption spectra of biological acceptors. Using the set to controlled irradiation and allowing to measure absorption spectrum of biological medium it is possible to carry out objective assessment the impact of the exposure parameters on the state cells subjected to Low Level Light Therapy. That procedure allows comparing the biological response of cell lines after irradiation with radiation of variable spectral and energetic parameters. Researches were carried out on vascular endothelial cell lines. Cells proliferations after irradiation of LEDs: 645 nm, 680 nm, 740 nm, 780 nm, 830 nm, 870 nm, 890 nm, 970 nm and lasers 650 nm and 830 nm were examined.
Watermelon stomach is an unusual cause of gastrointestinal bleeding and iron deficiency anemia. Its etiology is unknown, but it has been reported to be associated with a variety of diseases, including autoimmune disorders and cirrhosis. We report on the long-term outcome of 15 patients (13 women, 2 men) treated with neodymium-yttrium-aluminum-garnet (Nd:YAG) laser therapy. The mean age of patients at presentation was 71.6 years (range, 59 to 85 years). Fourteen patients were transfusion-dependent, requiring an average of 9.6 units of blood in the 12 months preceding diagnosis and treatment. Associated diseases included sclerodermia (3 patients), mixed connective tissue disease (1 patient), history of cancer (3 patients), cryptogenic cirrhosis (3 patients), and chronic renal failure (3 patients). In 7 of 9 patients who had an antinuclear antibody test, an elevated titer greater than 1:160 in a speckled pattern was noted. Nd:YAG laser coagulation therapy was administered to all patients without complications and was successful in reducing bleeding in every case. Five patients died during the course of follow-up without signs of recurrent gastrointestinal bleeding. The remaining 10 patients have had both endoscopic and hematologic improvement during a mean follow-up period of 4.4 years from the time of initial diagnosis (range, 2 to 8 years). The 10 survivors are no longer transfusion-dependent and have stable hematocrits. PMID:7988823

Comparative clinical study using laser and LED-therapy for orofacial pain relief: dentin hypersensitivity and cervicogenic headache
NASA Astrophysics Data System (ADS)
Lizzarelli, Rosane F. Z.; Pizzo, Renata C. A.; Florez, Fernando L. E.; Grecco, Clovis; Speciali, Jose G.; Bagnato, Vanderlei S.
2015-06-01
Considering several clinical situations, low intensity laser therapy has been widely applied in pain relief or analgesia mechanism. With the advent of new LED-based (light emitting diode) light sources, the need of further clinical experiments aiming to compare the effectiveness among them is paramount. The LED system therapeutic use can be denominated as LEDT - Light Emitting Diode Therapy. This study proposed two clinical evaluations of pain relief effect: to dentin hypersensitivity and to cervicogenic headache using different sources of lasers (low and high intensity) and light emitting diodes (LEDs), one emitting at the spectral band of red (630+/- 5nm) and the other one at infrared band (880+/- 5nm). Two different clinical studies were performed and presented interesting results. Considering dentin hypersensitivity, red and infrared led were so effective than the control group (high intensity laser system); by the other side, considering cervicogenic headache, control group (infrared laser) was the best treatment in comparison to red and infrared led system.

Controlled five-year follow-up study of laser trabeculoplasty as primary therapy for open-angle glaucoma
SciTech Connect
Tuulonen, A.; Niva, A.K.; Alanko, H.I.
1987-10-15
We followed up 32 eyes of 32 patients with early glaucoma (22 with capsular glaucoma and ten with simple glaucoma) who received laser trabeculoplasty as a primary therapy. These eyes were compared with a matched control group of 32 eyes treated with medication initially. The success rate (intraocular pressure below 22 mm Hg with laser alone or medication alone) at five years was 50% (16 of 32 eyes) in the laser-treated group and 22% (seven of 32 eyes) in the control group (P less than .02). The control group required more modifications of their therapy to control intraocular pressure. The neuroretinal rim area in the control eyes decreased 2.5 times as much as in the laser group (P = .017). Changes in the Friedmann visual fields did not differ significantly between the two groups.

Auto-simultaneous laser treatment and Ohshiro's classification of laser treatment
NASA Astrophysics Data System (ADS)
Ohshiro, Toshio
2005-07-01
When the laser was first applied in medicine and surgery in the late 1960's and early 1970's, early adopters reported better wound healing and less postoperative pain with laser procedures compared with the same procedure performed with the cold scalpel or with electrothermy, and multiple surgical effects such as incision, vaporization and hemocoagulation could be achieved with the same laser beam. There was thus an added beneficial component which was associated only with laser surgery. This was first recognized as the "?-effect", was then classified by the author as simultaneous laser therapy, but is now more accurately classified by the author as part of the auto-simultaneous aspect of laser treatment. Indeed, with the dramatic increase of the applications of the laser in surgery and medicine over the last 2 decades there has been a parallel increase in

PubMed
Liberski, S M; McGarrity, T J; Hartle, R J; Varano, V; Reynolds, D
1994-01-01
the need for a standardized classification of laser treatment. Some classifications have been machine-based, and thus inaccurate because at appropriate parameters, a “low-power laser” can produce a surgical effect and a “high power laser”, a therapeutic one. A more accurate classification based on the tissue reaction is presented, developed by the author. In addition to this, the author has devised a graphical representation of laser surgical and therapeutic beams whereby the laser type, parameters, penetration depth, and tissue reaction can all be shown in a single illustration, which the author has termed the “Laser Apple”, due to the typical pattern generated when a laser beam is incident on tissue. Laser/tissue reactions fall into three broad groups. If the photoreaction in the tissue is irreversible, then it is classified as high-reactive level laser treatment (HLLT). If some irreversible damage occurs together with reversible photodamage, as in tissue welding, the author refers to this as mid-reactive level laser treatment (MLLT). If the level of reaction in the target tissue is lower than the cells’ survival threshold, then this is low reactive-level laser therapy (LLLT). All three of these classifications can occur simultaneously in the one target, and fall under the umbrella of laser treatment (LT).

LT is further subdivided into three main types: mono-type LT (Mo-LT, treatment with a single laser system; multi-type LT (Mu-LT, treatment with multiple laser systems); and concomitant LT (Cc-LT), laser treatment in combination, each of which is further subdivided by tissue reaction to give an accurate, treatment-based categorization of laser treatment. When this effect-based classification is combined with and illustrated by the appropriate laser apple pattern, an accurate and simple method of classifying laser/tissue reactions by the reaction, rather than by the laser used to produce the reaction, is achieved. Examples will be given to illustrate the author’s new approach to this important concept.

320. Anti-inflammatory and analgesic effects of low-level laser therapy on the postoperative healing process

PubMed Central
Fabre, Hebert S. C.; Navarro, Ricardo L.; Oltramari-Navarro, Paula V.P.; Oliveira, Rodrigo F.; Pires-Oliveira, Deise A. A.; Andraus, Rodrigo A. C.; Fuirini, Nelson; Fernandes, Karen B. P.
2015-01-01

[Purpose] This study aimed to evaluate the anti-inflammatory and analgesic effects of intraoral application of low-level laser therapy (660?nm) to control pain, swelling and interincisal opening following the extraction of mandibular third molars. [Subjects and Methods] Ten patients underwent removal of lower third molars using the same surgical protocol and pharmacological approach. In the postoperative period, all patients received four consecutive daily sessions of low-level laser therapy, beginning 24 hours after the surgery. Intraoral applications using the diode laser with 660?nm wavelength in the continuous scan mode were performed covering the entire surgical area, which was divided into four quadrants, each of 1?cm area at a distance of 1?cm. The energy applied at each point was 5?J/cm2 during 8 seconds. [Results] The swelling and interincisal opening returned to normal 24 hours after the first low-level laser therapy application (Friedman test).

Moreover, the pain intensity was reduced on the third postoperative day, according to the Friedman test.

[Conclusion] Low-level laser therapy (660?nm), at the dosimetry used in this study, was effective in reducing postoperative pain and swelling following oral surgery. PMID:26180289


PubMed Central
Herpich, Carolina Marciela; Amaral, Ana Paula; Leal-Junior, Ernesto Cesar Pinto; Tosato, Juliana de Paiva; Gomes, Cid Andre Fidelis de Paula; Arruda, Éric Edmur Camargo; Glória, Igor Phillip dos Santos; Garcia, Mariilia Barbosa Santos; Barbosa, Bruno Roberto Borges; Rodrigues, Monique Sampaio; Silva, Katiane Lima; El Hage, Yasmin; Politi, Fabiano; Gonzalez, Tabajara de Oliveira; Bussadori, Sandra Kalil; Biasotto-Gonzalez, Daniela Aparecida
2015-01-01

The aim of the present study was to perform a systematic review of the literature on the effects of low-level laser therapy in the treatment of TMD, and to analyze the use of different assessment tools. [Subjects and Methods] Searches were carried out of the BIREME, MEDLINE, PubMed and SciELO electronic databases by two independent researchers for papers published in English and Portuguese using the terms: “temporomandibular joint laser therapy” and “TMJ laser treatment”. [Results] Following the application of the
elibility criteria, 11 papers were selected for in-depth analysis. The papers analyzed exhibited considerable methodological differences, especially with regard to the number of sessions, anatomic site and duration of low-level laser therapy irradiation, as well as irradiation parameters, diagnostic criteria and assessment tools. [Conclusion] Further studies are needed, especially randomized clinical trials, to establish the exact dose and ideal parameters for low-level laser therapy and define the best assessment tools in this promising field of research that may benefit individuals with signs and symptoms of TMD. PMID:25642095

322. **Antibacterial photodynamic therapy with 808-nm laser and indocyanine green on abrasion wound models**

*NASA Astrophysics Data System (ADS)*

Topaloglu, Nermin; Güney, Melike; Yuksel, Sahru; Gülsoy, Murat

2015-02-01

Infections with pathogens could cause serious health problems, such as septicemia and subsequent death. Some of these deaths are caused by nosocomial, chronic, or burn-related wound infections. Photodynamic therapy (PDT) can be useful for the treatment of these infections. Our aim was to investigate the antibacterial effect of indocyanine green (ICG) and 808-nm laser on a rat abrasion wound model infected with the multidrug resistant Staphylococcus aureus strain. Abrasion wounds were infected with a multidrug resistant clinical isolate of S. aureus. ICG concentrations of 500, 1000, and 2000 ?g/ml were applied with a 450 J/cm² energy dose. Temperature change was monitored by a thermocouple system. The remaining bacterial burden was determined by the serial dilution method after each application. Wounds were observed for 11 days posttreatment. The recovery process was assessed macroscopically. Tissue samples were also examined histologically by hematoxinin-eosin staining. Around a 90% reduction in bacterial burden was observed after PDT applications. In positive control groups (ICG-only and laser-only groups), there was no significant reduction. The applied energy dose did not cause any thermal damage to the target tissue or host environment. Results showed that ICG together with a 808-nm laser might be a promising antibacterial method to eliminate infections in animals and accelerate the wound-healing process.

323. **Effect of laser infrared therapy on several rheological indices of blood and on the homeostasis of patients with post-infarction cardiosclerosis**

*NASA Astrophysics Data System (ADS)*

Volov, N. A.; Kudinova, M. A.; Fedulaeva, A. I.; Fedulaev, Yu. N.; Gordeev, I. G.

2001-04-01

An investigation was made on 38 patients affected by exertion angina pectoris of the I-III functional classes. The patients survived a Q-associated myocardial infarction not earlier than 1 year ago. The patients were treated according to a 10-session course of laser infrared therapy. The dynamics of several hemorheological indices (such as blood viscosity, the hematocrit of venous blood, fibrinogen, fibronectine, thrombocyte aggregation, antithrombin III, and the activated partial thromboplastin time) was estimated prior to the treatment, 5 - 7 days after the beginning of laser therapy, and 30 days after the beginning of laser therapy treatment. It was found that laser therapy was capable of producing a significant decrease in the blood viscosity, fibrinogen level, and in the aggregation of thrombocytes. Moreover, laser infrared therapy carried out on patients affected by post-infarction cardiosclerosis and by stable exertion stenocardia of the I-III functional classes produced a reliable normalization of hemorheological indices of the blood.

324. **Correction of biochemical and functional disorders in brain ischaemia with laser therapy**

*NASA Astrophysics Data System (ADS)*

Musienko, Julia I.; Nepochurenko, Natalia I.; Vasilevskaya, Ludmila A.

2005-08-01

Application of intravenous laser irradiation of blood (ILIB) is considered to be the most effective method of laser therapy and its application is expedient pathogenetically in the ischemic disturbances. The aim of this study is to investigate ILIB influence with red helium-neon laser (HNL) with 630 nm wavelength and different powers on blood oxygen transport (BOT), cerebral and dermal microhaemodynamics (MGD), hydro-ion balance in normal rabbits and after modeling of local ischemia of brain (LIB). Experimental cerebral ischemia is characterized by development of BOT disturbance, ionic disbalance and edema in the ischemic brain region. Microcirculation disturbances with worsening of the cerebral and dermal MHD were revealed. ILIB with HNL radiation of 2.5 and 4.5 mW powers provokes dehydration of brain structure alone with the K+, Na+ concentration decreasing and hemoglobin-oxygen affinity increasing in intact group of animals. There was not revealed marked changes of cerebral MHD condition here. Using of ILIB in rabbits after LIB contributes for improving function of BOT, normalizing of water content in all cerebral structures compared to operated animals. Preventive ILIB provoked improvement of speckl-optical parameters and marked protective effect on microhaemodynamics processes in superficial brain structures. HNL radiation with 1.0 mW power results in worsening of oxygen transport, cerebral and skin MHD, hydro-ion homeostasis in animals with LIB modeling. Thus, laser haemotherapy contributes for improving of hydro-ion status, blood oxygen transport and cerebral
microcirculation in brain ischemia, what allows considering that helium-neon radiation with the pointed regimen is substantiated pathogenetically in brain ischaemia.

325. Chondrogenic mRNA expression in prechondrogenic cells after blue laser irradiation. PubMed
Kushibiki, Toshihiro; Tajiri, Takako; Ninomiya, Yoshihisa; Awazu, Kunio
2010-03-01
Low-level laser therapy (LLLT) has been used as a method for biostimulation. Cartilage develops through the differentiation of mesenchymal cells into chondrocytes, and differentiated chondrocytes in articular cartilage maintain cartilage homeostasis by synthesizing cartilage-specific extracellular matrix. The aim of this study is to evaluate the enhancement of chondrocyte differentiation and the expression levels of chondrogenic mRNA in prechondrogenic ATDC5 cells after laser irradiation. For chondrogenic induction, ATDC5 cells were irradiated with a blue laser (405 nm, continuous wave) at 100 mW/cm(2) for 180 s following incubation in chondrogenic differentiation medium. Differentiation after laser irradiation was quantitatively evaluated by the measurement of total collagen contents and chondrogenesis-related mRNAs. The total amount of collagen and mRNA levels of aggrecan, collagen type II, SOX-9, and DEC-1 were increased relative to those of a non-laser irradiated group after 14 days of laser irradiation. On the other hand, Ap-2alpha mRNA, a negative transcription factor of chondrogenesis, was dramatically decreased after laser irradiation. In addition, intracellular reactive oxygen species (ROS) were generated after laser irradiation. These results, for the first time, provide functional evidence that mRNA expression relating to chondrogenesis is increased, and Ap-2alpha is decreased immediately after laser irradiation. As this technique could readily be applied in situ to control the differentiation of cells at an implanted site within the body, this approach may have therapeutic potential for the restoration of damaged or diseased tissue. PMID:20163967

326. Neuroimmunomodulatory effects of transcranial laser therapy combined with intravenous tPA administration for acute cerebral ischemic injury. PubMed Central
Peplow, Philip V.
2015-01-01
At present, the only FDA approved treatment for ischemic strokes is intravenous administration of tissue plasminogen activator within 4.5 hours of stroke onset. Owing to this brief window only a small percentage of patients receive tissue plasminogen activator. Transcranial laser therapy has been shown to be effective in animal models of acute ischemic stroke, resulting in significant improvement in neurological score and function. NEST-1 and NEST-2 clinical trials in human patients have demonstrated the safety and positive trends in efficacy of transcranial laser therapy for the treatment of ischemic stroke when initiated close to the time of stroke onset. Combining intravenous tissue plasminogen activator treatment with transcranial laser therapy may provide better functional outcomes. Statins given within 4 weeks of stroke onset improve stroke outcomes at 90 days compared to patients not given statins, and giving statins following transcranial laser therapy may provide an effective treatment for patients not able to be given tissue plasminogen activator due to time constraints. PMID:26487831

327. Tri-wave laser therapy for spinal cord injury, neuropathic pain management, and restoration of motor function. NASA Astrophysics Data System (ADS)
Chariff, Mark D.; Olszak, Peter
2015-03-01
A laser therapy device using three combined wavelengths 532nm, 808nm, and 1064nm has been demonstrated in clinical studies. Primarily, therapeutic lasers have used wavelengths in the ranges of 632nm through 1064nm, where the optical density (OD) < 5, to achieve pain relief and tissue regeneration. Conventional wisdom would argue against using wavelengths in the region of 532nm, due to poor penetration (OD ~ 8); however, the author's observations are to the contrary. The 532nm light is efficiently absorbed by chromophores such as oxyhemoglobin, deoxyhemoglobin, and cytochrome c oxidase thereby providing energy to accelerate the healing process. The 808nm light is known to result in Nitric Oxide production thereby reducing inflammation and oxidative stress. All three laser wavelengths likely contribute to pain relief by inhibiting nerve conduction; however, the 1064nm has the deepest penetration. Through the use of this device on over 1000 patients with a variety of acute and chronic neuro-musculoskeletal disorders, the author observed that a majority of these individuals experienced rapid relief from their presenting conditions and most patients reported a tingling sensation upon irradiation. Patient testimonials and thermal images have been collected to document the results of the laser therapy. These studies demonstrate the ability of laser therapy to rapidly alleviate pain from both acute and chronic conditions.

328. Effect of low-power laser therapy on edema dynamics: sensing by using the electrical capacitance method. NASA Astrophysics Data System (ADS)
The inflammatory process can be considered as a tissue protective response to an aggressive stimulus. That process leads to an increase in vascular permeability and, consequently, edema formation. In this study it is shown that the electrical capacitance can be used as a tool for the monitoring of the time evolution of an edema in biological tissues and that the method can sense the modulating effect of low power laser therapy. The electrical capacitance was measured during the edema settling up in rats after induction of acute inflammation by carrageenan injections, associated or not with low power laser therapy. A LCR meter model LCR-815B from HP, was used to measure the electrical capacitance between two electrodes positioned onto the rat skin, in the edematous site. Measurements were taken every 15 min. All rats were anesthetized to overcome electrical capacitance variations. Rats were divided into three groups: i) only anesthetic was injected (0.3 ml of Zoletil 50); ii) anesthetic and 1 ml of carrageenin at 2%; iii) same as group (ii) plus treatment with 2.5 J/cm² from a GaAlAs laser (650 nm). A maximum on the capacitance variation was observed when the anesthetic and the carrageenin were injected. Lower values were obtained for the laser treated group, which corroborated with the anti-inflammatory effect of the laser therapy. The electric capacitance accompanied the settling up and down of the edemas for all animals.

329. Low Intensity Laser Therapy (LILT) Versus Transcutaneous Electrical Nerve Stimulation On Microcirculation In Diabetic Neuropathy
NASA Astrophysics Data System (ADS)
Battecha, Kadria H.; Atya, Azza M.
2011-09-01
Reduced microcirculation is a morbid element of neuropathy and one of the most common complications of uncontrolled diabetes. Many physical modalities have gained a considerable attention for enhancing cutaneous microcirculation in diabetic patients and prevent its serious complications. Accordingly, the present study was conducted to compare between the effect of low intensity laser therapy (LILT) and transcutaneous electrical nerve stimulation (TENS) on microcirculation in diabetic neuropathy. Thirty diabetic polyneuropathic patients ranged in age from 45-60 years participated in this study. They were randomly divided into two groups of equal number; patients in group (A) received LILT on plantar surface of foot with a dose of 3 J/cm² and wavelength (904 nm), while those in group (B) received TENS on lower leg for 30 minutes with frequency (2 HZ). Treatment was conducted 3 times/week for 6 weeks. The cutaneous microcirculation was evaluated by Laser Doppler flowmetry at the baseline and at the end of treatment. Results revealed that group (A) showed statistically significant increase in the cutaneous microcirculation compared with group (B). So, it was concluded that LILT has to be more efficient than TENS in increasing cutaneous microcirculation in patients with diabetic neuropathy.

PubMed
Fahrenholtz, Samuel J; Moon, Tim Y; Franco, Michael; Medina, David; Danish, Shabbar; Gowda, Ashok; Shetty, Anil; Maier, Florian; Hazle, John D; Stafford, Roger J; Warburton, Tim; Fuentes, David
2015-11-01
A cross-validation analysis evaluating computer model prediction accuracy for a priori planning magnetic resonance-guided laser-induced thermal therapy (MRgLITT) procedures in treating focal diseased brain tissue is presented. Two mathematical models are considered. (1) A spectral element discretisation of the transient Pennes bioheat transfer equation is implemented to predict the laser-induced heating in perfused tissue. (2) A closed-form algorithm for predicting the steady-state heat transfer from a linear superposition of analytic point source heating functions is also considered. Prediction accuracy is retrospectively evaluated via leave-one-out cross-validation (LOOCV). Modelling predictions are quantitatively evaluated in terms of a Dice similarity coefficient (DSC) between the simulated thermal dose and thermal dose information contained within N=222 MR thermometry datasets. During LOOCV analysis, the transient model's DSC mean and median are 0.7323 and 0.8001 respectively, with 15 of 22 DSC values exceeding the success criterion of DSC>0.7. The steady-state model's DSC mean and median are 0.6431 and 0.6770 respectively, with 10 of 22 passing. A one-sample, one-sided Wilcoxon signed-rank test indicates that the transient finite element model method achieves the prediction success criteria, DSC>0.7, at a statistically significant level. PMID:26368014

331. Model-based planning and real-time predictive control for laser-induced thermal therapy.
PubMed Central
Feng, Yusheng; Fuentes, David
2014-01-01
In this article, the major idea and mathematical aspects of model-based planning and real-time predictive control for laser-induced thermal therapy (LITT) are presented. In particular, a computational framework and its major components developed by authors in recent years are reviewed. The framework provides the backbone for not only treatment planning but also real-time surgical monitoring and control with a focus on MR thermometry enabled predictive control and applications to image-guided LITT, or MRgLITT. Although this computational framework is designed for LITT in treating prostate cancer, it is further applicable to other thermal therapies in focal lesions induced by radio-frequency (RF), microwave and high-intensity-focused ultrasound (HIFU). Moreover, the model-based dynamic closed-loop predictive control algorithms in the framework, facilitated by the coupling of mathematical modelling and computer simulation with real-time imaging feedback, has great potential to enable a novel methodology in thermal medicine. Such technology could dramatically increase treatment efficacy and reduce morbidity. PMID:22098360

332. Subjective and objective evaluation of low-level laser therapy after molar extraction
NASA Astrophysics Data System (ADS)
Kucrova, Hana; Dostalova, Tatjana; Himmelova, Lucia; Bartova, Jirina; Mazanek, Jiri
2000-06-01
The aim of this study was to evaluate the different frequencies of low-level laser irradiation on healing process after human molar extractions. Frequencies of 5 Hz, 292 Hz and 9000 Hz were used in experiments. Monitoring of secretory IgA and albumin level in saliva and changes in bone density were used as objective markers of biostimulatory effect. Subjective evaluation of therapy was observed using scale. Changes of sIgA, albumin levels and bone density were compared in group of 150 patients. Differences in levels of the saliva markers were found to be significant comparing irradiated and non-irradiated groups, as well as comparing groups irradiated by various modulatory frequencies. We observed significant differences between the increase of sIgA res. Albumin and subjective treatment feelings. Bone density after extraction and six-months after surgical treatment was examined using the dental digital radiovisiography. There were detected no significant differences between bone density in irradiated and non-irradiated groups perhaps due to our used therapy diagram.

333. Effects of tissue water content on the propagation of laser light during low-level laser therapy
PubMed
Kim, Soogeun; Shin, Sungho; Jeong, Sungho
2015-05-01
This work reports that the laser fluence rate inside porcine skin varied notably with the change of tissue water content under the same laser irradiation conditions. The laser fluence rate inside skin tissue samples with varying water content was measured using an optical fiber sensor, while the target was irradiated either by a low-level 635 or 830 nm laser (50 mW/cm2). It was demonstrated that the distribution of laser fluence rate inside the target is strongly affected by tissue water content and its profile is determined by the water content dependency of optical properties at the laser wavelength. PMID:25611979

334. Effects of tissue water content on the propagation of laser light during low-level laser therapy
NASA Astrophysics Data System (ADS)
Kim, Soogeun; Shin, Sungho; Jeong, Sungho
2015-05-01
This work reports that the laser fluence rate inside porcine skin varied notably with the change of tissue water content under the same laser irradiation conditions. The laser fluence rate inside skin tissue samples with varying water content was measured using an optical fiber sensor, while the target was irradiated either by a low-level 635 or 830 nm laser (50 mW/cm^2). It was demonstrated that the distribution of laser fluence rate inside the target is strongly affected by tissue water content and its profile is determined by the water content dependency of optical properties at the laser wavelength.

335. Lasers
ERIC Educational Resources Information Center
Schewe, Phillip F.
1981-01-01
Examines the nature of laser light. Topics include: (1) production and characteristics of laser light; (2) nine types of lasers; (3) five laser techniques including holography; (4) laser spectroscopy; and (5) laser fusion and other applications. (SK)

336. Red laser attenuation in biological tissues: study of the inflammatory process and pigmentation influence
NASA Astrophysics Data System (ADS)
Sabino, Caetano P.; Meneguzzo, Daiane T.; Benetti, Endi; Kato, Ilka T.; Prates, Renato A.; Ribeiro, Martha S.
2012-03-01
Several studies indicate that low level laser therapy (LLLT) accelerates the healing process, however, for a determined pathology, dosimetry remains difficult to be established. To understand the tissue optical properties under different conditions is extremely relevant since the dose delivered to the target tissue is known to be critical. The skin pigmentation influence on the laser attenuation is not yet well established on different mice lineages or human ethnical groups, making the dose problematic. Along the same line, inflammatory processes may cause similar problems since the tissues in this condition change their optical properties due to inflammatory cell accumulation. This work evaluated the attenuation pattern of a HeNe laser (?=632.8 nm) using ex vivo skin samples from Balb/C and C57BL/6 mice under inflammatory stages induced in their paw by local carrageenan inoculation. The samples were placed between two microscope slides, and a CCD camera was placed orthogonal to the beam path. The intensity distribution of the scattered light was photographed in grayscale and analyzed by ImageJ software. Our findings suggest that even slight differences of the epithelial pigmentation could result in a relevant dose loss delivered to the deeper tissues. The increase of the inflammatory cell density in the connective tissue indicated a highly scattering area also resulting in a dose loss for the deeper tissues when compared to control group.

337. Use of the immunomodulative influence of low-level laser radiation in the treatment of an autoimmune thyroiditis
NASA Astrophysics Data System (ADS)
Mikhailov, V. A.; Alexandrova, O. A.; Denisov, I. N.
2000-06-01
Use of LLLT for 42 patients with an autoimmune thyroiditis has shown that the helper function of lymphocytes has decreased, the suppressive activity has increased, the quantity of B-lymphocytes has decreased and the immunoregulative index has been normalized. The effect of LLLT application was active about 4 months in 78 percent of the patients. Soft semiconductor laser was used. The radiation was in the IR range of spectrum, wavelength - 890 nm. The technique included cutaneous irradiation of the thymus projection zones, vascular junction and thyroid gland. The total dose was made 2.42 J/cm2.

338. The effect of low-intensity laser therapy (LLLT) on cutaneous wound healing and pain relief in rats
PubMed Central
Koo, Hyun-Mo; Yong, Min-Sik; Na, Sang-Su
2015-01-01
[Purpose] This study examined the impact of low-intensity laser therapy on wound healing and pain control using a rat cutaneous wound model. [Subjects and Methods] Twenty-four adult male Sprague-Dawley rats (between 220?240?g, 7 weeks) were used in this study. The rats were anesthetized and a circular fragment of skin was removed from the dorsal region of the back by a punch with an 8-mm diameter. The animals were randomly divided into 6 groups, Groups C 1, C 3, and C 5, control groups, received no laser treatment. Groups T 1, T 3, and T 5 received laser treatment for 20?min per day for 1, 3 and 5 days, respectively. Lumbar spine and dorsal skin were extracted and processed using western blot analysis. [Results] Periodical observation showed increases in NGF expression on the skin, and decreases in c-fos expression by the spinal cord in the treatment groups compared to the control group. [Conclusion] The present findings suggest that low-intensity laser therapy could be used as an effective therapy for wound healing and pain relief, and could be further used as a clinical approach for treating cutaneous wounds. PMID:26696711

339 Low-Level Laser Therapy at 635 nm for Treatment of Chronic Plantar Fasciitis: A Placebo-Controlled, Randomized Study.
PubMed
Macias, David M; Coughlin, Michael J; Zang, Kerry; Stevens, Faustin R; Jastifer, James R; Doty, Jesse F
2015-01-01
Plantar fasciitis affects nearly 1 million persons in the United States at any one time. Conservative therapies have been reported to successfully treat 90% of plantar fasciitis cases; however, for the remaining cases, only invasive therapeutic solutions remain. This investigation studied newly emerging technology, low-level laser therapy. From September 2011 to June 2013, 69 subjects were enrolled in a placebo-controlled, randomized, double-blind, multicenter study that evaluated the clinical utility of low-level laser therapy for the treatment of unilateral chronic fasciitis. The volunteer participants were treated twice a week for 3 weeks for a total of 6 treatments and were evaluated at 5 separate time points: before the procedure and at weeks 1, 2, 3, 6, and 8. The pain rating was recorded using a visual analog scale, with 0 representing "no pain" and 100 representing "worst pain." Additionally, Doppler ultrasonography was performed on the plantar fascia to measure the fascial thickness before and after treatment. Study participants also completed the Foot Function Index. At the final follow-up visit, the group participants demonstrated a mean improvement in heel pain with a visual analog scale score of 29.6 ± 24.9 compared with the placebo subjects, who reported a mean improvement of 5.4 ± 16.0, a statistically significant difference (p < .001). Although additional studies are
warranted, these data have demonstrated that low-level laser therapy is a promising treatment of plantar fasciitis. PMID:25769363

340. Wavelength, beam size and type dependences of cerebral low-level light therapy: A Monte Carlo study on visible Chinese human
NASA Astrophysics Data System (ADS)
Li, Ting; Zhao, Yue; Duan, Meixue; Sun, Yunlong; Li, Kai
2014-02-01
Low level light therapy (LLLT) has been clinically utilized for many indications in medicine requiring protection from cell/tissue death, stimulation of healing and repair of injuries, pain reduction, swelling and inflammation. Presently, use of LLLT to treat stroke, traumatic brain injury, and cognitive dysfunction is attracting growing interest. Near-infrared light can penetrate into the brain tissue, allowing noninvasive treatment to be carried out with few treatment-related adverse events. Optimization of LLLT treatment effect is one key issue of the field; however, only a few experimental tests on mice for wavelength selection have been reported. We addressed this issue by low-cost, straightforward and quantitative comparisons on light dosage distribution in Visible Chinese human head with Monte Carlo modeling of light propagation. Optimized selection in wavelength, beam type and size were given based on comparisons among frequently-used setups (i.e., wavelengths: 660 nm, 810 nm, 980 nm; beam type: Gaussian and flat beam; beam diameter: 2 cm, 4 cm, 6cm). This study provided an efficient way to guide optimization of LLLT setup and selection on wavelength, beam type and size for clinical brain LLLT.

• «
• 16
• 17
• 18
• 19
• 20

341. Cellular chromophores and signaling in low level light therapy
NASA Astrophysics Data System (ADS)
Hamblin, Michael R.; Demidova-Rice, Tatiana N.
2007-02-01
The use of low levels of visible or near infrared light (LLLT) for reducing pain, inflammation and edema, promoting healing of wounds, deeper tissues and nerves, and preventing tissue damage by reducing cellular apoptosis has been known for almost forty years since the invention of lasers. Originally thought to be a peculiar property of laser light (soft or cold lasers), the subject has now broadened to include photobiomodulation and photobiostimulation using non-coherent light. Despite many reports of positive findings from experiments conducted in vitro, in animal models and in randomized controlled clinical trials, LLLT remains controversial. This likely is due to two main reasons; firstly the biochemical mechanisms underlying the positive effects are incompletely understood, and secondly the complexity of rationally choosing amongst a large number of illumination parameters such as wavelength, fluence, power density, pulse structure and treatment timing has led to the publication of a number of negative studies as well as many positive ones. In recent years major advances have been made in understanding the mechanisms that operate at the cellular and tissue levels during LLLT. Mitochondria are thought to be the main site for the initial effects of light and specifically cytochrome c oxidase that has absorption peaks in the red and near infrared regions of the electromagnetic spectrum matches the action spectra of LLLT effects. The discovery that cells employ nitric oxide (NO) synthesized in the mitochondria by neuronal nitric oxide synthase, to regulate respiration by competitive binding to the oxygen binding of cytochrome c oxidase, now suggests how LLLT can affect cell metabolism. If LLLT photodissociates inhibitory NO from cytochrome c oxidase, this would explain increased ATP production, modulation of reactive oxygen species, reduction and prevention of apoptosis, stimulation of angiogenesis, increase of blood flow and induction of transcription factors. In particular, signaling cascades are initiated via cyclic adenosine monophosphate (cAMP) and nuclear factor kappa B (NF-κB). These signal transduction pathways in turn lead to increased cell proliferation and migration (particularly by fibroblasts), modulation in levels of cytokines, growth factors and inflammatory mediators, and increases in anti-apoptotic proteins. The results of these biochemical and cellular changes in animals and patients include such benefits as increased healing in chronic wounds, improvements in sports injuries and carpal tunnel syndrome, pain reduction in arthritis and neuropathies, and amelioration of damage after heart attacks, stroke, nerve injury and retinal toxicity.

342. Role of the circulation in the systemic effects of low-light therapy
Conclusions: The use of minimally invasive alternative minimally invasive procedures has slowly grown from 767 interventions in 2007 to 1559 in 2011. In contrast, the number of distribution according to provinces, in 2011, about 40% of procedures were performed in Ontario, 20% in BC, 18 in Quebec and 8% in Alberta. These proportions between provinces have remained similar and stable between 2007 and 2011. In contrast, the number of alternative minimally invasive procedures has slowly grown from 767 interventions in 2007 to 1559 in 2011. Overall, laser procedures represented 7.6% of the total number of BPH surgeries in Canada in 2011. The contribution of laser therapy to the amount of total BPH procedures largely varied between provinces.

Introduction: Clinically benign prostatic hyperplasia (BPH) is classically associated with the progressive development of lower urinary tract symptoms (LUTS). The incidence of bothersome LUTS is associated with age and may vary in patients over 50 years old. In many developing countries with an aging population, BPH associated with LUTS has become a major health issue. To optimize quality of care and control of cost, there is an imperative need to examine the pattern of BPH management. The goal of this study is to capture the Canadian trend in surgical management of BPH and the use of laser therapy during the last 5 years from 2007–2008 to 2011–2012. Methods: We collected the number of transurethral resection of the prostate (TURP) procedures performed in each province in Canada from the Canadian Institute for Health Information (CIHI) reports for the fiscal years (April 1st–March 31st) of 2007–2008, 2008–2009, 2009–2010, 2010–2011 and 2011–2012. Results: Overall, the total number of TURP procedures remained stable from 20 294 procedures per year in 2007 to 20 629 in 2011. In terms of distribution according to provinces, in 2011, about 40% of procedures were performed in Ontario, 20% in BC, 18 in Quebec and 8% in Alberta. These proportions between provinces have remained similar and stable between 2007 and 2011. In contrast, the number of alternative minimally invasive procedures has slowly grown from 767 interventions in 2007 to 1559 in 2011. Overall, laser procedures represented 7.6% of the total number of BPH surgeries in Canada in 2011. The contribution of laser therapy to the amount of total BPH procedures largely varied between provinces.

Conclusions: The use of minimally invasive laser procedure alternatives to TURP is progressively growing.
Among the novel laser therapies, HoLEP and GreenLight vaporization are the only procedures that have demonstrated equivalent outcomes compared to TURP in randomized clinical trials. Furthermore, due to shorter hospital stay, these novel laser modalities have the potential to reduce healthcare expenses for the treatment of BPH. We can infer that following the trend observed in the United States, the number of laser therapies for BPH in Canada may increase significantly during the coming years. PMID:24069100

345. Clinical Evaluation of a Laser Surface Scanning System in 120 Patients for Improving Daily Setup Accuracy in Fractionated Radiation Therapy

SciTech Connect

Moser, Torsten; Habl, Gregor; Uhl, Matthias; Schubert, Kai; Sroka-Perez, Gabriele; Debus, Jürgen; Herfarth, Klaus; Karger, Christian P.
2013-03-01

Purpose: To evaluate the clinical suitability of a specific optical surface imaging system to detect setup errors in fractionated radiation therapy. Methods and Materials: The setup correction accuracy of a 3-dimensional laser imaging system was analyzed for 6 different tumor locations with 20 patients each. For each patient, the setup corrections of the megavoltage computed tomography (MVCT) images of a TomoTherapy unit (TomoTherapy, Madison, WI) were compared with those of the laser system for the first 10 fractions. For the laser system, the reference surface either was obtained from the DICOM (Digital Imaging and Communications in Medicine) surface structure delineated on the planning computed tomography images or was acquired with the system itself at the first fraction after the MVCT-based setup correction. Data analysis was performed for both reference types. Results: By use of the DICOM reference image, systematic shifts between 3 and 9 mm were found, depending on the tumor location. For the optical reference, no clinically relevant systematic shifts were found. MVCT-based setup corrections were detected with high accuracy, and only small movements were observed during treatment. Conclusions: Using a reference image acquired with the laser system itself after MVCT-based setup correction appears more reliable than importing the DICOM reference surface. After generation of the optical reference, the laser system may be used to derive setup corrections over a certain number of fractions, but additional radiologic imaging may still be necessary on a regular basis (eg, weekly) or if the corrections of the optical system appear implausibly large. Nevertheless, such a combined application may help to reduce the imaging dose for the patient.

346. The effect of low-level laser therapy (810 nm) on root development of immature permanent teeth in dogs.

PubMed

Fekrazad, Reza; Seraj, Bahman; Ghadimi, Sara; Tamiz, Parvin; Mottahary, Pouriya; Dehghan, Mohammad-Mehdi
2015-05-01

Traumatic injuries and dental caries can be a big challenge to immature teeth. In these cases, the main purpose of treatment is to maintain the pulp vitality. The purpose of this study was to investigate the effect of low-level laser therapy on accelerating the rate of dentinogenesis in pulpotomy of immature permanent teeth (apexogenesis). Three dogs, 4-6 months old, were used in this study. One jaw in each dog was randomly assigned to laser irradiation group. All selected teeth were pulpotomized with mineral trioxide aggregate (MTA) and restored with amalgam. In the laser group, the Ga-Al-As laser (810 nm, 0.3 W, 4 J/cm(2), 9 s) was used on buccal and lingual gingiva of each tooth in 48 h intervals for 2 weeks. In order to observe the newly formed dentine, tetracycline was injected on the 1st, 3rd, 7th, and 14th day after the operation. Then, ground sections of teeth were observed under a fluorescence microscope. The data was analyzed with Generalized Estimating Equations (GEE) test. The mean distance between the lines of tetracycline formed on the 1st and 14th day was significantly higher in the laser group (P=0.005). Within the limitation of this study, irradiation of Ga-Al-As laser (810 nm) can accelerate the rate of dentinogenesis in apexogenesis of immature permanent teeth with MTA in dogs. PMID:24858234

347. Comparison between photodynamic therapy with topical application of 5-aminolevulinic acid and CO2 laser therapy in the treatment of cervical condyloma acuminata: a randomized controlled trial

PubMed Central

Du, Juan; Lu, Xiao-Nian; Li, Fei; Wang, Duo-Qin; Xu, Ming; Sun, Ying; Liang, Jun; Tang, Hui; Yang, Yong-Sheng; Zhang, Zhen; Zhu, Xiao-Hua; Lin, Jin-Ran; Xu, Jin-Hua
2015-01-01

The present study aimed to evaluate the efficacy of photodynamic therapy with topical applied 5-aminolevulinic acid (ALA-PDT) for the treatment of cervical condyloma acuminata (CA). 161 Patients with cervical CA were randomly divided into ALA-PDT group and CO2 laser (control) group. Patients (n=89) in the ALA-PDT group were treated with topical 5% ALA under occlusive dressing for 3 h followed by irradiation with semiconductor laser at a dose of 1000 J/cm-2 and a power of 100 mW. Patients were treated 2 weeks later if necessary. Patients (n=72) in the control group were treated with CO2 laser. The treatment was
were evaluated with MTT assay at 30 minutes, 24 hours, 5 days and 10 days after analyzed using fluorescein diacetate (FDA) staining. Results The osteoblast cells viability and proliferation in pressure ulcer patients was investigated using the MTT assay. After laser irradiation procedure the viability and proliferation of osteoblast cells were evaluated using fluorescein diacetate (FDA) staining. Results The osteoblast cells viability and proliferation were evaluated with MTT assay at 30 minutes, 24 hours, 5 days and 10 days after laser irradiation. In the first

348. Diabetic distal symmetric polyneuropathy: effect of low-intensity laser therapy
PubMed
Khamseh, Mohammad Ebrahim; Kazemikho, Nooshafarin; Aghili, Rokhsareh; Forough, Bijan; Lajevardi, Marjan; Hashem Dabaghian, Fataneh; Goushegir, Ashrafeddin; Malek, Mojtaba
2011-11-01
Low-intensity laser therapy (LILT) has been considered as a treatment modality in diabetic distal symmetric polyneuropathy (DSP). The aim of this study is to determine the effectiveness of LILT on DSP. We examined 107 subjects with type 2 diabetes for detection of DSP using the Michigan Neuropathy Screening Instrument (MNSI). Seventeen subjects were eligible to be enrolled in the study. Nerve conduction studies (NCS) were performed in all eligible subjects as an objective method to confirm neuropathy. The participants received LILT three times a week for ten sessions. NCSs were reevaluated after completion of the treatment. The absolute changes in NCS parameters were considered to establish the effectiveness of the treatment. Baseline demographics were similar in all participants. The mean differences of NCV parameters were considered for comparison. At the end of the study, the subjects showed a significant increase in neural potential amplitudes (p < 0.05). This study clearly demonstrated a significant positive effect of LILT on improvement of nerve conduction velocity on diabetic distal symmetric polyneuropathy (DSP). This finding supports the therapeutic potential of LILT in DSP. PMID:21853320

349. Laser therapy in pressure ulcers: evaluation by the Pressure Ulcer Scale for Healing and Nursing Outcomes Classification
PubMed
Palagi, Sofia; Severo, Isis Marques; Menegon, Dóris Baratz; Lucena, Amália de Fátima
2015-10-01
OBJECTIVE To describe the pressure ulcer healing process in critically ill patients treated with conventional dressing therapy plus low-intensity laser therapy evaluated by the Pressure Ulcer Scale for Healing (PUSH) and the result of Wound Healing: Secondary Intention, according to the Nursing Outcomes Classification (NOC). METHOD Case report study according to nursing process conducted with an Intensive Care Unit patient. Data were collected with an instrument containing the PUSH and the result of the NOC. In the analysis we used descriptive statistics, considering the scores obtained on the instrument. RESULTS A reduction in the size of lesions of 7 cm to 1.5 cm of length and 6 cm to 1.1 cm width, in addition to the increase of epithelial tissue and granulation, decreased secretion and odor. CONCLUSION There was improvement in the healing process of the lesion treated with adjuvant therapy and the use of NOC allowed a more detailed and accurate assessment than the PUSH. PMID:26516754

350. The influence of laser radiation on human osteoblasts cultured on nanostructured composite substrates
PubMed Central
CRISAN, LIANA; SORITAU, OLGA; BACIU, MIHAELA; BACIU, GRIGORE; CRISAN, BOGDAN
2015-01-01
Background and aims Carbon-based nanomaterials such as carbon nanotubes, graphene oxide and graphene have been explored by researchers as well as the industry. Graphene is a new nanomaterial which has commercial and scientific advantages. Laser therapy has proven highly useful in biomedicine, with the use of different laser types and energies for distinct purposes. The low level laser therapy (LLLT) can have anti-inflammatory, analgesic and biostimulant effects. Recent research has shown that laser radiation has different effects on osteoblasts. The aim of this study was to identify the influence of laser radiation on human osteoblastic cells cultured on nanostructured composite substrates. Materials and methods Four types of substrates were created using colloidal suspensions of nanostructured composites in PBS at a concentration of 30 µg/ml. We used human osteoblasts isolated from patella bone pieces harvested during arthroplasty. Irradiation of osteoblasts cultured on nanostructured composite substrates was made with a semiconductor laser model BTL-10 having a wavelength of 830 nm. The proliferation activity of osteoblast cells was assessed using the MTT assay. After laser irradiation procedure the viability and proliferation of osteoblast cells were analyzed using fluorescein diacetate (FDA) staining. Results The osteoblast cells viability and proliferation were evaluated with MTT assay at 30 minutes, 24 hours, 5 days and 10 days after laser irradiation. In the first
30 minutes there were no significant differences between the irradiated and non-irradiated cells. At 24 hours after laser irradiation procedure a significant increase of MTT values in case of irradiated osteoblasts cultivated on nanostructured hydroxyapatite, nanostructured hydroxyapatite with gold nanoparticles and 1.6% and 3.15% graphenes composites substrates was observed. A more marked proliferation rate was observed after 10 days of irradiation for irradiated osteoblasts seeded on nanostructured hydroxyapatite with gold nanoparticles and graphenes containing substrate. Using FDA staining we obtained very similar results with MTT test. Conclusions The association between the 830 nm laser irradiation of osteoblasts and their long-term cultivation of the nanostructured composite substrates induces the cell proliferation and differentiation and therefore it will be a useful alternative for bone regeneration therapy. PMID:26528075

PEGylated nickel carbide nanocrystals as efficient near-infrared laser induced photothermal therapy for treatment of cancer cells in vivo
NASA Astrophysics Data System (ADS)
Zhou, Zhiguo; Wang, Jun; Liu, Wei; Yu, Chao; Kong, Bin; Sun, Yanan; Yang, Hong; Yang, Shiping; Wang, Wei
2014-10-01
Photothermal therapy has attracted significant attention as a minimally invasive therapy methodology. In this work, we report PEGylated nickel carbide nanocrystals (Ni3C NCs) as an efficient photothermal agent for the first time. The nanoparticles exhibit a broad absorption from the visible to the near-infrared regions and a rapid rise in temperature when irradiated by an 808 nm laser even at a concentration of 100 ?g mL-1. In vitro and in vivo cytotoxicity assays demonstrate they have good biocompatibility, which lays an important foundation for their biological application. In vitro studies reveal the efficient damage of cancer cells by the exposure of 808 nm laser with a power density of 0.50 W cm-2. Furthermore, hematoxylin and eosin (H & E) and terminal deoxynucleotidyl transferase biotin-dUTP nick-end labeling (TUNEL) staining of tumor slices confirmed the obvious destruction of cancer cells in vivo by an 808 nm laser (0.50 W cm-2) after only a 5 min application. Our work may open up a new application domain for transition metal carbides for biomedicine. Photothermal therapy has attracted significant attention as a minimally invasive therapy methodology. In this work, we report PEGylated nickel carbide nanocrystals (Ni3C NCs) as an efficient photothermal agent for the first time.

SU-E-J-161: Inverse Problems for Optical Parameters in Laser Induced Thermal Therapy
SciTech Connect
Fahrenholtz, SJ; Stafford, RJ; Fuentes, DT
2014-06-01
Purpose: Magnetic resonance-guided laser-induced thermal therapy (MRgLITT) is investigated as a neurosurgical intervention for oncological applications throughout the body by active post market studies. Real-time MR temperature imaging is used to monitor ablative thermal delivery in the clinic. Additionally, brain MRgLITT could improve through effective planning for laser fiber's placement. Mathematical bioheat models have been extensively investigated but require reliable patient specific physical parameter data, e.g. optical parameters. This abstract applies an inverse problem algorithm to characterize optical parameter data obtained from previous MRgLITT interventions. Methods: The implemented inverse problem has three primary components: a parameter-space search algorithm, a physics model, and training data. First, the parameter-space search algorithm uses a gradient-based quasi-Newton method to optimize the effective optical attenuation coefficient, ?-eff. A parameter reduction reduces the amount of optical parameter-space the algorithm must search. Second, the physics model is a simplified bioheat model for homogeneous tissue where closed-form Green's functions represent the exact solution. Third, the training data was temperature imaging data from 23 MRgLITT oncological brain ablations (980 nm wavelength) from seven different patients. Results: To three significant figures, the descriptive statistics for ?-eff were 1470 m{sup ?1} mean, 1360 m{sup ?1} median, 369 m{sup ?1} standard deviation, 933 m{sup ?1} minimum and 2260 m{sup ?1} maximum. The standard deviation normalized by the mean was 25.0%. The inverse problem took <30 minutes to optimize all 23 datasets. Conclusion: As expected, the inferred average is biased by underlying physics model. However, the standard deviation normalized by the mean is smaller than literature values and indicates
an increased precision in the characterization of the optical parameters needed to plan MRgFUS procedures. This investigation demonstrates the potential for the optimization and validation of more sophisticated bioheat models that incorporate the uncertainty of the data into the predictions, e.g. stochastic finite element methods.

353. A finite element method model to simulate laser interstitial thermo therapy in anatomical inhomogeneous regions
PubMed Central
Mohammed, Yassene; Verhey, Janko F
2005-01-01
Background Laser Interstitial ThermoTherapy (LITT) is a well established surgical method. The use of LITT is so far limited to homogeneous tissues, e.g. the liver. One of the reasons is the limited capability of existing treatment planning models to calculate accurately the damage zone. The treatment planning in inhomogeneous tissues, especially of regions near main vessels, poses still a challenge. In order to extend the application of LITT to a wider range of anatomical regions new simulation methods are needed. The model described with this article enables efficient simulation for predicting damaged tissue as a basis for a future laser-surgical planning system. Previously we described the dependency of the model on geometry. With the presented paper including two video files we focus on the methodological, physical and mathematical background of the model. Methods In contrast to previous simulation attempts, our model is based on finite element method (FEM). We propose the use of LITT, in sensitive areas such as the neck region to treat tumours in lymph node with dimensions of 0.5 cm – 2 cm in diameter near the carotid artery. Our model is based on calculations describing the light distribution using the diffusion approximation of the transport theory; the temperature rise using the bioheat equation, including the effect of microperfusion in tissue to determine the extent of thermal damage; and the dependency of thermal and optical properties on the temperature and the injury. Injury is estimated using a damage integral. To check our model we performed a first in vitro experiment on porcine muscle tissue. Results We performed the derivation of the geometry from 3D ultrasound data and show for this proposed geometry the energy distribution, the heat elevation, and the damage zone. Further on, we perform a comparison with the in-vitro experiment. The calculation shows an error of 5% in the x-axis parallel to the blood vessel. Conclusions The FEM technique proposed can overcome limitations of other methods and enables an efficient simulation for predicting the damage zone induced using LITT. Our calculations show clearly that major vessels would not be damaged. The area/volume of the damaged zone calculated from both simulation and in-vitro experiment fits well and the deviation is small. One of the main reasons for the deviation is the lack of accurate values of the tissue optical properties. In further experiments this needs to be validated. PMID:15631630

354. The diverse application of laser hair removal therapy: a tertiary unit’s experience with less common indications and a literature overview.
PubMed
Koch, D; Pratsou, P; Szczecinska, W; Lanigan, S; Abdullah, A
2015-01-01
We describe the diversity of indications for laser hair removal (LHR) therapy and compare our experience with the literature. Patients' case notes referred to the Birmingham Regional Skin Laser Centre between 2003 and 2011 for laser hair removal, with indications other than hirsutism, were reviewed retrospectively. Thirty-one treated patients with the following indications were identified: hair-bearing skin grafts/flaps, intra-oral hair-bearing flap, Becker's naevus, localised nevoid hypertrichosis, peristomal hair-bearing skin, scrotal skin prior to vaginoplasty in male-to-female (MTF) gender reassignment, pilonidal sinus disease (PSD), pseudofolliculitis barbae (PFB) and hidradenitis suppurativa (HS). Seven patients with the following indications have been reported before: intra-oral hair-bearing graft, naevoid hypertrichosis and peristomal hair-bearing skin. A clinical review of the evidence available for each indication is provided. Our experience and that in the published literature suggest that LHR is a safe, well-tolerated and effective treatment modality for the indications we report, leading to significant symptom and functional improvement with high patient satisfaction. LHR appears effective in the treatment of chronic inflammatory conditions such as PSD, PFB and HS, particularly at an early disease stage. We aim to increase awareness of the diversity of laser hair removal indications and add evidence to the medical literature of the wide range of indications for this useful treatment modality. PMID:24173910

355. Self-expanding metal mesh stents and laser therapy: a complementary approach for the palliation of malignant dysphagia
NASA Astrophysics Data System (ADS)
Madhotra, Ravi; Raouf, A.; Sturgess, R.; Krasner, Neville
1997-12-01
Re-establishment of the oesophageal lumen is the main focus of care in patients with inoperable oesophageal carcinomas. The self-expanding metal mesh stents (MMS) are increasingly being used. 51 patients aged 44-89 with inoperable oesophago-gastric carcinomas were intubated with MMS. 18 of these patients had endoscopic laser therapy (ELT) as primary palliation. 25 patients required follow-up endoscopy at variable intervals after stent insertion. 17 patients were found to have significant tumor growth (9), overgrowth (4) and both (4). All these patients were treated with Nd:YAG or diode laser for maintenance of satisfactory swallowing. 4 patients being treated with Nd:YAG laser developed deformity of MMS. This complication was not encountered with diode laser. The reblocking of MMS due to ingrowth or overgrowth of tumor is a not uncommon complication. The timing of the stent insertion should be carefully chosen since the longer the stent is in situ, the greater is the likelihood of tumor ingrowth or overgrowth. ELT can effectively deal with tumor ingrowth and overgrowth. Nd:YAG laser can cause melting of MMS. Overall the combination of ELT and MMS may offer the best palliation, particularly when patient survival of several months is anticipated. 356. Laser ablation therapy: An alternative treatment for medically resistant mesial temporal lobe epilepsy after age 50.

Waseem, Hena; Osborn, Katie E; Schoenberg, Mike R; Kelley, Valerie; Bozorg, Ali; Cabello, Daniel; Benbadis, Selim R; Vale, Fernando L.

2015-10-01

Selective anterior mesial temporal lobe ablation (AMTL) resection is considered a safe and effective treatment for medically refractory mesial temporal lobe epilepsy (MTLE). However, as with any open surgical procedure, older patients (aged 50+) face greater risks. Magnetic resonance-guided laser interstitial thermal therapy (MRgLITT) has shown recent potential as an alternative treatment for MTLE. As a less invasive procedure, MRgLITT could be particularly beneficial to older patients. To our knowledge, no study has evaluated the safety and efficacy of MRgLITT in this population. Seven consecutive patients (aged 50+) undergoing MRgLITT for MTLE were followed prospectively to assess surgical time, complications, postoperative pain control, length of stay (LOS), operating room (OR) charges, total hospitalization charges, and seizure outcome. Five of these patients were assessed at the 1-year follow-up for seizure outcome. These data were compared with data taken from 7 consecutive patients (aged 50+) undergoing AMTL resection. Both groups were of comparable age (mean: 60.7 (MRgLITT) vs. 53 (AMTL)). One AMTL resection patient had a complication of aseptic meningitis. One MRgLITT patient experienced an early postoperative seizure, and two MRgLITT patients had a partial visual field deficit. Seizure-freedom rates were comparable (80% (MRgLITT) and 100% (AMTL) (p>0.05)) beyond 1-year postsurgery (mean follow-up: 1.0 years (MRgLITT) vs. 1.8 years (AMTL)). Mean LOS was shorter in the MRgLITT group (1.3 days vs. 2.6 days (p<0.05)). Neuropsychological outcomes were comparable. Short-term follow-up suggests that MRgLITT is safe and provides outcomes comparable to AMTL resection in this population. It also decreases pain medication requirement and reduces LOS. Further studies are necessary to assess the long-term efficacy of the procedure. PMID:26280814

357. InGaP 670-nm laser therapy combined with a hydroalcoholic extract of Solidago chilensis Meyen in burn injuries.

Catárnio, Helen Reinhard Camargo; de Godoy, Natâlia Pereira; Scharlack, Nayara Kastem; Neves, Lia Mara Grosso; de Gaspi, Fernanda Oliveira de Gaspari; Esquisatto, Marcelo Augusto Marreto; do Amaral, Maria Esméria Corezola; Mendoça, Fernanda Aparecida Sampaio; dos Santos, Gláucia Maria Tech.

2015-04-01

Therapies that accelerate the healing of burn injuries, improving the quality of life of the patient and reducing the cost of treatment are important. This study evaluated the effects of InGaP 670-nm laser therapy combined with a hydroalcoholic extract of Solidago chilensis leaves on burn wound healing in rats. Seventy-two rats were divided randomly into four groups: control untreated (C), treated with InGaP 670-nm laser with power density of 0.41 W/cm(2) and energy density of 4.93 J/cm(2) (L), treated with S. chilensis extract (S) and treated with S. chilensis extract and laser (LS). Second-degree burns were produced on the back of the animals with metal plate. Wound samples were collected on days 7, 14 and 21 of treatment for structural analysis, morphometry and Western blotting to quantify the expression of transforming growth factor beta 1 (TGF-β1) and vascular endothelial growth factor (VEGF). The results showed that InGaP laser irradiation at 670 nm alone and combined with extract of S. chilensis promoted significant tissue repair responses in this experimental model, increasing the number of fibroblasts, collagen fibres and newly formed blood vessels throughout the experimental period and decreasing the number of granulocytes in burn wounds of second degree in all treated groups. Exclusive treatment of burn wounds with the hydroalcoholic extract of S. chilensis provided similar quantitative results to those seen in the untreated group throughout the experimental period. Therefore, it was observed in the L and LS groups different responses in the expression of TGF-β1 and VEGF.
The application of 670-nm laser alone or combined with the extract of S. chilensis promoted favourable responses in tissue repair of second-degree burns in this experimental model. PMID:25600614

358. Method for estimating optimal spectral and energy parameters of laser irradiation in photodynamic therapy of biological tissue
NASA Astrophysics Data System (ADS)
Lisenko, S. A.; Kugeiko, M. M.
2015-04-01
We have solved the problem of layer-by-layer laser-light dosimetry in biological tissues and of selecting an individual therapeutic dose in laser therapy. A method is proposed for real-time monitoring of the radiation density in tissue layers in vivo, concentrations of its endogenous (natural) and exogenous (specialy administered) chromophores, as well as in-depth distributions of the spectrum of light action on these chromophores. As the background information use is made of the spectrum of diffuse light reflected from a patient's tissue, measured by a fibre-optic spectrophotometer. The measured spectrum is quantitatively analysed by the method of approximating functions for fluxes of light multiply scattered in tissue and by a semi-analytical method for calculating the in-depth distribution of the light flux in a multi-layered medium. We have shown the possibility of employing the developed method for monitoring photosensitizer and oxyhaemoglobin concentrations in tissue, light power absorbed by chromophores in tissue layers at different depths and laser-induced changes in the tissue morphology (vascular volume content and ratios of various forms of haemoglobin) during photodynamic therapy.

359. The association of fractional CO2 laser 10.600nm and photodynamic therapy in the treatment of onychomycosis*
PubMed Central
de Oliveira, Guilherme Bueno; Antonio, João Roberto; Antonio, Carlos Roberto; Tomé, Fernanda Alves
2015-01-01
BACKGROUND Onychomycosis is a fungal infection of the nails caused in most cases by dermatophytes Trichophyton rubrum and Trichophyton mentagrophytes. Despite numerous available antifungal drugs for therapy of this infection, the cure rate is low, with high rates of relapse after treatment and side effects.
OBJECTIVES To present a new option for the treatment of onychomycosis, in search of a more effective and rapid method than conventional ones. METHODS Patients underwent two sessions of CO2 fractional laser 10.600nm associated with photodynamic therapy. Mycological and digital photography were performed before and after the treatment. RESULTS McNemar test with continuity correction and degrees of freedom = 1: for clinical cure rate, 13.06, with p=0.00005; for mycological cure, 17.05, with p=0.00005; 72% felt fully satisfied with the procedure. CONCLUSIONS The use of fractional CO2 laser 10.600nm associated with photodynamic therapy can be effective in the treatment of onychomycosis, decreasing the risk of systemic lesions that may be triggered with prolonged use of oral antifungals. PMID:26375214

360. Review of Current Laser Therapies for the Treatment of Benign Prostatic Hyperplasia
PubMed Central
Choi, Benjamin B.
2013-01-01
The gold standard for symptomatic relief of bladder outlet obstruction secondary to benign prostate hyperplasia has traditionally been a transurethral resection of the prostate (TURP). Over the past decade, however, novel laser technologies that rival the conventional TURP have multiplied. As part of the ongoing quest to minimize complications, shorten hospitalization, improve resection time, and most importantly reduce mortality, laser prostatectomy has continually evolved. Today, there are more variations of laser prostatectomy, each with several differing surgical techniques. Although abundant data are available confirming the safety and feasibility of the various laser systems, future randomized-controlled trials will be necessary to verify which technique is superior. In this review, we describe the most common modalities used to perform a laser prostatectomy, mainly, the holmium laser and the potassium-titanyl-phosphate lasers. We also highlight the physical and clinical characteristics of each technology with a review of the most current and highest-quality literature. PMID:23789041
Previous studies have demonstrated the feasibility of laser irradiation (λ=1.45 μm) in tandem with cryogen spray cooling (CSC) to reshape rabbit auricular cartilage using total energy density of 14 J/cm². The aim of this study was to further explore and identify the dosimetry parameter space for laser output energy, CSC duration, and treatment cycles required to achieve shape change while limiting skin and cartilage injury. Ten New Zealand white rabbits were treated with the 1.45 μm diode laser combined with cryogen spray cooling (Candela Smoothbeam™, Candela Co., Wayland, MA). The ear’s central portion was bent around a cylindrical jig and irradiated in consecutive spots of 6 mm diameter (13 J/cm² or 14 J/cm² per spot) along 3 rows encompassing the bend. CSC was delivered during irradiation in cycles consisting of 25-35 ms. At thin and thick portions of the ear, 4-7 and 6-10 treatment cycles were delivered, respectively. After surgery, ears were examined and splinted for 6 weeks. Treatment parameters resulting in acceptable (Grades 1 & 2) and unacceptable (Grade 3) skin injuries for thick and thin regions were identified and shape change was observed. Confocal and histological analysis of cartilage tissue revealed several outcomes correlating to laser dosimetry, CSC duration, and treatment cycles. These outcomes included expansion of cartilage layers (thickening), partial cartilage injuries, and full thickness cartilage injuries. We determined therapy thresholds for laser output energy, cryogen spray cooling duration, and treatment cycles in the rabbit auricular model. These parameters are a starting point for future clinical procedures aimed at correcting external ear deformities. PMID:24202858

Purpose: Osteoblasts are capable to produce different compounds directly connected to bone mineralization process. This study aims to standardize the reverse transcriptase polymerase chain reaction (RT-PCR) for adult osteoblasts to observe the effect of low level laser therapy on bone mineralization. Methods: Five-millimeter long fragments obtained from the mead femoral region of male Wistar rats were assigned into group A (n=10, laser) and group B (n=10, no laser), submitted to mechanic and enzymatic digestion. After 7 days, cultures of group A were irradiated daily on a single spot with a GaInAs laser, λ=808nm, 200mW/cm², 2J/cm², bean diameter of 0.02mm, 5 seconds for 6 days. Group B was manipulated but received no laser irradiation. After 13 days the cells were trypsinized for 15 minute and stabilized with RNA later® for RNA extraction with Trizol®. cDNA synthesis used 10²g of RNA and M-MLV® enzyme. PCR was accomplished using the ?-actin gene as a control. Another aliquot was fixed for Hematoxylin-Eosin and Von Kossa staining to visualize bone mineralization areas. Results: Under UV light we observed clearly the amplification of ?-actin gene around 400bp. HE and Von Kossa staining showed osteoblast clusters, a higher number of bone cells and well defined mineralization areas in group A. Conclusion: The cell culture, RNA extraction and RT-PCR method for adult osteoblasts was effective, allowing to use these methods for bone mineralization studies. Laser improved bone mineralization and further studies are needed involving osteogenesis, calcium release mechanisms and calcium related channels.

Tumor thermotherapy is a method of cancer treatment wherein cancer cells are killed by exposing the body tissues to high temperatures. Successful clinical implementation of this method requires a clear understanding and assessment of the changes of the tumor area after the therapy. In this study, we evaluated the effect of near-infrared laser tumor thermotherapy at the molecular, cellular, and physical levels. We used single-walled carbon nanotubes (SWNTs) in combination with this thermotherapy. We established a mouse model for breast cancer and randomly divided the mice into four groups: mice with SWNT-assisted thermotherapy; mice heat treated without SWNT; mice injected with SWNTs without thermotherapy; and a control group. Tumors were irradiated using a near-infrared laser with their surface temperature remaining at approximately 45 °C. We monitored the tumor body growth trend closely by daily physical measurements, immunohistochemical
This study evaluated the effect of CO2 laser irradiation and topical fluoride therapy in the control of caries progression on primary teeth enamel. 30 fragments (3 × 3 × 2?mm) from primary canines were submitted to an initial cariogenic challenge that consisted of immersion on demineralizing solution for 3 hours and remineralizing solution for 21 hours for 5 days. Fragments were randomly assigned into three groups (n = 10): L: CO2 laser (? = 10.6??m), APF: 1.23% acidulated phosphate fluoride, and C: no treatment (control). CO2 laser was applied with 0.5?W power and 0.44?J/cm2 energy density. Fluoride application was performed with 0.1?g for 1 minute. Cariogenic challenge was conducted for 5 days following protocol previously described. Subsurface Knoop microhardness was measured at 30ʔm from the edge. Obtained data were subjected to analysis the variance (ANOVA) and Duncan test with significance of 5%. It was found that the L group showed greater control of deciduous enamel demineralization and were similar to those of APF group, while being statistically different from C group (P ? 0.05) that showed the lowest microhardness values. It was concluded that CO2 laser can be an additional resource in caries control progression on primary teeth enamel.

PMID:25874248

This study evaluated the effect of CO2 laser irradiation and topical fluoride therapy in the control of caries progression on primary teeth enamel. 30 fragments (3 × 3 × 2?mm) from primary canines were submitted to an initial cariogenic challenge that consisted of immersion on demineralizing solution for 3 hours and remineralizing solution for 21 hours for 5 days. Fragments were randomly assigned into three groups (n = 10): L: CO2 laser (? = 10.6??m), APF: 1.23% acidulated phosphate fluoride, and C: no treatment (control). CO2 laser was applied with 0.5?W power and 0.44?J/cm2 energy density. Fluoride application was performed with 0.1?g for 1 minute. Cariogenic challenge was conducted for 5 days following protocol previously described. Subsurface Knoop microhardness was measured at 30ʔm from the edge. Obtained data were subjected to analysis the variance (ANOVA) and Duncan test with significance of 5%. It was found that the L group showed greater control of deciduous enamel demineralization and were similar to those of APF group, while being statistically different from C group (P ? 0.05) that showed the lowest microhardness values. It was concluded that CO2 laser can be an additional resource in caries control progression on primary teeth enamel.

PMID:25874248

Tumor thermotherapy is a method of cancer treatment wherein cancer cells are killed by exposing the body tissues to high temperatures. Successful clinical implementation of this method requires a clear understanding and assessment of the changes of the tumor area after the therapy. In this study, we evaluated the effect of near-infrared laser tumor thermotherapy at the molecular, cellular, and physical levels. We used single-walled carbon nanotubes (SWNTs) in combination with this thermotherapy. We established a mouse model for breast cancer and randomly divided the mice into four groups: mice with SWNT-assisted thermotherapy; mice heat treated without SWNT; mice injected with SWNTs without thermotherapy; and a control group. Tumors were irradiated using a near-infrared laser with their surface temperature remaining at approximately 45 °C. We monitored the tumor body growth trend closely by daily physical measurements, immunohistochemical staining, and H&E (hematoxylin-eosin) staining by stage. Our results showed that infrared laser hyperthermia had a significant inhibitory effect on the transplanted breast tumor, with an inhibition rate of 53.09%, and also significantly reduced the expression of the heat shock protein Hsp70. Furthermore, we have found that protein analysis and histological analysis can be used to assess therapeutic effects effectively, presenting broad application prospects for determining the effect of different treatments on tumors. Finally, we discuss the effects of SWNT-assisted near-infrared laser tumor thermotherapy on tumor growth at the molecular, cellular, and physical levels.

Assessment of the efficacy of laser hyperthermia and nanoparticle-enhanced therapies by heat shock protein analysis
NASA Astrophysics Data System (ADS)
Tang, Fei; Zhang, Ye; Zhang, Juan; Guo, Junwei; Liu, Ran
2014-03-01
Tumor thermotherapy is a method of cancer treatment wherein cancer cells are killed by exposing the body tissues to high temperatures. Successful clinical implementation of this method requires a clear understanding and assessment of the changes of the tumor area after the therapy. In this study, we evaluated the effect of near-infrared laser tumor thermotherapy at the molecular, cellular, and physical levels. We used single-walled carbon nanotubes (SWNTs) in combination with this thermotherapy. We established a mouse model for breast cancer and randomly divided the mice into four groups: mice with SWNT-assisted thermotherapy; mice heat treated without SWNT; mice injected with SWNTs without thermotherapy; and a control group. Tumors were irradiated using a near-infrared laser with their surface temperature remaining at approximately 45 °C. We monitored the tumor body growth trend closely by daily physical measurements, immunohistochemical staining, and H&E (hematoxylin-eosin) staining by stage. Our results showed that infrared laser hyperthermia had a significant inhibitory effect on the transplanted breast tumor, with an inhibition rate of 53.09%, and also significantly reduced the expression of the heat shock protein Hsp70. Furthermore, we have found that protein analysis and histological analysis can be used to assess therapeutic effects effectively, presenting broad application prospects for determining the effect of different treatments on tumors. Finally, we discuss the effects of SWNT-assisted near-infrared laser tumor thermotherapy on tumor growth at the molecular, cellular, and physical levels.

Therapy and treatment with a high-energy laser in case of a periodontal disease treatment instead of physiotherapy or low-level laser treatment
NASA Astrophysics Data System (ADS)
Buerger, Friedhelm R.
1996-12-01
Since intensive efforts of prophylaxis including fluoridisation, better oral hygiene, eating ofless sugar containing foods, reduced the risk of caries and the problems of caries lesions significantly. But, especially beginning at the age of 30 years more than 80 % ofthe population in almost every nation shows signs of periodontal defects. This you can call an epidemic disease. Because people get older and expect a lot concerning their outlook, their esthetic, their phonetic, they have great expectations towards their natural dentition and keep their own teeth. This is a great challenge to periodontal prophylaxis and periodontal therapy. According to the progress ofthe disease different therapies are indicated. Starting with oral hygiene instructions to establish better oral hygiene with all the modern technologies ofmicrobiological investigations,
pharmaceutical therapy, physiotherapy, low level laser treatment, periodontal-surgery, like curettage, deepscaling and rootplaning but also more sophisticated treatment plans with gingivoplasty, gingivectomy, flap-procedures and mucogingival surgery including bone fillings, regenerativ technics the whole spectrum of treatment options has widely expanded during the last years.

367. **Low-level red laser therapy alters effects of ultraviolet C radiation on Escherichia coli cells**

*PubMed Central*


2015-01-01

Low-level lasers are used at low power densities and doses according to clinical protocols supplied with laser devices or based on professional practice. Although use of these lasers is increasing in many countries, the molecular mechanisms involved in effects of low-level lasers, mainly on DNA, are controversial. In this study, we evaluated the effects of low-level red lasers on survival, filamentation, and morphology of Escherichia coli cells that were exposed to ultraviolet C (UVC) radiation. Exponential and stationary wild-type and uvrA-deficient E. coli cells were exposed to a low-level red laser and in sequence to UVC radiation. Bacterial survival was evaluated to determine the laser protection factor (ratio between the number of viable cells after exposure to the red laser and UVC and the number of viable cells after exposure to UVC). Bacterial filaments were counted to obtain the percentage of filamentation. Area-perimeter ratios were calculated for evaluation of cellular morphology. Experiments were carried out in duplicate and the results are reported as the means of three independent assays. Pre-exposure to a red laser protected wild-type and uvrA-deficient E. coli cells against the lethal effect of UVC radiation, and increased the percentage of filamentation and the area-perimeter ratio, depending on UVC fluence and physiological conditions in the cells. Therapeutic, low-level red laser radiation can induce DNA lesions at a sub-lethal level. Consequences to cells and tissues should be considered when clinical protocols based on this laser are carried out. PMID:26445338

368. **Self temperature regulation of photothermal therapy by laser-shared photoacoustic feedback.**

*PubMed*

Feng, Xiaohua; Gao, Fei; Xu, Chenyu; Gaoming, Li; Zheng, Yuanjin

2015-10-01

This article describes a laser-shared photothermal system that achieves tight temperature regulation by frequency-domain photoacoustic (FD-PA) feedback. To this end, a continuous-wave laser system was designed with arbitrarily modulatable laser intensity. And, by fast alternating in the time domain between a constant laser intensity for photothermal heating and a modulated laser intensity for FD-PA temperature measurement, photothermal temperature variations are captured by FD-PA in real time. A proportional-integral-derivative (PID) controller monitors the feedback from FD-PA measurements and controls photothermal heating dose accordingly, thus stabilizing the temperature at preset values. The proposed system is demonstrated to achieve ultrafast temperature measurement at a 4 kHz rate, and with proper averaging, the measurement and regulation accuracy are 0.75 deg and 0.9 deg respectively. PMID:26421564

369. **The role of nitric oxide in low level light therapy**

*NASA Astrophysics Data System (ADS)*

Hamblin, Michael R.

2008-02-01

The use of low levels of visible or near infrared light for reducing pain, inflammation and edema, promoting healing of wounds, deeper tissues and nerves, and preventing tissue damage by reducing cellular apoptosis has been known for almost forty years since the invention of lasers. Despite many reports of positive findings from experiments conducted in vitro, in animal models and in randomized controlled clinical trials, LLLT remains controversial. Firstly the biochemical mechanisms underlying the positive effects are incompletely understood, and secondly the complexity of choosing amongst a large number of illumination parameters has led to the publication of a number of negative studies as well as many positive ones. This review will focus on the role of nitric oxide in the cellular and tissue effects of LLLT. Red and near-IR light is primarily absorbed by cytochrome c oxidase (unit four in the mitochondrial respiratory chain). Nitric oxide produced in the mitochondria can inhibit respiration by binding to cytochrome c oxidase and competitively displacing oxygen, especially in stressed or hypoxic cells. If light absorption displaced the nitric oxide and thus allowed the cytochrome c oxidase to recover and cellular respiration to resume, this would explain many of the observations made in LLLT. Why the effect is only seen in hypoxic, stressed or damaged cells or tissues? How the effects can keep working for some time (hours or days) postillumination? Why increased NO concentrations are sometimes measured in cell culture or in animals? How blood flow can be increased? Why angiogenesis is sometimes increased after LLLT in vivo?

370. **Carbon nanodots featuring efficient FRET for two-photon photodynamic cancer therapy with a low fs laser power density.**
The effect of low level laser therapy in different wavelengths in the treatment of oral mucositis—proposal for extra-oral implementation

NASA Astrophysics Data System (ADS)

The oral mucositis is the most frequent acute oral complication resulting from antineoplastic treatment and may worsen the clinical condition of the patient and interfere with his/her quality of life. This study aimed to comparatively evaluate, from a clinical point of view, the effect of Laser Therapy ?660 nm (wavelength of the red Laser) and ?830 nm (wavelength of the infrared Laser), at extra-oral points, in remission of severity of oral mucositis and pain associated with it in pediatric oncological patients undergoing chemotherapy with the anticancer drug methotrexate, noting which of the two wavelength is the most appropriate to this new technique. The sample consisted of 13 patients placed at random in each group and subjected to sessions of Low Level Laser Therapy, at predetermined extra-oral points for five consecutive days, starting at the beginning of the observation of mucositis injuries. It became possible to note that from the group of patients in the group of Laser ?830 nm (n = 6; 46.15%), four (n = 4; 66.67%) of these patients had remission of injuries to grade 0 (WHO), and as for pain, five patients (n = 5; 83.33%) showed no painful symptoms for mucositis injuries. In the Laser ?660 nm group (n = 7; 53.85%), only two patients (n = 2; 28.57%) achieved a regression of lesions to grade 0 (WHO), while four patients (n = 4; 57.14%) had no pain. So, the extra-oral application of Laser Therapy was effective in treating injuries of oral mucositis in the patients treated; and Laser Therapy in the infrared spectrum (?830 nm) was more effective in the treatment of oral mucositis injuries compared to the red spectrum (?660 nm), which can be explained by the greater power of penetration of infrared rays, acting in a more expressive way in deeper places.

374. Fifty Years of Ophthalmic Laser Therapy ASER IS A CATCHY SCIENTIFIC ACRONYM THAT
E-print Network
Palanker, Daniel
sunlight on their retinas to treat melanomas. In his groundbreaking book,2 he notes that the first, and the burns it caused were large and severe. Development of the laser provided a tool for more precise
evaluation in treating injuries of oral mucositis in the patients treated; and Laser Therapy in the infrared spectrum (?830 nm) was more effective in the treatment of oral mucositis injuries compared to the red spectrum (?660 nm), which can be explained by the greater power of penetration of infrared rays, acting in a more expressive way in deeper places.

375. Evaluation of the Effects of Diode (980 Nm) Laser on Gingival Inflammation after Nonsurgical Periodontal Therapy
PubMed Central
Zare, Davoud; Haerian, Ahmad; Molla, Reza
2014-01-01
Introduction: Periodontitis is an inflammatory disease, for which, scaling and root planning (SRP) is the common approach for non-surgical control of inflammation. Using lasers is another approach in the first phase of periodontal treatment for control of inflammation. Diode laser has some beneficial effects such as acceleration of wound healing, promotion of angiogenesis and augmentation of growth factor release. Thus the aim of this study is the evaluation of diodelaser (980 nm) effect on gingival inflammation when it is used between the first and second phase of periodontal treatment, in comparison with common treatment (SRP) modality alone. Methods: In this study, 21 patients with moderate to severe chronic periodontitis were selected and divided into control group (SRP) and test group (SRP + laser). Two months after the last scaling and laser irradiation, indexes including gingival level (GL), bleeding on probing (BOP) and modified gingival index (MGI) were recorded and compared with baseline. Results: Two months after the beginning of the study, all indices improved in both groups. The indices were not different between two groups except for BOP which was lower in laser group. Conclusion: Based on overall improvement in parameters such as superiority of laser application in some indices, lack of thermal damage and gingival recession with the specific settings used in this study, the application of laser as an adjunctive treatment together with common methods is preferable.
PMID:25606336

376. In vivo study of necrosis on the liver tissue of Wistar rats: a combination of photodynamic therapy and carbon dioxide laser ablation
NASA Astrophysics Data System (ADS)
2013-07-01
Photodynamic therapy (PDT) is known to be limited to applications in large volume tumors due to its limited penetration. Therefore, a combination of PDT and carbon dioxide (CO2) laser ablation may constitute a potential protocol to destroy bulk tumors because it involves an association of these two techniques allowing the removal of visible lesions with a high selectivity of destruction of remnant tumors. The main aim of this study is to investigate the most appropriate procedure to combine use of a CO2 laser and PDT on livers of healthy rats, and to analyze different techniques of this treatment using three types of photosensitizers (PSs). Forty eight animals were separated to form six groups: (1) only CO2 laser ablation, (2) drug and CO2 laser ablation, (3) only PDT, (4) drug and light (PDT) followed by CO2 laser ablation, (5) ablated with CO2 laser followed by PDT, and (6) drug followed by CO2 laser ablation and light. For each group, three types of
photosensitization were used: topical 5-aminolevulinic acid (ALA), intravenous ALA and intravenous Photogem®. Thirty hours after the treatments, the animals were sacrificed and the livers removed. The depth of necrosis was analyzed and measured, considering microscopic and macroscopic aspects. The results show that the effects of the PDT were considerably enhanced when combined with CO2 laser ablation, especially when the PDT was performed before the CO2 laser ablation.

PubMed Central
Dalaie, Kazem; Kharazifard, Mohammad Javad; Mahdian, Mina; Bayat, Mehrdad
2015-01-01
Objectives: One major drawback of orthodontic treatment is its long duration due to slow tooth movement and the pain at the onset of treatment following application of forces. There is controversy regarding the efficacy of laser for decreasing the treatment time and pain of orthodontic treatment. The purpose of this study was to investigate the effect of low level diode laser on the rate of orthodontic tooth movement and the associated pain.

Materials and Methods: In this double blind randomized controlled clinical trial, 12 orthodontic patients referring to Shahid Beheshti School of Dentistry for first premolar extraction were randomly selected and allocated to gallium aluminum-arsenide laser (GA-AL-AS diode laser, 880 nm, 100 mW, 5 j/cm², 8 points, 80 seconds, continuous mode) or control group. The patients initially underwent leveling and alignment using the sectional system. Force (150 gr) was applied to each canine tooth via sectional closing loops. The loops were activated every month. The rate of tooth movement and pain were monitored over the treatment period and recorded on days 1, 3, 7, 30, 33, 37, 60, 63 and 67. Two-way ANOVA was used for comparison of groups.

Results: There was no significant difference in terms of tooth movement and pain scores between the irradiated and non-irradiated sides at any time point (P>0.05). Conclusion: Although laser enhanced orthodontic tooth movement in the upper jaw, we failed to provide solid evidence to support the efficacy of laser for expediting tooth movement or reducing the associated pain.

PubMed
Vreman, S; Wiemer, P; Keesler, R I
2013-10-01
A 10-year-old KWPN (Royal Warmblood Studbook of the Netherlands) gelding was euthanized after developing severe neurological symptoms preceded by severe epistaxis during laser treatment for progressive ethmoid haematoma (PEH) in the right nasal cavity. Postmortem examination of the head revealed a large amount of clotted blood between the right ventral and dorsal conchae in the nasal cavity and acute haemorrhage in the right subarachnoid space. Histologically, there was moderate, acute polioencephalomalacia in the neuropil adjacent to the haemorrhage. The haemorrhages were most likely caused by the laser treatment and therefore should be considered a possible complication that could lead to severe peracute neurological symptoms.

PMID:24199337

379. TRPV Channels in Mast Cells as a Target for Low-Level-Laser Therapy
PubMed Central
Wang, Lina; Zhang, Di; Schwarz, Wolfgang
2014-01-01
Low-level laser irradiation in the visible as well as infrared range is applied to skin for treatment of various diseases. Here we summarize and discuss effects of laser irradiation on mast cells that leads to degranulation of the cells. This process may contribute to initial steps in the final medical effects. We suggest that activation of TRPV channels in the mast cells forms a basis for the underlying mechanisms and that released ATP and histamine may be putative mediators for therapeutic effects.

PMID:24971848

380. Preliminary clinical results of pulsed-dye laser therapy for recurrent respiratory papillomatosis
NASA Astrophysics Data System (ADS)
McMillan, Kathleen; Shapshay, Stanley M.; McGilligan, J. A.; Wang, Zhi; Rebeiz, Elie E.
1998-07-01
Recurrent respiratory papillomatosis (RRP) is a viral disease characterized by the growth of benign tumors on the vocal cords. Standard management of RRP currently consists of CO2 laser microsurgical ablation of the papillomas. Because of the recurrent nature of this disease, patients are often faced with significant cumulative risk of soft tissue complications such as vocal cord scarring. As a minimally traumatic alternative to management of RRP, we have investigated the use of the 585 nm pulsed dye laser (PDL) to cause regression of the papillomas by selective eradication of the tumor microvasculature. Three patients have been treated with the PDL at fluences of 6 J/cm² (double pulses per irradiated site), 8 J/cm² (single pulses), and 10 J/cm² (single pulses), at noncritical areas within the larynx, using a specially designed micromanipulator. Lesions on the true
cords were treated with the CO2 laser. Clinical examination showed that PDL treatment appeared to produce complete regression of papillomas. Unlike the sites of lesions treated by the CO2 laser, the epithelial surface at the PDL treatment sites was preserved intact. The presumed mechanism for papilloma regression following PDL treatment involves acute or chronic localized hypoxia caused by loss of tumor microvasculature.

- "18
- 19
- 20
- 21
- 22

381. A new model of in vitro fungal biofilms formed on human nail fragments allows reliable testing of laser and light therapies against onychomycosis.

Vila, Taissa Vieira Machado; Rozental, Sonia; de Sá Guimarães, Claudia Maria Duarte
2015-04-01
Onychomycoses represent approximately 50 % of all nail diseases worldwide. In warmer and more humid countries like Brazil, the incidence of onychomycoses caused by non-dermatophyte molds (NDM, including Fusarium spp.) or yeasts (including Candida albicans) has been increasing. Traditional antifungal treatments used for the dermatophyte-borne disease are less effective against onychomycoses caused by NDM. Although some laser and light treatments have demonstrated clinical efficacy against onychomycosis, their US Food and Drug Administration (FDA) approval as "first-line" therapy is pending, partly due to the lack of well-demonstrated fungicidal activity in a reliable in vitro model. Here, we describe a reliable new in vitro model to determine the fungicidal activity of laser and light therapies against onychomycosis caused by Fusarium oxysporum and C. albicans. Biofilms formed in vitro on sterile human nail fragments were treated with 1064 nm neodymium-doped yttrium aluminum garnet laser (Nd:YAG), 420 nm intense pulsed light (IPL) IPL 420, followed by Nd:YAG, or near-infrared light ((NIR) 700-1400 nm). Light and laser antibiofilm effects were evaluated using cell viability assay and scanning electron microscopy (SEM). All treatments were highly effective against C. albicans and F. oxysporum biofilms, resulting in decreases in cell viability of 45-60 % for C. albicans and 92-100 % for F. oxysporum. The model described here yielded fungicidal activities that matched more closely to those observed in the clinic, when compared to published in vitro models for laser and light therapies. Thus, our model might represent an important tool for the initial testing, validation, and "fine-tuning" of laser and light therapies against onychomycosis. PMID:25471266

382. Transcranial Near-Infrared Laser Therapy for Stroke: How to Recover from Futility in the NEST-3 Clinical Trial.

Lapchak, Paul A; Boitano, Paul D
2016-01-01
Development of drugs and devices for the treatment of stroke is not exempt from current translational research standards, which include Stroke Treatment Academic Industry Roundtable (STAIR) criteria and RIGOR guidelines. Near-infrared laser therapy (NILT) was developed to treat stroke in an era when STAIR criteria were not adhered to, thus NILT was not optimized in multiple species, nor was it optimized for efficacy across barriers in translational animal models before proceeding to expensive and extensive clinical trials. Moreover, the majority of rodent studies did not adhere to RIGOR guidelines. This ultimately led to failure in the NeuroThera Effectiveness and Safety Trial-3. Because NILT remains a promising therapeutic approach to treat stroke, we designed a systematic study to determine laser light penetration profiles across the skull of four different species with increasing skull thickness: mouse, rat, rabbit, and human. Our study demonstrates that NILT differentially penetrates the skulls. There is especially extensive attenuation of light energy penetration across the human calvaria, compared with animal skulls, which suggests that the power density setting used in stroke clinical trials may not have optimally stimulated neuroprotection and repair pathways. The results of our study suggest that NILT cannot be sufficiently optimized in "small" animals and directly translated to humans because of significant variances of skull thickness and penetration characteristics across species. NILT neuroprotection should be further studied using a research design that endeavors to incorporate human skull characteristics (thickness) into the development plan to increase the probability of success in stroke victims. PMID:26463915

383. Study on the therapeutic effects of low-energy laser therapy combined with cyclophosphamide on the mouse ascites sarcoma
By using the experimental model of mouse S180 ascites sarcoma, the feasibility and mechanism of low-energy laser therapy combined with the traditional antitumor drug of cyclophosphamide in the treatment of malignant tumors were discussed. The S180 ascites sarcoma suffering BALB/c mice were irradiated upon the Harder's glands with the dosages of 11.00, 14.67 and 22.00 J/cm² respectively, and/or injected with CYT intraperitoneally to evaluate the therapeutic effects of CYT/LELT combination on malignant tumors. The three dosages of LELT combined with CYT all showed remarkably therapeutic effects on the mouse S180 ascites sarcoma. Comparatively, the dosage of 14.673/cm² LELT combined with CYT showed the most ideal therapeutic effects and the survival time was up to 20.80 days, and the life prolongation ratio was 33.33% which was remarkably higher than those of the CYT and tumor control groups. CYT/LELT combined therapy had remarkably inhibiting effects on the mice asctes growth because of the existence of CYT.

Dye-enhanced selective photothermal laser-tissue interaction and photodynamic therapy in combination with immunoadjuvant for cancer treatment

Immunoadjuvants have been used to stimulate host immune responses. However, immunoadjuvants alone have not been very successful in treating metastatic tumors. Following the principle of combined therapy in AIDS treatment and in combination chemotherapy, immunoadjuvants have been used in conjunction with other treatment modalities. The current study is an attempt to use both selective photothermal and selective photochemical interactions to accompany a new immunoadjuvant in the treatment of metastatic tumors. The immunoadjuvant, glycated chitosan (GC), has been shown in the previous studies to be effective in inducing immune responses when combined with the treatment of laser irradiation after the intratumoral injection of indocyanine green solution. When glycated chitosan was used with photodynamic therapy (PDT), the treatment effect was significantly increased. Specifically, when glycated chitosan was injected peri-tumorally after Photofrin-based PDT treatment of EMT6 mammary sarcoma in mice, the tumor-free rate of the treated mice was increased from 38% to 75% using 1.5% GC solution. In mTHPC-based PDT treatment of Line-1 lung adenocarcinoma in mice, the tumor-free rates of treated mice reached 38% while PDT alone did not result in any tumor free mouse. The combination of the immunoadjuvant and selective photophysical interaction may become an effective method to treat tumors with an induced anti-tumor immunity.

Measuring the effects of topically applied skin optical clearing agents and modeling the effects and consequences for laser therapies

Human skin prepared with an optical clearing agent manifests reduced scattering as a result of de-hydration and refractive index matching. This has potentially large effects for laser therapies of several skin lesions such as port wine stain, hair removal and tattoo removal. With most topically applied clearing agents the clearing effect is limited because they penetrate poorly through the intact superficial skin layer (stratum corneum). Agent application modi other than topical are impractical and have limited the success of optical clearing in laser dermatology. In recent reports, however, a mixture of lipofylic and hydrofylic agents was shown to successfully penetrate through the intact stratum corneum layer which has raised new interest in this field. Immediately after application, the optical clearing effect is superficial and, as the agent diffuses through the skin, reduced scattering is manifested in deeper skin layers. For practical purposes as well as to maximize therapeutic success, it is important to quantify the reduced scattering as well as the trans-cutaneous transport dynamics of the agent. We determined the time and tissue depth resolved effects of optically cleared skin by inserting a microscopic reflector array in the skin. Depth dependent light intensity was measured by quantifying the signal of the reflector array with optical coherence tomography. A 1-dimensional mass diffusion model was used to estimate a trans-cutaneous transport diffusion constant for the clearing agent mixture. The results are used in Monte Carlo modeling to determine the optimal time of laser treatment after topical application of the optical clearing agent.
Laser accelerated proton beams have been proposed to be used in different research fields. A great interest has risen for the potential replacement of conventional accelerating machines with laser-based accelerators, and in particular for the development of new concepts of more compact and cheaper hadrontherapy centers. In this context the ELIMED (ELI MEDical applications) research project has been launched by INFN-LNS and ASCR-FZU researchers within the pan-European ELI-Beamlines facility framework. The ELIMED project aims to demonstrate the potential clinical applicability of optically accelerated proton beams and to realize a laser-accelerated ion transport beamline for multi-disciplinary user applications. In this framework the eye melanoma, as for instance the uveal melanoma normally treated with 62 MeV proton beams produced by standard accelerators, will be considered as a model system to demonstrate the potential clinical use of laser-driven protons in hadrontherapy, especially because of the limited constraints in terms of proton energy and irradiation geometry for this particular tumour treatment. Several challenges, starting from laser-target interaction and beam transport development up to dosimetry and radiobiology, need to be overcome in order to reach the ELIMED final goals. A crucial role will be played by the final design and realization of a transport beamline capable to provide ion beams with proper characteristics in terms of energy spectrum and angular distribution which will allow performing dosimetric tests and biological cell irradiation. A first prototype of the transport beamline has been already designed and other transport elements are under construction in order to perform a first experimental test with the TARANIS laser system by the end of 2013. A wide international collaboration among specialists of different disciplines like Physics, Biology, Chemistry, Medicine and medical doctors coming from Europe, Japan, and the US is growing up around the ELIMED project with the aim to work on the conceptual design, technical and experimental realization of this core beamline of the ELI Beamlines facility.
Transient absorption changes in vivo during photodynamic therapy with pulsed-laser light

Pogue, B W; Momma, T; Wu, H C; Hasan, T
1999-01-01
High intensity pulsed-laser light can be used to excite absorbing molecules to transient states in large proportions. The laser-induced spectral changes can be characterized by transient changes in light propagation; through the tissue provided the excited states of these molecules have altered absorption spectra. Characterization of these transient changes may then be used to exploit new mechanisms in photosensitization and/or to optimize photobiological effects. In this study, transmittance and reflectance were measured as a function of laser pulse energy, from tissue-simulating media as well as in rat muscle and liver slices, both with and without the photosensitizer benzoporphyrin derivative monoacid (BPD-MA) present. There was a transient decrease in absorption from the photosensitizer at peak pulse irradiance in the range of 100–1000 W cm−2. The depth of photodynamic treatment-induced tissue necrosis was measured in a subcutaneous prostate cancer model in Copenhagen rats. A comparison between continuous wave irradiation and pulsed irradiation with the same average incident irradiance showed no statistically significant difference in the depth of necrosis at 48 h after irradiation. These results indicate that photosensitizer population-state changes are measurable in tissues and may provide a method for measuring triplet-state properties of photosensitizer in vivo, but for BPD-MA clinically used concentrations these changes do not significantly affect the depth of photodynamically-induced tissue damage. © 1999 Cancer Research Campaign PMID:10408836

Low-energy laser biostimulation therapy of musculoskeletal disorders: clinical study

Filonenko, Natalia; Livshitz, Oleg; Salansky, Norman M.
1992-06-01
215 patients (86 males and 129 females, average age 60.3 years) suffering from musculoskeletal and neuromuscular disorders, both chronic and acute, were treated by low energy lasers. Most patients failed to improve in spite of the fact that different conventional treatment modalities were implemented. Some of them were unable to tolerate drugs because of allergy or gastrointestinal intolerance. The photobiostimulation system FABULIGHTTM (IMM Inc., Canada) with adjustable output parameters for both red and infrared wavelength was used. Different modalities of LELBT were used: local and generalized stimulation of tender points and affected areas. Stiffness, swelling, range of motion and pain were assessed. 65% of symptoms improvement was obtained in average.


Soran, Ozlem
2016-01-01
Medically refractory angina pectoris (RAP) is defined by presence of severe angina with objective evidence of ischemia and failure to relieve symptoms with coronary revascularization. Medication and invasive revascularization are the most common approaches for treating coronary artery disease (CAD). Although symptoms are eliminated or alleviated by these invasive approaches, the disease and its causes are present after treatment. New treatment approaches are needed to prevent the disease from progressing and symptoms from recurring. External enhanced counterpulsation therapy provides a treatment modality in the management of CAD and can complement invasive revascularization procedures. Data support that it should be considered a first-line treatment of RAP. PMID:26567978

Laser Doppler line scanner for monitoring skin perfusion changes of port wine stains during vascular-targeted photodynamic therapy

Chen, Defu; Ren, Jie; Wang, Ying; Gu, Ying
2014-11-01
Vascular-targeted photodynamic therapy (V-PDT) is known to be an effective therapeutic modality for the treatment of port wine stains (PWS). Monitoring the PWS microvascular response to the V-PDT is crucial for improving the effectiveness of PWS treatment. The objective of this study was to use laser Doppler technique to directly assess the skin perfusion in PWS before and during V-PDT. In this study, 30 patients with PWS were treated with V-PDT. A commercially laser Doppler line scanner (LDLS) was used to record the skin perfusion of PWS immediately before; and at 1, 3, 5, 7, 10, 15 and 20 minutes during V-PDT treatment. Our results showed that there was substantial inter- and intra-patient perfusion heterogeneity in PWS lesion. Before
V-PDT, the comparison of skin perfusion in PWS and contralateral healthy control normal skin indicated that PWS skin perfusion could be larger than, or occasionally equivalent to, that of control normal skin. During V-PDT, the skin perfusion in PWS significantly increased after the initiation of V-PDT treatment, then reached a peak within 10 minutes, followed by a slowly decrease to a relatively lower level. Furthermore, the time for reaching peak and the subsequent magnitude of decrease in skin perfusion varied with different patients, as well as different PWS lesion locations. In conclusion, the LDLS system is capable of assessing skin perfusion changes in PWS during V-PDT, and has potential for elucidating the mechanisms of PWS microvascular response to V-PDT.

393. Intense pulsed light, near infrared pulsed light, and fractional laser combination therapy for skin rejuvenation in Asian subjects: a prospective multi-center study in China.

Tao, Li; Wu, Jiaqiang; Qian, Hui; Lu, Zhong; Li, Yuanhong; Wang, Weizhen; Zhao, Xiaozhong; Tu, Ping; Yin, Rui; Xiang, Leihong

2015-09-01

Ablative skin rejuvenation therapies have limitations for Asian people, including post-inflammatory hyperpigmentation and long down time. Non-ablative lasers are safer but have limited efficacy. This study is to investigate the safety and efficacy of a combination therapy consisting of intense pulsed light (IPL), near infrared (NIR) light, and fractional erbium YAG (Er:YAG) laser for skin rejuvenation in Asian people. This study recruited 113 subjects from six sites in China. Subjects were randomly assigned to a full-face group, who received combination therapy, and split-face groups, in which one half of the face received combination therapy and the other half received IPL monotherapy. Each subject received five treatment sessions during a period of 90 days. Subjects were followed up at 1 and 3 months post last treatment. Three months after last treatment, the full-face group (n=57) had a global improvement rate of 29% and 29% for wrinkles, 32% for skin texture, 33% for pigment spots, 28% for pore size, respectively. For patients in the split-face groups (n=56), monotherapy side had a global improvement rate of 23% and 20% for wrinkles, 27% for skin texture, 25% for pigment spots, 25% for pore size, respectively. Both combination therapy and monotherapy resulted in significant improvements at the follow-up visits compared to baseline (P?therapy showed significantly greater improvements compared to monotherapy at two follow-up visits (P?therapy is a safe and more effective strategy than IPL monotherapy for skin rejuvenation in Asian people. PMID:26266401

394. Intravascular low-intensity He-Ne laser irradiation therapy on idiopathic edema

Gao, Yunqing; Liu, T. C.; Tang, Xiang-Jun

1998-11-01

194 patients with psoriasis were treated by intravascular low level laser irradiation combined with Vit C 2.0g iv and O2 inhale to the nose. An hour once a day, for 5-40 times, and 13.06 times in average, ten times with 4-7 days intervals. The results: cured 23 cases, good effected 61 cases, improved 110 cases, relapsed 10 cases. Curative effect was related to treatment times, cured and good effected 5 times 12.5 percent, 10 times 31 percent, 15 times 94 percent. A matched control group in 17 patients was treated by drug. The results: good effected 1 case, improved 13 cases, not effected 3 cases.

395. Effect of GaAs Laser at 904 nm in the Pain Threshold in Tibia and Tolerance in Deltoid Evaluated by Pressure Algometry

Soares, Luiz G. P.; Sato, Sidney K.; Silveira, Landulfo; Aimbire, Flávio; Moreira, Leonardo M.; Pinheiro, Antônio L. B.

2011-08-01

The use of LLLT in pain relief is a controversial issue in Physiotherapy, with the efficacy of LLLT associated to pain relief still requiring significant study. Objective. This work focuses on the evaluation of the effect of low power GaAs laser at 904 nm in pressure pain threshold and tolerance in tibia and deltoid muscle, respectively. A total of 17 subjects were divided in two groups: active and sham laser. Measurements were taken before and after laser irradiation in healthy individuals using a pressure algometry, first verifying the viability of algometry to evaluate the pain threshold and tolerance inter individuals and comparing the differences of right and left sides in the same patients, and finally evaluating the pain threshold and tolerance before and after a single laser application. Laser energy density was of 4.0 J/cm2 with power density of 137 mW/cm2. Comparing algometry values of active laser group and the sham group, the pain tolerance in the deltoid muscle did not change among groups after laser irradiation, while it was also encountered a statistically significant difference in the pain threshold in tibia when comparing the laser active and sham laser (p<0.05). It was found that the active laser was effective in maintaining the pain threshold in tibia. The effective laser
action in raising the pain threshold in tibia upon healthy individuals can suggest that the laser could be applied not only as curative but also with preventive purpose.

396. Comparison of the Effect of Nd:YAG and Diode Lasers and Photodynamic Therapy on Microleakage of Class V Composite Resin Restorations
PubMed Central
Savadi Oskoei, Siavash; Alizadeh Oskoei, Parnian; Jafari Navimipour, Elmira; Ahmad Ajami, Amir; Pournaghi Azar, Fatemeh; Rikhtegaran, Sahand; Amini, Melina
2013-01-01
Background and aims Considering the importance of disinfecting dentin after cavity preparation and the possible effect of disinfection methods on induction of various reactions between the tooth structure and the adhesive restorative material, the aim of the present study was to evaluate microleakage of composite resin restorations after disinfecting the prepared dentin surface with Nd:YAG and Diode lasers and photodynamic therapy. Materials and methods Standard Class V cavities were prepared on buccal surfaces of 96 sound bovine teeth. The samples were randomly divided into 4 groups based on the disinfection method: Group 1: Nd:YAG laser; Group 2: Diode laser; Group 3: photodynamic therapy; and Group 4: the control. Self-etch bonding agent (Clearfil SE Bond) was applied and all the cavities were restored with composite resin (Z100). After thermocycling and immersing in 0.5% basic fuchsin, the samples were prepared for microleakage evaluation under a stereomicroscope. Data was analyzed with Kruskal-Wallis and Wilcoxon signed-rank tests at P<0.05. Results There were no significant differences in the microleakage of occlusal and gingival margins between the study groups (P>0.05). There were no significant differences in microleakage between the occlusal and gingival margins in the Nd:YAG laser group (P>0.05). In the other groups, microleakage at gingival margins was significantly higher than that at the occlusal margins (P<0.05). Conclusion Nd:YAG and Diode lasers and photodynamic therapy can be used to disinfect cavity preparations before composite resin restorations. PMID:23875084

397. Lasers
PubMed
Passeron, T
2012-11-01
Lasers are a very effective approach for treating many hyperpigmented lesions. They are the gold standard treatment for actinic lentigos and dermal hypermelanocytosis, such as Ota nevus. Becker nevus, hyperpigmented mosaicsmias, and lentigines can also be successfully treated with lasers, but they could be less effective and relapses can be observed. However, lasers cannot be proposed for all types of hyperpigmentation. Thus, freckles and café-au-lait macules should not be treated as the relapses are nearly constant. Due to its complex pathophysiology, melasma has a special place in hyperpigmented dermatoses. Q-switched lasers (using standard parameters or low fluency) should not be used because of consistent relapses and the high risk of post-inflammatory hyperpigmentation. Paradoxically, targeting the vascular component of the melasma lesion with lasers could have a beneficial effect. However, these results have yet to be confirmed. In all cases, a precise diagnosis of the type of hyperpigmentation is mandatory before any laser treatment, and the limits and the potential side effects of the treatment must be clearly explained to patients. PMID:23260518

398. Endovenous Laser Therapy for Occlusion of Incompetent Saphenous Veins Using 1940nm Lasers
NASA Astrophysics Data System (ADS)
Sroka, Ronald; Pongratz, Thomas; Esipova, Anna; Dikic, Slobodan; Demhasaj, Sahit; Comsa, Florin; Schmedt, Claus-Georg
2015-07-01
Objective: Several studies indicate that ELT using wavelengths of high water absorption showed advantages compared to conventional ELT. Thulium-Lasers emit nearby the local absorption maximum of water at 1940nm. In this clinical study the effectiveness, safety and the feasibility of 1940nm-ELT is proven. Materials and Method: A single centric, prospective observational study was performed. 1940nm-laserenergy was applied using radial emitting fibres with continuous pullback (1mm/s). Treatment was performed under anesthesia (general, spinal, tumescent) thus simultaneous miniphlebectomy and ligation of perforators could be applied. Patient and technical details were systematically collected. Evaluation included: standardized questionnaire, clinical examination, color-duplex ultrasonography preoperatively, 3d, 4w, 6m postoperatively, statistic. Results: The 1940nm-ELT study include 55 patients (female/men=34/21, mean age 55y, range 23-90y) treating n=72 vessels. The mean maximum diameter of great saphenous veins (GSV, n=59) was 7.5mm (range 3.7-11.3mm) and of small saphenous veins (SSV, n=13) was 5.3mm (3.0-10.0mm). The mean applied longitudinal endovenous energy density (LEED) was 64.3J/cm (40.3-98.2J/cm) in GSVs and 51.0J/cm (37.6-72.7J/cm) in SSVs. Complete occlusion of the vein without sign of reflux was achieved in 100%. The mean length of non-occluded stump at the sapheno-femoral junction was 6.0mm (1.0-20.0mm). Postoperative
reduction of the diameter of GSV was 1.6mm (21.3%) and 2.0mm (37.7%) in SSV. One (1.4%) endovenous heat induced thrombus (EHIT) was observed. Further adverse events were: paresthesia 10/72 (13.9%), ecchymosis 1/72 (1.4%), lymphocele 1/72 (1.4%), hyperpigmentation 1/72 (1.4%). The mean postoperative pain intensity was 1.3 and 1.8 single doses of analgesics were administered. Normal physical activity was reached after 3d (1-21d). Conclusion: 1940nm-ELT using radial light application effectively eliminates the reflux in insufficient saphenous veins by a significant diameter reduction. The risk profile correlates with other endothermal treatment options. Low postoperative pain and analgesic requirements with rapid convalescence indicate a high level of patient comfort.


PubMed
Kauvar, Arielle N B
2012-06-01
Melasma is an acquired disorder of pigmentation that commonly affects women with phototypes III-V, and it has a negative impact on the quality of life in affected individuals. It presents clinically as symmetric tan or brown patches on the face, most often involving the forehead, cheeks, perioral region, and periorbital region. On histologic examination, there is increased melanin in the epidermis and/or an increased number of melanosomes in the dermis, with a normal number of highly melanized and dendritic melanocytes. The mainstay of treatment is the use of sunscreen along with topical medications that suppress melanogenesis. Clearance is usually incomplete and recurrences or exacerbations are frequent, probably because of the poor efficacy in clearing dermal melanosomes. Treatment with high-energy pigment-specific lasers, ablative resurfacing lasers, and fractional lasers results in an unacceptably high rate of postinflammatory hyper- and hypopigmentation and rebound melasma. Recently, promising results have been achieved with low-fluence Q-switched neodymium-doped yttrium aluminium garnet laser treatment, which can selectively target dermal melanosomes without producing inflammation or epidermal damage, in all skin phototypes. This article reviews the current treatment modalities for melasma, the rationale for using and the clinical results of combination therapy with low-fluence Q-switched neodymium-doped yttrium aluminium garnet lasers.
PMID:22640433

400. The effects of infrared laser therapy and weightbath traction hydrotherapy as components of complex physical treatment in disorders of the lumbar spine: a controlled pilot study with follow-up

NASA Astrophysics Data System (ADS)
Oláh, Csaba; Oláh, Mihály; Demeter, Béla; Jancsó, Zoltán; Páll, Valéria; Bender, Tamás
2010-02-01
Introduction: The therapeutic modalities available for the conservative management of chronic lumbar pain included infrared laser therapy and underwater traction, which usefulness is not universally acknowledged. This study was intended to ascertain any beneficial impact of infrared laser therapy and weightbath treatment on the clinical parameters and quality of life of patients with lumbar discopathy. Material and methods: The study population comprised 54 randomised subjects. I. group of 18 patents received only infrared laser therapy to lumbar region and painful Valley points. II. group of 18 subjects each received underwater traction therapy of lumbar spine with add-on McKenzie exercise and iontophoresis. The remaining III. group treated with exercise and iontophoresis, served as control. VAS, Oswestry index, SF36 scores, range of motion, neurological findings and thermography were monitored to appraise therapeutic efficacies in lumbar discopathy. A CT or MRI scan was done at baseline and after 3 months follow-up. Result:Infrared laser therapy and underwater traction for discopathy achieved significant improvement of all study parameters, which was evident 3 months later. Among the controls, significant improvement of only a single parameter was seen in patients with lumbar discopathy. Conclusions: Infrared laser therapy and underwater traction treatment effectively mitigate pain, muscle spasms, enhance joint flexibility, and improve the quality of life of patients with lumbar discopathy.

401. History of the World Federation of Societies for Laser Medicine and Surgery (WFSLMS) and its Non-Profit Organization (NPO-WFSLMS)
402. Laser-Supported CD133+ Cell Therapy in Patients with Ischemic Cardiomyopathy: Initial Results from a Prospective Phase I Multicenter Trial

PubMed Central
2014-01-01

Objectives: This study evaluates the safety, principal feasibility and restoration potential of laser-supported CD133+ intramyocardial cell transplantation in patients with ischemic cardiomyopathy. Methods: Forty-two patients with severe ischemic cardiomyopathy (left ventricular ejection fraction (LVEF) >15% and <55%) were included in this prospective multicenter phase I trial. They underwent coronary artery bypass grafting (CABG) with subsequent transepicardial low-energy laser treatment and autologous CD133+ cell transplantation, and were followed up for 12 months. To evaluate segmental myocardial contractility as well as perfusion and to identify the areas of scar tissue, cardiac MRI was performed at 6 months and compared to the preoperative baseline. In addition, clinical assessment comprising of CCS scoring, blood and physical examination was performed at 3, 6 and 12 months, respectively. Results: Intraoperative cell isolation resulted in a mean cell count of 9.7±1.2×10⁶. Laser treatment and subsequent CD133+ cell therapy were successfully and safely carried out in all patients and no procedure-related complications occurred. At 6 months, the LVEF was significantly increased (29.7±1.9% versus 24.6±1.5% with p?=?0.004). In addition, freedom from angina was achieved, and quality of life significantly improved after therapy (p<0.0001). Interestingly, an extended area of transmural delayed enhancement (>3 myocardial segments) determined in the preoperative MRI was inversely correlated with a LVEF increase after laser-supported cell therapy (p?=0.024). Conclusions: This multicenter trial demonstrates that laser-supported CD133+ cell transplantation is safe and feasible in patients with ischemic cardiomyopathy undergoing CABG, and in most cases, it appears to significantly improve the myocardial function. Importantly, our data show that the beneficial effect was significantly related to the extent of transmural delayed enhancement, suggesting that MRI-guided selection of patients is mandatory to ensure the effectiveness of the therapy. Trial Registration: EudraCT 2005-004051-35) Controlled-Trials.com ISRCTN49998633 PMID:25941420

403. Pulsed vs. CW low level light therapy on osteoarticular signs and symptoms in limited scleroderma (CREST syndrome)

NASA Astrophysics Data System (ADS)
Barolet, Daniel
Limited cutaneous systemic sclerosis (lcSSc) was formerly known as CREST syndrome in reference to the associated clinical features: Calcinosis, Raynaud's phenomenon, Esophageal dysfunction, Sclerodactyly, and Telangiectasias. The transforming growth factor beta (TGF-β) has been identified as a major player in the pathogenic process, while low level light therapy (LLLT) has been shown to modulate this cytokine superfamily. This case study was conducted to assess the efficacy of 940nm using microsecond domain pulsing and continuous wave mode (CW) on osteoarticular signs and symptoms associated with lcSSc. The patient was treated two to three times a week for 13 weeks, using a sequential pulsing mode on one elbow, and a CW mode on the other. Efficacy assessments included inflammation, symptoms, pain, and health scales, patient satisfaction, clinical global impression, and adverse effects monitoring. Significant functional and morphologic improvements were observed after LLLT, with best results seen with the pulsing mode. No significant adverse effects were noted. Two mechanisms of action may be at play. The 940nm wavelength provides inside-out heating possibly vasodilating capillaries which in turn increases catabolic processes leading to a reduction of in situ calcinosis. LLLT may also improve symptoms by triggering a cascade of cellular reactions, including the modulation of inflammatory mediators.

404. Quantitative evaluation of multi-parametric MR imaging marker changes post-laser interstitial ablation therapy (LITT) for epilepsy
NASA Astrophysics Data System (ADS)
Tiwari, Pallavi; Danish, Shabbar; Wong, Stephen; Madabhushi, Anant
2013-03-01
Laser-induced interstitial thermal therapy (LITT) has recently emerged as a new, less invasive alternative to craniotomy for treating epilepsy; which allows for focussed delivery of laser energy monitored in real time by MRI, for precise removal of the epileptogenic foci. Despite being minimally invasive, the effects of laser ablation on the epileptogenic foci (reflected by changes in MR imaging markers post-LITT) are currently unknown. In this work, we present a quantitative framework for evaluating LITT-related changes by quantifying per-voxel changes in MR imaging markers which may be more reflective of local treatment related changes (TRC) that occur post-LITT, as compared to the standard volumetric analysis which involves monitoring a more global volume change across pre-, and post-LITT MRI. Our framework focuses on three objectives: (a) development of temporal MRI signatures that characterize TRC corresponding to patients with seizure freedom by comparing differences in MR imaging markers and monitoring them over time, (b) identification of the optimal time point when early LITT induced effects (such as edema and mass effect) subside by monitoring TRC at subsequent time-points post-LITT, and (c) identification of contributions of individual MRI protocols towards characterizing LITT-TRC for epilepsy by identifying MR markers that change most dramatically over time and employ individual contributions to create a more optimal weighted MP-MRI temporal profile that can better characterize TRC compared to any individual imaging marker. A cohort of patients were monitored at different time points post-LITT via MP-MRI involving T1-w, T2-w, T2-GRE, T2-FLAIR, and apparent diffusion coefficient (ADC) protocols. Post affine registration of individual MRI protocols to a reference MRI protocol pre-LITT, differences in individual MR markers are computed on a per-voxel basis, at different time-points with respect to baseline (pre-LITT) MRI as well as across subsequent time-points. A time-dependent MRI profile corresponding to successful (seizure-free) is then created that captures changes in individual MR imaging markers over time. Our preliminary analysis on two patient studies suggests that (a) LITT related changes (attributed to swelling and edema) appear to subside within 4-weeks post-LITT, (b) ADC may be more sensitive for evaluating early TRC (up to 3-months), and T1-w may be more sensitive in evaluating early delayed TRC (1-month, 3-months), while T2-w and T2-FLAIR appeared to be more sensitive in identifying late TRC (around 6-months post-LITT) compared to the other MRI protocols under evaluation. T2-GRE was found to be only nominally sensitive in identifying TRC at any follow-up time-point post-LITT. The framework presented in this work thus serves as an important precursor to a comprehensive treatment evaluation framework that can be used to identify sensitive MR markers corresponding to patient response (seizure-freedom or seizure recurrence), with an ultimate objective of making prognostic predictions about patient outcome post-LITT.

405. Laser CO2 treatment for vulvar lymphedema secondary to gynecological cancer therapy: A report of two cases and review of the literature
PubMed Central
SORACORDEVOLE, FRANCESCO; MANCIOLI, FRANCESCA; CANZONIERI, VINCENZO; BUTTIGNOL, MONICA; GIORDA, GIORGIO; CIAVATTINI, ANDREA
2015-01-01
Vulvar lymphedema is an uncommon and disabling side-effect of pelvic lymphadenectomy and pelvic radiotherapeutic treatment for invasive genital cancer. Lymphorrhea, a complication of lymphedema, may be
extremely distressing for patients due to the requirement to wear sanitary towels and as the pain and loss of elasticity of the vulvar skin and mucosa can cause discomfort during coitus. Surgical treatments of lymphorrhea and vulvar lymphedema secondary to gynecological cancer treatments remain controversial and are not currently considered to be the standard therapy. The present study reports two cases of vulvar lymphedema complicated by vulvar lymphorrhea in females who had undergone treatment for cervical and endometrial cancer, respectively; a review of the literature is also included. In the two present cases, vulvar lymphedemas were refractory to standard treatments, including decongestive therapy, manual lymph drainage, elastic bandaging, low-stretch bandaging, exercises and skin care. Laser CO2 excision and vaporization of the whole skin and mucosal tissue of the vulva was successfully performed to treat the lymphorrhea and improve quality of life. Thus, the present two cases indicated that laser CO2 surgery may present an additional therapy for the treatment of genital lymphedema that is refractory to other treatments. PMID:25789062

Doxorubicin loaded polymeric gold nanoparticles targeted to human folate receptor upon laser photothermal therapy potentiates chemotherapy in breast cancer cell lines. PubMed
Banu, Hussaina; Sethi, Dipinder Kaur; Edgar, Andre; Sheriff, Adhnaan; Rayees, Nuthan; Renuka, N; Faheem, S M; Premkumar, Kumpati; Vasanthakumar, Geetha
2015-08-01
The current research focuses on the application of folate conjugated and doxorubicin loaded polymeric gold nanoparticles (GNPs) for the targeted treatment of folate receptor overexpressing breast cancers, augmented by adjucntive laser photothermal therapy. Herein, GPNs surface modified with folate, drug doxorubicin and polyethylene glycol were engineered and were used as vehicles for folate receptor targeted delivery of doxorubicin into cancer cells. Subsequently, the GPNs were photo-excited using laser light for mediating hyperthermia in the cancer cells. In vitro studies were performed to validate the efficacy of the combined modality of folate conjugated and doxorubicin loaded polymeric GNP mediated chemotherapy followed by photothermal therapy in comparison to treatment with free drug; and the combination modality showed better therapeutic efficacy than that of plain doxorubicin treatment in MDA-MB-231 breast cancer cells that express increased levels of surface folate receptors when compared to MCF-7 breast cancer cells that express low levels of folate receptor. The mechanism of cell death was investigated using fluorescent microscopy. Immunoassays showed the up-regulation of the pro-apoptotic protein p53 and down-regulation of the anti-apoptotic protein Bcl-2. Collectively, these results suggest that the folate tagged doxorubicin loaded GPNs are an attractive platform for targeted delivery of doxorubicin and are agents suitable for photothermal cancer therapy. PMID:26057021

Surgical lasers in dermatology. NASA Astrophysics Data System (ADS)
Szymanczyk, Jacek; Nowakowski, Wlodzimierz; Golebiowska, Aleksandra; Michalska, I.; Mindak, Marek K.
1997-10-01
Almost every laser for medical applications was first tried in dermatology. The efficiency of YAG, CO2, and Argon lasers on this area and their potential advantages over conventional methods were mostly evaluated by cosmetic effect of laser therapy. The indications for different laser treatment in such dermatological cases as: angiomias, telangiecstasias, pigmented lesions, nevus flammeus congenitus, deep cavernous angiomas, skin neoplasms and condylomata acuminata are discussed in this paper and the results of the laser therapy are also presented.

The thermal impact of phototherapy with concurrent super-pulsed lasers and red and infrared LEDs on human skin. PubMed
Grandinétti, Vanessa dos Santos; Miranda, Eduardo Foschini; Johnson, Douglas Scott; de Paiva, Paulo Roberto Vicente; Tomazoni, Shaiaine Silva; Vanin, Adriane Aver; Albuquerque-Pontes, Gianna Mões; Frigo, Lucio; Marcos, Rodrigo Labat; de Carvalho, Paulo de Tarso Camillo; Leal-Junior, Ernesto Cesar Pinto
2015-07-01
From the very first reports describing the method of action of phototherapy, the effects have been considered to be the result of photochemical and photophysical interactions between the absorbed photons and tissue and not related to secondary changes in tissue or skin temperature. However, thermal effects have been recently reported in dark pigmented skin when irradiated with single wavelengths of 810 and 904 nm of low-level laser therapy (LLLT) devices even with doses that do not exceed those recommended by the World Association of Laser Therapy (WALT). The aim of this study was to evaluate the thermal impact during the concurrent use of pulsed red and infrared LEDs and super-pulsed lasers when applied to light, medium, and dark pigmented human skin with doses typically seen in clinical practice. The study evaluated the skin temperature of 42 healthy volunteers (males and females 18 years or older, who presented different pigmentations, stratified
Such diseases are usually manifested by an inflammation, erosions, ulcers, hemorrhages. An abundant internal organs diseases, especially those of blood and the gastroenteric tract, constitute a particular group. The oral cavity mucosa lesions caused by the hematologic and gastroenteric disease of preferentially sensitizing a malignant mesenchymal cell line, while sparing its non-tissue heating. Additionally, the doses and device utilized in present study have demonstrated positive outcomes in prior clinical trials. Therefore, it can be concluded that the effects seen by the concurrent use of multiple wavelengths and light sources were the result of desirable photobiomodulation effect and not related to thermal influence. PMID:7557226

409. [Special suction tube holder for a laser handpiece in effective smoke suction evacuation. On the problem of smoke suction in external CO2 laser therapy].
PubMed
Heim, K
1995-08-01
Treatment with a CO2 laser causes high smoke production, which leads to reduced view to the surgical field, to bad smell and has potential health hazards. Hitherto the problem of the external smoke evacuation had not been solved sufficiently. Therefore a special sucking-tube holder for a laser handpiece is presented. The end of the sucking tube exactly follows all movements of the handpiece and can be positioned close to the source of smoke. Through a defined angle the smoke can be removed quickly out of the way of the laser beam. According to the practical experiences so far, this special equipment on a laser handpiece guarantees an effective evacuation of smoke, allows the reduction of assisting staff, reduces irritation through bad smell and additionally minimizes the potential risks of smoke caused by an external CO2 laser application. PMID:25987340

410. Laser-induced photodynamic therapy with aluminum phthalocyanine tetrasulfonate as the photosensitizer: Differential phototoxicity in normal and malignant human cells in vitro
SciTech Connect
Glassberg, E.; Lewandowski, L.; Lask, G.; Uitto, J.
1990-05-01
Photodynamic therapy (PDT) involves the use of laser or noncoherent light energy with photosensitizing dyes to induce a cytotoxic reaction in the target cells, resulting in cell injury and/or death. In this study, we have examined laser-induced phototoxicity in normal human skin fibroblasts and HT-1080 fibrosarcoma cells incubated with aluminum phthalocyanine tetrasulfonate (AlPcS) in vitro. The culture, laser, and photosensitizer parameters were varied in attempts to establish the conditions for differential cytotoxicity between normal and malignant human fibroblasts. Biochemical assays, as a measure of cytotoxicity, included (3H)thymidine incorporation (an index of DNA replication), (35S)methionine incorporation (a measure of protein synthetic activity), and the MTT assay (an indirect index of mitochondrial activity). In the absence of laser irradiation, AlPcS was non-toxic to both cell lines in concentrations up to 25 micrograms/ml. Laser light alone at 675 nm (the absorption maximum of AlPcS) had no effect on the cells at energy densities up to 16 J/cm². In the presence of 3 or 10 micrograms/ml of AlPcS, both cell lines demonstrated marked energy-dependent toxicity. If an 8-h or a 24-h efflux period in AlPcS-free medium was allowed to take place prior to laser irradiation, normal fibroblasts were much less sensitive to PDT, whereas fibrosarcoma cells still exhibited a marked degree of toxicity. The results indicate that, under appropriate treatment conditions, AlPcS is capable of preferentially sensitizing a malignant mesenchymal cell line, while sparing its non-malignant normal cell counterpart.

411. Diagnosis and indications for low-intensity laser therapy of the pathology of the oral cavity mucosa of patients with hematologic and gastroenteric diseases
NASA Astrophysics Data System (ADS)
Kunin, Anatoly A.; Minakov, E. V.; Sutscenko, A. V.; Vornovskiy, V. A.; Dunaeva, S. V.; Stepanov, Nicolay N.; Shumilovitch, Bogdan R.
1996-11-01
In the recent years low intensity laser irradiation is made use of in stomatology with the view of treating numerous diseases of the oral cavity mucosa and parodontium. The oral cavity mucosa lesions caused by the internal organs diseases, especially those of blood and the gastroenteric tract, constitute a particular group. Such diseases are usually manifested by an inflammation, erosions, ulcers, hemorrhages. An abundant
microflora of the oral cavity and diminished immunity of the patients contribute to the possibility of septicemia development. Laser therapy of the oral cavity mucosa lesions according to strictly defined indications promotes rapid healing of ulcers, arresting the oral cavity mucosa inflammation, providing a reduction in bleeding and presents a safe prophylactic means of stomatogenic sepsis.

412. Experimental carbon dioxide laser brain lesions and intracranial dynamics. Part 2. Effect on brain water content and its response to acute therapy
SciTech Connect
Tizzano, E.G.; James, H.E.; Moore, S.
1985-04-01
Experimental brain lesions were created over the left parietooccipital cortex of the albino rabbit through the intact dura mater with high radiating carbon dioxide laser energy. The brain water content was studied 2, 6, and 24 hours after the insult. Another two groups of animals received acute therapy with either dexamethasone (1 mg/kg) or furosemide (1 mg/kg). In all groups, Evans blue extravasation uniformly extended from the impact crater into the surrounding white matter. The brain water content in the gray matter was elevated from the control value by 2 hours after impact and remained elevated at 6 and 24 hours. The white matter brain water content did not increase until 6 hours after impact and remained elevated in the 24-hour group. After dexamethasone treatment, there was a significant decrease of water in the gray matter, but not in the white matter. With furosemide therapy, there was no reduction of gray or white matter brain water.

413. Endovascular laser therapy and the state of lipid metabolism; the structural and functional properties of red blood cells and immunoreactivity in patients with cerebrovascular pathology
NASA Astrophysics Data System (ADS)
Livshits, L. Y.; Ageeva, T. S.; Rassomakhin, A. A.; Zakharova, Natalia B.; Nikanorov, A. V.
1993-06-01
Endovascular laser therapy (EVLT) with the help of the light-conductor was carried out for 30 minutes every day. The treatment consisted of 5 - 7 sessions. 56 patients suffering from ischemic brain stroke (IBS) and dyscriculatory once phalopathy (DE) were examined. A total systems approach was used to study the influence of the EVLT on the state of hemocirculation, lipid metabolism and immunoreactivity. It has been shown that EVLT provoked the suppression of LP, the extraction of cholesterol from the cells membrane, the positive changes in the system of microcirculation and the improvement of the clinical state of the patients with the cerebrovascular diseases (CVD).

PubMed
Dehkordi, Mahboobeh Adami; Einolghozati, Sasan; Ghasemi, Seyyed Mohsen; Abolbashari, Samaneh; Meshkat, Mojtaba; Behzad, Hadi
2015-01-01
Many treatments for chronic tinnitus have been attempted, but the condition remains difficult to cure, especially in the case of cochlear tinnitus. We conducted a prospective, double-blind, placebo-controlled study to assess the effect of low-dose laser therapy on chronic cochlear tinnitus. Our study population was made up of 66 patients-33 who received active laser treatment (case group) and 33 who received inactive dummy treatment (control group). Patients in the laser group received 5 mV with a wavelength of 650 nm for 20 minutes a day, 5 days a week, for 4 weeks. The controls followed the same schedule, but they were "treated" with an inactive device. The degree of tinnitus was evaluated before and after treatment in each group in three ways: (1) the Tinnitus Severity Index (TSI), (2) a subjective 10-point self-assessment scale for tinnitus loudness, and (3) the Tinnitus Evaluation Test (TET). At study's end, we found no statistically significant differences between the case and control groups in the number of patients who experienced a reduction in TSI values (p = 0.589) or a reduction in subjective self-assessment scores (p = 0.475). Nor did we find any significant reductions in the loudness (p = 0.665) and frequency (p = 0.396) of tinnitus as determined by the TET. We conclude that 5-mV laser therapy with a wavelength of 650 nm is no better than placebo for improving hearing thresholds overall or for treating tinnitus with regard to age, sex, environmental noise level, and the duration of tinnitus. PMID:25606834

415. Light-emitting diode therapy (LEDT) before matches prevents increase in creatine kinase with a light dose response in volleyball players.
PubMed
Ferraresi, Cleber; Dos Santos, Ricardo Vinicius; Marques, Guilherme; Zangrande, Marcelo; Leonaldo, Roberley; Hamblin, Michael R; Bagnato, Vanderlei Salvador; Parizotto, Nivaldo Antonio
2015-05-01
Low-level laser (light) therapy (LLLT) has been applied over skeletal muscles before intense exercise (muscular pre-conditioning) in order to reduce fatigue and muscle damage (measured by creatine kinase, CK)
in clinical trials. However, previous exercise protocols do not exactly simulate the real muscle demand required in sports. For this reason, the aim of this randomized and double-blind placebo-controlled trial was to investigate whether light-emitting diode therapy (LEDT) applied over the quadriceps femoris muscles, hamstrings, and triceps surae of volleyball players before official matches could prevent muscle damage (CK) with a dose response, establishing a therapeutic window. A professional male volleyball team (12 athletes) was enrolled in this study, and LEDT was applied before 4 matches during a national championship. LEDT used an array of 200 light-emitting diodes (LEDs) arranged in 25 clusters of 4 infrared LEDs (850±10 nm; 130 mW) and 25 clusters of 4 red LEDs (630±10 nm; 80 mW). Athletes were randomized to receive one of four different total doses over each muscle group in a double-blind protocol: 105 J (20 s), 210 J (40 s), 315 J (60 s), and placebo (no light for 30 s). CK in blood was assessed 1 h before and 24 h after each match. LEDT at 210 J avoided significant increases in CK (+10 %; P=0.993) as well as 315 J (+31 %, P=0.407). Placebo (0 J) allowed a significant increase in CK (+53 %; P=0.012) as well as LEDT at 105 J (+59 %; P=0.001). LEDT prevented significant increases of CK in blood in athletes when applied before official matches with a light dose response of 210-315 J, suggesting athletes might consider applying LEDT before competition.

PMID:25722067

416. LGR5 expressing cells of hair follicle as potential targets for antibody mediated anti-cancer laser therapy

NASA Astrophysics Data System (ADS)

Popov, Boris V.

2013-02-01

Near infrared laser immunotherapy becomes now a new promising research field to cure the patients with cancers. One of the critical limitation in medical application of this treatment is availability of the specific markers for delivery of laser-sensitive nanoparticles. When coupled to antibodies to the cancer stem cells markers these nanoparticles may be delivered to the cancer tissue and mediate the laser induced thermolysis of the cancer stem cells that initiate and drive growth of cancer. This paper addresses the Lgr5 cell surface marker mediating the Wnt/?-catenin signal transduction as a potential target for anti-cancer laser immunotherapy of skin cancers.

417. Oral Mucositis Prevention By Low-Level Laser Therapy in Head-and-Neck Cancer Patients Undergoing Concurrent Chemoradiotherapy: A Phase III Randomized Study

SciTech Connect

Gouvea de Lima, Aline; Villar, Rosangela Correa; Castro, Gilberto de; Antequera, Reynaldo; Gil, Erlon; Rosalmeida, Mauro Cabral; Federico, Miriam Hatsue Honda; Snitcovsky, Igor Moises Longo

2012-01-01

Purpose: Oral mucositis is a major complication of concurrent chemoradiotherapy (CRT) in head-and-neck cancer patients. Low-level laser (LLL) therapy is a promising preventive therapy. We aimed to evaluate the efficacy of LLL therapy to decrease severe oral mucositis and its effect on RT interruptions. Methods and Materials: In the present randomized, double-blind, Phase III study, patients received either gallium-aluminum-arsenide LLL therapy 2.5 J/cm2 (sup 2) or placebo laser, before each radiation fraction. Eligible patients had to have been diagnosed with squamous cell carcinoma or undifferentiated carcinoma of the oral cavity, pharynx, larynx, or metastases to the neck with an unknown primary site. They were treated with adjuvant or definitive CRT, consisting of conventional RT 60-70 Gy (range, 1.8-2.0 Gy/d, 5 times/wk) and concurrent cisplatin. The primary endpoints were the oral mucositis severity in Weeks 2, 4, and 6 and the number of RT interruptions because of mucositis. The secondary endpoints included patient-reported pain scores. To detect a decrease in the incidence of Grade 3 or 4 oral mucositis from 80% to 50%, we planned to enroll 74 patients. Results: A total of 75 patients were included, and 37 patients received preventive LLL therapy. The mean delivered radiation dose was greater in the patients treated with LLL (69.4 vs. 67.9 Gy, p = .03). During CRT, the number of patients diagnosed with Grade 3 or 4 oral mucositis treated with LLL vs. placebo was 4 vs. 5 (Week 2, p = 1.0), 4 vs. 12 (Week 4, p = .08), and 8 vs. 9 (Week 6, p = 1.0), respectively. More of the patients treated with placebo had RT interruptions because of mucositis (6 vs. 0, p = .02). No difference was detected between the treatment arms in the incidence of severe pain. Conclusions: LLL therapy was not effective in reducing severe oral mucositis, although a marginal benefit could not be excluded. It reduced RT interruptions in these head-and-neck cancer patients, which might translate into improved CRT efficacy.

418. Photo-excitation of electrons in cytochrome c oxidase as a theory of the mechanism of the increase of ATP production in mitochondria by laser therapy

NASA Astrophysics Data System (ADS)

Zielke, Andrzej

2014-02-01
The hypothesis explains the molecular basis for restoring mitochondrial function by laser therapy. It also explains how laser therapy reverses both excessive oxidation (lack of NADH/FADH2) and excessive reduction (lack of O2) states of cytochrome c oxidase complex. It is proposed that photons interact with heme molecules of cytochrome c oxidase. A molecule of heme contains a porphyrin ring and an atom of iron in the center. The iron atom (Fe) can switch oxidation states back and forth between ferrous (Fe2+) and ferric (Fe3+) by accepting or releasing an electron. The porphyrin ring is a complex aromatic molecule that has 26 pi electrons which are "delocalized", spinning in the carbon rings creating a resonating electromagnetic cloud. Photons with similar wavelengths are absorbed by the cloud increasing its energy. The energy is then passed on to the centrally located atom of iron existing in a reduced state (Fe2+). The electrons on the orbits of the iron atom accept this electromagnetic energy, and change orbitals to a higher energetic level. If the energy is sufficient, electrons leave the atom entirely. If this occurs, Fe2+ become oxidized to Fe3+ releasing electrons, thus restoring electron flow and the production of ATP. At the same time, electrons freed from complex IV may have sufficient energy to be picked by NAD+/FADH and re-enter the chain at the complex I or II amplifying the flow of electrons.

419. Role of iNOS gene expression in the anti-inflammatory and tissue protective mechanisms of continuous wave at 630-905nm and 905nm superpulsed laser therapy
NASA Astrophysics Data System (ADS)
Mandel, Arkady; Moriyama, Yumi; Fong, Jamie; Dumoulin-White, Roger; Lilge, Lothar
2012-03-01
Up regulation of iNOS gene expression is playing a role in the initiation of the anti-inflammatory and tissue protective mechanisms related to nitric oxide (NO) for continuous wave red and infrared as well as 905nm superpulsed laser therapy (SPLT). The iNOS expression before and after laser therapy was evaluated in a zymosan-induced acute arthritis model, in knee joints of young (<15 weeks), middle aged (>15 weeks and < 35 weeks) and old (> 35 weeks) FVB/N-Tg (iNOS-luc) mice by bioluminescence imaging.

420. In vitro study of bactericidal effect of low-level laser therapy in the presence of photosensitizer on cariogenic bacteria
NASA Astrophysics Data System (ADS)
Zanin, Iriana C. J.; Brugnera, Aldo, Jr.; Goncalves, Reginaldo B.
2002-06-01
The aim of this in vitro study was to determine whether low-level laser light in the presence of a photosensitizer could kill Streptococcus mutans and Streptococcus sobrinus. Suspensions of these microorganisms were exposed to a gallium-aluminium-arsenide laser light (660 nm) in the presence of photosensitizer toluidine blue O. Viable microorganisms were counted on brain heart agar plates after incubation at 37 degree(s)C in partial atmosphere of 10% CO2 for 48 hours. Their exposure to the laser light in the absence of the dye or the dye in the absence of the laser light presented no significant effect on the viability of the microorganisms. However, a decrease in the number of viable microorganisms was only verified when they were exposed to both the laser light and the dye at the same time. Their total growth inhibition was achieved with a dye concentration of 100 mg/mL and a light energy density of 28.8 J/cm2, after being exposed to laser light for 900 seconds. In conclusion, these results imply that these bacteria can be killed by low-power laser light in the presence of the photosensitizer.

Pulsed versus continuous wave low-level light therapy on osteoarticular signs and symptoms in limited scleroderma (CREST syndrome): a case report
NASA Astrophysics Data System (ADS)
Barolet, Daniel
2014-11-01
Limited cutaneous systemic sclerosis (lcSSc) was formerly known as CREST syndrome in reference to the associated clinical features: calcinosis, Raynaud’s phenomenon, esophageal dysfunction, sclerodactyly, and telangiectasias. The transforming growth factor beta has been identified as a major player in the pathogenic process, where low-level light therapy (LLLT) has been shown to modulate this cytokine superfamily. This
case study was conducted to assess the efficacy of 940 nm using millisecond pulsing and continuous wave (CW) modes on osteoarticular signs and symptoms associated with lcSSc. The patient was treated two to three times a week for 13 weeks using a sequential pulsing mode on one elbow and a CW mode on the other. Efficacy assessments included inflammation, symptoms, pain, health scales, patient satisfaction, clinical global impression, and adverse effects monitoring. Considerable functional and morphologic improvements were observed after LLLT, with the best results seen with the pulsing mode. No adverse effects were noted. Pulsed LLLT represents a treatment alternative for osteoarticular signs and symptoms in limited scleroderma (CREST syndrome).

422. Quantitative Evaluation of Treatment Related Changes on Multi-Parametric MRI after Laser Interstitial Thermal Therapy of Prostate Cancer
PubMed Central
Viswanath, Satish; Toth, Robert; Rusu, Mirabela; Sperling, Dan; Lepor, Herbert; Futterer, Jurgen; Madabhushi, Anant
2014-01-01
Laser interstitial thermal therapy (LITT) has recently shown great promise as a treatment strategy for localized, focal, low-grade, organ-confined prostate cancer (CaP). Additionally, LITT is compatible with multi-parametric magnetic resonance imaging (MP-MRI) which in turn enables (1) high resolution, accurate localization of ablation zones on in vivo MP-MRI prior to LITT, and (2) real-time monitoring of temperature changes in vivo via MR thermometry during LITT. In spite of rapidly increasing interest in the use of LITT for treating low grade, focal CaP, very little is known about treatment-related changes following LITT. There is thus a clear need for studying post-LITT changes via MP-MRI and consequently to attempt to (1) quantitatively identify MP-MRI markers predictive of favorable treatment response and longer term patient outcome, and (2) identify which MP-MRI markers are most sensitive to post-LITT changes in the prostate. In this work, we present the first attempt at examining focal treatment-related changes on a per-voxel basis (high resolution) via quantitative evaluation of MR parameters pre- and post-LITT. A retrospective cohort of MP-MRI data comprising both pre- and post-LITT T2-weighted (T2w) and diffusion-weighted (DWI) acquisitions was considered, where DWI MRI yielded an Apparent Diffusion Co-efficient (ADC) map. A spatially constrained affine registration scheme was implemented to first bring T2w and ADC images into alignment within each of the pre- and post-LITT acquisitions, following which the pre- and post-LITT acquisitions were aligned. Pre- and post-LITT MR parameters (T2w intensity, ADC value) were then standardized to a uniform scale (to correct for intensity drift) and then quantified via the raw intensity values as well as via texture features derived from T2w MRI. In order to quantify imaging changes as a result of LITT, absolute differences were calculated between the normalized pre- and post-LITT MRI parameters. Quantitatively combining the ADC and T2w MRI parameters enabled construction of an integrated MP-MRI difference map that was highly indicative of changes specific to the LITT ablation zone. Preliminary quantitative comparison of the changes in different MR parameters indicated that T2w texture may be highly sensitive as well as specific in identifying changes within the ablation zone pre- and post-LITT. Visual evaluation of the differences in T2w texture features pre- and post-LITT also appeared to provide an indication of LITT-related effects such as edema. Our preliminary results thus indicate great potential for non-invasive MP-MRI imaging markers for determining focal treatment related changes, and hence long- and short-term patient outcome. PMID:24817802

423. Quantitative evaluation of treatment related changes on multi-parametric MRI after laser interstitial thermal therapy of prostate cancer
NASA Astrophysics Data System (ADS)
Viswanath, Satish; Toth, Robert; Rusu, Mirabela; Sperling, Dan; Lepor, Herbert; Futterer, Jurgen; Madabhushi, Anant
2013-03-01
Laser interstitial thermal therapy (LITT) has recently shown great promise as a treatment strategy for localized, focal, low-grade, organ-confined prostate cancer (CaP). Additionally, LITT is compatible with multi-parametric magnetic resonance imaging (MP-MRI) which in turn enables (1) high resolution, accurate localization of ablation zones on in vivo MP-MRI prior to LITT, and (2) real-time monitoring of temperature changes in vivo via MR thermometry during LITT. In spite of rapidly increasing interest in the use of LITT for treating low grade, focal CaP, very little is known about treatment-related changes following LITT. There is thus a clear need for studying post-LITT changes via MP-MRI and consequently to attempt to (1) quantitatively identify MP-MRI markers predictive of favorable treatment response and longer term patient outcome, and (2) identify which MP-MRI markers are most sensitive to post-LITT changes in the prostate. In this work, we present the first attempt at examining focal treatment-related changes on a per-voxel basis (high resolution) via quantitative evaluation of MR parameters pre- and post-LITT. A retrospective cohort of MP-MRI data comprising both pre- and post-LITT T2-weighted (T2w) and diffusion-weighted (DWI) acquisitions...
was considered, where DWI MRI yielded an Apparent Diffusion Co-efficient (ADC) map. A spatially constrained affine registration scheme was implemented to first bring T2w and ADC images into alignment within each of the pre- and post-LITT acquisitions, following which the pre- and post-LITT acquisitions were aligned. Pre- and post-LITT MR parameters (T2w intensity, ADC value) were then standardized to a uniform scale (to correct for intensity drift) and then quantified via the raw intensity values as well as via texture features derived from T2w MRI. In order to quantify imaging changes as a result of LITT, absolute differences were calculated between the normalized pre- and post-LITT MRI parameters. Quantitatively combining the ADC and T2w MRI parameters enabled construction of an integrated MP-MRI difference map that was highly indicative of changes specific to the LITT ablation zone. Preliminary quantitative comparison of the changes in different MR parameters indicated that T2w texture may be highly sensitive as well as specific in identifying changes within the ablation zone pre- and post-LITT. Visual evaluation of the differences in T2w texture features pre- and post-LITT also appeared to provide an indication of LITT-related effects such as edema. Our preliminary results thus indicate great potential for non-invasive MP-MRI imaging markers for determining focal treatment related changes, and hence long- and short-term patient outcome.

424. Action of a 904-nm diode laser in orthopedics and traumatology: a clinical study on 447 cases
NASA Astrophysics Data System (ADS)
Tam, Giuseppe
2001-10-01
Objective: The evidence in medical literature is that a beneficial analgesic effect can only be obtained by employing laser radiation of relatively low power density and wavelengths which are able to penetrate tissue. For this reason the semiconductor, or laser diode (GaAs, 904 nm), is the most appropriate choice in pain-reduction therapy. Summary Background Data: Low power laser (or LLL) acts on the Prostaglandin synthesis, increases the endorphins synthesis in the Rolando gelatinous substance and in the dorsal horn of the spinal cord. The L-Arginine, which is the classic substrate of nitric oxide, carries on vasodilatory and anti-inflammatory action. Methods: Treatment was carried out on 447 cases and 435 patients (250 women and 185 men) between 20th May 1987 and 31st December 1999. The patients, whose age ranged from 25 to 70, were suffering from rheumatic, degenerative and traumatic pathologies as well as cutaneous ulcers. The majority of patients had been seen by orthopaedists and rheumatologists and had undergone x-ray, ultrasound scan, etc. All patients had previously received drug-based treatment and/or physiotherapy, with poor results. Two thirds were experiencing acute symptomatic pain, while the others presented a chronic pathology with recurrent crises. We used a pulsed IR diode laser, GaAs emitting at 904 nm. Frequency of treatment: 1 application per day for 5 consecutive days, followed by a 2-day interval. The percentage reduction in symptoms or improvement in functional status were determined on the basis of objective analysis as it happens in the Legal and Insurance Medicine field. Results: Very good results were achieved especially with cases of symptomatic osteoarthritis of the cervical vertebrae, with sport-related injuries, epicondylitis, osteoarthritis of the knee, periarthritics and with cutaneous ulcers. The beneficial action of the LLLT in the latter pathology is linked to the increase in collagen and to fibroblast proliferation. The total relief of the pain was achieved in 80% of acute and 65% of chronic cases. Conclusions: Treatment with 904 nm IR diode laser has substantially reduced the symptoms as well as improved the quality of life of the patient, thus postponing the need for surgery.

425. Numerical Optimization of Sequential Cryogen Spray Cooling and Laser Irradiation for Improved Therapy of Port Wine Stain
PubMed Central
Milani?, Matija; Jia, Wangcun; Nelson, J Stuart; Majaron, Boris
2011-01-01
Background and Objective Despite application of cryogen spray (CS) precooling, customary treatment of port wine stain (PWS) birthmarks with a single laser pulse does not result in complete lesion blanching for a majority of patients. One obvious reason is nonselective absorption by epidermal melanin, which limits the maximal safe radiant exposure. Another possible reason for treatment failure is screening of PWS blood vessels with diameters of 30–150 μm are located at depths of 200–600 μm, and shading by nearby vessels is accounted for according to PWS histology data from the literature. For moderately pigmented and dark skin phototypes, PWS blood vessel coagulation and epidermal thermal damage are assessed for various parameters of sequential CS cooling and 532-nm laser irradiation, i.e. the number of pulses in a sequence (1–5), repetition rate (7–30 Hz), and radiant exposure. Results Simulations...
of PWS treatment in darker skin phototypes indicate specific cooling/irradiation sequences that provide significantly higher efficacy and safety as compared to the customary single-pulse approach across a wide range of PWS blood vessel diameters and depths. The optimal sequences involve three to five laser pulses at repetition rates of 10–15 Hz. Conclusions Application of the identified cooling/irradiation sequences may offer improved therapeutic outcome for patients with resistant PWS, especially in darker skin phototypes.

PMID:21384397

426. Intra-orl low level laser therapy in chronic maxillary sinusitis: A new and effective recommended technique
PubMed Central
Mortazavi, Hamed; Khalighi, Hamidreza; Goljanian, Ali; Mojahedi, Saeed; Sabour, Siamak
2015-01-01

Background Chronic sinusitis is one of the most common chronic diseases involving different age groups. Because the nature and etiology of chronic sinusitis are not completely known, there is not any standard treatment for this disease. It has been suggested that low-level laser can be used in treating chronic sinusitis but there are limited studies about its usage. In this research, intra-orl radiation of low-level laser has been described and implemented for the first time. Suggested hypotheses about the efficacy of this type of radiation (intra-orl) in treating chronic maxillary sinusitis includes this fact that the depth of maxilla’s vestibule is also the floor of maxillary sinus and sinus discharges collect in this area because of gravity effect. Therefore, with considering suitable radiation angle, this area gets the most benefits of laser’s anti-inflammatory effects.

Material and Methods In this study, 20 patients with chronic maxillary sinusitis were included. They were assessed before and after treatment. Treatment plan was performed in 8 sessions every other days using low-level diode laser with 810 nm. Snot-22 questionnaire and rhinomanometry were used for evaluating patients. Changes of signs and symptoms were recorded in questionnaire every session and 6 months after treatment. Friedman and Wilcoxon tests were used for data analyses. In this study, P value < 0.05 was considered statistically significant. Results All variables and all symptoms of patients were improved using intra-orl low-level laser and this improvement was statistically significant (P value<0.05). There was also significant decrease in nasal airway resistance and significant increase in air flow (P value<0.05). Six month after treatment completion, there was no significant difference between the results of completion and the results of 8th treatment session (P value< 0.05). Conclusions Using intra-orl low-level laser is a suitable way to treat patients with chronic maxillary sinusitis. Key words:Chronic sinusitis, maxillary sinusitis, low-level laser.
PMID:26644829

427. Multifunctional gold nanorods for selective plasmonic photothermal therapy in pancreatic cancer cells using ultra-short pulse near-infrared laser irradiation
NASA Astrophysics Data System (ADS)
Patino, Tania; Mahajan, Ujjwal; Palankar, Raghavendra; Medvedev, Nikolay; Walowski, Jakob; Münzenberg, Markus; Mayerle, Julia; Delcea, Mihaela
2015-03-01

Gold nanorods (AuNRs) have attracted considerable attention in plasmonic photothermal therapy for cancer treatment by exploiting their selective and localized heating effect due to their unique photophysical properties. Here we describe a strategy to design a novel multifunctional platform based on AuNRs to: (i) specifically target the adenocarcinoma MUC-1 marker through the use of the EPPT-1 peptide, (ii) enhance cellular uptake through a myristoylated polyarginine peptide (MPAP) and (iii) selectively induce cell death by ultra-short near infrared laser pulses. We used a biotin-avidin based approach to conjugate EPPT-1 and MPAP to AuNRs. Dual-peptide (EPPT-1 + MPAP) labelled AuNRs showed a significantly higher uptake by pancreatic ductal adenocarcinoma cells when compared to their single peptide or avidin conjugated counterparts. In addition, we selectively induced cell death by ultra-short near infrared laser pulses in small target volumes (~1 μm3), through the creation of plasmonic nanobubbles that lead to the destruction of a local cell environment. Our approach opens new
avenues for conjugation of multiple ligands on AuNRs targeting cancer cells and tumors and it is relevant for plasmonic photothermal therapy. Electronic supplementary information (ESI) available: Size distribution histograms of the hydrodynamic diameter and ?-potential of functionalized and CTAB stabilized AuNRs. Characterization of TR-AV functionalized AuNRs after 48 h at 4 °C. The ?-potential of TR-AV functionalized AuNRs and CTAB stabilized AuNRs. The ?-potential of peptide-conjugated AuNRs in water. See DOI: 10.1039/c5nr00114e

428. Dynamics of prolactin, gonadotropin, and of sex steroids in the blood serum of parturients during laser therapy
NASA Astrophysics Data System (ADS)
Kovalyov, M. I.
2001-04-01
An investigation was made of the effect (lambda) equals 0.63 micrometers diode laser radiation with the energy density of 0.6 to 0.8 J cm-2 on parturients affected by nipples ' rhabades. In our experiments, we determined the content of prolactin (PRL), follicle-stimulating hormone (FSH), luteinizing hormone (LH), estradiol (E2), and of progesterone (P) in the parturients' blood serum. It was found that laser radiation produced an insignificant effect on the prolactic (PRL) content in parturients with the normal lactation level. On the contrary, it produced a stimulating effect on the PRL level in parturients with hypogalactia. Possibly, laser radiation promoted the decrease in the FSH level in the parturients' blood serum. It was also found that this laser radiation produced an insignificant effect on the levels of LH, estradiol (E2), and of progesterone. Women subsequently affected by mastitis exhibited a significantly higher PRL level in their blood serum, as compared with women of the control group.

429. Efficacy of krypton laser photodynamic therapy for oral mucosa dysplasia in 9,10-dimethyl-1,2-benzanthracene-treated hamsters
PubMed
Shen, Lingyue; Xu, Qing; Li, Pingping; Zhou, Guoyu
2013-11-01
The present study aimed to evaluate the efficacy of krypton laser photodynamic therapy (PDT) with PsD-007 for the treatment of oral mucosa dysplasia in 9,10-dimethyl-1,2-benzanthracene (DMBA)-treated hamsters. A DMBA-induced hamster cheek pouch model of precancerous lesions was created and the resultant 25 hamsters were divided into five groups. The right side was treated with PDT and the left side was used as the positive control. Following systemic anesthesia, an incision was made in the groin area to expose the femoral vein. PsD-007 was administered intravenously through the femoral vein. Various doses of photosensitizer were used to treat groups A-E. Subsequent to closing the incision, the right side of the buccal mucosa was irradiated with light using the krypton laser at a wavelength of 413 nm, a power density of 150 mW/cm(2) and an irradiation time of 20 min. At six weeks post-surgery, the response was analyzed using histological examinations of the buccal pouch mucosa. A total of 24 hamsters completed the six-week observation period, as one hamster from group C died in the second week following the PDT. Of all 24 irradiated sides, 15 formed normal mucosal tissues and nine demonstrated mild dysplasia. Of the total control sides, six developed moderate dysplasia, five developed severe dysplasia and 13 progressed to carcinoma in situ or squamous cell carcinoma (SCC). The results revealed a significant difference between the two sides (P<0.01) and the various doses of the PsD-007 groups. When the PsD-007 dose was >10 mg/kg, there was no statistical difference (P>0.05). PsD-007-mediated krypton laser PDT is effective for the treatment of oral mucosa dysplasia in hamsters. PMID:24179524

430. Effect of low intensity laser therapy in an experimental model of cranio-encephalic trauma in rats
NASA Astrophysics Data System (ADS)
Meneguzzo, Daiane T.; Okada, Cristina Y.; Koike, Márcia K.; Silva, Bomfim A., Jr.; Moreira, Maria S.; Eduardo, Carlos d. P.; Martins Marques, Marcia
2007-02-01
The aim of this study was to analyze the effects of phototherapy with low intensity laser on the inflammatory reaction after rat brain injury. Cryogenic injury was performed at the brain of 16 male Wistar rats (250-300g) using a cooper probe at -80A° C. Immediately, 24 h and 48 h later, the rats received laser irradiation using a GaAlAs laser (830 nm, 100 mW). The samples were randomly divided into four groups (ns 4 per group): A: control (non- irradiated); B: energy density of 14.28 J/cm2; C: 28.57 J/cm2; D: 42.85 J/cm2. Three days later, the cerebral vascular permeability and the inflammatory cells at the trauma site were evaluated. For vascular permeability analysis, 2 h prior sacrifice an intra vascular injection of Evans blue stain was done in the rats. For inflammatory cells counting, frozen samples were sectioned and the histological slides were stained with Giemsa. The data were compared by either ANOVA or Kruskall-Wallis complemented by the Dunn's test. The irradiated groups presented higher cerebral vascular permeability than controls (A: 2.6 +/- 0.8; B:12.0 +/- 2.0; C: 13.1 +/- 4.1, and D: 12.4 +/- 1.8; p=0.016). The inflammatory cell numbers of irradiated samples were
similar to controls (A: 65 +/- 6; B:85 +/- 9; C: 84 +/-14, and D: 83 +/- 3; p=0.443). The data showed that phototherapy with low intensity laser modulates the inflammatory reaction in the brain by increasing the cerebral vascular permeability after a cryogenic trauma. 

431. **Developments in laser trabeculoplasty.**
PubMed
Tsang, Susanna; Cheng, Jason; Lee, Jacky Wy
2016-01-01
Laser trabeculoplasty has an increasing important role in the management of glaucoma as more emphasis is placed on minimally invasive therapies. In recent years, the following laser trabeculoplasty technologies have been introduced: micropulse laser trabeculoplasty, titanium-sapphire laser trabeculoplasty and pattern scanning trabeculoplasty. These lasers help to reduce the intraocular pressure (IOP) and the burden of glaucoma medical therapy. Literature findings regarding the safety and efficacy of these newer forms of laser trabeculoplasty in the treatment of open-angle glaucoma is summarised. These relatively newer procedures appear to have similar efficacy when compared with the former selective laser trabeculoplasty or argon laser trabeculoplasty. In addition, they potentially offer a more favourable safety profile with fewer complications, including postlaser inflammation and IOP spikes. Further large-scale studies are necessary to evaluate the long-term benefits of these newer forms of laser trabeculoplasty. Their initial promising results offer patients with glaucoma additional treatment alternatives. PMID:26377417

432. **Intractable prurigo nodularis successfully treated with combination therapy with a newly developed excimer laser and topical steroids.**
PubMed
Nakashima, Chisa; Tanizaki, Hideaki; Otsuka, Atsushi; Miyachi, Yoshiki; Kabashima, Kenji
2014-06-01
Prurigo nodularis (PN) is an eruption of lichenified or excoriated nodules related to intractable pruritus. A few reports have shown that a 308-nm excimer lamp/laser (EL) is effective for intractable PN. Herein, we report on two cases of intractable prurigo nodularis successfully treated with a new EL equipped with a filter to cut wavelengths shorter than 297 nm. Because this newly developed EL yields a therapeutic effect with low cumulative dosages of UV and a lower risk of DNA damage, it can be a new treatment option for intractable PN. PMID:24945654

433. **Tissue Distribution and Efficacy of Gold Nanorods Coupled with Laser Induced Photoplasmonic Therapy in Ehrlich Carcinoma Solid Tumor Model**
PubMed Central
El-Sayed, Mostafa A.; Shabaka, Ali A.; El-Shabrawy, Osama A.; Yassin, Nemat A.; Mahmoud, Sawsan S.; El-Shenawy, Siham M.; Al-Ashqar, Emad; Eisa, Wael H.; Farag, Niveen M.; El-Shaer, Marwa A.; Salah, Nabila; Al-Abd, Ahmed M.
2013-01-01
Gold nanorods (GNR) within tumor microregions are characterized by their ability to absorb near IR light and emit heat in what is called photoplasmonic effect. Yet, the efficacy of nanoparticles is limited due to intratumoral tissue distribution reasons. In addition, distribution of GNRs to normal tissue might result in non specific toxicity. In the current study, we are assessing the intratumoral and tissue distribution of PEGylated GNRs on the top of its antitumor characteristics when given intravenously or intratumoral to solid tumor bearing mice and coupled with laser photoplasmonic sessions. PEGylated GNRs with a longitudinal size of less than 100 nm were prepared with aspect ratio of 4.6 showing strong surface plasmon absorption at wavelength 800 nm. Pharmacokinetics of GNR after single I.V. administration (0.1 mg/kg) showed very short systemic circulating time (less than 3 h). On the other hand, tissue distribution of I.V. GNR (0.1 mg/kg) to normal animals showed preferential deposition in spleen tissue. Repeated administration of I.V. GNR resulted in preferential accumulation in both liver and spleen tissues. In addition, I.V. administration of GNR to Ehrlich carcinoma tumor bearing mice resulted in similar tissue distribution; tumor accumulation and anti-tumor effect compared to intratumoral administration. In conclusion, the concentration of GNR achieved within tumors microregions after I.V. administration was comparable to I.T. administration and sufficient to elicit tumoral growth arrest when coupled with laser-aided photoplasmonic treatment. PMID:24098446

434. **Gold nanorods/mesoporous silica-based nanocomposite as theranostic agents for targeting near-infrared imaging and photothermal therapy induced with laser**
PubMed Central
Liu, Yang; Xu, Ming; Chen, Qing; Guan, Guannan; Hu, Wen; Zhao, Xiuli; Qiao, Mingxi; Hu, Haiyang; Liang, Ying; Zhu, Heyun; Chen, Dawei
2015-01-01
Photothermal therapy (PTT) is widely regarded as a promising technology for cancer treatment. Gold nanorods (GNRs), as excellent PTT agent candidates, have shown high-performance photothermal conversion ability under laser irradiation, yet two major obstacles to their clinical application are the lack of selective accumulation in the target site following systemic administration and the greatly reduced photothermal conversion efficiency caused by self-aggregating in aqueous environment. Herein, we demonstrate that tLyp-1 peptide-functionalized, indocyanine green (ICG)-containing mesoporous silica-coated GNRs (I-TMSG) possessed dual-function as tumor cells-targeting near-infrared (NIR) fluorescent probe and PTT agents. The construction of the nanostructure began with synthesis of GNRs by seed-mediated growth method, followed by the coating of mesoporous silica, the chemical conjugation of PEG and tLyp-1 peptide, and the enclosure of ICG as an NIR imaging agent in the mesoporous. The as-prepared nanoparticles could shield the GNRs against their self-aggregation, improve the stability of ICG, and exhibit negligible dark cytotoxicity. More importantly, such a theranostic nanocomposite could realize the combination of GNRs-based photothermal ablation under NIR illumination, ICG-mediated fluorescent imaging, and tLyp-1-enabled more easy endocytosis into breast cancer cells. All in all, I-TMSG nanoparticles, in our opinion, possessed the strong potential to realize the effective diagnosis and PTT treatment of human mammmary cancer. PMID:26251596

E-print Network
Aguilar, Guillermo
2001-01-01
following CSC does not usually affect laser dosage delivered for therapy of sub- surface targets. Moreover by the laser pulse. Consequently, higher light dosages com- pared to laser treatment without CSC can be used, leading to more effective laser therapy in fewer treatment sessions without adverse effects. CSC promotes LITT value. By comparison, both the original T2w intensity and ADC value demonstrated a markedly lower percentage change of 186% within the ablation zone and 43% in a spatially distinct normal region, relative to its pre-LITT value. By comparison, both the original T2w intensity and ADC value demonstrated a markedly less sensitive as well as specific response in different MRI features. Quantitative, voxel-wise comparison of the changes in different MRI features indicated that steerable and non-steerable gradient texture features, rather than the original T2w intensity and ADC values, were highly sensitive as well as specific in identifying changes within the ablation zone pre- and post-LITT. The highest ranked texture feature yielded a normalized percentage change of 186% within the ablation zone and 43% in a spatially distinct normal region, relative to its pre-LITT value. By comparison, both the original T2w intensity and ADC value demonstrated a markedly less sensitive as well as specific response to changes within the ablation zone. Qualitative as well as quantitative evaluation of co-occurrence texture features indicated the presence of LITT-related effects such as edema adjacent to the ablation zone, which were indiscernible on the original T2w and ADC images. Our preliminary results thus indicate great potential for non-invasive computerized MRI imaging features for determining focal treatment related changes, informing image-guided interventions, as well as predicting long- and short-term patient outcome. PMID:25346574

Identifying Quantitative In Vivo Multi-Parametric MRI Features For Treatment Related Changes after Laser Interstitial Thermal Therapy of Prostate Cancer
PubMed Central
Viswanath, Satish; Toth, Robert; Rusu, Mirabela; Sperling, Dan; Lepor, Herbert; Futterer, Jurgen; Madabhushi, Anant
2014-01-01
Laser interstitial thermal therapy (LITT) is a new therapeutic strategy being explored in prostate cancer (CaP), which involves focal ablation of organlocalized tumor via an interstitial laser fiber. While little is known about treatment-related changes following LITT, studying post-LITT changes via imaging is extremely significant for enabling early image-guided intervention and follow-up. In this work, we present the first attempt at examining focal treatment-related changes on a per-voxel basis via quantitative comparison of MRI features pre- and post-LITT, and hence identifying computerized MRI features that are highly sensitive as well as specific to post-LITT changes within the ablation zone in the prostate. A retrospective cohort of 5 patient datasets comprising both pre- and post-LITT T2-weighted (T2w) and diffusion-weighted (DWI) acquisitions was considered, where DWI MRI yielded an Apparent Diffusion Co-efficient (ADC) map. Our scheme involved (1) inter-protocol registration of T2w and ADC MRI, as well as inter-acquisition registration of pre- and post-LITT MRI, (2) quantitation of MRI parameters by correcting for intensity drift in order to examine tissuespecific response, and (3) quantification of the information captured by T2w MRI and ADC maps via texture and intensity features. Correction of parameter drift resulted in visually discernible improvements in highlighting tissue-specific response in different MRI features. Quantitative, voxel-wise comparison of the changes in different MRI features indicated that steerable and non-steerable gradient texture features, rather than the original T2w intensity and ADC values, were highly sensitive as well as specific in identifying changes within the ablation zone pre- and post-LITT. The highest ranked texture feature yielded a normalized percentage change of 186% within the ablation zone and 43% in a spatially distinct normal region, relative to its pre-LITT value. By comparison, both the original T2w intensity and ADC value demonstrated a markedly less sensitive and specific response to changes within the ablation zone. Qualitative as well as quantitative evaluation of co-occurrence texture features indicated the presence of LITT-related effects such as edema adjacent to the ablation zone, which were indiscernible on the original T2w and ADC images. Our preliminary results thus indicate great potential for non-invasive computerized MRI imaging features for determining focal treatment related changes, informing image-guided interventions, as well as predicting long- and short-term patient outcome. PMID:25346574

Identifying Quantitative In Vivo Multi-Parametric MRI Features For Treatment Related Changes after Laser Interstitial Thermal Therapy of Prostate Cancer,
PubMed
Viswanath, Satish; Toth, Robert; Rusu, Mirabela; Sperling, Dan; Lepor, Herbert; Futterer, Jurgen; Madabhushi, Anant
Laser interstitial thermal therapy (LITT) is a new therapeutic strategy being explored in prostate cancer (CaP), which involves focal ablation of organlocalized tumor via an interstitial laser fiber. While little is known about treatment-related changes following LITT, studying post-LITT changes via imaging is extremely significant for enabling early image-guided intervention and follow-up. In this work, we present the first attempt at examining focal treatment-related changes on a per-voxel basis via quantitative comparison of MRI features pre- and post-LITT, and hence identifying computerized MRI features that are highly sensitive as well as specific to post-LITT changes within the ablation zone in the prostate. A retrospective cohort of 5 patient datasets comprising both pre- and post-LITT T2-weighted (T2w) and diffusion-weighted (DWI) acquisitions was considered, where DWI MRI yielded an Apparent Diffusion Co-efficient (ADC) map. Our scheme involved (1) inter-protocol registration of T2w and ADC MRI, as well as inter-acquisition registration of pre- and post-LITT MRI, (2) quantitation of MRI parameters by correcting for intensity drift in order to examine tissuespecific response, and (3) quantification of the information captured by T2w MRI and ADC maps via texture and intensity features. Correction of parameter drift resulted in visually discernible improvements in highlighting tissue-specific response in different MRI features. Quantitative, voxel-wise comparison of the changes in different MRI features indicated that steerable and non-steerable gradient texture features, rather than the original T2w intensity and ADC values, were highly sensitive as well as specific in identifying changes within the ablation zone pre- and post-LITT. The highest ranked texture feature yielded a normalized percentage change of 186% within the ablation zone and 43% in a spatially distinct normal region, relative to its pre-LITT value. By comparison, both the original T2w intensity and ADC value demonstrated a markedly less sensitive and specific response to changes within the ablation zone. Qualitative as well as quantitative evaluation of co-occurrence texture features indicated the presence of LITT-related effects such as edema adjacent to the ablation zone, which were indiscernible on the original T2w and ADC images. Our preliminary results thus indicate great potential for non-invasive computerized MRI imaging features for determining focal treatment related changes, informing image-guided interventions, as well as predicting long- and short-term patient outcome. PMID:25346574

The Sinergy Between Lasers and Adipose Surgery in Face and Neck Rejuvenation: A New Approach from Personal Experience
Jianu, D. M.; Filipescu, M.; Jianu, S. A.; Nita, A. C.; Chirita, D. A.
2012-01-01
Background and aims: Patients now want a long-lasting youthful appearance but with a minimally-invasive approach. Our unique approach, “AdipoLASER reJuvenation (ALJ)”, involves a variety of minimally-invasive laser- and lipolysis-based techniques, and the present study assessed the impact of this ALJ approach. Subjects and Methods: From 2008 — 2011, we prospectively enrolled 221 patients into the study. 71 of them, underwent the ALJ approach; 2 reductive techniques via microliposuction and laser-assisted lipolysis (LAL); and 2 regenerative techniques via autologous fat graft and fractional CO2 laser resurfacing. The remaining 150 patients underwent only 1 or 2 of these techniques. Patients were monitored through 1 to 18 months, clinical photography was taken and histological assessments were performed. Results: Significantly better and long-lasting results were obtained for the complete ALJ approach regarding all aspects of the face, mandible and neck compared with controls. The combination of the regenerative and the reductive approaches delivered on excellent balance, restoring a youthful, natural appearance to the face. Conclusions: The fractional CO2 laser has both a photodestructive, or HLLT, effect and an LLLT component in the beam periphery. This LLLT effect possibly prolonged the life and improved the take of the fat grafts, with the well-documented HLLT effect inducing swift collagenesis and better remodeling of the dermal matrix. A natural look in depressed areas was thus restored with the combination of fat redistribution and the HLLT/LLLT effect. Microlipolysis and laser-assisted lipolysis (LAL) could at the same time remove those areas of redundant and prolapsed fat while countering skin laxity, and address both jowl formation and submental flaccidity. The unique combination of all four approaches in our “AdipoLASER reJuvenation” proved to be superior to any other lesser approach in both the long- and short term with very little patient downtime, but did not present much more in terms of treatment time and cost to the patient. We believe that the ALJ approach offers a real minimally-invasive alternative to the classic surgical facelift PMID:24511192

Nonfacial laser rejuvenation.
Ross, Edward Victor; Udall, Don Norris
2003-06-01
With continuing developments in laser rejuvenation of nonfacial skin, dermatology nurses and support staff need to stay abreast of procedural, preoperative, and postoperative aspects of new therapies. PMID:12875011
Based on the relationship between music and nature, the paper compares laser and light with music sound on the principles of synergetics, describes music physically and objectively, and proposes a music holographic therapy by laser. Maybe it will have certain effects on mechanism study and clinical practice of the music therapy.

The use of low levels of visible or near infrared light for reducing pain, inflammation and edema, promoting healing of wounds, deeper tissues and nerves, and preventing tissue damage has been known for almost forty years since the invention of lasers. Originally thought to be a peculiar property of laser light (soft or cold lasers), the subject has now broadened to include photobiomodulation and photobiostimulation using non-coherent light. Despite many reports of positive findings from experiments conducted in vitro, in animal models and in randomized controlled clinical trials, LLLT remains controversial. This likely is due to two main reasons; firstly the biochemical mechanisms underlying the positive effects are incompletely understood, and secondly the complexity of rationally choosing amongst a large number of illumination parameters such as wavelength, fluence, power density, pulse structure and treatment timing has led to the publication of a number of negative studies as well as many positive ones. In particular a biphasic dose response has been frequently observed where low levels of light have a much better effect than higher levels. This introductory review will cover some of the proposed cellular chromophores responsible for the effect of visible light on mammalian cells, including cytochrome c oxidase (with absorption peaks in the near infrared) and photoactive porphyrins. Mitochondria are thought to be a likely site for the initial effects of light, leading to increased ATP production, modulation of reactive oxygen species and induction of transcription factors. These effects in turn lead to increased cell proliferation and migration (particularly by fibroblasts), modulation in levels of cytokines, growth factors and inflammatory mediators, and increased tissue oxygenation. The results of these biochemical and cellular changes in animals and patients include such benefits as increased healing in chronic wounds, improvements in sports injuries and carpal tunnel syndrome, pain reduction in arthritis and neuropathies, and amelioration of damage after heart attacks, stroke, nerve injury and retinal toxicity.

Acne vulgaris is a pervasive inflammatory disorder of the skin, with multiple etiologies and treatment options. Although first-line therapies exist, it is often the case that a patient will present with an underlying disorder that prohibits the use of most currently accepted treatment modalities. We present a patient with severe acne vulgaris and a history of retinitis pigmentosa who was treated with 595 nanometer pulsed dye laser therapy, in conjunction with therapeutic alternatives to first-line acne medications. Our patient exhibited a significant and sustained improvement with the combined use of 595 nanometer pulsed dye laser, Yaz (drospirenone-ethinyl estradiol), dapsone, topical metronidazole, sodium-sulfacetamide wash, and topical azelaic acid. The positive results in this case, suggest that this combined treatment modality may serve as an example of a safe and effective treatment alternative in the management of acne vulgaris complicated by medical co-morbidities that contraindicate the use of most first-line treatment options. PMID:24656277

Investigation of low-level laser therapy potentiality on proliferation and differentiation of human osteoblast-like cells in the absence/presence of osteogenic factors
Several studies have shown that low-level laser irradiation (LLLI) has beneficial effects on bone regeneration. The objective of this study was to examine the in vitro effects of LLLI on proliferation and differentiation of a human osteoblast-like cell line (Saos-2 cell line). Cultured cells were exposed to different doses of LLLI with a semiconductor diode laser (659 nm 10 mW power output). The effects of laser on proliferation were assessed daily up to seven days of culture in cells irradiated once or for three consecutive days with laser doses of 1 or 3 J/cm². The obtained results showed that laser stimulation enhances the proliferation potential of Saos-2 cells without changing their telomerase pattern or morphological characteristics. The effects on cell differentiation were assessed after three consecutive laser irradiation treatments in the presence or absence of osteo-inductive factors on day 14. Enhanced secretion of proteins specific for differentiation toward bone as well as calcium deposition and alkaline phosphatase activity were observed in irradiated cells cultured in a medium not supplemented with osteogenic factors. Taken together these findings indicate that laser treatment enhances the in vitro proliferation of Saos-2 cells, and also influences their osteogenic maturation, which suggest it is a helpful application for bone tissue regeneration.

Laser therapy as the method of choice in treating young women with CIN lesions of the uterine cervix and VIN lesions of the vulva

The aim of the studies was to attempt to investigate the results of treating young women with CIN I - III of the cervix and epithelial VIN I - III lesions of the vulva by means of the laser technique (vaporization).

Behavior Therapy

... Email Print Share Behavior Therapy for Children with ADHD Article Body Behavior Therapy Has 3 Basic Principles: ... using both medication and behavior therapy to treat attention-deficit/hyperactivity disorder (ADHD). This is known as a multimodal treatment ...

Radiation Therapy

... Professionals Questions to Ask about Your Treatment Research Radiation Therapy Radiation therapy (also called radiotherapy) is a ... rays of your teeth or broken bones. How Radiation Therapy Works against Cancer At high doses, radiation ...

Hormone therapy

HRT: Estrogen replacement therapy; ERT: Hormone replacement therapy ... vaginal dryness and pain with intercourse. The hormone estrogen protects against thinning of the bones (osteoporosis). However, ...

Treating metabolic syndrome's metaflammation with low level light therapy: preliminary results

Metabolic syndrome comprises a constellation of morbidities such as insulin resistance, hyperinsulinemia, atherogenic dyslipidemia, dysglycemia and obesity (especially abdominal). Metabolic alterations are observed in major insulin target organs, increasing the risk of cardiovascular diseases, type-2 diabetes and therefore mortality. Tissue alterations are characterized by immune cells infiltrates (especially activated macrophages). Released inflammatory mediators such as TNF-? induce chronic inflammation in subjects with metabolic syndrome, since inflammatory pathways are activated in the neighboring cells. The intra-abdominal adipose tissue appears to be of particular importance in the onset of the inflammatory state, and strategies contributing to modulate the inflammatory process within this adipose tissue can mitigate the metabolic syndrome consequences. Considering the low level light therapy (LLLT) recognized benefits in inflammatory conditions, we hypothesized this therapeutic approach could promote positive effects in modulating the inflammatory state of metabolic syndrome. That being the scope of this study, male C57BL/6 mice were submitted to a high-fat/high-fructose diet among 21 days using an 850 nm LED (6 sessions, 300 seconds per session, 60 mW output power, ~6 J/cm² fluence, ~19 mW/cm² fluence rate). Before and during treatment, blood was sampled either from the retroorbital plexus or from tail puncture for glucose, total cholesterol and triglycerides analysis. So far
449. Osteogenic gene expression of murine osteoblastic (MC3T3-E1) cells under cyclic tension
NASA Astrophysics Data System (ADS)
2014-08-01
Low-level laser therapy (LLLT) can promote cell proliferation. The remodeling ability of the tension side of orthodontic teeth affects post-orthodontic stability. The purpose of the present study was to investigate the osteogenic effects of LLLT on osteoblast-like cells treated with a simulated tension system that provides a mechanical tension regimen. Murine osteoblastic (MC3T3-E1) cells were cultured in a Flexcell strain unit with programmed loads of 12% elongation at a frequency of 0.5 Hz for 24 and 48 h. The cultured cells were treated with a low-level diode laser using powers of 5 J and 10 J. The proliferation of MC3T3-E1 cells was determined using the Alamar Blue assay. The expression of osteogenic genes (type I collagen (Col-1), osteopontin (OPN), osteocalcin (OC), osteoprotegerin (OPG), receptor activator of nuclear factor kappa B ligand (RANKL), bone morphologic protein (BMP-2), and bone morphologic protein (BMP-4)) in MC3T3-E1 cells was analyzed using reverse transcription polymerase chain reaction (RT-PCR). The data were analyzed using one-way analysis of variance. The proliferation rate of tension-cultured MC3T3-E1 cells under 5 J and 10 J LLLT increased compared with that of the control group (p < 0.05). Prominent mineralization of the MC3T3-E1 cells was visible using a von Kossa stain in the 5 J LLLT group. Osteogenic genes (Col-1, OC, OPG and BMP-2) were significantly expressed in the MC3T3-E1 cells treated with 5 J and 10 J LLLT (p < 0.05). LLLT in tension-cultured MC3T3-E1 cells showed synergistic osteogenic effects, including increases in cell proliferation and Col-1, OPN, OC, OPG and BMP-2 gene expression. LLLT might be beneficial for bone remodeling on the tension side of orthodontics.

450. Laser therapy of a dermal nevus in the esthetic zone of the nasal tip: A case report and comprehensive literature review
E-print Network
Vertes, Akos
Therapeutic practice. Overview of psychotherapy theories relevant to art therapy. Open only to art therapy and psychotherapy in light of the creative process and other aspects of the clinical practice of art therapy. Client

451. Laser therapy of a dermal nevus in the esthetic zone of the nasal tip: A case report and comprehensive literature review
PubMed
Angermair, Johannes; Dettmar, Peer; Linsenmann, Robert; Nolte, Dirk
2015-12-01
This case report demonstrates the ablation of a dermal nevus using a diode laser in the esthetically very demanding facial area of the nasal tip. The clinical outcome shows good results and a high level of patient satisfaction. Due to effective wound granulation and healing, elaborate skin grafts could be avoided. The application of the contact laser ensures safe treatment in highly perfused areas thanks to haptic feedback and good coagulative effect. The method should therefore be considered as an alternative to other ablative procedures for benign lesions in the facial area. PMID:25803680

452. Lasers in periodontics
PubMed Central
Elavarasu, Sugumari; Naveen, Devisree; Thangavelu, Arthiie
2012-01-01
Laser is one of the most captivating technologies in dental practice since Theodore Maiman in 1960 invented the ruby laser. Lasers in dentistry have revolutionized several areas of treatment in the last three and a half decades of the 20th century. Introduced as an alternative to mechanical cutting device, laser has now become an instrument of choice in many dental applications. Evidence suggests its use in initial periodontal therapy, surgery, and more recently, its utility in salvaging implant opens up a wide range of applications. More research with better designs are a necessity before lasers can become a part of dental armamentarium. This paper gives an insight to laser in periodontics. PMID:23066266

453. Real-time optical coherence tomography observation of retinal tissue damage during laser photocoagulation therapy on ex-vivo porcine samples
NASA Astrophysics Data System (ADS)
Steiner, P.; Považay, B.; Stoller, M.; Morgenthaler, P.; Inniger, D.; Arnold, P.; Sznitman, R.; Meier, Ch.
2015-07-01

our results indicate no alterations on these metabolic parameters after LLLT. For further investigations, blood was collected for plasma inflammatory cytokine quantification and fresh ex vivo samples of liver and intra-abdominal adipose tissue were harvested for immunohistochemistry purposes.
Retinal laser photocoagulation represents a widely used treatment for retinal pathologies such as diabetic chorioretinopathy or diabetic edema. For effective treatment, an appropriate choice of the treatment energy dose is crucial to prevent excessive tissue damage caused by over-irradiation of the retina. In this manuscript we investigate simultaneous and time-resolved optical coherence tomography for its applicability to provide feedback to the ophthalmologist about the introduced retinal damage during laser photocoagulation. Time-resolved and volumetric optical coherence tomography data of 96 lesions on ex-vivo porcine samples, set with a 577 nm laser prototype and irradiance of between 300 and 8800 W/cm² were analyzed. Time-resolved scans were compared to volumetric scans of the lesion and correlated with ophthalmoscopic visibility. Lastly, image parameters extracted from optical coherence tomography M-scans, suitable for lesion classification were identified. Results presented in this work support the hypothesis that simultaneous optical coherence tomography provides valuable information about the extent of retinal tissue damage and may be used to guide retinal laser photocoagulation in the future.

New cancer-treatment model of photodynamic therapy combined with a type I topoisomerase inhibitor, CPT-11, against HeLa cell tumors in nude mice used by OPO parametric tunable laser

Yoshida, Takato O.; Matsuzawa, Eiji; Matsuo, Tetsumichi; Koide, Yukio; Terakawa, Susumu; Yokokura, Teruo; Hirano, Toru

1995-03-01

A new cancer-treatment model, photodynamic therapy (PDT) combined with a type I topoisomerase inhibitor, camptothecin derivative (CPT-11), against HeLa cell tumors in BALB/c nude mice has been developed using a wide-band tunable coherent light source operated on optical parametric oscillation (OPO parametric tunable laser). The Photosan-3 PDT and CPT-11 combined therapy was remarkably effective, that is the inhibition rate (I.R.) 40 - 80%, as compared to PDT only in vivo. The analysis of HpD (Photosan-3) and CPT-11 effects on cultured HeLa cells in vitro has been studied by a video-enhanced contrast differential interference contrast microscope (VEC-DIC). Photosan-3 with 600 nm light killed cells by mitochondrial damage within 50 min, but not with 700 nm light. CPT-11 with 700 - 400 nm light killed cells within 50 min after nucleolus damage appeared after around 30 min. The localization of CPT-11 in cells was observed as fluorescence images in the nucleus, particularly the nucleolar area produced clear images using an Argus 100.

Three-dimensional dynamics of temperature fields in phantoms and biotissue under IR laser photothermal therapy using gold nanoparticles and ICG dye

Akchurin, Georgy G.; Garif, Akchurin G.; Maksimova, Irina L.; Skaptsov, Alexander A.; Terentyuk, Georgy S.; Khlebtsov, Boris N.; Khlebtsov, Nikolai G.; Tuchin, Valery V.

2010-02-01

We describe applications of silica (core)/gold (shell) nanoparticles and ICG dye to photothermal treatment of phantoms, biotissue and spontaneous tumor of cats and dogs. The laser irradiation parameters were optimized by preliminary experiments with laboratory rats. Three dimensional dynamics of temperature fields in tissue and solution samples was measured with a thermal imaging system. It is shown that the temperature in the volume region of nanoparticles localization can substantially exceed the surface temperature recorded by the thermal imaging system. We have demonstrated effective optical destruction of cancer cells by local injection of plasmon-resonant gold nanoshells and ICG dye followed by continuous wave (CW) diode laser irradiation at wavelength 808 nm.

Argon-pumped tunable dye laser therapy for facial port-wine stain hemangiomas in adults--a new technique using small spot size and minimal power

Scheinber, A.; Wheeland, R.G.

1989-03-01

A low power, argon-pumped tunable dye laser was used to deliver yellow light of 577 nm. Individual blood vessels within port-wine stain hemangiomas were treated with a 0.1-mm beam of light using 8X magnification. This technique permits excellent resolution of facial and nuchal port-wine stain hemangiomas in adults without the adverse complications of textural change, permanent pigmentation abnormality, or hypertrophic scarring.

A NASA discovery has current applications in orthopaedics

2015-01-01

Low-level laser therapy (LLLT) has been actively used for nearly 40 yr, during which time it has been known to reduce pain, inflammation, and edema. It also has the ability to promote healing of wounds, including deep tissues and nerves, and prevent tissue damage through cell death. Much of the landmark research was done by
Lasers in endodontics: an overview

The interest in endodontic use of dental laser systems is increasing. Developing laser technology and a better understanding of laser effects widened the spectrum of possible endodontic indications. Various laser systems including excimer-, argon+-, diode-, Nd:YAG-, Er:YAG- and CO2-lasers are used in pulp diagnosis, treatment of hypersensitivity, pulp capping, sterilization of root canals, root canal shaping and obturation or apicectomy. With the development of new delivery systems - thin and flexible fibers - for many different wavelengths laser applications in endodontics may increase. Since laser devices are still relatively costly, access to them is limited. Most of the clinical applications are laser assisted procedures such as the removing of pulp remnants and debris or disinfection of infected root canals. The essential question is whether a laser can provide improved treatment over conventional care. To perform laser therapy in endodontics today different laser types with adopted wavelengths and pulse widths are needed, each specific to a particular application. Looking into the future we will need endodontic laser equipment providing optimal laser parameters for different treatment modalities. Nevertheless, the quantity of research reports from the last decade promises a genuine future for lasers in endodontics.

Increased expression of mitochondrial benzodiazepine receptors following low-level light treatment facilitates enhanced protoporphyrin IX production in glioma-derived cells in vitro

This study investigates whether low level light treatment (LLLT) can enhance the expression of Peripheral-type mitochondrial benzodiazepine receptors (PBRs) on the glioma-derived tumour cell line, CNS-1, and by doing so promote the synthesis of protoporphyrin IX (PpIX) and increase the photodynamic therapy (PDT)-induced cell kill using 5-aminolevulinic acid (ALA). The endogenous photosensitizer, (PpIX) and related metabolites including coproporphyrin III are known to traffic via the PBRs on the outer mitochondrial membrane on their passage into or out of the mitochondria. Astrocyte-derived cells within the brain express PBRs, while neurons express the central-type of benzodiazepine receptor. CNS-1 cells were exposed to a range of differing low-level light protocols immediately prior to PDT. LLLT involved using broad-spectrum light or monochromatic laser light specific to 635 or 905 nm wavelength. Cells (5×10^5) were exposed to a range of LLLT doses (0, 1 or 5 J/cm²) using a fixed intensity of 10 mW/cm² and subsequently harvested for cell viability, immunofluorescence or western blot analysis of PBR expression. The amount of PpIX within the cells was determined using chemical extraction techniques. Results confirm the induction of PBR following LLLT is dependent on the dose and wavelength of light used. Broad-spectrum light provided the greatest cell kill following PDT, although LLLT with 635 nm or 905 nm also increased cell kill as compared to PDT alone. All LLLT regimens increased PBR expression compared to controls with corresponding increases in PpIX production. These data suggest that by selectively increasing PBR expression in tumour cells, LLLT may facilitate enhanced cell kill using ALA-PDT without damaging surrounding normal brain.

A split-face, evaluator-blind randomized study on the early effects of Q-switched Nd:YAG laser plus Er:YAG micropeel (combined therapy) versus Q-switched Nd:YAG alone in light solar lentigines in Asians.

Solar lentigines are a common sign of aging in Asians, who often asked for treatment. Various lasers, including Q-switched Nd:YAG and Er:YAG, have been adopted, but the results are not always satisfactory, especially for those who are relatively light in color. Our objective was to compare the early effects as well as side effects of Q-switched Nd:YAG laser plus Er:YAG micropeel (combined therapy) with those of Q-switched Nd:YAG laser (QSNY) alone in light solar lentigines in Asians. This was a split-face, evaluator-blind, randomized controlled study. A single session of treatment was performed on Asian patients with light facial lentigines. A combined treatment with QSNY and Er:YAG micropeel was allocated to one half of the face, and QSNY alone to the other half. The response to therapy was evaluated by two independent
dermatologists, with standardized photographs taken 2 weeks and 1 month after the laser treatment. Patients' satisfaction and preference in treatment were also assessed. Fifteen patients completed the study and were analyzed. Overall, a reduction in pigment was observed with both treatment arms during the study period. The degree of pigment reduction following combined therapy and QSNY alone was similar at 2 weeks' follow-up ($\approx 0.433$). However, due to the higher incidence of postinflammatory hyperpigmentation (PIH) with combined therapy (73.3 vs 40%), the degree of pigment reduction in the combined side of the face was found significantly lower than that of the QSNY-alone side at 1-month follow-up ($P = 0.014$). Although our study results show that both combined therapy and QSNY alone are capable of reducing pigmentation, QSNY alone is considered to have more favorable qualities than combined treatment for light solar lentigines in Asians. PMID:24292155

- 21
- 22
- 23
- 24
- 25

461. *Multiphoton Biomedical Imaging and Photodynamic Therapy: Agents & Applications*  
E-print Network  
Van Stryland, Eric  
Hydrophobic and hydrophilic dyes Two-Photon Photodynamic Therapy #12;"Two-photon laser scanning at the focus of the scanning pulsed-infrared laser beam, resulting in a much less harmful light dose during Multiphoton Biomedical Imaging and Photodynamic Therapy: Agents & Applications Kevin D. Belfield

462. *Recent Developments in Laser Treatment of Diabetic Retinopathy*  
PubMed Central  
Yun, Samuel H.; Adelman, Ron A.  
2015-01-01  
Laser photocoagulation has been the mainstay of diabetic retinopathy treatment since its development in mid-20th century. With the advent of antivascular endothelial growth factor therapy, the role of laser therapy appeared to be diminished, however many advances in laser technology have been developed since. This review will describe recent advances in laser treatment of diabetic retinopathy including pattern scan laser, short-pulse duration and a reduced fluence laser, and navigated laser system for proliferative diabetic retinopathy and macular edema. PMID:25949072

463. *Solid State Laser*  
NASA Technical Reports Server (NTRS)  
1990-01-01  
The Titan-CW Ti:sapphire (titanium-doped sapphire) tunable laser is an innovation in solid-state laser technology jointly developed by the Research and Solid State Laser Divisions of Schwartz Electro-optics, Inc. (SEO). SEO is producing the laser for the commercial market, an outgrowth of a program sponsored by Langley Research Center to develop Ti:sapphire technology for space use. SEO's Titan-CW series of Ti:sapphire tunable lasers have applicability in analytical equipment designed for qualitative analysis of carbohydrates and proteins, structural analysis of water, starch/sugar analyses, and measurements of salt in meat. Further applications are expected in semiconductor manufacture, in medicine for diagnosis and therapy, and in biochemistry.

464. *Electroconvulsive therapy*  
MedlinePLUS  
Welch CA. Electroconvulsive therapy. In: Stern TA, Rosenbaum JF, Fava ... General Hospital Comprehensive Clinical Psychiatry . 1st ed. ...

465. *Radiation Therapy*  
MedlinePLUS  
... Your Best Self Smart Snacking Losing Weight Safely Radiation Therapy KidsHealth > Teens > Diseases & Conditions > Cancer & Tumors > Radiation ... how to cope with side effects. What Is Radiation Therapy? Cancer is a disease that causes cells ...

466. *Treatment of rheumatoid arthritis using photodynamic therapy*
The only early therapy of rheumatoid arthritis in orthopedic surgery is a synovectomy, which is restricted to more or less big joints. A laser-synovectomy of small joints is ineffective yet. An alternative method may be photodynamic therapy. In our study we describe the photodynamic effect of Photosan 3 in a cell culture study.

Evaluation of the efficacy of photodynamic antimicrobial therapy using a phenothiazine compound and Laser (?=660?m) on the interface: macrophage vs S. aureus

NASA Astrophysics Data System (ADS)
de Oliveira, Susana C. P. S.; Monteiro, Juliana S. C.; Pires-Santos, Gustavo M.; Sampaio, Fernando José P.; Zannin, Fátima Antônia A.; Pinheiro, Antônio L. B.
2015-03-01
Nowadays photodynamic inactivation has been proposed as an alternative treatment for localized bacterial infections as a response to the problem of antibiotic resistance. Much is already known about the photodynamic inactivation of microorganisms: both antibiotic-sensitive and -resistant strains can be successfully photoinactivated and there is the additional advantage that repeated photosensitization of bacterial cells does not induce a selection of resistant strains. Staphylococcus spp. are opportunistic microorganisms known for their capacity to develop resistance against antimicrobial agents. The emergence of resistant strains of bacteria such as methicillin-resistant Staphylococcus aureus (MRSA) poses a major challenge to healthcare. MRSA is a major cause of hospital-acquired infection throughout the world and is now also prevalent in the community as well as nursing and residential homes. The aim of this study was to evaluate the phagocytic function of macrophages J774 against S. aureus in the presence and absence of AmPDT with phenothiazine compound (12.5 ?g/mL) and low level laser (?=660nm, 12 J/cm²). Experimental groups: Control group (L-P-), Phenothiazine group (L-P+), Laser group (L+P-), AmPDT group (L+P+). The tests presented in this study were performed in triplicate. This study showed that AmPDT induced bacterial death in about 80% as well as increasing phagocytic capacity of macrophages by approximately 20% and enhanced the antimicrobial activity by approximately 50% compared to the control group and enabling more intense oxidative burst.


PubMed
Sebaratnam, Deshan F; Lim, Adrian C; Lowe, Patricia M; Goodman, Greg J; Bekhor, Philip; Richards, Shawn
2014-02-01
Part two of this review series evaluates the use of lasers and laser-like devices in dermatology based on published evidence and the collective experience of the senior authors. Dermatologists can laser-treat a wide range of dermatoses, including vascular, pigmentary, textural, benign proliferative and premalignant conditions. Some of these conditions include vascular malformation, haemangioma, facial telangiectases, café-au-lait macules, naevi of Ota, lentigines, acne scarring, rhytides, rhinophyma and miscellaneous skin lesions. Photodynamic therapy with lasers and intense pulsed light is addressed, with particular reference to actinic keratosis and actinic cheilitis. A treatment algorithm for acne scarring based on scar morphology and severity is comprehensively outlined. Following from part one, the various devices are matched to the corresponding dermatological conditions with representative pictorial case vignettes illustrating likely clinical outcomes as well as limitations and potential complications of the various laser and light therapies. PMID:24433372

Does the real-time thermal damage estimate allow for estimation of tumor control after MRI-guided laser-induced thermal therapy? Initial experience with recurrent intracranial ependymomas.

PubMed
Patel, Nitesh V; Jethwa, Pinakin R; Shetty, Anil; Danish, Shabbabar F
2015-04-01
OBJECT Although control of intracranial ependymomas is highly correlated with degree of resection, it is unknown if the same is true for MRI-guided laser-induced thermal therapy (MRgLITT). The authors report their experience with MRgLITT for ependymoma and examine the utility of the real-time thermal damage estimate (TDE), a recent software advance, with respect to completeness of ablation and impact on tumor control. To the authors' knowledge, this is the largest single-center experience utilizing MRgLITT for recurrent ependymomas.

METHODS Five tumors in 4 patients were treated with the Visualase Thermal Therapy System. Two tumors were treated similarly on recurrence. Ablation was performed using a 980-nm diode laser with a real-time image acquisition system. Single-plane TDEs were calculated and compared with the original lesion area to compute percentage area ablated (PAA). Volumetric analysis was performed, and percentage volume ablated (PVA) was estimated and correlated with the TDE. Tumor control was correlated with the TDE and volumetric data during treatment.

RESULTS Nine ablations were performed on 5 tumors, 2 of which had multiple recurrences. The average pretreatment lesion volume was 8.4 ± 6.3 cm³, and the average largest
2D area was 5.3 ± 2.7 cm². The averaged TDE was 3.9 ± 2.1 cm², average PAA was 80.1% ± 34.3%, and average PVA was 64.4% ± 23.5%. For subtotal ablations, average recurrence time was 4.4 ± 5.3 months; 1 adult case remains recurrence-free at 40 months. Using TDEs, the correlation between recurrence time and PAA was r = 0.93 (p = 0.01), and for PVA was r = 0.88 (p = 0.02). Furthermore, PVA and PAA were strongly correlated (r = 0.88, p = 0.02). CONCLUSIONS Through using the PAA, the real-time TDE correlated with the volume of ablation in this initial investigation. Furthermore, the TDE and volumetric data corresponded to the level of tumor control, with time to recurrence dependent on ablation completeness. MRgLITT may have a role in the management of recurrent ependymomas, especially with recent software advances. PMID:25580512

470. Understanding lasers
SciTech Connect
Gibilisco, S.
1989-01-01
Covering all different types of laser applications-Gibilisco offers an overview of this fascinating phenomenon of light. Here he describes what lasers are and how they work and examines in detail the different kinds of lasers in use today. Topics of particular interest include: the way lasers work; the different kinds of lasers; infrared, ultraviolet and x-ray lasers; use of lasers in industry and manufacturing; use of lasers for long-distance communications; fiber optic communications; the way laser shows work; the reality of Star Wars; lasers in surgical and medical applications; and holography and the future of laser technology.

PubMed Central
Kardoulaki, Evdokia M.; Sym, Richard R. A.; Young, Ian R.; Choonee, Kaushal; Rea, Marc; Gedroyc, Wladyslaw M. W.
2015-01-01
Purpose: Flexible microcoils integrated with ablation catheters can improve the temperature accuracy during local MR-thermometry in Nd:YAG laser interstitial thermal therapies. Here, the authors are concerned with obtaining a preliminary confirmation of the clinical utility of the modified catheter. They investigate whether the thin-film substrate and copper tracks of the printed coil inductor affect the symmetry of the thermal profile, and hence of the lesion produced. Methods: Transmission spectroscopy in the near infrared was performed to test for the attenuation at 1064 nm through the 25 ?m thick Kapton substrate of the microcoil. The radial transmission profile of an infrared high-power, light-emitting diode with >80% normalized power at 1064 nm was measured through a cross-section of the modified applicator to assess the impact of the copper inductor on the optical profile. The measurements were performed in air, as well as with the applicator surrounded by two types of scattering media: crystals of NaCl and a layer of liver-mimicking gel phantom. A numerical model based on Huygens–Fresnel principle and finite element simulations, using a commercially available package (COMSOL Multiphysics), were employed to compare with the optical measurements. The impact of the modified optical profile on the thermal symmetry was assessed by examining the high-resolution microcoil derived thermal maps from a Nd:YAG laser ablation performed on a liver-mimicking gel phantom. Results: Less than 30% attenuation through the Kapton film was verified. Shadowing behind the copper tracks was observed in air and the measured radial irradiation correlated well with the diffraction pattern calculated numerically using the Huygens–Fresnel principle. Both optical experiments and simulations, demonstrate that shadowing is mitigated by the scattering properties of a turbid medium. The microcoil-derived thermal maps at the end of a Nd:YAG laser ablation performed on a gel phantom in a 3 T scanner confirm that the modified irradiation pattern does not disrupt the thermal symmetry, even though, unlike tissue, the gel is minimally scattering. Conclusions: The results from this initial assessment indicate that microcoils can be safely integrated with ablation catheters and ensure that the complete necrosis of the liver tumor can still be achieved. PMID:25735293

472. Dielectric laser accelerators
NASA Astrophysics Data System (ADS)
England, R. Joel; Noble, Robert J.; Bane, Karl; Dowell, David H.; Ng, Cho-Kuen; Spencer, James E.; Tantawi, Sami; Wu, Ziran; Byer, Robert L.; Peralta, Edgar; Soong, Ken; Chang, Chia-Ming; Montazeri, Behnam; Wolf, Stephen J.; Cowan, Benjamin; Dawson, Jay; Gai, Wei; Hommelhoff, Peter; Huang, Yen-Chieh; Jing, Chenguang; McGuinness, Christopher; Palmer, Robert B.; Naranjo, Brian; Rosenzweig, James; Travish, Gil; Mizrahi, Amit; Schachter, Levi; Sears, Christopher; Werner, Gregory R.; Yoder, Rodney B.
2014-10-01
The use of infrared lasers to power optical-scale lithographically fabricated particle accelerators is a developing area of research that has garnered increasing interest in recent years. The physics and technology of this approach is reviewed, which is referred to as dielectric laser acceleration (DLA). In the DLA scheme
operating at typical laser pulse lengths of 0.1 to 1 ps, the laser damage fluences for robust dielectric materials correspond to peak surface electric fields in the GV/m regime. The corresponding accelerating field enhancement represents a potential reduction in active length of the accelerator between 1 and 2 orders of magnitude. Power sources for DLA-based accelerators (lasers) are less costly than microwave sources (klystrons) for equivalent average power levels due to wider availability and private sector investment. Because of the high laser-to-particle coupling efficiency, required pulse energies are consistent with tabletop microJoule class lasers. Combined with the very high (MHz) repetition rates these lasers can provide, the DLA approach appears promising for a variety of applications, including future high-energy physics colliders, compact light sources, and portable medical scanners and radiative therapy machines.


Choi, Bernard
2006-01-01

Blood flow, laser speckle imaging was performed before, immediately after, and 18 hours postphotodynamic therapy; pulsed dye laser; Benzoporphyrin; laser speckle imaging INTRODUCTION The pulsed dye laserLasers in Surgery and Medicine 38:532539 (2006) Microvascular Blood Flow Dynamics Associated

474. Image-guided laser thermal ablation therapy: a comparison of modeled tissue damage using interventional MR temperature images with tissue response

NASA Astrophysics Data System (ADS)
Breen, Michael S.; Butts, Kim; Chen, Lili; Wilson, David L.
2004-05-01

Solid tumors and other pathologies can be treated using laser thermal ablation under interventional magnetic resonance imaging (mMRI) guidance. We developed a model to predict cell death from MR thermometry measurements and applied it to in vivo rabbit brain data. We aligned post-ablation MR lesion images to gradient echo images, from which temperature is derived, using a mutual information registration method. We used the outer boundary of the hyperintense rim in the post-ablation MR lesion image as the boundary for cell death, as verified from histology. Model parameters were simultaneously estimated using an iterative optimization algorithm applied to every interesting voxel in 185 images from multiple experiments having various temperature histories. The model gave a voxel sensitivity and specificity of 86.9% and 98.8%, respectively. Mislabeled voxels typically were within one voxel of the segmented necrotic boundary. This is good evidence that iMRI temperature maps can be used with our model to predict therapeutic regions in real-time.

475. Carbon dioxide reactivity of tumor blood flow as measured by dynamic contrast-enhanced computed tomography: a new treatment protocol for laser thermal therapy

NASA Astrophysics Data System (ADS)
Purdie, Thomas G.; Sherar, Michael D.; Fenster, Aaron; Lee, Ting-Yim
2001-05-01

The purpose of the current study is to measure the carbon dioxide reactivity of blood flow in VX2 tumor in the rabbit thigh. The carbon dioxide reactivity of the functional parameters was investigated in eight rabbits by changing the ventilation rate in order to manipulate the arterial carbon dioxide tension (PaCO2). In each experiment, functional maps were generated at four PaCO2 levels: normocapnia (PaCO2 equals 40.7 +/- 1.4 mm Hg), hypocapnia (27.1 +/- 2.5 and 33.7 +/- 2.2) and hypercapnia (53.8 +/- 5.2). The carbon dioxide reactivity of tumor blood flow showed significant differences between normocapnia and the two levels of hypocapnia, but not between normocapnia and hypercapnia. The average fractional change of blood flow from normocapnia for the two hypocapnic levels was -0.41 +/- 0.06 and -0.29 +/- 0.08, respectively. The ability to reduce blood flow through hypocapnia has significant implications in thermal therapy, as heat dissipation represents a major obstacle which limits the effectiveness of treatment.

476. Lasers and laser-like devices: part one.

PubMed
Stewart, Nicholas; Lim, Adrian C; Lowe, Patricia M; Goodman, Greg
2013-08-01

Lasers have been used in dermatology for nearly 50 years. Through their selective targeting of skin chromophores they have become the preferred treatment for many skin conditions, including vascular malformations, photorejuvenation and acne scars. The technology and design of lasers continue to evolve, allowing greater control of laser parameters and resulting in increased safety and efficacy for patients. Innovations have allowed the range of conditions and the skin types amenable to treatment, in both general and cosmetic dermatology, to expand over the last decade. Integrated skin cooling and laser beam fractionation, for example, have improved safety, patient tolerance and decreased downtime. Furthermore, the availability and
affordability of quality devices continues to increase, allowing clinicians not only to access laser therapies more readily but also to develop their personal experience in this field. As a result, most Australian dermatologists now have access to laser therapies, either in their own practice or within referable proximity, and practical knowledge of these technologies is increasingly required and expected by patients. Non-laser energy devices utilising intense pulsed light, plasma, radiofrequency, ultrasound and cryolipolysis contribute to the modern laser practitioners' armamentarium and will also be discussed. PMID:23573909

477. Physical Therapy and Occupational Therapy in Progeria

MedlinePLUS
Physical Therapy and Occupational Therapy in Progeria Information for Families and Caretakers from The Progeria Research Foundation Written ... accelerated aging in children. Children with Progeria need Physical Therapy (PT) and Occupational Therapy (OT) as often as ...

478. Antiparasitic therapy.

PubMed
Kappagoda, Shanthi; Singh, Upinder; Blackburn, Brian G
2011-06-01
Parasitic diseases affect more than 2 billion people globally and cause substantial morbidity and mortality, particularly among the world's poorest people. This overview focuses on the treatment of the major protozoan and helminth infections in humans. Recent developments in antiparasitic therapy include the expansion of artemisinin-based therapies for malaria, new drugs for soil-transmitted helminths and intestinal protozoa, expansion of the indications for antiparasitic drug treatment in patients with Chagas disease, and the use of combination therapy for leishmaniasis and human African trypanosomiasis. PMID:21628620

479. Antiparasitic Therapy

PubMed Central
Kappagoda, Shanthi; Singh, Upinder; Blackburn, Brian G.
2011-01-01
Parasitic diseases affect more than 2 billion people globally and cause substantial morbidity and mortality, particularly among the world's poorest people. This overview focuses on the treatment of the major protozoan and helminth infections in humans. Recent developments in antiparasitic therapy include the expansion of artemisinin-based therapies for malaria, new drugs for soil-transmitted helminths and intestinal protozoa, expansion of the indications for antiparasitic drug treatment in patients with Chagas disease, and the use of combination therapy for leishmaniasis and human African trypanosomiasis. PMID:21628620

480. Alternative Therapies

MedlinePLUS
... classes, or trained individuals. Bodywork includes myofascial release (Smith, 1997) , various types of massage, craniosacral therapy, chiropractic ... 1987) ; therapeutic touch, developed in nursing (Gerber, 1988; Smith, 1997) ; and reiki and polarity (Goldberg, 1995) . All ...

481. Oxygen Therapy

MedlinePLUS
Oxygen therapy is a treatment that provides you with extra oxygen. Oxygen is a gas that your body needs to function. Normally, your lungs absorb oxygen from the air you breathe. But some conditions ...

482. Radiation therapy

MedlinePLUS
Radiation therapy uses high-powered x-rays, particles, or radioactive seeds to kill cancer cells, ... faster than normal cells in the body. Because radiation is most harmful to quickly growing cells, radiation ...

483. Machine therapy

E-print Network
Dobson, Kelly E. (Kelly Elizabeth), 1970-2007-01-01
Machine Therapy is a new practice combining art, design, psychoanalysis, and engineering work in ways that access and reveal the vital, though often unnoticed, relevance of people's interactions and relationships with ...

484. **Proton Therapy**
MedlinePLUS
... for e-updates Please leave this field empty Proton Therapy SHARE Home > Treatment and Care > Treatments Listen ... a nucleus, which holds two types of particles—protons and neutrons. The nucleus is surrounded by electrons. ...

485. **Oxygen Therapy**
MedlinePLUS
... therapy works, it helps to understand how your respiratory system works. This system is a group of organs and tissues that help you breathe. The respiratory system includes the airways and lungs. The airways carry ...

486. **Radiation Therapy**
MedlinePLUS
Radiation therapy is a cancer treatment. It uses high doses of radiation to kill cancer cells and stop them from ... half of all cancer patients receive it. The radiation may be external, from special machines, or internal, ...

487. **Radionuclide Therapy**
NASA Astrophysics Data System (ADS)
Zalutsky, M. R.
Radionuclide therapy utilizes unsealed sources of radionuclides as a treatment for cancer or other pathological conditions such as rheumatoid arthritis. Radionuclides that decay by the emission of ? and ? particles, as well as those that emit Auger electrons, have been used for this purpose. In this chapter, radiochemical aspects of radionuclide therapy, including criteria for radionuclide selection, radionuclide production, radiolabeling chemistry, and radiation dosimetry are discussed.

488. **Adaptive Therapy**
PubMed Central
Gatenby, Robert A.; Silva, Ariosto S.; Gillies, Robert J.; Frieden, B. Roy
2013-01-01
A number of successful systemic therapies are available for treatment of disseminated cancers. However, tumor response is often transient, and therapy frequently fails due to emergence of resistant populations. The latter reflects the temporal and spatial heterogeneity of the tumor microenvironment as well as the evolutionary capacity of cancer phenotypes to adapt to therapeutic perturbations. Although cancers are highly dynamic systems, cancer therapy is typically administered according to a fixed, linear protocol. Here we examine an adaptive therapeutic approach that evolves in response to the temporal and spatial variability of tumor microenvironment and cellular phenotype as well as therapy-induced perturbations. Initial mathematical models find that when resistant phenotypes arise in the untreated tumor, they are typically present in small numbers because they are less fit than the sensitive population. This reflects the “cost” of phenotypic resistance such as additional substrate and energy used to up-regulate xenobiotic metabolism, and therefore not available for proliferation, or the growth inhibitory nature of environments (i.e., ischemia or hypoxia) that confer resistance on phenotypically sensitive cells. Thus, in the Darwinian environment of a cancer, the fitter chemosensitive cells will ordinarily proliferate at the expense of the less fit chemoresistant cells. The models show that, if resistant populations are present before administration of therapy, treatments designed to kill maximum numbers of cancer cells remove this inhibitory effect and actually promote more rapid growth of the resistant populations. We present an alternative approach in which treatment is continuously modulated to achieve a fixed tumor population. The goal of adaptive therapy is to enforce a stable tumor burden by permitting a significant population of chemosensitive cells to survive so that they, in turn, suppress proliferation of the less fit but chemoresistant subpopulations. Computer simulations show that this strategy can result in prolonged survival that is substantially greater than that of high dose density or metronomic therapies. The feasibility of adaptive therapy is supported by in vivo experiments. PMID:19487300

489. **Diabetic macular edema: New promising therapies**
PubMed Central
Shamsi, Hanan N Al; Masaud, Jluwi S; Ghazi, Nicola G
2013-01-01
The treatment of diabetic macular edema is rapidly evolving. The era of laser therapy is being quickly replaced by an era of pharmacotherapy. Several pharmacotherapies have been recently developed for the treatment of retinal vascular diseases such as diabetic macular edema. Several intravitreal injections or sustained delivery devices have undergone phase 3 testing while others are currently being evaluated. The results of clinical trials have shown the superiority of some of these agents to laser therapy. However, with the availability of several
of these newer agents, it may be difficult to individualize treatment options especially those patients respond differently to various therapies. As such, more effort is still needed in order to determine the best treatment regimen for a given patient. In this article, we briefly summarize the major new therapeutic additions for the treatment of diabetic macular edema and allude to some future promising therapies. PMID:24379924

490. Induratio penis plastica (IPP) and laser: a review
NASA Astrophysics Data System (ADS)
Longo, Leonardo; Mancini, S.; Postiglione, M. G. 2002-10-01
The first employments of Laser therapy for I.P.P. came from back to more than twenty years ago. At the beginning it was employed only in the acute forms as analgesic laser was used also as anti-inflammatory following the doses of Low Level Laser Therapy. Than the science tried to use the laser effect remodelling phase of the scars, to make the fibrosis regrade in the chronic forms. Tunable laser in small optical fiber was used for ablation of calcified zones with very good results. For the slight forms were used diode laser 660 and 904 nm, alone or coupling with CO2 laser with large spot. At first some Author used helium-Neon laser 632. Some of these lasers were combined with microiontophoresis and ultrasounds therapy in teh same treatment. Now we use 810 nm surgical diode laser in almost all induratio forms. The immediate results and follow up will be discussed. Thanks to these results we could conclude that IPP laser therapy can be effective in most of the clinic forms. Although the used procedure is subject to improvement.

491. Transcutaneous laser treatment of leg veins.
PubMed
Meesters, Arne A; Pitassi, Luiza H U; Campos, Valeria; Wolkerstorfer, Albert; Dierickx, Christine C 2014-03-01
Leg telangiectasias and reticular veins are a common complaint affecting more than 80% of the population to some extent. To date, the gold standard remains sclerotherapy for most patients. However, there may be some specific situations, where sclerotherapy is contraindicated such as needle phobia, allergy to certain sclerosing agents, and the presence of vessels smaller than the diameter of a 30-gauge needle (including telangiectatic matting). In these cases, transcutaneous laser therapy is a valuable alternative. Currently, different laser modalities have been proposed for the management of leg veins. The aim of this article is to present an overview of the basic principles of transcutaneous laser therapy of leg veins and to review the existing literature on this subject, including the most recent developments. The 532-nm potassium titanyl phosphate (KTP) laser, the 585-600-nm pulsed dye laser, the 755-nm alexandrite laser, various 800-983-nm diode lasers, and the 1,064-nm neodymium yttrium-aluminum-garnet (Nd:YAG) laser and various intense pulsed light sources have been investigated for this indication. The KTP and pulsed dye laser are an effective treatment option for small vessels (<1 mm). The side effect profile is usually favorable to that of longer wavelength modalities. For larger veins, the use of a longer wavelength is required. According to the scarce evidence available, the Nd:YAG laser produces better clinical results than the alexandrite and diode laser. Penetration depth is high, whereas absorption by melanin is low, making the Nd:YAG laser suitable for the treatment of larger and deeply located veins and for the treatment of patients with dark skin types. Clinical outcome of Nd:YAG laser therapy approximates that of sclerotherapy, although the latter is associated with less pain. New developments include (1) the use of a nonuniform pulse sequence or a dual-wavelength modality, inducing methemoglobin formation and enhancing the optical absorption properties of the target structure, (2) pulse stacking and multiple pass laser treatment, (3) combination of laser therapy with sclerotherapy or radiofrequency, and (4) indocyanin green enhanced laser therapy. Future studies will have to confirm the role of these developments in the treatment of leg veins. The literature still lacks double-blind controlled clinical trials comparing the different laser modalities with each other and with sclerotherapy. Such trials should be the focus of future research. PMID:24220848

Choi, Bernard 2008-01-01
mm spot); and (5) PDT (25 or 75 J/cm2 )þPDL (7 J/cm2 ). Laser speckle imaging was used to monitor. Key words: benzoporphyrin derivative; laser speckle imaging; photodynamic therapy; port wine stainsLasers in Surgery and Medicine 40:644650 (2008) Vascular Effects of Photodynamic and Pulsed Dye

493. Emerging Therapies for Scar Prevention
PubMed Central
Block, Lisa; Gosain, Ankush; King, Timothy W. 2015-01-01
Significance: There are 12 million traumatic lacerations treated in the United States emergency rooms each year, 250 million surgical incisions created worldwide every year, and 11 million burns severe enough to warrant medical treatment worldwide. In the United States, over $20 billion dollars per year are spent on the treatment and management of scars. Recent Advances: Investigations into the management of scar therapies over the last decade have advanced our understanding related to the care of cutaneous scars. Scar treatment methods are presented including topical, intralesselional, and mechanical therapies in addition to cryotherapy, radiotherapy, and laser therapy. Critical Issues: Current treatment options for scars have significant limitations. This review presents the current and emerging therapies available for scar management and the scientific evidence for scar management is discussed. Future Directions: Based upon our new understanding of scar formation, innovative scar therapies are being developed. Additional research on the basic science of scar formation will lead to additional advances and novel therapies for the treatment of cutaneous scars.

PMID:26487979

494. Lasers and their therapeutic application in chiropractic
PubMed Central
Fitz-Ritson, Don
2001-01-01
The purpose of this paper is to review some of the applications of laser therapy and its reported effects on tissue healing, pain relief and other effects. Several musculoskeletal and low back pain studies are highlighted to show the efficacy of laser therapy and its' applicability as an adjunct to chiropractic treatment. Information is also presented which highlights the necessary information the clinician should be aware of in order to develop specific protocols for musculoskeletal pathologies. The parameters, which are now available on lasers, include power, frequency, duty cycle and cadence. When these are manipulated, different effects are achieved on tissues, which may enhance chiropractic treatment. Imagesp34-a

495. Testosterone therapy for men
MedlinePLUS
Testosterone replacement therapy; Androgen therapy; Androgen replacement therapy; Testosterone deficiency - replacement ... TESTOSTERONE AND YOUR BODY Testosterone is a hormone made by the testicles in men. It is the ...

496. Model of laser-induced temperature changes in solid-state optical refrigerators
E-print Network
Sheik-Bahae, Mansoor
laser gain materials,2 display and lamp phosphors,3 solid-state lighting devices,46 luminescent biomarkers,79 and fiber lasers and amplifiers. Light-induced heating also plays a key role in laser ablation,10 photothermal therapy,113 laser-induced damage of tissue, and thermal lensing. While

497. Alternative Approach to the Management of Postoperative Pain after Pediatric Surgical Procedures
PubMed Central
Souza, Juliana; Santos-Pinto, Lourdes; Pansani, Cyneu
2014-01-01
ABSTRACT Aim: This paper reports two clinical cases in which the application of low-level laser therapy (LLLT) enhanced the postoperative symptoms after pediatric surgical procedures. Background: The uses of novel technologies allow more comfort to the patients and ensure a rapid procedure, and LLLT application has shown a positive effect in the prevention of discomfort after invasive procedures. Case description: Low-level laser therapy protocol was applied after surgical removal of supernumerary tooth and frenectomy resulting in less swelling and pain with no need of medication intake. Conclusion: The laser application was well accepted by both children and parents and showed a clinical efficacy in the follow-up examinations beyond the satisfactory quality of wound healing. Clinical significance: The LLLT approach is an excellent adjuvant therapy resource for delivery an optimal postoperative after surgical procedures in children. How to cite this article: Paschoal M, Souza J, Santos-Pinto L, Pansani C. Alternative Approach to the Management of Postoperative Pain after Pediatric Surgical Procedures. Int J Clin Pediatr Dent 2014;7(2):125-129. PMID:25356012

498. Periodontal Treatment Elevates Carotid Wall Shear Stress in the Medium Term
PubMed Central
Carallo, Claudio; Franceschi, Maria Serena De; Tripolino, Cesare; Iovane, Claudio; Catalano, Serena; Giudice, Amerigo; Crispino, Antonio; Figliuzzi, Michele; Irace, Concetta; Fortunato, Leonzio; Gnasso, Agostino
2015-01-01
Abstract Periodontal disease is associated with endothelial dysfunction of the brachial artery and hemodynamic alterations of the common carotid artery. Periodontal therapy improves endothelial function. It
is not known if it is able also to improve the hemodynamics of the carotid artery. The aim of the current study was to evaluate the efficacy of 2 different periodontal treatments on carotid hemodynamics: scaling and root planing (SRP) alone or together with low-level laser therapy (LLLT). Forty patients were recruited and randomly treated with SRP (n=?20) or SRP+?LLLT (n=?20). Periodontal indices (plaque, gingival, and probing depth indices) were measured before and 5 months after treatment. Blood viscosity, common carotid wall shear stress, circumferential wall tension, and Peterson elastic modulus were evaluated before, soon after and 5 months after treatment. It was found that the periodontal indices improved in both groups, but significantly more so for SRP+?LLLT than for SRP (decrease in gingival index 69.3% versus 45.4%, respectively, P=?0.04). In the SRP+?LLLT group, after a transient reduction by 5% immediately after therapy, shear stress increased by 11% after 5 months. In SRP only group, however, shear stress variations were less marked. No significant changes were found for the other hemodynamic parameters in either of the groups. Periodontal disease treatment by SRP+?LLLT can therefore be said to improve common carotid wall shear stress. This suggests a possible mechanism by which the treatment of periodontal disease has beneficial effects on the cardiovascular system. PMID:26496285

499. Fractional Resurfacing Aiding Photodynamic Therapy of a Recalcitrant Plantar Verruca
PubMed Central
Pope, Amy
2008-01-01
Fractional resurfacing has become a very popular laser modality in recent years, and photodynamic therapy (PDT) has become a mainstay of many practices treating a wide array of clinical entities. In this case report, we describe a recalcitrant verrucous lesion on the foot that is unresponsive to cryotherapy, pulsed dye laser, and pulsed dye laser with PDT. The lesion did, however, respond very well to the use of a fractional laser to enhance the penetration of the PDT photosensitizer and then responded to pulsed dye laser with PDT. Fractional resurfacing prior to PDT may be a novel dermatologic treatment approach, making PDT an even better treatment option in the future. PMID:21103307

500. Laser/Light Therapy for Birthmarks
MedlinePLUS
... subspecialty, ASDS member dermatologists perform medically necessary and cosmetic procedures to improve the health, function and beauty ... to frown lines… Performing more than 5 million cosmetic procedures each year, ASDS member dermatologists offer many ...