Aceasta este o selectie din articolele gasite pe internet in legatura cu efectele luminii polarizate dar si ale LASER-elor de joasa energie (ce nu se folosesc in chirurgie) care actioneaza in acelasi fel, motiv pentru care cercetarile cu aceste lasere sint valabile si pentru lumina polarizata

Sublinierile imi apartin si le-am facut ca sa fie mai vizibila, pentru mine mai ales, concluzia autorului.
Evident cei care doresc pot cauta articolele complete si pot cauta si altele. Le-as ramine dator celor care vor gasi alte articole interesante si mi le-ar semnala si mie.

Anul C V
Nr. 4 **Revista de Medicina Militara în anii 2001 si 2002.**
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EDITATA DE DIRECTIA ASISTENTA MEDICALA DIN MINISTERUL APARARII NATIONALE SI ASOCIATIA MEDICILOR SI FARMACISTILOR MILITARI DIN ROMÂNIA

Terapia cu lumina polarizata în prostatite. I.COMAN, V.VANEA, Gh.STANESCU, G.GORDAN, S.STANESCU, G.G.GORDAN

Prostatitele reprezinta afectiuni frecvent întâlnite în patologia urologica masculina, care necesita tratamente îndelungate, complexe si destul de costisitoare.
Lumina polarizata, policromatica, incoerenta de energie joasa, se dovedeste a fi deosebit de utila în tratamentul afectiunilor inflamtorii ale prostatei, activând capacitatea de autoaparare precum si unele procese de regenerare.
Rezultatele obtinute în urma investigarii unui lot de 144 de pacienti, doi ani consecutiv, ne permit sa afirmam ca TERAPIA CU LUMINA POLARIZATA largeste gama terapeutica si permite atât utilizarea solitara a luminii polarizate, cât si terapia asociata, cu efecte benefice pentru pacienti într-un interval de timp redus.
Aplicarea terapiei cu lumina polarizata este comoda, ieftina, cu rezultate favorabile si de durata.

http://www.holisticonline.com/Light_Therapy/light_conductor.htm#ConductLight

Does the Human Body Conduct Light?

When we studied optics in school, we learned about conductors and reflectors. Those that conduct light are called transparent objects; those that do not conduct or transmit light are called opaque. One of the signs of an opaque object is that it creates a shadow when it is struck by light. Our body is transparent to higher energy photons such as x-rays and laser. But, it is opaque to visible light (it produces shadow.) ; or is it?

A group of scientists under Prof. Kaznachejew conducted some unusual experiments at the Institute for clinical and Experimental Medicine, in Novosibirsk, USSR. They directed a focused beam of light into different parts of the human body. The objective was to measure the skin reaction to radiation in the visible light spectrum. They used a simple laboratory light, equipped with several light filters. During this experiment, the experimenters saw a strong light signal, a tiny speck of light, at a not illuminated area about 10 centimeters distant from the illuminated surface. To their surprise, they noticed that the spot of the light had spread under the human skin (the strength of the light signal was monitored by a photo-metric device, supported by a luminance microscope with a photo multiplier).

In order to understand this phenomena better and to better classify it, follow-up experiments were conducted with better equipment. They found that only certain parts of the body are able to conduct the light entering it. This "light sensitive regions" coincided with the well-known acupuncture points and meridians on the body surface. (Please refer to the section on Acupuncture for a description of the meridians and a schematic view of the 12 meridians in the human body.) The traditional Chinese defines 365 main acupuncture points (which actually are holes which provide access to the meridians or channels which control body's vital organs.) Historically, acupuncture points were believed to be holes that allow entry into channels. These holes provide us gateways to influence, redirect, increase, or decrease body's vital substance, qi, thus correcting many of the imbalances.

The experiments at Novosibirsk did demonstrate that light will only propagate

between points of the same acupuncture circuit. If the light source is moved by as little as 3-4 millimeters distant from the acupuncture point, the signal to the photomultiplier disappears at once. The light path through the human body was found to be dependent on the spectral range of the light used. The white light (a mixture of all colors) propagated the best , followed by red and blue. Green light had traveled the least.

If a living organism is exposed to visible light at the critical points, the light can travel immense distances within the body as shown in the routing of the meridians. We may think of the meridians as a "light distribution system," similar to a fiber optics system used in modern communication systems. In a fiber optic channel, the light can travel even around bends and corners by bouncing and reflecting. If one accept this light conducting theory, then we can explain the claim made by some individuals that they can sense colors and differentiate texture just by touching!

Two American scientists, Dina F. Mandoley and Winslow R.Briggs, found that light can travel through plants (Scientific American, August 1984). They illuminated the end of a barley stem with red light of a helium-neon laser. They found that the barley stem conducted the light for a distance of 4.5 centimeters. The light was traced visually and with the aid of a photo multiplier at the dark end of the stem.

From these observations, it has been postulated that the living beings are sensitive to the changes in intensity of incident light. In fact, the light may have a profound influence on the cycles of life. The entire internal system of light guiding channels is adapted to the electromagnetic environment provided by the sun and is an additional aid to survival. It is also possible that the organism uses the light to sense the changes to its external environment and use it to regulate the function of different body parts. For instance, plants do not have a nervous system such as that present in animal and humans. So, the plants may be using these "light channels" as a pseudo nervous system. This can explain why a plant will die if it does not get enough sunlight (Of course, the plants cannot make their food in the absence of light.) Within the human organism, the inner light guide system is, perhaps, a remnant of a much older regulatory system, which was inherited from an earlier state of evolution from a time where nervous systems in living organism were either undeveloped or not in existence at all.

Many scientists believe that light entering through the retina of the eye is

responsible for the coordination of the circadian rhythms in human beings. Recent research has shown, however, some blind person's circadian rhythm can be influenced by light therapy. If body can conduct light, as this research has shown, it may bring up a whole new aspect to the manipulation of circadian rhythm.

1: Opt Lett. 2008 Jan 1;33(1):77-9. Links

Numerical study of the effects of scatterer sizes and distributions on multiple backscattered intensity patterns of polarized light.

Deng Y, **Zeng S**, **Luo Q**, **Zhang Z**, **Fu L**.

Britton Chance Center for Biomedical Photonics, Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, Wuhan 430074, China.

We investigate numerically the effects of scatterer sizes on backscattered polarization patterns using the third-order scattering model developed. The calculated results show that both parallel and cross polarization patterns from water suspensions of polystyrene spheres have four-lobe structures of the azimuth dependence of intensities. Particularly, the parallel polarization pattern is sensitive to scatterer sizes, exhibiting good agreement with prior experimental measurements. Furthermore, the polarization patterns from the dysplastic and normal cells with different size distribution widths are calculated and analyzed. The results show that the polarization patterns of dysplastic and normal cells have distinct differences, which might be used for identification of the morphological structure changes of cancer, dysplasia, and regeneration cells.

PMID: 18157264 [PubMed - indexed for MEDLINE]

: Cell Biol Int. 2002;26(3):265-9. Links

Opposite effect of linearly polarized light on biosynthesis of interleukin-6 in a human B lymphoid cell line and peripheral human monocytes.

Fenyo M, **Mandl J**, **Falus A**.

Bioptron Health Center, Budapest, Hungary.

The effects of linearly polarized light (LPL) and diffuse light (DL) on the in vitro interleukin-6 (IL-6) production in a human B lymphoma cell line (BMNH) and peripheral monocytes of healthy volunteers were compared. Our data show that there was a significant increase of IL-6 and IgM production in BMNH after exposure to LPL. The increase in IgM secretion was a consequence of its autocrine regulation by IL-6, since in the presence of anti-IL-6 and anti-IL-6 receptor antibodies the LPL-induced IgM secretion was abolished. In contrast to the stimulatory effect on B cells, exposure of human mononuclear phagocytes to LPL markedly reduced the production of IL-6 induced by subsequent stimulation of cells with bacterial endotoxin (LPS). The inhibition as most pronounced when suboptimal doses of LPS were applied. Under identical experimental conditions, DL had no effect on the IL-6 and IgM production of either B cells or monocytes.

PMID: 11991654 [PubMed - indexed for MEDLINE

1: Immunol Cell Biol. 1995 Jun;73(3):239-44. Links

Effect of visible light on some cellular and immune parameters.

Kubasova T, **Horváth M**, **Kocsis K**, **Fenyö M**.

Frédéric Joliot-Curie National Research Institute for Radiobiology and Radiohygiene, Budapest, Hungary.

The biological effect of visible light of low energy density was investigated in this study. The effects of diffuse (DL) and linearly polarized (LPL) light were compared on models in vitro and in vivo. Experiments in vitro were performed on human lymphocytes to study their blast-transformation and rosette-formation abilities. Both DL and LPL increased the number of blast-transformed cells even in a lymphocyte culture without PHA, and reduced rosette-formation of T lymphocytes. LPL had a more pronounced effect. In vivo exposure to DL and LPL of the spleens of tumour-bearing mice caused the appearance of factor(s) in their serum, inhibiting the incorporation in vitro of [3H]-thymidine into the tumour cells obtained from non-exposed animals. In the other series of experiments serum samples were taken from tumorous animals after the exposure of their spleens to LPL. Following the daily administration of these sera to another group of non-exposed tumorous mice a decreasing tendency of the mitotic kinetics of ascites tumour was observed. The application of visible (preferably linearly polarized) light for the stimulation of human immune competent cells, and clinical trials with extracorporeal

irradiation of blood for the promotion of natural defences of an immune-repressed organism are suggested.

PMID: 7590897 [PubMed - indexed for MEDLINE]

1: J Burn Care Res. 2007 Mar-Apr;28(2):291-8. Links

The efficacy of linear polarized polychromatic light on burn wound healing: an experimental study on rats.

Karadag CA, **Birtane M**, **Aygit AC**, **Uzunca K**, **Doganay L**.

Physical Medicine and Rehabilitation Department, Trakya University Medical Faculty, Edirne, Turkey.

We aimed to investigate the questionable effect of linear polarized polychromatic light on burn wound healing in rats. Two deep second-degree burn wounds on the backside of each of 21 Sprague-Dawley rats were created with a standard burning procedure by applying a heated plaque. Burned regions located right dorsolaterally and classified as group I lesions were treated with linear polarized polychromatic light + open dressing + antibacterial pomade, whereas group II lesions were located left dorsolaterally and treated with only open dressing + antibacterial pomade. Macroscopic evaluation was performed for determination of the completed wound closure rate, measurement of burn wound area, and investigation of macroscopic edema, hyperemia, and epithelialization. Histopathological evaluation included monitoring of epithelialization, vascularization, origination of granulation tissue, inflammatory cell response, and total histopathological score on days 7, 14, and 21 after burn creation. Macroscopic evaluation revealed more obvious epithelialization in group I lesions between days 6 and 15. The number of completely closed wounds was higher in group I than in group II on days 16 and 21. The average area of burn wounds was lower from day 5, hyperemia was less on days 2 to 17, and edema was less from day 4 to day 13 in group I lesions. Histopathological evaluation revealed a higher rate of epithelialization on day 7 and higher vascularization occurrence on day 21 in group I lesions. Linear polarized polychromatic light seems to be effective in the treatment of burn wounds and in the promotion of healing. This may be related to linear polarized polychromatic light stimulation of epithelialization and vascularization.

PMID: 17351447 [PubMed - indexed for MEDLINE]

Related Links

- [Morphological characteristics of the healing of burn wounds covered by an activated-charcoal tissue dressing] [Biull Eksp Biol Med. 1989]
- Polychromatic LED therapy in burn healing of non-diabetic and diabetic rats. [J Clin Laser Med Surg. 2003]
- Porcine dermal collagen as a wound dressing for skin donor sites and deep partial skin thickness burns. [Burns. 1992]
- Evaluation of a porous bovine collagen membrane bandage for management of wounds in horses. [Am J Vet Res. 1995]
- Polarized light (400-2000 nm) and non-ablative laser (685 nm): a description of the wound healing process using immunohistochemical analysis. [Photomed Laser Surg. 2005]

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2: J Rehabil Res Dev. 2006 Jul-Aug;43(4):565-72. FREE full text article at JRRD Links

Antinociceptive effect of linear polarized 0.6 to 1.6 microm irradiation of lumbar sympathetic ganglia in chronic constriction injury rats.

Muneshige H, **Toda K**, **Ma D**, **Kimura H**, **Asou T**, **Ikuta Y**.

Department of Rehabilitation, Hiroshima University Hospital, Hiroshima, Japan.

Linear polarized near-infrared light created with linear polarized near-infrared light therapy equipment (Super Lizer TM HA-550, Tokyo Iken Co, Ltd, Tokyo, Japan) has been used for the treatment of various painful disorders in Japan. Irradiation near the stellate ganglion with a Super Lizer (ISGL) is an especially notable therapeutic method used with stellate ganglion block (SGB) or substitutes for SGB. ISGL is a safe, simple, well-tolerated, and effective treatment. We examined the effects of irradiation with a Super Lizer applied to an area near the lumbar sympathetic ganglia on the ligated side in a chronic constriction injury (CCI) model, which is believed to be an animal model of complex regional pain syndrome (CRPS). Rats showing thermal hyperalgesia in a radiant heat test 1 wk postoperatively were used in Experiments 1 and 2: (1) Thermal hyperalgesia of irradiation group (n = 11) was less than that of the control or nonirradiation (n = 11) group at 1, 3, and 8 h after irradiation; however, the effect disappeared 12 h after irradiation. (2) Daily irradiation (n = 16) and 1 wk (n = 14) from 7 days after nerve ligation significantly shortened the interval from thermal hyperalgesia

until recovery. Rats showing mechanical hyperalgesia in the von Frey hair test 1 wk postoperatively were used in Experiment 3: 1 wk irradiation beginning 7 days after nerve ligation (n = 9) did not promote the recovery from mechanical hyperalgesia. We speculate that repeated ISGL may be more effective than a single ISGL in alleviating pain in CRPS patients. We cannot explain the discrepancy between the results obtained in Experiments 2 and 3. We believe the results of this study are relevant to the effect of ISGL for patients with upper-limb CRPS: irradiation near the lumbar sympathetic ganglia of the rat is effective for thermal but not mechanical pain in CCI.

PMID: 17123194 [PubMed - in process]

Related Links

- [The effects of linear polarized light irradiation around the lumbar sympathetic ganglion area upon the skin temperature of lower extremities] [Masui. 2007]
- Effects of linearly polarized 0.6-1.6 microM irradiation on stellate ganglion function in normal subjects and people with complex regional pain (CRPS I). [Lasers Surg Med. 2003]
- Thiamine, pyridoxine, cyanocobalamin and their combination inhibit thermal, but not mechanical hyperalgesia in rats with primary sensory neuron injury. [Pain. 2005]
- Effect of linear polarized light irradiation near the stellate ganglion in skin blood flow of fingers in patients with progressive systemic sclerosis. [Photomed Laser Surg. 2006]
- Antinociceptive effects of neurotropin in a rat model of painful peripheral mononeuropathy. [Life Sci. 1998]

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3: Masui. 2006 Sep;55(9):1104-11. Links

[Equipment for low reactive level laser therapy including that for light therapy]

[Article in Japanese]

Saeki S.

Department of Anesthesiology, Nihon University School of Medicine (Surugadai Nihon University Hospital), Tokyo.

Equipments used for light therapy include machinery used for irradiation by low reactive level laser, xenon light and linear polarized infra-red ray. Low reactive level laser is

divided into two types of laser according to the medium by which laser is obtained ; semiconductor laser and helium-neon laser. Low reactive level laser has only one wave length and produces analgesia by action of light itself. On the other hands, Xenon light and linear polarized infra-red ray produce analgesia by warming effect induced by light in addition to the action of light itself. There are four methods of irradiation by these light sources; irradiation of acupuncture points, of trigger points, along nerves causing pain and of stellate ganglion area. Indication for light therapy includes various kinds of diseases such as herpes zoster, post herpetic neuralgia, cervical pain, lumbago due to muscle contracture, complex regional pain syndrome, arthralgia etc. However, we have to know that light therapy does not exert analgesic effects equally to all patients. But light therapy does not accompany pain and rarely shows any side effects. Therefore it is thought to be an alternative for patients who reject injection or patients who are not indicated for nerve block because of patients' conditions such as bleeding tendency.

PMID: 16984008 [PubMed - indexed for MEDLINE]

Related Links

- Rapid healing of gingival incisions by the helium-neon diode laser. [J Mass Dent Soc. 1999]
- [Effects of low reactive level laser, linear polarized light and Xenon-ray irradiation on the stellate ganglion in dogs] [Masui. 2001]
- Effects of helium-neon laser irradiation on skin resistance and pain in patients with trigger points in the neck or back. [Phys Ther. 1989]
- Relief from chronic pain by low power laser irradiation. [Neurosci Lett. 1983]
- Evaluation of analgesic effect of low-power He:Ne laser on postherpetic neuralgia using VAS and modified McGill pain questionnaire. [J Clin Laser Med Surg. 1991]

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4: Am J Dent. 2006 Aug;19(4):227-30. Links

Resolution of intractable hiccups after near-infrared irradiation of relevant acupoints.

Chang CC, **Chang ST**, **Lin JC**, **Li TY**, **Chiang SL**, **Tsai KC**.

Department of Physical Medicine and Rehabilitation, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan, Republic of China.

BACKGROUND: Intractable hiccups are occasionally encountered in the presence of stroke but are usually difficult to manage. METHODS: We describe two stroke patients with intractable hiccups that were refractory to pharmacological treatment but were well resolved by application to relevant acupoints with the modality linear polarized near-infrared ray equipment on PC 6 (Nei Guan), ST 36 (Zu San Li), and DU 9 (Chih Yang), which are the empirical acupoints aimed at regulating gastrointestinal mobility and function of the thoracic organ. RESULTS: The first patient who received the treatment for only one time came out with a dramatic termination of intractable hiccups 3 hours later and with no recurrence thereafter. We applied the same treatment on the second patient once a day for 8 consecutive days, which led to progressive amelioration of intractable hiccups. CONCLUSIONS: This is the first report about the complete resolution of intractable hiccups due to stroke using near-infrared irradiation to acupoints, rather than using conventional pharmacologic therapy, traditional acupuncture, or moxibustion. Consequently, these findings suggest that linear polarized near-infrared ray irradiation, with its noninvasive properties, might be an alternative treatment for intractable hiccups after stroke.

PMID: 16909058 [PubMed - indexed for MEDLINE]

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- Acupuncture therapy rapidly terminates intractable hiccups complicating acute myocardial infarction. [South Med J. 2005]
- Vagus nerve stimulation for chronic intractable hiccups. Case report. [J Neurosurg. 2005]
- Termination of intractable hiccups with digital rectal massage. [J Intern Med. 1990]
- Gabapentin as a drug therapy of intractable hiccup because of vascular lesion: a three-year follow up. [Neurologist. 2004]
- Intractable hiccups during stroke rehabilitation. [Arch Phys Med Rehabil. 1998]

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6: Clin J Sport Med. 2006 Jul;16(4):293-7. Wolters Kluwer | Lippincott Williams & Wilkins Links

Comparison in the effect of linear polarized near-infrared light irradiation and light exercise on shoulder joint flexibility.

Demura S, **Noguchi T**, **Matsuzawa J**.

Faculty of Education, Graduate School of Nature Science and Technology, Kanazawa University, Kakuma-machi, Kanazawa, Ishikawa, Japan.

OBJECTIVE: This study aimed at comparing the effect of linear polarized near-infrared light irradiation (PL irradiation) and bicycle exercise with 50%HRreserve on the flexibility of the shoulder joint. DESIGN: Placebo-controlled trial. SETTING: Twenty-four healthy young adults (10 males: mean+/-SD, age 20.9+/-3.1 y, height 171.0+/-3.9 cm, body mass 63.4+/-3.5 kg and 14 females: age 21.2+/-1.7 y, height 162.0+/-7.8 cm, body mass 56.2+/-7.2 kg). INTERVENTIONS: PL-irradiation (100%, 1800 mW), placebo-irradiation (10%,180 mW), and light exercise (50%HRreserve) for 10 minutes. OUTCOME MEASUREMENTS AND RESULTS: The shoulder joint angles were measured twice-before and after each intervention. We measured the angles when the right shoulder joint extended forward and flexed backward maximally without support, and analyzed these shoulder joints and range of motion. Trial-to-trial reliability (intraclass correlations) of each joint angle was very high, over 0.98. All joint angles showed significant changes, and values in post-PL-irradiation and postlight exercise were significantly greater than that in postplacebo-irradiation. Shoulder forward flexion and backward extension angles had significantly greater change rates in PL-irradiation and light exercise than placebo-irradiation, and their range of motion angle was in the order of PL-irradiation, light exercise, and placebo-irradiation. CONCLUSIONS: It is suggested that PL-irradiation produces almost the same effect on shoulder joint range of motion as light exercise.

PMID: 16858211 [PubMed - indexed for MEDLINE]

Related Links

- Effect of linear polarized near-infrared light irradiation on flexibility of shoulder and ankle joints. [J Sports Med Phys Fitness. 2002]
- Adding weights to stretching exercise increases passive range of motion for healthy elderly. [J Strength Cond Res. 2003]
- Exercise therapy for shoulder pain aimed at restoring neuromuscular control: a randomized comparative clinical trial. [J Rehabil Med. 2005]
- Evaluation of the passive function of the biceps brachii muscle-tendon unit in limitation of shoulder and elbow joint ranges of motion in horses. [Am J Vet Res. 2005]
- Measurement of angles of abduction for diagnosis of shoulder instability in dogs using goniometry and digital image analysis. [Vet Surg. 2005]

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7: Vopr Kurortol Fizioter Lech Fiz Kult. 2006 Mar-Apr;(2):37. Links

[Application of polarized light in herpes]

[Article in Russian]

Dvurechenskiĭ VV, **Kiseleva SS**.

PMID: 16752826 [PubMed - indexed for MEDLINE]

Related Links

- [The intracorporeal ultraviolet irradiation of the blood and its effect on the immune status in patients with a surgical infection] [Lik Sprava. 1997]
- [New technique and methods of combined hemosorption] [Khirurgiia (Mosk). 1997]
- Efficacy of narrowband UVB phototherapy in early stage of mycosis fungoides. [J Eur Acad Dermatol Venereol. 2006]
- Wide-area 308-nm phototherapy with nonlaser light in the treatment of psoriasis: results of a pilot study. [Br J Dermatol. 2005]
- Various patterns of repigmentation after narrowband UVB monotherapy in patients with vitiligo. [J Dermatol. 2005]

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8: Photomed Laser Surg. 2006 Apr;24(2):129-39. Links

Pro- and anti-inflammatory cytokine content in human peripheral blood after its transcutaneous (in vivo) and direct (in vitro) irradiation with polychromatic visible and infrared light.

Zhevago NA, **Samoilova KA**.

Photobiology Unit, Institute of Cytology of the Russian Academy of Sciences, St. Petersburg.

OBJECTIVE: The aim of this randomized, placebo-controlled, double-blind trial was to investigate changes in the content of 10 cytokines in the human peripheral blood after transcutaneous and in vitro irradiation with polychromatic visible and infrared (IR) polarized light at therapeutic dose. BACKGROUND DATA: The role of cytokines in development of anti-inflammatory, immunomodulatory, and wound-healing effects of visible and IR light remains poorly studied. METHODS: The sacral area of volunteers

was exposed (480-3400 nm, 95% polarization, 12 J/cm(2)); in parallel, the blood samples of the same subjects were irradiated in vitro (2.4 J/cm(2)). Determination of cytokine content was performed using enzyme-linked immunosorbent assay (ELISA). RESULTS: A dramatic decrease in the level of pro-inflammatory cytokines TNF-alpha, IL-6, and IFN-gamma was revealed: at 0.5 h after exposure of volunteers (with the initial parameters exceeding the norm), the cytokine contents fell, on average, 34, 12, and 1.5 times. The reduced concentrations of TNF-alpha and IL-6 were preserved after four daily exposures, whereas levels of IFN-gamma and IL-12 decreased five and 15 times. At 0.5 h and at later times, the amount of anti-inflammatory cytokines was found to rise: that of IL-10 rose 2.7-3.5 times (in subjects with normal initial parameters) and of TGF-beta1 1.4-1.5 times (in the cases of its decreased level). A peculiarity of the light effect was a fast rise of IFN-gamma at 3.3-4.0 times in subjects with normal initial values. The content of IL-1beta, IL-2, IFN-alpha, and IL-4 did not change. Similar regularities of the light effects were recorded after in vitro irradiation of blood, as well as on mixing the irradiated and non-irradiated autologous blood at a volume ratio 1:10 (i.e., at modeling the events in a vascular bed of the exposed person when a small amount of the transcutaneously photomodified blood contacts its main circulating volume). CONCLUSION: Exposure of a small area of the human body to light leads to a fast decrease in the elevated pro-inflammatory cytokine plasma content and to an increase in the the anti-inflammatory factor concentration, which may be an important mechanism of the anti-inflammatory effect of phototherapy. These changes result from transcutaneous photomodification of a small volume of blood and a fast transfer of the light-induced changes to the entire pool of circulating blood.

PMID: 16706691 [PubMed - indexed for MEDLINE]

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- [Changes in cytokine content in the peripheral blood of volunteers after their exposure to polychromatic visible and infrared light] [Tsitologiia. 2005]
- [Enhancement of fibroblast growth promoting activity of human blood after its irradiation in vivo (transcutaneously) and in vitro with visible and infrared polarized light] [Tsitologiia. 2004]
- [Modulation of proliferation of peripheral blood lymphocytes after irradiation of volunteers with polychromatic visible and infrared light] [Tsitologiia. 2004]
- Enhancement of the blood growth promoting activity after exposure of volunteers to visible and infrared polarized light. Part I: stimulation of human keratinocyte proliferation in vitro. [Photochem Photobiol Sci. 2004]

- [Enhancement of growth promoting activity of human blood on keratinocytes after its irradiation in vivo (transcutaneously) and in vitro with visible and infrared polarized light] [Tsitologiia. 2003]

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9: J Biomed Opt. 2006 Mar-Apr;11(2):024002. Links

Collagen birefringence in skin repair in response to red polarized-laser therapy.

da Silva Dde F, **Vidal Bde C**, **Zezell DM**, **Zorn TM**, **Núñez SC**, **Ribeiro MS**.

IPEN-CNEN/SP , Instituto de Pesquisas Energéticas e Nucleares-Comissão, Nacional de Energia Nuclear/SP, Centro de Lasers e Aplicações, CEP 05508-000, São Paulo, São Paulo, Brazil. dftsilva@ipen.br

We use the optical path difference (OPD) technique to quantify the organization of collagen fibers during skin repair of full-thickness burns following low-intensity polarized laser therapy with two different polarization incidence vectors. Three burns are cryogenerated on the back of rats. Lesion L(parallel) is irradiated using the electric field vector of the polarized laser radiation aligned in parallel with the rat's occipital-caudal direction. Lesion L(perpendicular) is irradiated using the electric field vector of the polarized laser radiation aligned perpendicularly to the aforementioned orientation. Lesion C is untreated. A healthy area labeled H is also evaluated. The tissue samples are collected and processed for polarized light microscopy. The overall finding is that the OPD for collagen fibers depends on the electric field vector of the incident polarized laser radiation. No significant differences in OPDs are observed between L(parallel) and H in the center, sides, and edges of the lesion. Lesions irradiated using the electric field vector of the polarized laser radiation aligned in parallel with the rat's occipital-caudal direction show higher birefringence, indicating that collagen bundles in these lesions are more organized.

PMID: 16674192 [PubMed - indexed for MEDLINE]

Related Links

- Effects of low-intensity polarized visible laser radiation on skin burns: a light microscopy study. [J Clin Laser Med Surg. 2004]
- Effects of 1047-nm neodymium laser radiation on skin wound healing. [J Clin Laser Med Surg. 2002]

- Polarized light (400-2000 nm) and non-ablative laser (685 nm): a description of the wound healing process using immunohistochemical analysis. [Photomed Laser Surg. 2005]
- Anaylsis of birefringence during wound healing and remodeling following alkali burns in rabbit cornea. [Exp Eye Res. 2001]
- Intensity profiles of linearly polarized light backscattered from skin and tissue-like phantoms. [J Biomed Opt. 2005]

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10: Pain Res Manag. 2006 Spring;11(1):49-57. Links

Suppression of pain by exposure of acupuncture points to polarized light.

Limansky YP, **Tamarova ZA**, **Gulyar SA**.

Bogomoletz Institute of Physiology, National Academy of Sciences, Kiev, Ukraine. liman@biph@kiev.ua

BACKGROUND: According to clinical studies, the stimulation of acupuncture points (APs) by a variety of methods (eg, needles, pressure, etc) is an effective method for the treatment of many pain syndromes. However, no experimental proof exists showing that the exposure of APs to low-intensity incoherent polarized (P) light evokes an analgesic affect. OBJECTIVES: The authors' previous work, using mice, shows that the exposure of APs to low-intensity microwaves effectively decreases pain. The purpose of the present study was to determine whether exposure of APs to low-intensity incoherent P light evokes a statistically significant reduction in pain. METHODS: The effects of P light on behavioural responses to acute and tonic pain were tested in mice. The threshold of vocalization during electrical stimulation of the foot (acute pain) was measured before and after exposure of AP E-36 to P light. The duration of licking the formalin-injected foot (tonic pain) was investigated in control mice and mice exposed to P light on APs E-36, V-56 and V-60 or on skin that did not contain analgesic APs. RESULTS: Exposure of APs to P light evoked a statistically significant increase in pain threshold by 34.2% to 59.1%, and shortened the licking time by 32.3% to 50% in mice. The most effective AP was E-36 in both the painful foot and the normal foot. After 2 min, 6 min and 10 min of P light exposure, analgesia was 7.6%, 30.9% and 50%, respectively. The exposure to P light on skin that did not contain analgesic APs did not evoke significant effect. CONCLUSIONS: The results show the efficacy of pain suppression by exposure of antinociceptive APs to P light.

PMID: 16511614 [PubMed - indexed for MEDLINE]

Related Links

- [Suppression of visceral pain by action of the low intensity polarized light on acupuncture antinociceptive points] [Fiziol Zh. 2003]
- [Evaluation of analgesia evoked by microwaves of low intensity in the point of acupuncture in mice with different genotypes] [Fiziol Zh. 2004]
- [Comparative testing of analgesia induced by polarized light and analgetics] [Fiziol Zh. 2005]
- Increased pain threshold following electroacupuncture: analgesia is induced mainly in meridian acupuncture points. [Acupunct Electrother Res. 1997]
- [The examination of the analgetic action of polarized light] [Fiziol Zh. 2000]

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11: Photomed Laser Surg. 2006 Feb;24(1):17-21. Links

Effect of linear polarized light irradiation near the stellate ganglion in skin blood flow of fingers in patients with progressive systemic sclerosis.

Lee CH, **Chen GS**, **Yu HS**.

Department of Dermatology, Kaohsiung Medical University, Kaohsiung, Taiwan.

OBJECTIVE: The purpose of this study is to evaluate the effect of linear polarized light irradiation near the stellate ganglion area on cutaneous blood flow in fingers of patients with progressive systemic sclerosis. BACKGROUND DATA: Sympathetic overactivity is known to be present in patients with progressive systemic sclerosis. Recently introduced linear polarized light irradiation is designed to simulate noninvasive stellate ganglion block to decrease sympathetic output. METHODS: Five patients with progressive systemic sclerosis and three normal healthy controls were studied. Linear polarized light (Super Lizer) was irradiated near the stellate ganglion on the right side of the neck at 358 J/cm(2) for 10 min. Then, laser Doppler flowmetry, laser Doppler imager, and capillary microscopy were used to measure the cutaneous blood flow of the right fourth finger for 30 min. RESULTS: No significant alternations of the skin blood flow between normal controls and patients with progressive systemic sclerosis after linear polarized light irradiation were detected. The effect of linear polarized light on the microcirculation of patients with progressive systemic sclerosis was minimal and transient. CONCLUSION: The effect of linear polarized light in treating patients with progressive systemic sclerosis may not result from the improvement of skin blood flow. Therefore, the use of linear polarized light in those patients to increase cutaneous blood flow should not be overemphasized.

PMID: 16503783 [PubMed - indexed for MEDLINE]

Related Links

- [Linear polarized light irradiation around the stellate ganglion area increases skin temperature and blood flow] [Masui. 1996]
- [Effects of low reactive level laser, linear polarized light and Xenon-ray irradiation on the stellate ganglion in dogs] [Masui. 2001]
- [Polarized light irradiation near the stellate ganglion in a patient with Raynaud's sign] [Masui. 1992]
- Effects of linearly polarized 0.6-1.6 microM irradiation on stellate ganglion function in normal subjects and people with complex regional pain (CRPS I). [Lasers Surg Med. 2003]
- [The effects of linear polarized light irradiation around the lumbar sympathetic ganglion area upon the skin temperature of lower extremities] [Masui. 2007]

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12: Clin Rehabil. 2006 Jan;20(1):12-23. Links

Comparison of effects of Cyriax physiotherapy, a supervised exercise programme and polarized polychromatic non-coherent light (Bioptron light) for the treatment of lateral epicondylitis.

Stasinopoulos D, **Stasinopoulos I**.

Rheumatology and Rehabilitation Centre, Athens, Greece. d_stasinopoulos@yahoo.gr

OBJECTIVE: To compare the effectiveness of Cyriax physiotherapy, a supervised exercise programme, and polarized polychromatic non-coherent light (Bioptron light) in the treatment of lateral epicondylitis. DESIGN: Controlled clinical trial. SETTING: Rheumatology and rehabilitation centre. SUBJECTS: This study was carried out with 75 patients who had lateral epicondylitis. They were allocated to three groups by sequential allocation. INTERVENTIONS: Group A (n = 25) was treated with Cyriax physiotherapy. A supervised exercise programme was given to group B (n = 25). Group C (n = 25) received polarized polychromatic non-coherent light (Bioptron light). All patients received three treatments per week for four weeks. OUTCOMES: Pain was evaluated using a visual analogue scale and function using a visual analogue scale and pain-free grip strength at the end of the four-week course of treatment (week 4), one month (week 8), three months (week 16) and six months (week 28) after the end of treatment. RESULTS: The supervised exercise programme produced the largest effect in the

reduction of pain and in the improvement of function at the end of the treatment (P<0.05) and at any of the follow-up time points (P< 0.05). CONCLUSION: The supervised exercise programme should be the first treatment option for therapists when they manage lateral epicondylitis patients. If this is not possible, Cyriax physiotherapy and polarized polychromatic non-coherent light (Bioptron light) may be suitable.

PMID: 16502745 [PubMed - indexed for MEDLINE]

Related Links

- The use of polarized polychromatic non-coherent light as therapy for acute tennis elbow/lateral epicondylalgia: a pilot study. [Photomed Laser Surg. 2005]
- Comparison of short- and long-term outcomes for aggressive spine rehabilitation delivered two versus three times per week. [Spine J. 2002]
- Radial shock wave therapy for lateral epicondylitis: a prospective randomised controlled single-blind study. [Eura Medicophys. 2005]
- A prospective pilot study of a multidisciplinary home training programme for lateral epicondylitis. [Musculoskeletal Care. 2007]
- Comparison of effects of exercise programme, pulsed ultrasound and transverse friction in the treatment of chronic patellar tendinopathy. [Clin Rehabil. 2004]

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13: Photomed Laser Surg. 2005 Oct;23(5):485-92. Links

Polarized light (400-2000 nm) and non-ablative laser (685 nm): a description of the wound healing process using immunohistochemical analysis.

Pinheiro AL, **Pozza DH**, **Oliveira MG**, **Weissmann R**, **Ramalho LM**.

Laser Center, School of Dentistry, Federal University of Bahia (UFBA), Bahia, Brazil. albq@ufba.br

OBJECTIVE: This study aimed to describe, through morphologic and cytochemical analysis, the healing process of wounds submitted (or not) to laser therapy (lambda685 nm) or polarized light (lambda400-2000 nm). BACKGROUND DATA: There are many reports on different effects of several types of phototherapies on the treatment of distinct conditions, amongst them, on wound healing. Laser therapy and the use of polarized light are still controversial despite successive reports on their positive effects on several biological processes. METHODS: Thirty male Wistar rats, approximately 4 months old, were used, and standardized excisional wounds were created on their dorsum. The

wounds were irradiated in four equidistant points with laser light or illuminated with polarized light, both with doses of 20 or 40 J/cm2. Group 1 acted as untreated controls. Animals were irradiated every 48 h during 7 days, starting immediately after surgery, and were humanely killed on the 8th post-operative day. Specimens were taken and routinely processed and stained with H&E, and for descriptive analysis of myofibroblasts and collagen fibers, the specimens were imunnomarked by smooth muscle alpha-actin and picrosirius stain. RESULTS: Control specimens showed the presence of ulceration, hyperemia, discrete edema, intense, and diffuse inflammation, collagen deposition was irregular, and myofibroblasts were seen parallel to the wound margins. Wounds treated by laser therapy with a dose of 20 J/cm2 showed mild hyperemia, inflammation varied from moderate to intense, the number of fibroblasts was large, and the distribution of collagen fibers was more regular. Increasing the dose to 40 J/cm2 evidenced exuberant neovascularization, severe hyperemia, moderate to severe inflammation, large collagen deposition, and fewer myofibroblasts. On subjects illuminated with polarized light with a dose of 20 J/cm2, mild to moderate hyperemia was detectable, and collagen matrix was expressive and unevenly distributed; a larger number of myofibroblasts was present and no re-epithelialization was seen. Increasing the dose resulted in mild to moderate hyperemia, no re-epithelialization was seen, edema was discrete, and inflammation was moderate. CONCLUSION: The use of 685-nm laser light or polarized light with a dose of 20 J/cm2 resulted in increased collagen deposition and better organization on healing wounds, and the number of myofibroblast was increased when polarized light is used.

PMID: 16262579 [PubMed - indexed for MEDLINE]

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- Biomodulative effects of polarized light on the healing of cutaneous wounds on nourished and undernourished Wistar rats. [Photomed Laser Surg. 2006]
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[Comparative testing of analgesia induced by polarized light and analgetics]

[Article in Ukrainian]

Tamarova ZA, **Lymans'kyĭ IuP**, **Huliar SO**.

O. O. Bogomoletz Institute of Physiology, National Academy of Sciences of Ukraine, Kyiv.

In experiments on mice with the tonic pain locus the comparison of analgesia caused by the action of polarized light on an acupuncture point or by two classic analgetics (analginum, tramadol) was performed. The pain was evoked by hypodermic injection of formalin (30 ml of 5% solution) in the plantar region of hindlimb. Intensity of a pain was judged by duration of painful (licking of the pain locus) and non-painful (slipping, eating, running, washing) behavioral reactions for 60 minutes of observation. In animals which received immediately after creation of the tonic pain locus a single intraperitoneal injection of analginum in a doze of 4.2 mg/kg or 8.3 mg/kg the duration of pain response was reduced by 28.5% and 74.9%, respectively. Tramadol decreased the duration of pain behavioral response by 34.2% and 56.2% in a dose 0.8 mg/kg and 8.3 mg/kg, respectively. Statistically significant attenuation of pain (by 50%) was observed in the group of animals exposed to a 10 minute session of polarized light on the antinociceptive acupoint A-36. Compare to animals that received high dozes of analgetics, activity and behavior in mice subjected to an polarized light differed less from the norm. It is possible to suppose, that polarized light will allow a reduction of pharmacological analgetics use and consequently will reduce the risk of development of undesirable side effects in clinic.

PMID: 15943232 [PubMed - indexed for MEDLINE]

Related Links

- [Suppression of visceral pain by action of the low intensity polarized light on acupuncture antinociceptive points] [Fiziol Zh. 2003]
- [Sensitivity to tonic pain and analgin in two lines of mice with knockout genotype] [Fiziol Zh. 2004]
- Suppression of pain by exposure of acupuncture points to polarized light. [Pain Res Manag. 2006]
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17: Photomed Laser Surg. 2005 Apr;23(2):225-8. Links

Treatment of carpal tunnel syndrome with polarized polychromatic noncoherent light (Bioptron light): a preliminary, prospective, open clinical trial.

Stasinopoulos D, **Stasinopoulos I**, **Johnson MI**.

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OBJECTIVE: Our aim was to assess the efficacy of polarized polychromatic noncoherent light (Bioptron light) in the treatment of idiopathic carpal tunnel syndrome. BACKGROUND: Carpal tunnel syndrome is the most common compression neuropathy, but no satisfactory conservative treatment is available at present. METHOD: An uncontrolled experimental study was conducted in patients who visited our clinic from mid-2001 to mid-2002. A total of 25 patients (22 women and three men) with unilateral idiopathic carpal tunnel syndrome, mild to moderate nocturnal pain, and paraesthesia lasting >3 months participated in the study. The average age of the patients was 47.4 years and the average duration of patients' symptoms was 5.2 months. Polarized polychromatic noncoherent light (Bioptron light) was administered perpendicular to the carpal tunnel area. The irradiation time for each session was 6 min at an operating distance of 5-10 cm from the carpal tunnel area, three times weekly for 4 weeks. Outcome measures used were the participants' global assessments of nocturnal pain and paraesthesia, respectively, at 4 weeks and 6 months. RESULTS: At 4 weeks, two patients (8%) had no change in nocturnal pain, six (24%) were in slightly less nocturnal pain, 12 (48%) were much better in regard to nocturnal pain and five (20%) were pain-free. At 6 months, three patients (12%) were slightly better in regard to nocturnal pain, 13 (52%) were much better regarding nocturnal pain, and nine patients (36%) were pain-free. At 4 weeks, four patients (16%) had no change in paraesthesia, five (20%) were slightly better, 13 patients (52%) were much better, and three patients (12%) were without paraesthesia. At 6 months, two patients (8%) had no change in paraesthesia, two (8%) were slightly better, 14 (56%) were much better, and seven (28%) were without paraesthesia. CONCLUSIONS: Nocturnal pain and paraesthesia associated with idiopathic carpal tunnel syndrome improved during polarized polychromatic noncoherent light (Bioptron light) treatment. Controlled clinical trials are needed to establish the absolute and relative effectiveness of this intervention.

PMID: 15910192 [PubMed - indexed for MEDLINE]

Related Links

- Carpal tunnel syndrome pain treated with low-level laser and microamperes transcutaneous electric nerve stimulation: A controlled study. [Arch Phys Med Rehabil. 2002]
- A randomised clinical trial of oral steroids in the treatment of carpal tunnel syndrome: a long term follow up. [J Neurol Neurosurg Psychiatry. 2002]
- Splinting or surgery for carpal tunnel syndrome? Design of a randomized controlled trial [ISRCTN18853827]. [BMC Neurol. 2001]
- Outcomes of endoscopic surgery compared with open surgery for carpal tunnel syndrome among employed patients: randomised controlled trial. [BMJ. 2006]
- Single-portal endoscopic carpal tunnel release compared with open release : a prospective, randomized trial. [J Bone Joint Surg Am. 2002]

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18: Photomed Laser Surg. 2005 Feb;23(1):66-9. Links

The use of polarized polychromatic non-coherent light as therapy for acute tennis elbow/lateral epicondylalgia: a pilot study.

Stasinopoulos D.

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OBJECTIVE: The aim of this study was to assess the efficacy of polarized, polychromatic, non-coherent, low energy light (Bioptron 2, Bioptron AG, Switzerland) in the treatment of acute tennis elbow. BACKGROUND: Tennis elbow, or lateral epicondylitis, is one of the most common lesions affecting the arm. A plethora of treatment regimes have been described for this condition, but no specific therapy has emerged as a gold standard. METHODS: A pilot study was carried out with 25 patients who had acute tennis elbow. Bioptron 2 device was applied over lateral epicondyle three times per week for 4 weeks. Pain on VAS, function on VAS, and painfree grip strength were measured at the beginning (week 0) and at the end of the study (week 4). RESULTS: The pain on VAS was reduced at the end of treatment ($t(24) = 3.84$, $p = 0.001$). Function on VAS was increased at the end of treatment ($t(24) = 4.23$, $p < 0.001$). Pain-free grip strength was increased at the end of treatment ($t(24) = 4.23$, $p < 0.004$). CONCLUSION: Although the results suggested that the Bioptron 2 could reduce patients' symptoms with acute tennis elbow, future controlled studies are needed to establish the relative and absolute effectiveness of Bioptron 2.

PMID: 15782036 [PubMed - indexed for MEDLINE]

Related Links

- Comparison of effects of Cyriax physiotherapy, a supervised exercise programme and polarized polychromatic non-coherent light (Bioptron light) for the treatment of lateral epicondylitis. [Clin Rehabil. 2006]
- Radial shock wave therapy for lateral epicondylitis: a prospective randomised controlled single-blind study. [Eura Medicophys. 2005]
- Non-operative treatment regime including eccentric training for lateral humeral epicondylalgia. [Scand J Med Sci Sports. 2001]
- Treatment of medial and lateral epicondylitis--tennis and golfer's elbow--with low level laser therapy: a multicenter double blind, placebo-controlled clinical study on 324 patients. [J Clin Laser Med Surg. 1998]
- Associations between pain, grip strength, and manual tests in the treatment evaluation of chronic tennis elbow. [Clin J Pain. 2002]

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19: Braz Dent J. 2004;15 Spec No:SI21-8. Links

Phototherapy improves healing of cutaneous wounds in nourished and undernourished Wistar rats.

Pinheiro AL, **Meireles GC**, **de Barros Vieira AL**, **Almeida D**, **Carvalho CM**, **dos Santos JN**.

Laser Center, School of Dentistry, Federal University of Bahia, Salvador, BA, Brazil. albp@ufba.br

A wound represents the interruption of the continuity of tissue that is followed by damage or cellular death. Wound healing occurs due to a competitive mechanism between the synthesis and lysis of collagen. Any factor that increases collagen lysis or reduces its synthesis may result in changes in the healing process, i.e., nutritional deficiencies. Phototherapies have been suggested as an effective method to improve wound healing. This study evaluated, histologically, the differences in the healing of cutaneous wounds in nourished and undernourished rats following laser therapy or illumination by polarized light. Fifty nourished or undernourished Wistar rats had a standardized wound created on the dorsum and were divided into 6 subgroups: Group 1--Control (Standard diet; n=5); Group 2--Control (DBR; n=5); Group 3--Standard diet + laser therapy (lambda635nm; 20J/cm2, n=5; or 40J/cm2, n=5); Group 4--Standard diet + Bioptron (lambda400-2000nm; 20J/cm2, n=5; or 40 J/cm2, n=5); Group 5--DBR + laser therapy (lambda635nm; 20J/cm2, n=5; or 40J/cm2, n=5); Group 6--DBR + Bioptron (lambda400-

2000nm; 20J/cm2, n=5; or 40 J/cm2, n=5). The first application of the treatment was carried out immediately after surgery and repeated every 24 h during 7 days. Specimens were routinely processed (wax, cut and stained with H&E and Picrosirius stain) and analyzed under light microscopy. Analysis included re-epithelization, inflammatory infiltrate, and fibroblastic proliferation. Picrosirius stained slides were used to perform descriptive analysis of the collagen fibers. The results showed the best results for nourished and undernourished groups treated with polarized light at a dose of 20J/cm2 and the undernourished groups irradiated with the laser light. It is concluded that the nutritional status influenced the progression of the healing process as well as the quality of the healed tissue and that the use of both modalities of phototherapy resulted in a positive biomodulatory effect in both nourished and undernourished subjects. The effect of the polarized light was more evident in nourished subjects and laser therapy more effective in the treatment of undernourished subjects, in both cases with a dose of 20J/cm2.

PMID: 15690767 [PubMed - indexed for MEDLINE]

Related Links

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- Polarized light (400-2000 nm) and non-ablative laser (685 nm): a description of the wound healing process using immunohistochemical analysis. [Photomed Laser Surg. 2005]
- Effect of 830-nm laser light on the repair of bone defects grafted with inorganic bovine bone and decalcified cortical osseous membrane. [J Clin Laser Med Surg. 2003]
- Effects of laser therapy in CO2 laser wounds in rats. [Photomed Laser Surg. 2006]
- A preliminary report on the effect of laser therapy on the healing of cutaneous surgical wounds as a consequence of an inversely proportional relationship between wavelength and intensity: histological study in rats. [Photomed Laser Surg. 2004]

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20: Aesthetic Plast Surg. 2004 Sep-Oct;28(5):324-7. Epub 2004 Nov 5. SpringerLink FULL-TEXT ARTICLE Links

The use of polarized light in aesthetic surgery.

Colić MM, **Vidojković N**, **Jovanović M**, **Lazović G**.

Aesthetic Surgery Clinic Colić, Bul. Kralja Aleksandra 280, 11000 Belgrade, Serbia and Montenegro. drcolic@eunet.yu

This article presents a clinical investigation of polarized light therapy after aesthetic surgery procedures. The study included patients who the authors underwent face-lifts, blepharoplasties, and various facial ancillary procedures, at center during the past 2 1/2 years. One side of the surgically treated area was managed with polarized light, whereas the other side served as a control. The results were compared using clinical examination only including signs of recovery such as resolution of swelling and bruises. The results in most cases showed a significant difference between the treated and untreated sides.

PMID: 15666049 [PubMed - indexed for MEDLINE]

Related Links

- Red light-emitting diode (LED) therapy accelerates wound healing post-blepharoplasty and periocular laser ablative resurfacing. [J Cosmet Laser Ther. 2006]
- The utilization of nonthermal blue (405-425 nm) and near infrared (850-890 nm) light in aesthetic dermatology and surgery-a multicenter study. [J Cosmet Laser Ther. 2005]
- Phototherapy improves healing of cutaneous wounds in nourished and undernourished Wistar rats. [Braz Dent J. 2004]
- Aesthetic male facial skeletal surgery. [Aesthetic Plast Surg. 1999]
- Osseous genioplasty in facial aesthetic surgery--a personal perspective reviewing 54 patients. [J Plast Reconstr Aesthet Surg. 2006]

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Design and testing of low intensity laser biostimulator.

Valchinov ES, **Pallikarakis NE**.

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BACKGROUND: The non-invasive nature of laser biostimulation has made lasers an attractive alternative in Medical Acupuncture at the last 25 years. However, there is still an uncertainty as to whether they work or their effect is just placebo. Although a plethora of scientific papers published about the topic showing positive clinical results, there is

still a lack of objective scientific proofs about the biostimulation effect of lasers in Medical Acupuncture. The objective of this work was to design and build a low cost portable laser device for stimulation of acupuncture points, considered here as small localized biosources (SLB), without stimulating any sensory nerves via shock or heat and to find out a suitable method for objectively evaluating its stimulating effect. The design is aimed for studying SLB potentials provoked by laser stimulus, in search for objective proofs of the biostimulation effect of lasers used in Medical Acupuncture. METHODS: The proposed biostimulator features two operational modes: program mode and stimulation mode and two output polarization modes: linearly and circularly polarized laser emission. In program mode, different user-defined stimulation protocols can be created and memorized. The laser output can be either continuous or pulse modulated. Each stimulation session consists of a pre-defined number of successive continuous or square pulse modulated sequences of laser emission. The variable parameters of the laser output are: average output power, pulse width, pulse period, and continuous or pulsed sequence duration and repetition period. In stimulation mode the stimulus is automatically applied according to the pre-programmed protocol. The laser source is 30 mW AlGaInP laser diode with an emission wavelength of 685 nm, driven by a highly integrated driver. The optical system designed for beam collimation and polarization change uses single collimating lens with large numerical aperture, linear polarizer and a quarter-wave retardation plate. The proposed method for testing the device efficiency employs a biofeedback from the subject by recording the biopotentials evoked by the laser stimulus at related distant SLB sites. Therefore measuring of SLB biopotentials caused by the stimulus would indicate that a biopotential has been evoked at the irradiated site and has propagated to the measurement sites, rather than being caused by local changes of the electrical skin conductivity. RESULTS: A prototype device was built according to the proposed design using relatively inexpensive and commercially available components. The laser output can be pulse modulated from 0.1 to 1000 Hz with a duty factor from 10 to 90%. The average output power density can be adjusted in the range 24-480 mW/cm2, where the total irradiation is limited to 2 Joule per stimulation session. The device is controlled by an 8-bit RISC Flash microcontroller with internal RAM and EEPROM memory, which allows for a wide range of different stimulation protocols to be implemented and memorized. The integrated laser diode driver with its onboard light power control loop provides safe and consistent laser modulation. The prototype was tested on the right Tri-Heater (TH) acupuncture meridian according to the proposed method. Laser evoked potentials were recorded from most of the easily accessible SLB along the meridian under study. They appear like periodical spikes with a repetition rate from 0.05 to 10 Hz and amplitude range 0.1-1 mV. CONCLUSION: The prototype's specifications were found to be better or comparable to those of other existing devices. It features low component count, small size and low power consumption. Because of the low power levels used the possibility of sensory nerve stimulation via the phenomenon of

shock or heat is excluded. Thus senseless optical stimulation is achieved. The optical system presented offers simple and cost effective way for beam collimation and polarization change. The novel method proposed for testing the device efficiency allows for objectively recording of SLB potentials evoked by laser stimulus. Based on the biopotential records obtained with this method, a scientifically based conclusion can be drawn about the effectiveness of the commercially available devices for low-level laser therapy used in Medical Acupuncture. The prototype tests showed that with the biostimulator presented, SLB could be effectively stimulated at low power levels. However more studies are needed to derive a general conclusion about the SLB biostimulation mechanism of lasers and their most effective power and optical settings.

PMID: 15649327 [PubMed - indexed for MEDLINE]

Related Links

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- [Low power laser biostimulation in the treatment of bronchial asthma] [Med Pregl. 2003]
- Rapid healing of gingival incisions by the helium-neon diode laser. [J Mass Dent Soc. 1999]
- Thermal lesions produced by CO2 laser beams: new findings to improve the quality of minimally invasive and transmyocardial laser revascularization protocols. [J Clin Laser Med Surg. 2000]
- Carpal tunnel syndrome: clinical outcome after low-level laser acupuncture, microamps transcutaneous electrical nerve stimulation, and other alternative therapies--an open protocol study. [J Altern Complement Med. 1999]

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

Ribeiro MS, **Da Silva Dde F**, **De Araújo CE**, **De Oliveira SF**, **Pelegrini CM**, **Zorn TM**, **Zezell DM**.

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OBJECTIVE: This study was carried out to investigate the influence of low-intensity polarized visible laser radiation on the acceleration of skin wound healing. Background

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

PMID: 15117489 [PubMed - indexed for MEDLINE]

Related Links

- Effects of 1047-nm neodymium laser radiation on skin wound healing. [J Clin Laser Med Surg. 2002]
- Collagen birefringence in skin repair in response to red polarized-laser therapy. [J Biomed Opt. 2006]
- A preliminary report on the effect of laser therapy on the healing of cutaneous surgical wounds as a consequence of an inversely proportional relationship between wavelength and intensity: histological study in rats. [Photomed Laser Surg. 2004]
- Healing of burns after treatment with 670-nanometer low-power laser light. [Plast Reconstr Surg. 2000]
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[Suppression of visceral pain by action of the low intensity polarized light on acupuncture antinociceptive points]

[Article in Ukrainian]

Lymans'kyĭ IuP, **Tamarova ZA**, **Huliar SO**.

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In experiments on mice, statistically authentic weakening of visceral pain has been shown after an action of low intensity polarized light from a device Bioptron on antinociceptive acupuncture points (AP). Pain was caused by an intraperitoneal injection of 2% acetic acid (0.1 ml/10 g). The intensity of pain was judged on duration and frequency of painful behavioral reactions (writhing, licking of abdomen), as well as on duration of sleep, eating and motor activity. In animals which immediately after injections of acetic acid were exposed to polarized light of low intensity for 10 min, applied on any of antinociceptive APs (E-36, E-43, VC-8, RP-6), the duration of painful behavioral reaction was determined to be reduced, while that of non-painful one increased. The comparison of the total duration of the writhing at control and experimental mice showed that an activation of AP E-43 induced the greatest analgesic effect (76.5%), from AP VC-8 it was 76.3%, from RP-6--46.8%, and from E-36--41.4%. We have concluded that the effect of polarized light of low intensity on APs was a convenient non-pharmacological method of treating visceral pain.

PMID: 14663889 [PubMed - indexed for MEDLINE]

Related Links

- Suppression of pain by exposure of acupuncture points to polarized light. [Pain Res Manag. 2006]
- [Comparative testing of analgesia induced by polarized light and analgetics] [Fiziol Zh. 2005]
- [The examination of the analgetic action of polarized light] [Fiziol Zh. 2000]
- Antinociceptive effects of bee venom acupuncture (apipuncture) in rodent animal models: a comparative study of acupoint versus non-acupoint stimulation. [Acupunct Electrother Res. 2001]
- [Pain relief by low-intensity frequency-modulated millimeter waves acting on the acupuncture points] [Vopr Kurortol Fizioter Lech Fiz Kult. 2000]

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26: Int J Dermatol. 2003 Sep;42(9):738-40. Full Text at Blackwell Synergy Links

Linear polarized infrared irradiation using Super Lizer is an effective treatment for multiple-type alopecia areata.

Yamazaki M, **Miura Y**, **Tsuboi R**, **Ogawa H**.

Department of Dermatology, Juntendo University School of Medicine, Tokyo, Japan. yamazaki@med.juntendo.ac.jp

BACKGROUND: Super Lizer trade mark is a linear polarized light instrument, which has been used with good effect in orthopedics and anesthesiology to treat arthralgia and neuralgia with a high output of infrared radiation. AIM: To test Super Lizer trade mark 's efficacy for the treatment of alopecia areata. METHODS: Fifteen patients over 18 years of age, diagnosed with alopecia areata and displaying symptoms of patchy hair loss, were topically irradiated with infrared radiation using the Super Lizer trade mark. The patients were irradiated intermittently for an interval of 3 min once every week or every 2 weeks. RESULTS: Seven of 15 (46.7%) of the irradiated areas showed hair regrowth 1.6 months earlier than the nonirradiated areas (chi2 official approval, P = 0.003). With regard to adverse effects caused by Super Lizer trade mark treatment, only one patient complained of a sensation of heat in the irradiated area. CONCLUSIONS: These findings suggest that Super Lizer trade mark, with its noninvasive properties, is a useful apparatus for the treatment of mild forms of alopecia areata.

PMID: 12956694 [PubMed - indexed for MEDLINE]

Related Links

- Use of the pulsed infrared diode laser (904 nm) in the treatment of alopecia areata. [J Cosmet Laser Ther. 2006]
- The pattern and profile of alopecia areata in Singapore--a study of 219 Asians. [Int J Dermatol. 2002]
- [Excimer laser therapy of alopecia areata--side-by-side evaluation of a representative area] [J Dtsch Dermatol Ges. 2005]
- Effects of psoralen-UV-A-Turban in alopecia areata. [Skinmed. 2006]
- Onion juice (Allium cepa L.), a new topical treatment for alopecia areata. [J Dermatol. 2002]

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27: Fiziol Zh. 2003;49(2):35-44. Links

[Mechanisms of primary reception of electromagnetic waves of optical range]

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Huliar SO, **Lymans'kyĭ IuP**.

A.A. Bogomoletz Institute of Physiology National Academy of Sciences of Ukraine, ZEPTER-Medical Sciences Information Center, Kiev.

An existence of separate functional system of regulation of electromagnetic balance of organism has been substantiated and a working conception of light therapy has been formulated. As a basis, there is a possibility to use the acupuncture points for input of biologically necessary electromagnetic waves into the system of their conductors in a body that might be considered as a transport facility for energy of the polarized electromagnetic waves. Zones-recipients are organs having an electromagnetic disbalance due to excess of biologically inadequate radiation and being the targets for peroxide oxidation. Foremost, a body has the neurohormonal and immune regulatory systems. Electromagnetic stimulation or modification of functions of the zones-recipients determines the achievement of therapeutic and useful effects, and their combination with local reparative processes allows to attain a clinical goal. We represent own and literary experimental data about the development of physiological responses (analgesia) to BIOPTRON-light exposure on the acupuncture points or biologically active zones. We show the experimental facts in support of a hypothesis that a living organism can perceive an action of the electromagnetic fields of optical range not only via the visual system, but also through the off-nerve receptors (specific energy-sensitive proteins detecting critical changes of energy in cells and functioning as the "sensory" cell systems), as well as via the acupuncture points. It confirms an important role of the electromagnetic waves of optical range in providing normal vital functions of living organisms. A current approach to BIOPTRON light therapy (by polarized polychromatic coherent low energy light) consists in combined (local and system) exposure of the electromagnetic waves within the biologically necessary range.

PMID: 12945112 [PubMed - indexed for MEDLINE]

Related Links

- A review of current research in microwave resonance therapy: novel opportunities in medical treatment. [Acupunct Electrother Res. 1999]
- [The hypothesis of acupuncture points as polymodal receptors of the ecoceptive sensitivity system] [Fiziol Zh. 1990]
- [The information-wave hypothesis of a pain] [Fiziol Zh. 2004]

- [Experiment with the local effect of superhigh-frequency electromagnetic energy on biologically active points] [Nauchnye Doki Vyss Shkoly Biol Nauki. 1983]
- About the biological effects of high and extremely high frequency electromagnetic fields. [Acta Physiol Pharmacol Bulg. 2003]

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28: J Mol Med. 2003 Aug;81(8):471-80. Epub 2003 Jul 18. SpringerLink FULL-TEXT ARTICLE Links

A molecule solves psoriasis? Systemic therapies for psoriasis inducing interleukin 4 and Th2 responses.

Ghoreschi K, **Mrowietz U**, **Röcken M**.

Department of Dermatology, University of Tübingen, Liebermeisterstrasse 25, 72076 Tübingen, Germany.

Psoriasis is an autoimmune disease affecting 2-4% of the Caucasian population. Inflammatory processes induce the migration of interferon (IFN) gamma producing Th1 lymphocytes into the skin. These play a key role in the pathogenesis of psoriasis. These Th1 lymphocytes are responsible for the pathological reactions in psoriatic skin leading to keratinocyte hyperproliferation, small vessel proliferation and neutrophilic infiltration. Antigen-presenting cells activate dermal CD4+ T lymphocytes, and various signals can support the polarization of Th1 responses. The main signal for Th1 development is interleukin (IL) 12. After binding to their receptors both IL-12 and IFN-gamma promote intracellular IFN-gamma production by activating signal transducer and activator of transcription (STAT) 4 or 1. STAT1 activation by IFN-gamma is followed by T-bet activation, a master transcription factor for Th1 lymphocytes. In experimental models of Th1-mediated autoimmune diseases immune deviation of polarized autoreactive Th1 into anti-inflammatory Th2 responses generally improves the disease. Therefore new therapeutic approaches based on immunomodulating molecules have been developed for psoriasis, a prototypical Th1-mediated autoimmune disorder. Recently IL-4, the most effective Th2-inducing cytokine, has been shown to be safe and efficient for treating psoriasis. Improvement was associated with the induction of a Th2 phenotype of skin infiltrating lymphocytes. This review summarizes the IL-4 inducing potential of various conventional and newer systemic therapies for psoriasis. Many of these were thought to be primarily immunosuppressive. A review of the literature reveals that most of them can induce IL-4 and Th2, and that Th2 induction may be an underestimated mode of action in the therapy of Th1-mediated autoimmune disease. Further studies are needed to determine the central role of IL-4 in the control of Th1-induced autoimmune disease, namely psoriasis.

PMID: 12879154 [PubMed - indexed for MEDLINE]

Related Links

- Interleukin-4 therapy of psoriasis induces Th2 responses and improves human autoimmune disease. [Nat Med. 2003]
- Immune deviation strategies in the therapy of psoriasis. [Curr Drug Targets Inflamm Allergy. 2004]
- T helper 1/T helper 2 cytokine imbalance in respiratory syncytial virus infection is associated with increased endogenous plasma cortisol. [Pediatrics. 2006]
- Selective stimulation of T helper 2 cytokine responses by the anti-psoriasis agent monomethylfumarate. [Eur J Immunol. 1996]
- In vitro generation of interleukin 10-producing regulatory CD4(+) T cells is induced by immunosuppressive drugs and inhibited by T helper type 1 (Th1)- and Th2-inducing cytokines. [J Exp Med. 2002]

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29: Lasers Surg Med. 2003;32(5):417-23. Links

Effects of linearly polarized 0.6-1.6 microM irradiation on stellate ganglion function in normal subjects and people with complex regional pain (CRPS I).

Basford JR, **Sandroni P**, **Low PA**, **Hines SM**, **Gehrking JA**, **Gehrking TL**.

Department of Physical Medicine and Rehabilitation, Autonomic Disorder Center, Mayo Clinic and Foundation, 200 Southwest Second Street, Rochester, Minnesota 55905, USA. basford.jeffrey@mayo.edu

BACKGROUND AND OBJECTIVES: Stellate ganglion blocks are an effective but invasive treatment of upper extremity pain. Linearly polarized red and near-infrared (IR) light is promoted as a safe alternative to this procedure, but its effects are poorly established. This study was designed to assess the physiological effects of this latter approach and to quantitate its benefits in people with upper extremity pain due to Complex Regional Pain Syndrome I (CRPS I, RSD). STUDY DESIGN/MATERIALS AND METHODS: This was a two-part study. In the first phase, six adults (ages 18-60) with normal neurological examinations underwent transcutaneous irradiation of their right stellate ganglion with linearly polarized 0.6-1.6 microm light (0.92 W, 88.3 J). Phase two consisted of a double-blinded evaluation of active and placebo radiation in 12 subjects (ages 18-72) of which 6 had upper extremity CRPS I and 6 served as "normal" controls. Skin temperature, heart rate (HR), sudomotor function, and vasomotor tone

were monitored before, during, and for 30 minutes following irradiation. Analgesic and sensory effects were assessed over the same period as well as 1 and 2 weeks later. RESULTS: Three of six subjects with CRPS I and no control subjects experienced a sensation of warmth following active irradiation (P = 0.025). Two of the CRPS I subjects reported a >50% pain reduction. However, four noted minimal or no change and improvement did not reach statistical significance for the group as a whole. No statistically significant changes in autonomic function were noted. There were no adverse consequences. CONCLUSIONS: Irradiation is well tolerated. There is a suggestion in this small study that treatment is beneficial and that its benefits are not dependent on changes in sympathetic tone. Further evaluation is warranted. Copyright 2003 Wiley-Liss, Inc.

PMID: 12766967 [PubMed - indexed for MEDLINE]

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- [Stellate ganglion block with transcutaneous electric nerve stimulation (TENS): a double-blind study with healthy probands] [Anasthesiol Intensivmed Notfallmed Schmerzther. 1995]
- Effect of linear polarized light irradiation near the stellate ganglion in skin blood flow of fingers in patients with progressive systemic sclerosis. [Photomed Laser Surg. 2006]
- Clinical and physiologic evaluation of stellate ganglion blockade for complex regional pain syndrome type I. [Clin J Pain. 2001]
- Analysis of peak magnitude and duration of analgesia produced by local anesthetics injected into sympathetic ganglia of complex regional pain syndrome patients. [Clin J Pain. 1998]
- Vascular abnormalities in acute reflex sympathetic dystrophy (CRPS I): complete inhibition of sympathetic nerve activity with recovery. [Arch Neurol. 1999]

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30: Tsitologiia. 2003;45(2):179-95. Links

[Changes in the expression of membrane markers and in the number of human blood monocytes after single and repeated courses of visible and infrared light at therapeutic doses]

[Article in Russian]

Zhevago NA, **Samoĭlova KA**, **Glazanova TV**, **Obolenskaia KD**, **Balliuzek MF**, **Romanenko NIu**.

Institute of Cytology RAS, St. Petersburg.

An attempt has been made to prove that the immunomodulating effect of therapeutic doses of polychromatic visible + infrared polarized (VIP) light at its application to a small body surface area is connected with a transcutaneous photomodification of a small amount of blood in superficial skin microvessels. For this purpose, in parallel experiments, using monoclonal antibodies, the membrane phenotype of circulating blood mononuclears was studied after irradiation of volunteers, of samples of their blood in vitvo, and of a mixture of the irradiated and non-irradiated autologous blood in a 1:10 volume ratio, thereby modeling events in vivo, when a small amount of the transcutaneously photomodified blood in the vascular bed contacts its main circulating volume. In this variant of experiment, a great similarity has been established of changes in expression of mononuclear membrane markers (CD3, CD4, CD8, CD20, CD16, HLA-DR and to a lesser degree of CD25); the ability has been proven of the photomodified blood to "translate" the light-induced changes to a much higher volume of non-irradiated blood, which might represent a mechanism of the systemic immunomodulating effect of phototherapy. Under conditions in vivo and in vitro, the most "reactive" were HLA-DR+, CD20+, CD16+, CD4+, and 0-cells. An increase of the total number of lymphocytes and monocytes has been shown by the end of the 10-day-long phototherapeutic course. The regulatory character of the single and course sessions of the VIP light on the blood immunocompetent cells is substantiated: depending on the initial state of the immune system, the VIP light can produce both stimulating and inhibitory effect on lymphoid cell subpopulations, which opens large possibilities of using this method for correction of immunological disturbances in diseases of different etiopathogenesis.

PMID: 12722482 [PubMed - indexed for MEDLINE]

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- [Modulation of proliferation of peripheral blood lymphocytes after irradiation of volunteers with polychromatic visible and infrared light] [Tsitologiia. 2004]
- Pro- and anti-inflammatory cytokine content in human peripheral blood after its transcutaneous (in vivo) and direct (in vitro) irradiation with polychromatic visible and infrared light. [Photomed Laser Surg. 2006]
- [Enhancement of fibroblast growth promoting activity of human blood after its irradiation in vivo (transcutaneously) and in vitro with visible and infrared polarized light] [Tsitologiia. 2004]

- [Changes in cytokine content in the peripheral blood of volunteers after their exposure to polychromatic visible and infrared light] [Tsitologiia. 2005]
- [The effect of UV irradiation and of UV-irradiated autologous blood on the functional state of human peripheral blood lymphocytes] [Tsitologiia. 1990]

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31: J Clin Laser Med Surg. 2003 Feb;21(1):35-9. Links

Contribution of phototherapy to the treatment of episiotomies.

Kymplová J, **Navrátil L**, **Knízek J**.

Section of Radiobiology and Toxicology, Department of Radiology, University of South Bohemia, Ceske Budejovice, Czech Republic.

OBJECTIVE: The purpose of this study was an objective consideration of possible benefits of phototherapy implemented with therapeutic laser or possibly polarized light in treating episiotomy, which is the most frequent obstetric intervention. MATERIALS AND METHODS: In the present study, the authors treated a total of 2,436 women. The light sources were as follows: a laser of a wave length 670 nm, power 20 mW, with continuous alternations of frequencies 10 Hz, 25 Hz, and 50 Hz, a polarized light source of a 400-2,000 nm wavelength in an interval of power 20 mW and frequency 100 Hz and a monochromatic light source of a 660 nm wavelength and power 40 mW, with simultaneous application of a magnetic field at an induction 8 mT. RESULTS: The work demonstrated high healing effects with minimum secondary complications in the treatment of episiotomies using a therapeutic laser at an energy density of 2 J/cm(2). The application of polarized light at an energy density of 5 J/cm(2) also exerted favorable therapeutic effects.

PMID: 12614558 [PubMed - indexed for MEDLINE]

Related Links

- Effects of 810 nm laser irradiation on in vitro growth of bacteria: comparison of continuous wave and frequency modulated light. [Lasers Surg Med. 2002]
- Effect of low intensity monochromatic light therapy (890 nm) on a radiation-impaired, wound-healing model in murine skin. [Lasers Surg Med. 1998]
- The comparison of effects between pulsed and CW lasers on wound healing. [J Clin Laser Med Surg. 2004]

- Polarized light (400-2000 nm) and non-ablative laser (685 nm): a description of the wound healing process using immunohistochemical analysis. [Photomed Laser Surg. 2005]
- Clinical study of the gingiva healing after gingivectomy and low-level laser therapy. [Photomed Laser Surg. 2006]

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32: Klin Khir. 2002 Sep;(9):34-6. Links

[Application of polarized light in purulent-septic surgery]

[Article in Ukrainian]

Desiateryk VI, **Mikhno SP**, **Kryvyts'kyĭ IuM**, **Kostiuk SO**.

Influence of polarized light on general state and healing of wounds and trophic ulcers in 57 patients with obliterating atherosclerosis of lower extremities, chronic venous insufficiency of extremities, purulent postoperative complications, purulent-septic complications in patients with diabetes mellitus was analyzed. Main mechanisms of the polarized light action in "Bioptron" apparatus were enlighted, effective schemes of its usage were determined.

PMID: 12440209 [PubMed - indexed for MEDLINE]

Related Links

- [Compression syndromes in chronic venous insufficiency of lower extremities] [Klin Khir. 2002]
- [Prophylaxis of purulent-septic complications after amputation of lower extremity for atherosclerotic gangrene] [Klin Khir. 2004]
- [Main principles in the treatment of patients with chronic venous insufficiency of the lower extremities with trophic lesions] [Khirurgiia (Mosk). 2005]
- [The potential of conservative therapy and surgical treatment of microcirculatory distress in chronic venous insufficiency of the lower extremities in a stage of trophic disorders] [Angiol Sosud Khir. 2004]
- Monochromatic phototherapy in elderly patients: a new way of treating chronic pressure ulcers? [Aging Clin Exp Res. 2003]

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33: Fiziol Zh. 2002;48(3):87-94. Links

[Effect of polarized light on the immune status and cytokine levels of patients with bronchial asthma during immunotherapy with bronchomunal]

[Article in Ukrainian]

Kravchenko OV.

P.L. Shupik Academy of Post-Graduate Education, Ministry of Public Health of Ukraine.

The influence of polarized polychromatic light on immunocompetent cells in complex with immunomodulated bronchomunal is studied. Data of content of the main cytokines taking part in development of inflammation are presented. It is cleared up that polarized light increases the number of T-lymphocyties, normalizes ratio of subpopulation of T-lymphocyties and level of serum FNO-alpha and level of interleukin-4 reaches the level of healthy people. It is ascertained that complex use bronchomunal and polarized polychromatic increases level of serum interferon-gamma.

PMID: 12125291 [PubMed - indexed for MEDLINE]

Related Links

- CpG ODNs treatments of HIV-1 infected patients may cause the decline of transmission in high risk populations - a review, hypothesis and implications. [Virus Genes. 2005]
- Ribavirin or CpG DNA sequence-modulated dendritic cells decrease the IgE level and airway inflammation. [Am J Respir Crit Care Med. 2003]
- Sublingual immunotherapy with Dermatophagoides monomeric allergoid down-regulates allergen-specific immunoglobulin E and increases both interferon-gamma- and interleukin-10-production. [Clin Exp Allergy. 2006]
- Pro- and anti-inflammatory cytokine content in human peripheral blood after its transcutaneous (in vivo) and direct (in vitro) irradiation with polychromatic visible and infrared light. [Photomed Laser Surg. 2006]
- [Updated assessment of efficacy of dry air radon baths of different concentrations at the stage of medical rehabilitation of patients with bronchial asthma] [Vopr Kurortol Fizioter Lech Fiz Kult. 2006]

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34: J Clin Laser Med Surg. 2002 Feb;20(1):37-40. Links

Effects of 1047-nm neodymium laser radiation on skin wound healing.

Ribeiro MS, **Silva DF**, **Maldonado EP**, **de Rossi W**, **Zezell DM**.

Center for Lasers and Applications, Instituto de Pesquisas Energéticas e Nucleares, CNEN/SP, São Paulo, Brazil. mribeiro@net.ipen.br

Previous research in our laboratory has shown that the polarization component of the electrical field plays an important role on the healing process of inflammatory lesions created in the end of the spinal column of Lewis rats, using a He-Ne laser at lambda = 632.8 nm. It is well known that polarization is lost in a turbid medium, such as living tissue. However, the Nd:YLF wavelength (lambda = 1,047 nm) allows more polarization preservation than lambda = 632.8 nm, and the Nd:YLF laser beam has been used in clinical trials as a biostimulating agent. In this work, we investigated the influence of a low-intensity, linearly polarized Nd:YLF laser beam on skin wound healing, considering two orthogonal directions of polarization. We have considered a preferential axis as the animals' spinal column, and we aligned the linear laser polarization first parallel, then perpendicular to this direction. Burns of about 6 mm in diameter were created with liquid N2 on the back of the animals, and the lesions were irradiated on days 3, 7, 10, and 14 postwounding, D = 1.0 J/cm2. Lesions 1 and 2 were illuminated using Nd:YLF pulsed laser radiation. Lesion 1 was irradiated with linear polarization parallel with the rat spinal column. Lesion 2 was irradiated using the same protocol, but the light polarization was aligned with the perpendicular relative orientation. Control lesions were not irradiated. We have taken photographs from the wound areas on the 3rd, 7th, 10th, 14th, and 17th postoperative day for a biometrical analysis. The results have shown that lesion 1 healed faster than the control lesions ($p < 0,05$), which presented a smaller degree of healing after 14 days postwounding.

PMID: 11902353 [PubMed - indexed for MEDLINE]

Related Links

- Effects of low-intensity polarized visible laser radiation on skin burns: a light microscopy study. [J Clin Laser Med Surg. 2004]
- Polarized light (400-2000 nm) and non-ablative laser (685 nm): a description of the wound healing process using immunohistochemical analysis. [Photomed Laser Surg. 2005]
- Comparison of the photostimulatory effects of visible He-Ne and infrared Ga-As lasers on healing impaired diabetic rat wounds. [Lasers Surg Med. 2003]
- Influence of low level laser therapy on wound healing and its biological action upon myofibroblasts. [Lasers Surg Med. 2003]

- Photobiomodulation improves cutaneous wound healing in an animal model of type II diabetes. [Photomed Laser Surg. 2004]

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35: Int J Nurs Pract. 2002 Feb;8(1):49-55. Full Text at Blackwell Synergy Links

Erratum in:
Int J Nurs Pract 2002 Apr;8(2):116.

Effect of polarized light in the healing process of pressure ulcers.

Iordanou P, **Baltopoulos G**, **Giannakopoulou M**, **Bellou P**, **Ktenas E**.

Department of Nursing, TEI, Athens, Greece.

A trial was conducted to examine the effect of polarized light on pressure ulcers of 1st, 2nd and 3rd grades. Patients with two pressure ulcers, one of which received the polarized light therapy (experimental ulcer) and the other acting as control, were included in the study. The experimental ulcers received treatments for 2 weeks consisting a 5 min therapy session each day, excluding weekends, for 10 days. Experimental and control ulcers were assessed as they appeared on admission and reassessed at the end of each week. Fifty-five patients aged 37-85 years (67.1 +/- 11.9 years) were studied. Pressure ulcers of 1st, 2nd and 3rd grades receiving extra treatment with polarized light had increased values of epithelial tissue between the first and second assessments of 0-30.9% and between the second and third assessments of 30.9-21.7%. Values of the control pressure ulcers were, respectively, from 0 to 5.5% and from 5.5% to 3.1%. The mean pink/white colour values of the experimental ulcers, between the first and second measurements increased significantly compared with the control ulcers (P = 0.021) and also increased significantly between the second and third measurements (P = 0.003). The mean values of 'no and minimal exudate' of the experimental ulcers increased significantly between first and second measurements compared with the control ulcers (P = 0.001), and similarly, significantly between the second and third measurements (P = 0.002). Mean surface areas of the experimental ulcers decreased significantly between the first and second measurements from 2.84 to 2.54 cm2 (P < or = 0.001) and between the first and third measurements from 2.84 to 2.26 cm2 (P < or = 0.001). Mean surface areas of the control ulcers decreased between the first and second measurements from 2.10 to 2.08 cm2 (P < or = 0.42) and between the first and third measurements from 2.10 to 2.04 cm2 (P < or = 0.007). Pressure ulcers subjected to extra treatment with polarized light in the early stages (first to third measurements) showed improvement in the healing process than the control ulcers.

PMID: 11831427 [PubMed - indexed for MEDLINE]

Related Links

- Efficacy of multiwavelength light therapy in the treatment of pressure ulcers in subjects with disorders of the spinal cord: A randomized double-blind controlled trial. [Arch Phys Med Rehabil. 2004]
- Comparison of air-fluidized therapy with other support surfaces used to treat pressure ulcers in nursing home residents. [Ostomy Wound Manage. 2005]
- Sequential treatment with calcium alginate dressings and hydrocolloid dressings accelerates pressure ulcer healing in older subjects: a multicenter randomized trial of sequential versus nonsequential treatment with hydrocolloid dressings alone. [J Am Geriatr Soc. 2002]
- Maggot versus conservative debridement therapy for the treatment of pressure ulcers. [Wound Repair Regen. 2002]
- The effectiveness of oral nutritional supplementation in the healing of pressure ulcers. [J Wound Care. 2004]

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37: J Clin Laser Med Surg. 1999 Dec;17(6):241-3. Links

In vivo caries-like lesion prevention with argon laser: pilot study.

Blankenau RJ, **Powell G**, **Ellis RW**, **Westerman GH**.

Creighton University, Omaha, Nebraska, USA.

OBJECTIVE: This clinical pilot study was conducted to investigate the effectiveness of argon laser irradiation to reduce demineralization or loss of tooth structure in vivo. SUMMARY BACKGROUND DATA: In vitro research previously demonstrated the ability of argon laser irradiation to reduce demineralization or loss of tooth structure. METHODS: Using the Ogaard model of producing demineralization, the experimental teeth were irradiated with argon laser of 250 mW (producing approximately 12 J/cm2) prior to banding. Polarized light evaluation of the sectioned, extracted teeth was used to determine the amount of demineralization. RESULTS: Results showed a 29.1% reduction in demineralization in the experimental teeth as compared to the bilateral control teeth. CONCLUSION: Low-power argon laser irradiation significantly reduced demineralization clinically.

PMID: 11800094 [PubMed - indexed for MEDLINE]

Related Links

- In vivo caries formation in enamel following argon laser irradiation and combined fluoride and argon laser treatment: a clinical pilot study. [Quintessence Int. 2004]
- The effects of argon laser irradiation on enamel decalcification: An in vivo study. [Am J Orthod Dentofacial Orthop. 2002]
- Prevention of demineralization by CO2 and Er,Cr:YSGG laser irradiation of overdenture abutments. [Am J Dent. 2006]
- Artificial caries removal and inhibition of artificial secondary caries by pulsed CO2 laser irradiation. [Am J Dent. 1999]
- Enamel caries initiation and progression after argon laser irradiation: in vitro argon laser systems comparison. [J Clin Laser Med Surg. 2002]

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42: Masui. 1992 Nov;41(11):1814-7. Links

[Polarized light irradiation near the stellate ganglion in a patient with Raynaud's sign]

[Article in Japanese]

Otsuka H, **Okubo K**, **Imai M**, **Kaseno S**, **Kemmotsu O**.

Department of Anesthesiology, Hokkaido University School of Medicine, Sapporo.

Polarized light irradiation near the stellate ganglion was performed in a 55-year-old female with Raynaud's sign. She was suffering from cold and numb pain in bilateral fingers for 1 year. Stellate ganglion block and low reactive-level laser therapy near the stellate ganglion were not sufficient to relieve this symptom. Polarized light irradiation near the stellate ganglion induced a sting stimulation and warm sensation in her hands. Thermograms revealed a remarkable increase in temperature of her hands. The results imply that polarized light irradiation near the stellate ganglion increases blood flow of forearms and relieves Raynaud's sign.

PMID: 1460761 [PubMed - indexed for MEDLINE]

Related Links

- [Low reactive-level laser therapy near the stellate ganglion for postherpetic facial neuralgia] [Masui. 1992]

- Effect of linear polarized light irradiation near the stellate ganglion in skin blood flow of fingers in patients with progressive systemic sclerosis. [Photomed Laser Surg. 2006]
- [Effects of low reactive level laser, linear polarized light and Xenon-ray irradiation on the stellate ganglion in dogs] [Masui. 2001]
- [Linear polarized light irradiation around the stellate ganglion area increases skin temperature and blood flow] [Masui. 1996]
- Improvement of acral circulation in a patient with systemic sclerosis with stellate blocks. [Vasa. 1998]

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Polarized light irradiation near the stellate ganglion in a patient with Raynaud's sign]

[Article in Japanese]

Otsuka H, **Okubo K**, **Imai M**, **Kaseno S**, **Kemmotsu O**.

Department of Anesthesiology, Hokkaido University School of Medicine, Sapporo.

Polarized light irradiation near the stellate ganglion was performed in a 55-year-old female with Raynaud's sign. She was suffering from cold and numb pain in bilateral fingers for 1 year. Stellate ganglion block and low reactive-level laser therapy near the stellate ganglion were not sufficient to relieve this symptom. Polarized light irradiation near the stellate ganglion induced a sting stimulation and warm sensation in her hands. Thermograms revealed a remarkable increase in temperature of her hands. The results imply that polarized light irradiation near the stellate ganglion increases blood flow of forearms and relieves Raynaud's sign.

PMID: 1460761 [PubMed - indexed for MEDLINE]

Improvement of acral circulation in a patient with systemic sclerosis with stellate blocks.

Klyscz T, **Jünger M**, **Meyer H**, **Rassner G**.

Department of Dermatology, University of Tübingen, Germany.

We report on a 77-year-old male patient with systemic sclerosis. He suffered from secondary Raynaud's phenomenon on the basis of systemic sclerosis. Medical treatment in the past, including the administration of calcium-channel blockers, pentoxifylline and intravenous

prostaglandin therapy, was unsuccessful and the clinical situation became worse. In a final effort stellate blocks were performed over a period of several weeks and, for the first time, there was lasting clinical benefit. Complaints and Raynaud's attacks abated significantly, as documented by local cold exposure tests. Therapeutic benefit from stellate blocks in a patient with systemic sclerosis is described here for the first time.

PMID: 9540432 [PubMed - indexed for MEDLINE]

[Pathogenetic basis for the correction of adaptation reactions in children using PILER-light]

[Article in Ukrainian]

Tsodikova OA, **Zosimov AM**.

According to the positions of systemic analysis of autoregulations and systemic reconstruction processes in children under the influence of PILER-light (Polarized polychromatic incoherent low-energy radiation) depending on the type of general non-specific adaptation reactions of the organism, the clinical blood test has been investigated using the correlation structures method. It has been established that phototherapy with polarized light causes stereotype effect of increased integration between the blood parameters, harmonizing of white and red blood parameters, elimination of the stress, decreased entropy elements. At the same time the specific adaptation reaction of the child's organism to the loadings of various origin, in particular, to the electromagnetic irradiation of optic diapason waves indicates the diverse character of the changed regulation system functions depending on the adaptation reaction type and grounds the differentiated approach to the polarized light therapy.

PMID: 17595913 [PubMed - indexed for MEDLINE]

Suppression of pain by exposure of acupuncture points to polarized light.

Limansky YP, **Tamarova ZA**, **Gulyar SA**.

Bogomoletz Institute of Physiology, National Academy of Sciences, Kiev, Ukraine. liman@biph@kiev.ua

BACKGROUND: According to clinical studies, the stimulation of acupuncture points (APs) by a variety of methods (eg, needles, pressure, etc) is an effective method for the treatment of many pain syndromes. However, no experimental proof exists showing that the exposure of APs to low-intensity incoherent polarized (P) light evokes an analgesic affect. OBJECTIVES: The authors' previous work, using mice, shows that the exposure

of APs to low-intensity microwaves effectively decreases pain. The purpose of the present study was to determine whether exposure of APs to low-intensity incoherent P light evokes a statistically significant reduction in pain. METHODS: The effects of P light on behavioural responses to acute and tonic pain were tested in mice. The threshold of vocalization during electrical stimulation of the foot (acute pain) was measured before and after exposure of AP E-36 to P light. The duration of licking the formalin-injected foot (tonic pain) was investigated in control mice and mice exposed to P light on APs E-36, V-56 and V-60 or on skin that did not contain analgesic APs. RESULTS: Exposure of APs to P light evoked a statistically significant increase in pain threshold by 34.2% to 59.1%, and shortened the licking time by 32.3% to 50% in mice. The most effective AP was E-36 in both the painful foot and the normal foot. After 2 min, 6 min and 10 min of P light exposure, analgesia was 7.6%, 30.9% and 50%, respectively. The exposure to P light on skin that did not contain analgesic APs did not evoke significant effect. CONCLUSIONS: The results show the efficacy of pain suppression by exposure of antinociceptive APs to P light.

PMID: 16511614 [PubMed - indexed for MEDLINE]

Related Links

- [Suppression of visceral pain by action of the low intensity polarized light on acupuncture antinociceptive points] [Fiziol Zh. 2003]
- [Action of the red and infrared electromagnetic waves of light-emitting diodes on the behavioral manifestation of somatic pain] [Fiziol Zh. 2007]
- [Evaluation of analgesia evoked by microwaves of low intensity in the point of acupuncture in mice with different genotypes] [Fiziol Zh. 2004]
- [Comparative testing of analgesia induced by polarized light and analgetics] [Fiziol Zh. 2005]
- Increased pain threshold following electroacupuncture: analgesia is induced mainly in meridian acupuncture points.

Treatment of carpal tunnel syndrome with polarized polychromatic noncoherent light (Bioptron light): a preliminary, prospective, open clinical trial.

Stasinopoulos D, **Stasinopoulos I**, **Johnson MI**.

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OBJECTIVE: Our aim was to assess the efficacy of polarized polychromatic noncoherent light (Bioptron light) in the treatment of idiopathic carpal tunnel syndrome.

BACKGROUND: Carpal tunnel syndrome is the most common compression neuropathy, but no satisfactory conservative treatment is available at present. METHOD: An uncontrolled experimental study was conducted in patients who visited our clinic from mid-2001 to mid-2002. A total of 25 patients (22 women and three men) with unilateral idiopathic carpal tunnel syndrome, mild to moderate nocturnal pain, and paraesthesia lasting >3 months participated in the study. The average age of the patients was 47.4 years and the average duration of patients' symptoms was 5.2 months. Polarized polychromatic noncoherent light (Bioptron light) was administered perpendicular to the carpal tunnel area. The irradiation time for each session was 6 min at an operating distance of 5-10 cm from the carpal tunnel area, three times weekly for 4 weeks. Outcome measures used were the participants' global assessments of nocturnal pain and paraesthesia, respectively, at 4 weeks and 6 months. RESULTS: At 4 weeks, two patients (8%) had no change in nocturnal pain, six (24%) were in slightly less nocturnal pain, 12 (48%) were much better in regard to nocturnal pain and five (20%) were pain-free. At 6 months, three patients (12%) were slightly better in regard to nocturnal pain, 13 (52%) were much better regarding nocturnal pain, and nine patients (36%) were pain-free. At 4 weeks, four patients (16%) had no change in paraesthesia, five (20%) were slightly better, 13 patients (52%) were much better, and three patients (12%) were without paraesthesia. At 6 months, two patients (8%) had no change in paraesthesia, two (8%) were slightly better, 14 (56%) were much better, and seven (28%) were without paraesthesia. CONCLUSIONS: Nocturnal pain and paraesthesia associated with idiopathic carpal tunnel syndrome improved during polarized polychromatic noncoherent light (Bioptron light) treatment. Controlled clinical trials are needed to establish the absolute and relative effectiveness of this intervention.

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The use of polarized polychromatic non-coherent light as therapy for acute tennis elbow/lateral epicondylalgia: a pilot study.

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OBJECTIVE: The aim of this study was to assess the efficacy of polarized, polychromatic, non-coherent, low energy light (Bioptron 2, Bioptron AG, Switzerland) in the treatment of acute tennis elbow. BACKGROUND: Tennis elbow, or lateral epicondylitis, is one of the most common lesions affecting the arm. A plethora of treatment regimes have been described for this condition, but no specific therapy has emerged as a gold standard. METHODS: A pilot study was carried out with 25 patients who had acute tennis elbow. Bioptron 2 device was applied over lateral epicondyle three times per week for 4 weeks. Pain on VAS, function on VAS, and painfree grip strength were measured at the beginning (week 0) and at the end of the study (week 4). RESULTS: The pain on VAS was reduced at the end of treatment ($t(24) = 3.84$, $p = 0.001$). Function on VAS was increased at the end of treatment ($t(24) = 4.23$, $p < 0.001$). Pain-free grip strength was increased at the end of treatment ($t(24) = 4.23$, $p < 0.004$). CONCLUSION: Although the results suggested that the Bioptron 2 could reduce patients' symptoms with acute tennis elbow, future controlled studies are needed to establish the relative and absolute effectiveness of Bioptron 2.

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The use of polarized light in aesthetic surgery.

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This article presents a clinical investigation of polarized light therapy after aesthetic surgery procedures. The study included patients who the authors underwent face-lifts, blepharoplasties, and various facial ancillary procedures, at center during the past 2 1/2 years. One side of the surgically treated area was managed with polarized light, whereas the other side served as a control. The results were compared using clinical examination only including signs of recovery such as resolution of swelling and bruises. The results in most cases showed a significant difference between the treated and untreated sides.

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