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Laser Ther. 2015 Dec 30;24(4):277-89. doi: 10.5978/islsm.15-OR-17.

Adjunctive 830 nm light-emitting diode therapy can improve the results following aesthetic procedures.

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Abstract

BACKGROUND:

Aggressive, or even minimally aggressive, aesthetic interventions are almost inevitably followed by such events as discomfort, erythema, edema and hematoma formation which could lengthen patient downtime and represent a major problem to the surgeon. Recently, low level light therapy with light-emitting diodes (LED-LLLT) at 830 nm has attracted attention in wound healing indications for its anti-inflammatory effects and control of erythema, edema and bruising.

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RATIONALE:

The wavelength of 830 nm offers deep penetration into living biological tissue, including bone. A new-generation of 830 nm LEDs, based on those developed in the NASA Space Medicine Laboratory, has enabled the construction of planar array-based LED-LLLT systems with clinically useful irradiances. Irradiation with 830 nm energy has been shown in vitro and in vivo to increase the action potential of epidermal and dermal cells significantly. The response of the inflammatory stage cells is enhanced both in terms of function and trophic factor release, and fibroblasts demonstrate superior collagenesis and elastinogenesis.

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CONCLUSIONS:

A growing body of clinical evidence is showing that applying 830 nm LED-LLLT as soon as possible post-procedure, both invasive and noninvasive, successfully hastens the resolution of sequelae associated with patient downtime in addition to significantly speeding up frank wound healing. This article reviews that evidence, and attempts to show that 830 nm LED-LLLT delivers swift resolution of postoperative sequelae, minimizes downtime and enhances patient satisfaction.

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J Cosmet Laser Ther. 2013 Feb 5. [Epub ahead of print]

Evaluation of low-level laser therapy in rabbit oral mucosa after soft tissue graft application: A pilot study.

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Source

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Abstract

The aim of the present study was to assess the histopathological effects of low-level laser therapy (LLLT) on healing of the oral mucosa after soft tissue graft operations. The alterations at the end of healing in normal and LLLT-applied oral mucosa were studied in two healthy adult New Zealand white rabbits by taking specimens for light microscopic inspection. There was no adverse event reported in the study and no post-operative complications, such as swelling, bleeding, or edema, were observed in the rabbits. Complete wound healing was faster in the LLLT-applied rabbit. Compared to the normal rabbit oral mucosa, thickening of the stratum corneum (hyperkeratosis) was found in the epithelia of the rabbits. A significant increase in the epithelial thickness was found in the samples of rabbits, suggesting increased scar tissue following the wound repair. Additionally, many mitotic figures were present in the epithelia of the LLLT-applied rabbit, indicating epithelial cell hyperplasia. Long and irregular connective tissue protrusions projecting into the undersurface of the epithelium and mononuclear cell infiltrations were noted in the rabbits. The results suggest that LLLT used for soft tissue operations provides better and faster wound healing and that LLLT enhances epithelization.

J Allergy (Cairo). 2012;2012:121797. Epub 2011 Dec 15.

Modern aspects of phototherapy for atopic dermatitis.

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Source

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Abstract

Phototherapy has still great importance in the treatment of atopic dermatitis, though costs, compliance, and long-term risks narrow its relevance. In spite of its long history, up to now, the therapeutic regimes are mostly empirical. Narrowband UVB und UVA1 are the most frequently applied regimens in atopic dermatitis with proven efficacy. However, even for these modalities randomized prospective and controlled studies are still pending. Advances in photoimmunology and molecular biology had demonstrated that phototherapy targets inflammatory cells, alters cytokine production, and has a significant antimicrobial effect within atopic skin. This paper summarizes the current literature on the different regimes of phototherapy and also discusses therapeutic modalities like photochemotherapy and extracorporeal photopheresis. These more complex regimes should be restricted to severe cases of atopic dermatitis, which are refractory to topical treatment.

Lasers Med Sci. 2012 Feb 8. [Epub ahead of print]

Biostimulatory effect of low-level laser therapy on keratinocytes in vitro.

Basso FG, Oliveira CF, Kurachi C, Hebling J, Costa CA.
Source

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Abstract

Epithelial cells play an important role in reparative events. Therefore, therapies that can stimulate the proliferation and metabolism of these cells could accelerate the healing process. To evaluate the effects of low-

level laser therapy (LLLT), human keratinocytes were irradiated with an InGaAsP diode laser prototype (LASERTable; 780?±?3 nm; 40 mW) using 0.5, 1.5, 3, 5, and 7 J/cm(2) energy doses. Irradiations were done every 24 h totaling three applications. Evaluation of cell metabolism (MTT assay) showed that LLLT with all energy doses promoted an increase of cell metabolism, being more effective for 0.5, 1.5, and 3 J/cm(2). The highest cell counts (Trypan blue assay) were observed with 0.5, 3, and 5 J/cm(2). No statistically significant difference for total protein (TP) production was observed and cell morphology analysis by scanning electron microscopy revealed that LLLT did not promote morphological alterations on the keratinocytes. Real-time polymerase chain reaction (qPCR) revealed that LLLT also promoted an increase of type I collagen (Col-I) and vascular endothelial growth factor (VEGF) gene expression, especially for 1.5 J/cm(2), but no change on fibroblast growth factor-2 (FGF-2) expression was observed. LLLT at energy doses ranging from 0.5 to 3 J/cm(2) promoted the most significant biostimulatory effects on cultured keratinocytes.

Acta Dermatovenerol Croat. 2011 Sep;19(3):195-205.

Phototherapy of psoriasis in the era of biologics: still in.

Benáková N.

Source

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Abstract

This article reviews recent literature on phototherapy for psoriasis, particularly narrowband UVB. The efficacy, safety, tolerability and acceptance of phototherapy are discussed. It focuses in detail on how to improve the efficacy and safety in practice by trying to optimize the protocols, using combination therapy, monitoring the cumulative dose and providing skin cancer surveillance. Careful patient selection, individualized treatment, long-term therapy plan and complex approach to patients are the prerequisites for this. Narrowband UVB as the most widely used modality of phototherapy for psoriasis has a relatively good efficacy, cost, availability and minimal side effects. It represents a valuable treatment, which deserves more utilization and research. Although not so dynamic as in systemic drugs, research into phototherapy is ongoing. Even in the era of biologics, phototherapy remains an important therapeutic modality for psoriasis and other dermatoses and represents an essential part of modern dermatological therapy.

J Cosmet Laser Ther. 2010 Jul 14. [Epub ahead of print]

Low-level laser therapy for the treatment of epidermolysis bullosa: A case report.

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Abstract

Abstract Epidermolysis bullosa (EB) is a rare group of diseases characterized by skin fragility. There is no specific treatment, short of protection from trauma, currently available for these patients. Low-level laser

therapy (LLLT) was effective as an analgesic and in accelerating cutaneous wound healing after six sessions of therapy in a child with dystrophic EB with cutaneous scarring and blisters on the limbs and trunk.

J Invest Dermatol. 2009 Dec;129(12):2751-9. Epub 2009 Jul 9.

Regulation of skin collagen metabolism in vitro using a pulsed 660 nm LED light source: clinical correlation with a single-blinded study.

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It has been reported that skin aging is associated with a downregulation in collagen synthesis and an elevation in matrix metalloproteinase (MMP) expression. This study investigated the potential of light-emitting diode (LED) treatments with a 660 nm sequentially pulsed illumination formula in the photobiomodulation of these molecules. Histological and biochemical changes were first evaluated in a tissue-engineered Human Reconstructed Skin (HRS) model after 11 sham or LED light treatments. LED effects were then assessed in aged/photoaged individuals in a split-face single-blinded study. Results yielded a mean percent difference between LED-treated and non-LED-treated HRS of 31% in levels of type-1 procollagen and of -18% in MMP-1. No histological changes were observed. Furthermore, profilometry quantification revealed that more than 90% of individuals showed a reduction in rhytid depth and surface roughness, and, via a blinded clinical assessment, that 87% experienced a reduction in the Fitzpatrick wrinkling severity score after 12 LED treatments. No adverse events or downtime were reported. Our study showed that LED therapy reversed collagen downregulation and MMP-1 upregulation. This could explain the improvements in skin appearance observed in LED-treated individuals. These findings suggest that LED at 660 nm is a safe and effective collagen-enhancement strategy.

Photomed Laser Surg. 2009 Dec;27(6):969-71.

Green tea and red light–a powerful duo in skin rejuvenation.

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OBJECTIVE: Juvenile skin has been the subject of intense research efforts since ancient times. This article reports on synergistic complementarities in the biological actions of green tea and red light, which inspired the design of a green tea-assisted facial rejuvenation program. BACKGROUND DATA: The approach is based on previous laboratory experiments providing insight into a mechanism by which visible light interacts with cells and their microenvironment. METHODS: After 2 months of extreme oxidative stress, green tea-filled cotton pads were placed once per day for 20 minutes onto the skin before treatment with an array of light-emitting diodes (central wavelength 670 nm, dermal dose 4 J/cm2). RESULTS: Rejuvenated skin, reduced wrinkle levels, and juvenile complexion, previously realized in 10 months of light treatment alone were realized in 1 month. CONCLUSION: The accelerated skin rejuvenation based on the interplay of the physicochemical and biological effects of light with the reactive oxygen species scavenging capacity of green tea extends the action spectrum of phototherapy. The duo opens the gate to a multitude of possible biomedical light applications and cosmetic formulas, including reversal of topical deterioration related to excess reactive oxygen species, such as graying of hair.

Photomed Laser Surg. 2009 Sep 21. [Epub ahead of print]

Combination 830-nm and 633-nm Light-Emitting Diode Phototherapy Shows Promise in the Treatment of Recalcitrant Psoriasis: Preliminary Findings.

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Abstract Background and Objectives: Psoriasis is one of the major problems facing dermatologists worldwide. Planar arrays of light-emitting diodes (LEDs) have recently attracted attention in the treatment of difficult dermatological entities, 830 nm in near infrared (near-IR) and 633 nm in visible red. This study was designed to assess the efficacy of combination 830-nm and 633-nm LED phototherapy in the treatment of recalcitrant psoriasis. Subjects and Methods: Nine informed and consenting patients with psoriasis were enrolled in this preliminary study, (3 men, 6 women, mean age 34.3, skin types I to IV). All had chronic psoriasis, which in most cases had proved resistant to conventional treatments. They were treated sequentially with LED arrays delivering continuous-wave 830 nm (near-IR) and 633 nm (red) in two 20-min sessions over 4 or 5 weeks, with 48 h between sessions (830 nm, 60 J/cm(2); 633 nm, 126 J/cm(2)). Results: All patients completed their LED regimens (4 requiring 1 regimen, 5 requiring a second). Follow-up periods were from 3 to 8 months, except in two patients who were lost to follow-up. Clearance rates at the end of the follow-up period ranged from 60% to 100%. Satisfaction was universally very high. Conclusions: The antiinflammatory effects of LED energy at 830 nm and 633 nm have been well documented, as has their use in wound healing. LED phototherapy is easy to apply, pain free and side-effect free, and is well tolerated by patients of all skin types. The promising results of this preliminary study warrant a proper controlled double-blind study with a larger patient population.

Hautarzt. 2009 Apr;60(4):310-7.

[UV, visible and infrared light. Which wavelengths produce oxidative stress in human skin?]

[Article in German]

Zastrow L, Groth N, Klein F, Kockott D, Lademann J, Ferrero L.

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Experimental evidence suggests that the creation of free radicals–mainly reactive oxygen species (ROS)–is the common photobiological answer to the skin-sunlight interaction. The free radical action spectrum (wavelength dependency) for ultraviolet and visible light (280-700 nm) has been determined by quantitative ESR spectroscopy. Visible light produces around 50% of the total oxidative stress caused by sunlight. Reactive species like *O(-)(2), *OH and *CHR are generated by visible light. The amount of ROS correlates with the visible light intensity (illuminance). We demonstrated the creation of excess free radicals by near-infrared light (NIR, 700-1600 nm). Free radical generation does not depend exclusively on the NIR irradiance, but also on the NIR initiated skin temperature increase. The temperature dependence follows the physiological fever curve. Our results indicate that the complex biological system skin creates the same type of free radicals over

the entire active solar spectrum. This general response will make it possible to define the beneficial or deleterious action of sunlight on human skin by introduction of a free radical threshold value.

Br J Dermatol. 2009 Jun;160(6):1273-85. Epub 2009 Feb 23.

Laser and other light therapies for the treatment of acne vulgaris: systematic review.

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BACKGROUND: Acne is common and can lead to scarring of the skin, as well as to psychological distress and reduced self-esteem. Most topical or oral treatments for acne are inconvenient and have side-effects. Laser and other light therapies have been reported to be convenient, safe and effective in treating acne. OBJECTIVES: To carry out a systematic review of randomized controlled trials of light and laser therapies for acne vulgaris. METHODS: We searched the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL, PsycInfo, LILACS, ISI Science Citation Index and Dissertation Abstracts International for relevant published trials. RESULTS: We identified 25 trials (694 patients), 13 of light therapy and 12 of light therapy plus light-activated topical cream (photodynamic therapy, PDT). Overall, the results from trials of light alone were disappointing, but the trials of blue light, blue-red light and infrared radiation were more successful, particularly those using multiple treatments. Red-blue light was more effective than topical 5% benzoyl peroxide cream in the short term. Most trials of PDT showed some benefit, which was greater with multiple treatments, and better for noninflammatory acne lesions. However, the improvements in inflammatory acne lesions were not better than with topical 1% adapalene gel, and the side-effects of therapy were unacceptable to many participants. CONCLUSIONS: Some forms of light therapy were of short-term benefit. Patients may find it easier to comply with these treatments, despite the initial discomfort, because of their short duration. However, very few trials compared light therapy with conventional acne treatments, were conducted in patients with severe acne or examined long-term benefits of treatment.

IJ Cosmet Laser Ther. 2009 Jun;11(2):125-8.

A study to determine the effect of combination blue (415 nm) and near-infrared (830 nm) light-emitting diode (LED) therapy for moderate acne vulgaris.

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BACKGROUND AND OBJECTIVE: Acne vulgaris remains a major problem in dermatological practice. Phototherapy for acne with blue (415 nm) and red (633 nm) light-emitting diode (LED) arrays has recently attracted attention. This pilot study assessed the efficacy of the combination of 415 nm and near-infrared (IR) LED therapy for moderate acne. METHODS: Seventeen individuals were recruited: 13 females and four males. Skin types ranged from type II to type VI, and the acne grades at baseline ranged from Burton grade 1 to 5. Patients underwent twice-weekly 20-minute sessions of LED therapy for 4 weeks, alternating between the blue (415 nm) and near-IR (830 nm) heads. No other treatment was allowed. Results were assessed and compared with the baseline values at 1, 4 and 8 weeks post-treatment. RESULTS: Six individuals failed to complete the study. Eleven individuals showed improvement ranging from 0% to 83.3%. A downward shift in the Burton grade was seen overall. Non-inflammatory lesion counts increased in four patients, but improved in the other seven by an average of 48.8%. No adverse effects were reported. CONCLUSIONS: The combination

therapy for acne produced results which were less effective in the reduction of inflammatory lesions than those achieved with the previously reported blue/red combination. Further study with a much larger patient population is warranted.

J Eval Clin Pract. 2009 Apr;15(2):292-8.

Mirror, mirror on the wall: placebo effects that exist only in the eye of the beholder.

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Rationale The extent to which placebo effects can be driven exclusively by subjective impressions of improvement in the absence of any independent corroboration is unclear. Methods Thirty-six self-referred patients were treated with a light therapy device intended to rejuvenate facial skin. At each of eight weekly treatments, participants' facial skin was exposed for 40 seconds to pulses of multispectral LED-generated light in the range of 588 nm wavelength at 0.1 J cm(-2). Outcomes were assessed by participants as well as by the treating doctor and by blinded, expert raters. Results Patients reported robust and statistically significant improvements in seven facial features at the conclusion of the 8-week treatment regimen as well as at 1-month follow-up (for all comparisons, P </= 0.003, median d = 1.14). In sharp contrast, both the treating doctor and blinded, expert raters were unable to detect any improvement whatsoever (for all comparisons, P > 0.05). Moreover, effect sizes were close to zero and in the opposite direction from improvement (median d = -0.06 for doctor ratings; and for observer ratings, there was only a 46% success rate at identifying post-treatment as compared with pre-treatment photographs). Conclusion The robust placebo responses documented in this trial were confined to the subjective impressions of the patients. Neither the treating doctor nor blinded, expert raters could detect any improvement. Thus, patients can perceive improvement in medical interventions in the absence of any independent corroboration that improvement has occurred. This result is used a heuristic to more clearly define the components of the placebo response.

Indian J Dermatol Venereol Leprol. 2009 Mar-Apr;75(2):119-25.

Targeted phototherapy.

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Phototherapy is one of the most important therapeutic modalities in dermatology. This field has seen several major advances in the recent years, the most recent being targeted phototherapy. Targeted phototherapy, which includes laser and nonlaser technologies, delivers light/laser in the ultraviolet spectrum, of specific wavelength, specifically targeted at the affected skin and thereby avoids many of the side effects of conventional phototherapy. The treatment has been claimed to be effective, quick, and needing fewer treatment sessions. The article reviews this new mode of phototherapy.

J Drugs Dermatol. 2009 Mar;8(3):239-41.

Photopneumatic therapy for the treatment of acne.

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BACKGROUND: A wide variety of laser and light-based therapies have been utilized for acne vulgaris; however, current techniques have been limited by photosensitivity issues or inconsistent results. OBJECTIVE: To determine the clinical efficacy and side-effect profile of photopneumatic therapy for the treatment of facial acne vulgaris. METHODS: Twenty adults with mild to severe facial acne vulgaris received 4 successive treatments at 2-week intervals with a combined photopneumatic device (intense pulsed light [IPL]: fluences = 3.6-4.2 J/cm2; negative pressure = 3 psi). Clinical improvement was evaluated on a quartile grading scale using comparative digital photographs at baseline, and 1 month and 3 months after the final treatment. Acne lesion counts were obtained at baseline, prior to each treatment session, and at the end of the study. RESULTS: Modest reduction in acne lesion counts and global clinical improvement was seen in the majority of patients. Patients with severe acne experienced the most clinical improvement. Side effects were mild and limited to transient erythema and rare purpura. Most patients experienced acne worsening early in the treatment course. CONCLUSION: Photopneumatic therapy is a safe and effective treatment for acne vulgaris. Patients with more severe acne respond best to treatment.

J Drugs Dermatol. 2009 Mar;8(3):221-6.

Assessment of the mobile delivery of infrared light (1100-1800 nm) for the treatment of facial and neck skin laxity.

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BACKGROUND: Previous studies have shown that although infrared light and radiofrequency delivered by stationary application is safe and effective for the treatment of rhytides, a mobile delivery of radiofrequency energy can render the treatment as painless. In addition, few studies have defined and assessed efficacy of these infrared treatments in treating laxity by quantitative grading. OBJECTIVE: This prospective study assesses the safety, efficacy, and pain profile of the application of infrared light with a mobile delivery method for the treatment of facial and neck skin laxity as assessed by a tested, quantitative grading scale. METHODS: In this study, 22 female subjects (aged 40-75 years; Caucasian and Asian ancestry) with a clinically observable excess of laxity (minimum grade 2 out of 4) on the face received 1 to 3 treatments with incoherent infrared (1100-1800 nm) light at 2-week to 4-week intervals. Each light pulse was administered in a mobile continuous fashion within a localized area measuring approximately 1 handpiece tip-width laterally and vertically. A series of 4 to 5 pulses were administered across small grid areas, followed by 6 to 8 passes to each grid area, totaling approximately 300 to 450 pulses per treatment. Each mobile pulse was delivered at fluences of 45 to 46 J/cm2 to the face, 45 J/cm2 to the mandible, and 44 J/cm2 to the neck. Clinical results were evaluated employing a comprehensive 4-point grading scale from photographs at baseline, and the 1-month and 3-month follow-up visits after the final treatment. Pain ratings were evaluated by visual analog scale (VAS) gradings and patient questionnaire immediately following treatment. RESULTS: All subjects completed and responded to treatment. The mean treatment number was 2.1 (+/- 0.9) and the mean follow-up interval was 1.9 (+/- 1) months. The quantitative evaluations demonstrated: a mean baseline laxity grade of 2.9 +/- 0.5 and mean posttreatment laxity grade of 2.5 +/- 0.6; and a mean difference in prelaxity grades versus postlaxity grades of 0.4 +/- 0.3 (95% CI; 0.2540-0.5415). The data demonstrated a statistically significant difference between before and after measurements (P<.0001) and a mean percent improvement in laxity grading scores of 14.1 +/- 11.3%. The treatment discomfort was rated as a mean of 0.7 (+/- 0.6) on a VAS grading scale (0 to 10). By patient questionnaire, sensation during the treatment was rated as painless by 100% of patients and rare (<5) transient moments of heat-related pain sensation were reported by 18% of patients. None of patients reported the procedure as painful or as sensing frequent (>5) or persistent heat-related pain sensation during the treatment. Other side effects included minimal erythema which resolved within 1 to 3 hours. No crusting, dyspigmentation, or scarring was observed. CONCLUSION: This prospective clinical study with quantitative

grading of laxity and VAS pain scores demonstrated that mobile delivery of infrared light appears to be safe, clinically effective, and painless in reducing facial and neck laxity. The mobile infrared light delivery allowed for delivery of approximately 30% higher fluence dosages and increased passes to each pulse area. The clinically observable and quantified decreases in skin laxity following treatment were statistically significant.

Dermatol Surg. 2009 Feb;35(2):229-39.

In the eye of the beholder–skin rejuvenation using a light-emitting diode photomodulation device.

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BACKGROUND: A light-emitting diode (LED) photomodulation system can produce pulses of amber light expected to induce structural skin changes and reverse the effects of photoaging. OBJECTIVE: To reproduce the encouraging results already published. METHODS AND MATERIALS: Facial skin was exposed to pulses of 588+/-10-nm-wavelength light from a photomodulation device for 40 seconds once a week for 8 weeks. Photographs, clinical assessment, and a subjective questionnaire were taken at baseline, at the last follow-up, and 1 month after that. Thirty-six patients' pre- and post-treatment photos were arbitrarily scrambled, and 30 independent blinded observers were asked to pick the post-treatment photo. Two time-point comparisons were evaluated. RESULTS: For every facial characteristic studied and for both time-point comparisons, patients reported highly statistically significant improvements. In extremely sharp contrast, neither the physician's assessment nor the independent observers' evaluation indicated any improvement. CONCLUSION: Although subjective findings are comparable between studies, we were unable to reproduce the objective results of efficacy previously reported. Patients genuinely believed that several of their facial features had improved, even though there was no detectable objective change. Our data therefore suggest that the LED photomodulation treatment from the device tested is a placebo.

Semin Cutan Med Surg. 2008 Dec;27(4):301-8.

Future considerations in cutaneous photomedicine.

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Laser and light technology and their use in dermatology are rapidly advancing. Radiofrequency devices have recently integrated lasers to augment the beneficial effects of both while minimizing potential complications of each. Laser-assisted liposuction is becoming more commonplace, and new investigations into the noninvasive selective destruction of fat with lasers have been undertaken. A better understanding of photobiology has generated renewed interest in the effects of low-level laser therapy on skin and wound healing. Lasers also are being used in novel ways for the purposes of in vivo diagnosis, producing some incredible imaging that may prove useful in the early diagnosis and evaluation of cutaneous disease. Finally, more recent work in the field of photochemical tissue bonding may be bringing us closer to sutureless and scarless surgery. Although not an exhaustive review, this article explores some recent advances in laser and light technologies for dermatologic applications and diagnosis.

Semin Cutan Med Surg. 2008 Dec;27(4):227-38.

Light-emitting diodes (LEDs) in dermatology.

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Light-emitting diode photobiomodulation is the newest category of nonthermal light therapies to find its way to the dermatologic armamentarium. In this article, we briefly review the literature on the development of this technology, its evolution within esthetic and medical dermatology, and provide practical and technical considerations for use in various conditions. This article also focuses on the specific cell-signaling pathways involved and how the mechanisms at play can be put to use to treat a variety of cutaneous problems as a stand-alone application and/or complementary treatment modality or as one of the best photodynamic therapy light source.

J Cosmet Dermatol. 2008 Dec;7(4):263-7.

A study to determine the efficacy of a novel handheld light-emitting diode device in the treatment of photoaged skin.

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The use of visible or near-infrared spectral light alone for the purpose of skin rejuvenation has been previously reported in the literature. These devices use large arrays of diodes to deliver light to the skin. In this study, a novel method of light-emitting diode (LED) photo rejuvenation incorporating a combination of these wavelengths delivered from a small handheld unit is proposed. Twenty-two subjects with facial rhytides received eight light therapy treatments over a course of 4 weeks, using the Omnilux handheld LED system. Assessment of global skin grading was evaluated at weeks 6, 9, and 12 by a dermatologist. Additional outcome measures included assessments of clinical photography and patient satisfaction scores. Seventy-four percent of the subjects reported a visible improvement in fine lines and wrinkles at 8 weeks posttreatment. Combination red and near-infrared LED therapy delivered from a small portable handheld unit represents an effective and acceptable method of photo rejuvenation. Further studies to optimize the parameters of treatment are required.

Dermatol Surg. 2008 Nov;34(11):1459-64. Epub 2008 Sep 15.

Application of a new intense pulsed light device in the treatment of photoaging skin in Asian patients.

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BACKGROUND: Intense pulsed light (IPL) technology has long been used in the treatment of photoaging skin. OBJECTIVE: To evaluate the efficacy and safety of a new IPL device in the treatment of photoaging skin in Asian patients. METHODS: One hundred fifty-two Chinese women with photoaging skin were enrolled in

this open-labeled study. Subjects received four IPL treatments at 3- to 4-week intervals. Changes of photoaging were evaluated using a global evaluation, an overall self-assessment, a Mexameter, and a Corneometer. RESULTS: One hundred thirty-nine of 152 patients (91.44%) experienced a score decrease of 3 or 2 grades, according to the dermatologist. One hundred thirty-six of 152 patients (89.47%) rated their overall improvement as excellent or good. The mean skin melanin index (MI) and erythema index values deceased with each session. MI on forehead and EI on cheilion decreased most significantly. Adverse effects were limited to mild pain and transient erythema. CONCLUSION: IPL treatment is a safe and effective method for photoaging skin in Asian patients. Adverse effects were minimal and acceptable.

Photomed Laser Surg. 2008 Oct;26(5):433-42.

Role of nitric oxide in the visible light-induced rapid increase of human skin microcirculation at the local and systemic level: I. diabetic patients.

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OBJECTIVE: This study aimed to reveal the effects of polychromatic visible (pVIS) or pVIS + near IR (nIR) light similar to some components of solar light on skin microcirculation and microvascular response to the vasodilatators acetylcholine (ACh) and nitroglycerine (NG), in the extremities of patients with diabetic microangiopathy. BACKGROUND DATA: The mechanisms behind light-induced increases in microcirculation as well as extracellular effects of terrestrial pVIS and pVIS + nIR light remain unknown. MATERIALS AND METHODS: In 24 subjects with type 2 diabetes mellitus local microcirculation was measured in the skin of the foot before and after exposure to both types of light. In another 26 patients systemic microcirculation was studied in the back of the hand before and after exposure of the lumbar-sacral area to light energy. Two different types of light therapy were performed by using two devises: Q-light, which delivers pVIP (385-750 nm) and pVIS nIR light (385-1700 nm) with a power density of 40 mW/cm2, which is similar to summer sunlight at noon in Central Europe. RESULTS: At 2 min after irradiation (12 J/cm2) of the forefoot with pVIS or pVIS + nIR light, a rise in local blood flow volume (Qas) was observed, on average by 39% and 31%, respectively. The maximal effect (+41-47%) had developed in all patients at 30 min, and it then decreased and disappeared completely 24 h post-irradiation. We obtained similar results after irradiation of the sacral area in Qas of the skin of the hand. Both types of microcirculation also increased following a second exposure to the light sources. Enhancement of microcirculation was accompanied by a decrease in the microvascular response to ACh and NG solutions administered intracutaneously by iontophoresis. CONCLUSION: Both types of irradiation stimulated microcirculation at the local and systemic levels through a mechanism of enhancement of endothelium-dependent and endothelium-independent vasodilation, in which nitric oxide plays a major role.

Semin Cutan Med Surg. 2008 Sep;27(3):207-11.

Evidence for laser- and light-based treatment of acne vulgaris.

Munavalli GS, Weiss RA.

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Acne is a very prevalent skin disorder, affecting more than 85% of adolescents and often continuing into adulthood. Active acne and its sequelae, especially permanent scarring, may cause longstanding psychological

or emotional harm in patients. Novel and promising treatments with laser/light devices (such as blue light, red light, pulsed dye laser, infrared lasers, light-emitting diodes, and pulsed light) have been reported to have varying degrees of efficacy for treatment. The authors compiled a summary of evidence-based literature on laser/light treatment for acne to assist clinicians to more appropriately identify treatment options, should they choose to supplement current medical antiacne therapies.

J Cosmet Dermatol. 2008 Sep;7(3):180-8.

An assessment of the efficacy of blue light phototherapy in the treatment of acne vulgaris.

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BACKGROUND: Acne vulgaris is a common skin condition that affects 8 out of 10 people. It varies from mild to severe, and different treatments target various aspects of the disease. Propionibacterium acnes, one of the culprits involved in the pathogenesis of acne vulgaris, is the main target of all major medical treatments used. Studies conducted in recent years have shown favorable effects within the visible light spectrum for the treatment of acne vulgaris. OBJECTIVE: In this study, we have evaluated the use of intense blue light within the spectral range of 415-425 nm (peak 420 nm) in the treatment of acne vulgaris. METHODS: Twenty-one patients with mild to moderate facial acne were treated with blue light phototherapy. All patients were given 14-min treatment sessions twice a week for 4 weeks. Acne severity was assessed using the Leeds Technique for grading and lesion counts. Disability was assessed using the Dermatology Life Quality Index (DLQI). In addition, standard digital and cross-polarized light photographs were taken and graded by a blinded evaluator. Visual analog scale (VAS) scores and cultures for P. acnes were carried out before starting the treatment and upon completion of the treatment. RESULTS: Significant improvement was achieved in the Leeds Acne Grade ($P = 0.001$). The inflammatory ($P = 0.001$) and noninflammatory ($P = 0.06$) lesion counts also improved significantly. A similar change was noted in the DLQI ($P = 0.001$); a degree of significance was also achieved in the patients' and the investigators' VAS scores ($P = 0.01$ and $P = 0.001$, respectively). P. acnes colony counts failed to show a significant decrease at the end of the treatment and remained almost constant ($P = 0.660$). CONCLUSIONS: We believe that blue light does appear to have some role in the management of acne and may be beneficial for the treatment of a select group of mild to moderate acne patients.

Clin Plast Surg. 2008 Oct;35(4):553-66, vi.

Pushing the clock back 15 to 20 years with facial rejuvenation.

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The goal of rejuvenation is to restore the good looks present 15 to 18 years before without having signs of surgical improvement. Patients should look like themselves at a younger age with specific improvement not present when younger, such as nose or neck contour.

Lasers Surg Med. 2008 Sep;40(7):454-60.

Low density, non-ablative fractional CO2 laser rejuvenation.

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BACKGROUND AND OBJECTIVES: Fractional skin rejuvenation has gained increased interest since its introduction in 2003. Both non-ablative and ablative lasers as well as different treatment techniques have been devised. Recent clinical studies indicate that a paradigm of low spot density combined with high fluences tend to produce better clinical results and less risk of post-inflammatory hyperpigmentation in darker skin types. The present study is focused on investigations of the clinical outcome by non-ablative fractional CO(2) treatments with a single pass with low spot density. METHODS AND MATERIALS: A CO(2) laser was equipped with a scanner enabling it to perform fractional treatments with 36, 64 or 100 microthermal zones (MTZ)/cm(2). Twelve patients participated in the study. The perioral area was treated three times with 1-month intervals using a spot density of 64 MTZ/cm(2), a spot diameter of 0.5 mm, a micro-beam energy of 36-60 mJ, and a pulse duration of 3-5 milliseconds. Follow-up was performed 3 months after the last treatment. RESULTS: At the 3-month follow-up 72.7% of the volunteers had obtained improvement in ultrasonographically determined dermal density, and the average improvement was 40.2% (SD: 48.0%). This improvement was statistically significant (P<0.006). Eighty percent of the volunteers rated the reduction in visible perioral wrinkles to be fair, good or excellent. For reduction of irregular pigmentation, fair, good or excellent clearance was reported by 62.5% of the volunteers. CONCLUSIONS: The present study demonstrates subjective improvements in wrinkles, skin texture and mottled pigmentation as well as statistically significant objectively measured improvements in ultrasonographical dermal density after three non-ablative fractional CO(2) laser treatments.

Br J Dermatol. 2008 Sep;159(3):628-32. Epub 2008 Jun 28.

Treatment of rosacea with intense pulsed light: significant improvement and long-lasting results.

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BACKGROUND: Rosacea is a common skin condition but the treatments currently available are not satisfactory. OBJECTIVES: To assess the efficacy of intense pulsed light (IPL) for treatment of stage I rosacea (flushing, erythema and telangiectasia). METHODS: Thirty-four patients were treated, 25 women and nine men, mean age 47 years. The treatment employed was IPL 515-1200 nm, with a 560 nm cut-off filter. The fluence range was 24-32 J cm(-2). Four treatments were administered on the face at 3-week intervals. Erythema values were measured at baseline and at the end of the treatment period on the cheeks and chin. Digital photographs were assessed by a consultant dermatologist on a 10-point visual analogue scale (VAS). Patients' assessments were also made using a 10-point VAS. Outcome measures were repeated 6 months after treatment. RESULTS: After four treatments the mean reduction of the erythema values was 39% on the cheeks ($P < 0.001$) and 22% on the chin ($P < 0.001$). This was confirmed by photographic assessment where erythema improved by 46% and telangiectasia by 55% ($P < 0.001$). The severity of rosacea was reduced on average by 3.5 points on the 10-point VAS. Patients' and physicians' assessments of the overall improvement of rosacea were similar: more than 50% improvement was noticed in 73% and 83% of patients, respectively ($P < 0.001$). The results were sustained at 6 months. Side-effects were minimal and self-limiting. CONCLUSIONS: IPL significantly reduces erythema and telangiectasia of rosacea and this is sustained for at least 6 months.

Lasers Med Sci. 2008 Apr;23(2):149-54. Epub 2007 May 10.

“Multi Light and Drugs”: a new technique to treat face photoaging. Comparative study with photorejuvenation.

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Nonablative skin rejuvenation using laser, intense pulsed lights (IPLs), or radiofrequency techniques are becoming increasingly popular. In this paper, a novel protocol that integrates IPL sessions, low intense light and vitamin C, low-weight hyaluronic acid, betaglucan dermal injection versus IPL photorejuvenation as monotherapy is compared. A group of 100 patients, all women, with ages ranging from 35 to 65 years old (median age 56.3) with different degrees of photodamage was considered. A blinded control study was done. The patients were divided not randomly into two groups. These groups are similar for ages, skin types, and degrees of photoaging distribution. A first group of 40 patients had monotherapy consisting of seven sessions of IPL only. A second group of 60 patients had triple therapy consisting of seven sessions of IPL as well as nine sessions of low intense diode light and also biostimulation by drugs. Considering only the improvement in hyperpigmentations and teleangectasias, the monotherapy and the triple therapy show good results with no significant statistical difference between the two groups. Considering the improvement in skin texture and firmness in the group treated only with monotherapy, 30% (12 patients) had positive results, and 70% (28 patients) had poor results. In the group treated with triple therapy, 70% (42 patients) had positive results, and 30% (18 patients) had poor results, with the main differences in skin silicone negative imprints. On the basis of the data presented, the new technique of IPL, low intensity diode light, and multidrugs biostimulation seems to be a safe and effective method for skin rejuvenation and upgrades the effects of IPL in the fibroblasts’ stimulation.

J Eur Acad Dermatol Venereol. 2008 Mar;22(3):267-78. Epub 2008 Jan 23.

Evidence-based review of lasers, light sources and photodynamic therapy in the treatment of acne vulgaris.

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Background There is a considerable need for effective and safe treatment for acne vulgaris. Objective In a systematic review with an evidence-based approach to assess the effects of optical treatments for acne vulgaris. Methods Original publications of controlled clinical trials were identified through searches in PubMed and the Cochrane Library. Results A total of 16 randomized controlled trials (RCT) and 3 controlled trials (CT) were identified, involving a total of 587 patients. Interventions included photodynamic therapy (PDT; 5 RCTs), infrared lasers (4 RCTs), broad-spectrum light sources (3 RCTs, 1 CT), pulsed dye lasers (PDL; 2 RCTs, 1 CT), intense pulsed light (IPL; 1 RCTs, 2 CTs), and potassium titanyl phosphate laser (1 RCT). The randomization method was mentioned in 6 of 16 RCTs, and one trial described adequate allocation concealment. Most trials were intraindividual trials (12 of 19), which applied blinded response evaluations (12 of 19) and assessed a short-term efficacy up to 12 weeks after treatment (17 of 19). Based on the present best available evidence, we conclude that optical treatments possess the potential to improve inflammatory acne on a short-term basis with the most consistent outcomes for PDT [up to 68% improvement, aminolevulinic acid (ALA), methyl-aminolevulinic acid (MAL) and red light]. IPL-assisted PDT seems to be superior to IPL alone. Only two trials compare optical vs. conventional treatments, and further studies are needed. Side-effects from

optical treatments included pain, erythema, oedema, crusting, hyperpigmentation, pustular eruptions and were more intense for treatments combined with ALA or MAL. Conclusion Evidence from controlled clinical trials indicates a short-term efficacy from optical treatments for acne vulgaris with the most consistent outcomes for PDT. We recommend that patients are preoperatively informed of the existing evidence, which indicates that optical treatments today are not included among first line treatments.

J Drugs Dermatol. 2008 Mar;7(3):273-9.

Skin rejuvenation in Asian skin: the analysis of clinical effects and basic mechanisms of intense pulsed light.

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BACKGROUND: Skin aging consists of photoaging and intrinsic aging. It is characterized clinically not only by rhytides, but also by pigmentary alterations and facial telangiectasias. There continues to be a growing interest in the efficacy of intense pulsed light (IPL) devices in the treatment of skin aging, as well as further defining its mechanism of action. OBJECTIVES: The objective of this clinical trial was to evaluate the effects and the mechanism of action of an IPL by comparing clinical photographs and biopsy results before and after treatment. METHODS: A total of 58 patients were treated using a new IPL device. Clinical photographs were taken before treatment and compared to those taken 3 weeks after the treatment. Also, 4 cases had pathological analyses of tissues that were stained by haematoxylin-eosin and Uana orcein. Immunohistology of human collagen of types 1 and 3 and quantitative analyses of elastin and collagen were performed by a poly-functional digital image light microscope; a transmission electron microscope was used for 2 of the cases to look for additional changes. RESULTS: After 3 treatments, 62.1% of the patients showed improvement in wrinkles and skin texture. Pigmentation improved in 84.6% of the patients, and a reduction in telangiectasis was seen in 81.25% of the patients. Pathological examination showed that both type 1 and type 3 collagens increased following treatment, but elastin content decreased; however, the elastin fibers were arranged more neatly. In the transmission electron microscope study, the amount of fibroblast activity increased, the fibroblasts were more active, and there were more collagen fibers neatly rearranged within the stroma. CONCLUSION: Clinical and pathological studies demonstrated that the IPL was effective in improving wrinkles and skin texture. The mechanism of action may be through the increasing activity of the fibroblasts, hyperplasia of the fibroblasts, and rearrangement of both collagen and elastin within the stroma.

Photodermatol Photoimmunol Photomed. 2008 Feb;24(1):49-51.

Effect of a new infrared light device (1100-1800 nm) on facial lifting.

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Laser skin resurfacing procedures can be classed into two categories – invasive and non-invasive. The last several decades have witnessed a host of advancements in ablative laser therapy and other ablative modalities for the rejuvenation of skin, including the CO(2) laser, the erbium : yttrium aluminum garnet laser, chemical peels, and dermabrasion. Despite the excellent results that can result from the practice of these techniques by experienced surgeons, the invasive nature of these devices is associated with inherent risks and patient

discomfort. Therefore, much of the focus has been on non-ablative lasers and intense-pulsed light devices. We evaluated the efficacy and safety of treatment with the new infrared light device (1100-1800 nm), Titan, and assessed the degree of improvement associated with two-time laser treatments, as compared to one-time laser treatment.

J Drugs Dermatol. 2008 Feb;7(2):139-45.

Photopneumatic technology for the treatment of acne vulgaris.

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OBJECTIVE: Treatment of acne vulgaris with light sources necessitates multiple targets including Propionibacterium acnes and sebaceous glands. Traditional light sources such as blue light capitalize on P acnes bacteria as targets while infrared lasers and radiofrequency devices target the sebaceous gland. A novel device combining vacuum and a unique broadband light source was designed to combine multiple targets for the effective treatment of acne. The objective of this study was to demonstrate the safety and efficacy of a novel device that uses a combination of broadband light and pneumatic energy for the treatment of acne vulgaris. METHODS: In a retrospective multicenter study, clinical data were collected from 56 patients with mild to severe acne. Patients had been treated 2 to 4 times with a portable photopneumatic device (Aesthera PPx, Aesthera Corporation, Pleasanton, CA) that delivers broadband light (400 to 1200 nm) to the treatment site via a hand piece. For 11 of the 56 patients, 3 independent physicians blinded to the study treatment or duration evaluated PPx efficacy by comparing photographs taken before and after PPx treatment. RESULTS: For the 56 patients, the median physician-rated clearance increased from 50% after a single treatment to 90% after the fourth treatment, whereas the median patient-rated clearance improved from 50% after a single treatment to 78% after the fourth treatment. On a 4-point scale, both physician-rated and patient-rated median overall satisfaction levels increased from a 3 after a single treatment, to 4 after the second, third, and fourth treatments. Clinically significant adverse events were not observed. For the 11 patients evaluated by photography, the median papule and pustule lesion counts decreased from 8 to 3 and from 2 to 0, respectively. Median acne severity (Burton scale) decreased from 4 before treatment to 2 after the final treatment, and the median improvement was 4.5 (scale 1-5). The median erythema rating decreased from 2 before treatment to 1 after the final treatment (scale 1-4). Adverse events were limited to mild erythema. The median acne clearance was 3 (scale 1-4). CONCLUSION: Photopneumatic technology provides a safe and effective treatment of mild to severe acne vulgaris.

J Cosmet Laser Ther. 2008 Jun;10(2):67-71.

Facial skin tightening with an 1100-1800 nm infrared device.

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BACKGROUND/OBJECTIVES: To determine the efficacy of the 1100-1800 nm infrared device for facial and cervical skin tightening. METHODS: Ten female patients, with a mean age of 56.5 years, received two treatments 1 month apart with a chilled tip infrared device (Titan; Cutera, Brisbane, CA, USA). Individuals were examined and photographed prior to treatment and at 1 and 3 months post-treatment. Three treatment-independent evaluators compared the photographs and graded them on a standardized scale applied to seven regions subdividing the face and neck. After evaluating the photographs, the difference in pretreatment and post-treatment scores was expressed as a percentage. The patients also rated their results.

RESULTS/CONCLUSION: The greatest tightening was achieved over the malar region, the upper neck and the body of the mandible. In these areas the average tightening was 10%, 10%, and 12% respectively. The patients reported a 32% improvement in the appearance of their cheeks and a 20% visible improvement in their necks. Overall, they were pleased with the result of this non-surgical skin tightening.

Aesthetic Plast Surg. 2008 May;32(3):523-30.

Effects achieved on stretch marks by a nonfractional broadband infrared light system treatment.

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BACKGROUND: Infrared light systems reportedly produce collagen-related effects, enabling the treatment of several skin disorders. This study was designed to evaluate effects on stretch marks from an intense pulsed light infrared device, which achieved high fluences with high-frequency stacked pulses on selected areas. METHODS: For this study, 10 patients were recruited for treatment with the NovaPlus infrared device. Three passes per session over four sessions were given 15 days apart. The patients were advised to maintain their weight throughout the study period to avoid any impact on stretch marks. Objective evaluation was performed by using a computer program to compare photographs taken before and 3 months after the last session. Three-dimensional (3D) skin surface analysis also was performed using scores of “worse,” “same,” “fair,” “better,” and “much better.” Biopsies were taken immediately before the first treatment and 3 months after the last session. Also, responses to questionnaires were evaluated to determine the patients’ satisfaction index. RESULTS: Few patients noted improvement. Photographs of stretch marks checked by computer analysis and 3D skin surface imagery gave a practically equal outcome, with no “worse” or “much better” results. However, these objective tests demonstrated greater improvement than shown by the clinician and patient findings. Histology showed positive changes in the epidermis and dermis related to improvement in tissue condition. The satisfaction index from the questionnaires was average. The authors recognize that the small number of subjects possibly limited the statistical power of the study. CONCLUSIONS: Objective improvement observed in the overall skin condition did not match the visual observation. The absence of side effects or complications and good compliance with the treatment suggest that extra treatment sessions with the infrared light device could be tried to obtain a better outcome.

J Cutan Med Surg. 2008 May-Jun;12(3):107-13.

Hand rejuvenation using intense pulsed light.

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BACKGROUND: The aging of the hands is typically characterized by wrinkles, skin thinning, and solar lentigines. The search for effective treatments has led to the use of laser and intense pulsed light (IPL) technologies. OBJECTIVE: To assess the effectiveness of an IPL device for the improvement of dyspigmentation and overall skin quality on the dorsa of the hands. METHODS: Twenty-three patients with sun damage and solar lentigines on the dorsal hands were treated with four IPL sessions at 3- to 4-week intervals. Prior to treatment, photographs were taken and informed consent was obtained. Pre- and post-treatment photography and investigator clinical assessment and patient questionnaires were collected for data

analysis. RESULTS: After four treatment sessions, good to excellent results in the improvement in solar lentigines and skin quality were assessed by investigators in 100% of the cases and in 86.94% (20 of 23 subjects) by patient self-assessments. No significant side effects were observed. CONCLUSION: IPL is an effective and safe treatment option to improve solar lentigines and skin texture for hand rejuvenation.

Aesthetic Plast Surg. 2008 May;32(3):523-30.

Effects achieved on stretch marks by a nonfractional broadband infrared light system treatment.

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BACKGROUND: Infrared light systems reportedly produce collagen-related effects, enabling the treatment of several skin disorders. This study was designed to evaluate effects on stretch marks from an intense pulsed light infrared device, which achieved high fluences with high-frequency stacked pulses on selected areas. METHODS: For this study, 10 patients were recruited for treatment with the NovaPlus infrared device. Three passes per session over four sessions were given 15 days apart. The patients were advised to maintain their weight throughout the study period to avoid any impact on stretch marks. Objective evaluation was performed by using a computer program to compare photographs taken before and 3 months after the last session. Three-dimensional (3D) skin surface analysis also was performed using scores of “worse,” “same,” “fair,” “better,” and “much better.” Biopsies were taken immediately before the first treatment and 3 months after the last session. Also, responses to questionnaires were evaluated to determine the patients’ satisfaction index. RESULTS: Few patients noted improvement. Photographs of stretch marks checked by computer analysis and 3D skin surface imagery gave a practically equal outcome, with no “worse” or “much better” results. However, these objective tests demonstrated greater improvement than shown by the clinician and patient findings. Histology showed positive changes in the epidermis and dermis related to improvement in tissue condition. The satisfaction index from the questionnaires was average. The authors recognize that the small number of subjects possibly limited the statistical power of the study. CONCLUSIONS: Objective improvement observed in the overall skin condition did not match the visual observation. The absence of side effects or complications and good compliance with the treatment suggest that extra treatment sessions with the infrared light device could be tried to obtain a better outcome.

Actas Dermosifiliogr. 2008 May;99(4):262-8.

Recent advances in laser therapy and other technologies

[Article in Spanish]

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Laser technology and other energy sources are rapidly finding a place in dermatology clinics. In the field of skin rejuvenation by fractional photothermolysis, although few controlled studies have been undertaken, several devices have emerged in recent years that appear less effective than laser ablation techniques but that are safer. The aim of this short article is to provide an introduction, though not treat in depth, the different emerging technologies in dermatology. We will focus particularly on lasers and light sources in improving applications such as the treatment of vascular lesions, acne, and encapsulated ink tattoos; light-emitting diodes; developments in the treatment of cellulitis; photodynamic therapy; suction methods; scarring; and finally the recent and doubtlessly future introduction of home devices for use in a range of dermatologic applications (depilation, rejuvenation, treatment of acne, etc).

J Cosmet Dermatol. 2008 Mar;7(1):30-4.

Use of light-emitting diode photomodulation to reduce erythema and discomfort after intense pulsed light treatment of photodamage.

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OBJECTIVES: This study evaluates the use of light-emitting diode (LED) photomodulation therapy to accelerate resolution of post-intense pulsed light (IPL) erythema. METHODS: In this split-face study, 15 subjects were randomized to receive LED treatment to one side of the face as determined by computer-generated randomization numbers. All 15 subjects received a single IPL treatment for facial photodamage. Immediately after IPL treatment, one side of the face was treated for 35 s with the LED device. The other side was not treated. Subjects returned 24 h later for a second LED treatment on the same side of the face. Posttreatment erythema was rated on both sides of the face by the blinded investigator and by subjects immediately after IPL treatment, 24 h later, and 1 week later on a scale of 0% (no erythema) to 100% (severe erythema). Patients commented on posttreatment discomfort immediately after IPL treatment. RESULTS: Mean erythema scores on the first visit were significantly higher (P = 0.0054) on the side not treated with LED (52.7 +/- 24.6) than on the LED-treated side (43.3 +/- 21.9). Visit 2 data showed a similar trend (P = 0.0281). The subjects reported similar findings with mean erythema scores on the first visit on the LED-treated side (46.7 +/- 25.3) compared with the untreated side (60.0 +/- 23.3); the difference was significant (P = 0.0382). On the second visit, the mean erythema scores trended lower on the LED-treated side (24.3 +/- 22.1) than on the untreated side (27.9 +/- 25.8), but the difference did not reach statistical significance (P = 0.1365). Erythema scores on both facial sides were 0 for all subjects 1 week after IPL treatment. Four patients commented that posttreatment discomfort was considerably less on the LED-treated side immediately after treatment. CONCLUSION: LED photomodulation treatment may accelerate the resolution of erythema and reduce posttreatment discomfort in IPL-treated patients with photodamage.

J Drugs Dermatol. 2008 Apr;7(4):347-50.

Handheld LED array device in the treatment of acne vulgaris.

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The successful treatment of acne still remains problematic. Conventional therapies often prove inconsistent with unacceptable side effects and recurrence rates, leading to patient noncompliance. A thermal phototherapy treatment using a combination of blue light and red light has recently attracted much attention and seems to offer an effective alternative. The objective of this study was to evaluate the efficacy of blue light (415 nm) in combination with red light (633 nm) in the reduction of inflammatory lesions on the face of subjects (n=21) with mild to moderate acne vulgaris after a course of 8 20-minute (blue) or 30-minute (red) alternated light treatments, self-administered by a handheld unit over a period of 4 weeks. Lesion counts progressively reduced throughout the 4-week light therapy period and continued to reduce up to 8 weeks posttherapy, with a final average reduction of 69% seen 8 weeks after the treatment course (P>.001). This pattern is similar to previously reported studies.

Aesthet Surg J. 2008 Mar-Apr;28(2):180-8.

Tissue tightening technologies: fact or fiction.

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Skin laxity is associated with chronological aging and exposure to solar radiation. The authors summarize the advantages and limitations of current laser, light-, and radiofrequency (RF)-based technologies purported to treat skin laxity by effecting heat-induced collagen contraction and subsequent remodeling during the months after treatment. Although penetration of laser or broadband light to the deep dermal layers is limited because of scattering of the light by epidermal melanin, a new device in which broadband infrared light is minimally scattered may overcome these limitations. RF energy offers a treatment alternative that has not only been proven to promote collagen contraction and remodeling but also is not scattered by epidermal constituents. Recently launched devices that use combinations of optical and RF energy achieve clinical benefits at lower and therefore safer levels of energy, with only mild pain and few adverse effects. A combined infrared-RF device takes maximum advantage of both optical and RF technologies to achieve the desired clinical effect. The electrooptical synergy systems have proven to be safe, effective, reliable, and user-friendly. Other more advanced powerful technologies may also be effective in this setting.

Lasers Surg Med. 2008 Feb;40(2):106-12.

LED photoprevention: reduced MED response following multiple LED exposures.

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BACKGROUND AND OBJECTIVES: As photoprotection with traditional sunscreen presents some limitations, the use of non-traditional treatments to increase skin resistance to ultraviolet (UV) induced damage would prove particularly appealing. The purpose of this pilot study was to test the potential of non-thermal pulsed light-emitting diode (LED) treatments (660 nm) prior to UV exposure in the induction of a state of cellular resistance against UV-induced erythema. STUDY DESIGN/MATERIALS AND METHODS: Thirteen healthy subjects and two patients with polymorphous light eruption (PLE) were exposed to 5, 6, or 10 LED treatments (660 nm) on an EXPERIMENTAL anterior thigh region. Individual baseline minimal erythema doses (MED) were then determined. UV radiation was thereafter performed on the LED EXPERIMENTAL and CONTROL anterior thigh areas. Finally, 24 hours post-UV irradiation, LED pre-treated MED responses were compared to the non-treated sites. RESULTS: Reduction of erythema was considered significant when erythema was reduced by >50% on the LED-treated side as opposed to CONTROL side. A significant LED treatment reduction in UV-B induced erythema reaction was observed in

at least one occasion in 85% of subjects, including patients suffering from PLE. Moreover, there was evidence of a dose-related pattern in results. Finally, a sun protection factor SPF-15-like effect and a reduction in post-inflammatory hyperpigmentation were observed on the LED pre-treated side. CONCLUSIONS: Results suggest that LED based therapy prior to UV exposure provided significant protection against UV-B induced erythema. The induction of cellular resistance to UV insults may possibly be explained by the induction of a state a natural resistance to the skin via specific cell signaling pathways and without the drawbacks and limitations of traditional sunscreens. These results represent an encouraging step towards expanding the potential applications of LED therapy and could be useful in the treatment of patients with anomalous reactions to sunlight.

Indian J Dermatol. 2008;53(2):49-53.

Latest laser and light-based advances for ethnic skin rejuvenation.

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BACKGROUND: Advances in nonablative skin rejuvenation technologies have sparked a renewed interest in the cosmetic treatment of aging skin. More options exist now than ever before to reverse cutaneous changes caused by long-term exposure to sunlight. Although Caucasian skin is more prone to ultraviolet light injury, ethnic skin (typically classified as types IV to VI) also exhibits characteristic photoaging changes. Widespread belief that inevitable or irreversible textural changes or dyspigmentation occurs following laser- or light-based treatments, has been challenged in recent years by new classes of devices capable of protecting the epidermis from injury during treatment. OBJECTIVE: The purpose of this article is to review recent clinical advances in the treatment of photoaging changes in ethnic skin. This article provides a basis for the classification of current advances in nonablative management of ethnic skin.

Lasers Surg Med. 2008 Feb;40(2):146-52.

A prospective, split face, single-blinded study looking at the use of an infrared device with contact cooling in the treatment of skin laxity in Asians.

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BACKGROUND: Although monopolar radiofrequency treatment is effective in the improvement of skin laxity, the pain and cost that are associated with this method suggest the need for alternative treatment options. Recently, an infrared device with contact cooling has been shown to be effective in the treatment of skin laxity, with ultrastructural changes observed that are similar to those that are observed following treatment with a monopolar radiofrequency device. However, no control was included in previous studies. OBJECTIVE: To conduct a prospective, split-face, single-blinded study to look at the efficacy and complications among Asians of treatment for skin tightening with an infrared device with contact cooling. METHOD: Thirteen Chinese women were treated. An infrared device with contact cooling (Titan, Cutera, Brisbane, CA) was used to treat one side of the face and the untreated side served as the control. The treatment was performed twice with a 4-week interval between the treatments and the patients were followed up by subjective assessment using a structured questionnaire 1 and 3 months after the second (and last) treatment. In all cases, pre- and post-

treatment clinical photographs were taken. Two independent observers assessed the photographs. RESULTS: Twenty-three percentage of patients reported mild improvement, 15% reported moderate improvement, and 54% reported significant improvement 3 months after their second (and last) treatment. In terms of objective assessment, 41% of patients were identified to have some degree of improvement of the treated side 3 months after their second treatment. Compared with the untreated side, the treated side improved significantly (P = 0.031) at 1 and 3 months after the second treatment. Blistering occurred in one patient, which had resolved completely by the 3-month follow-up visit. CONCLUSION: An infrared device with contact cooling can be used effectively and safely for the treatment of skin laxity, especially in smaller anatomical areas.

Dermatol Ther. 2007 Nov-Dec;20(6):414-29.

Nonablative laser rejuvenation in men.

Ross EV.

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As our culture increasingly emphasizes youth and virility in the workplace, men have become interested in enhancing their appearance. Once confined to a small number of “progressive” urban patients, the ever-enlarging buffet of minimally invasive procedures has broadened the appeal for laser rejuvenation. Although most procedures are gender neutral, there are sex-specific characteristics that should be considered in designing logical laser strategies for men. In this review, the major categories of rejuvenation are examined in a modality- and application-specific manner. When possible, settings are discussed for particular devices. The reader should be aware, however, that “go-by” recipes, although enticing for the novice, should only be applied within the context of identifiable tissue endpoints and with properly functioning equipment. The best settings are those that achieve desired results for a specific device, and ultimately, experience is the best guide for optimal parameter selection.

J Drugs Dermatol. 2007 Oct;6(10):1024-8.

Intense pulsed light versus advanced fluorescent technology pulsed light for photodamaged skin: a split-face pilot comparison.

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Intense pulsed light (IPL) has been a popular nonablative treatment of photodamage. A prospective, randomized, controlled, single-blinded, split-face pilot study compared the efficacy and safety of 2 multitechnology broadband pulsed light platform devices: an IPL device (Lumenis One, Lumenis Corporation, Santa Clara, CA) and a fluorescent pulsed light with advanced fluorescent technology (AFT, Harmony System, Alma Lasers, Buffalo Grove, IL) device. Eight volunteer subjects (skin types I-IV) with a 2.0 mean Global Score for Photoaging (scale 0-4) participated in the study. Subjects received 3 to 5 treatments 3 weeks apart in which one side of the face was treated with the IPL device and the other side with the AFT device. During each treatment session, the face received 3 complete passes without anesthesia. Treatment was aggressive and parameters were determined by test spot application. Treatment endpoints were mild erythema. Results were evaluated by clinical observations of the investigator and comparison of pre- and post-treatment photographs by subjects and 2 blinded dermatologists. Blinded evaluators agreed that improvements in dyspigmentation, telangiectasias, erythema, and skin texture were similar on both sides of the face. Subject assessments of discomfort during treatment were also comparable. Adverse effects were not observed.

Clin Dermatol. 2007 Sep-Oct;25(5):434-42.

Masers to magic bullets: an updated history of lasers in dermatology.

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Laser therapy is one of the fastest expanding and most exciting fields in dermatology. From its theoretical beginnings in Einstein's imagination, lasers have come to be used in treatments for conditions ranging from skin malignancy and acne to hirsutism and photoaging. We will briefly review the evolution of laser treatment, with a focus on the recent developments surrounding the new millennium.

Arch Dermatol. 2003 Oct;139(10):1265-76

Erratum in:

Arch Dermatol. 2004 May;140(5):625.

Clin Dermatol. 2007 Sep-Oct;25(5):474-9.

Nonablative tissue remodeling and photorejuvenation.

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Nonablative facial resurfacing is a noninvasive approach to tissue remodeling and skin rejuvenation. These procedures are considered an alternative to the more traditional laser resurfacing with less dramatic effects, but also with significantly less downtime. Results vary based on the lasers and light sources used. In general, the infrared lasers improve texture, visible light lasers somewhat improve texture but greatly reduce redness and telangiectasias, and intense pulsed light devices improve both red targets and brown discoloration, as well as skin texture. Lastly, low-energy devices may improve redness and texture modestly. Patient selection, as well as device selection, is based on the outcome desired. Side effects are uncommon and preventable.

J Cosmet Dermatol. 2007 Sep;6(3):189-94.

The use of light-emitting diode therapy in the treatment of photoaged skin.

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BACKGROUND: Light-emitting diode (LED) therapy is an increasingly popular methodology for the treatment of sun damage. Combination use of light wavelengths reported to stimulate collagen synthesis and accelerate fibroblast-myofibroblast transformation may display a composite rejuvenative effect. OBJECTIVE: To clinically assess reduction in sun damage signs following a 5-week course of LED therapy and to assess subject's perception of the treatment. METHODS: Thirteen subjects with wrinkles or fine lines in the periorbital and nasolabial region and those presenting Glogau scale photodamage grade II-III received nine 20-min duration light treatments using the Omnilux LED system. The treatments combined wavelengths of 633 and 830 nm at fluences of 126 and 66 J/cm(2), respectively. Sun-damage reduction was assessed at 6, 9, and 12 weeks by clinical photography and patient satisfaction scores. RESULTS: The majority of subjects displayed "moderate" (50%) or "slight" (25%) response to treatment at investigator assessment. Treatment of the periorbital region was reported more effective than the nasolabial region. At 12-week follow-up, 91% of subjects reported improved skin tone, and 82% reported enhanced smoothness of skin in the treatment area. CONCLUSION: Good response to LED therapy has been shown in this modest sample. Larger trials are needed to assess optimum frequency of light treatments and overall treatment time.

J Drugs Dermatol. 2007 Aug;6(8):838-40.

Combination of a new radiofrequency device and blue light for the treatment of acne vulgaris.

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Acne vulgaris is the most common skin disease treated by physicians. Current topical and oral treatments may have short- and long-term negative consequences. Since radiofrequency (RF) energy has been shown to reduce sebum production and 410-nm blue light has been shown to kill Propionibacterium acnes (P. acnes) cells, these modalities in combination should be a highly effective treatment of acne vulgaris with little or no downtime or risk. This case report describes the efficacy and safety of RF energy (Accent, Alma Lasers Inc, Buffalo Grove, IL) and blue light (BLU-U, Dusa Pharmaceuticals, Inc, Wilmington, MA) used in combination to treat grade 4 cystic acne and acne scars in an Asian woman of skin type IV. The results were considered excellent by both investigators and the patient, with improvement in the skin tone as an added cosmetic benef

Facial Plast Surg Clin North Am. 2007 May;15(2):179-84, vi.

Cervical facial skin tightening with an infrared device.

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Improvement of facial and cervical skin laxity has been difficult to achieve without surgical procedures. A device called the Titan, (Cutera, Inc., Brisbane, California) uses infrared light to volumetrically heat the dermis. It is designed to thermally induce collagen contraction, with subsequent collagen remodeling and neocollagen synthesis. The epidermis is protected via pre-, parallel, and post-treatment cooling. Because there is minimal to no discomfort during the procedure, no anesthesia is necessary. With this device, improvements in skin laxity and facial and neck contours have been achieved. Results can vary, however. This variation may be caused by patient selection variability and differences in technique. This article presents an effective approach to patient selection, evaluation, and treatment planning, and a detailed treatment protocol.

Zhonghua Yi Xue Za Zhi. 2007 May 29;87(20):1394-7.

[Effects of rejuvenation by intense pulsed light and basic mechanism thereof]

[Article in Chinese]

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OBJECTIVE: To evaluate the effects of rejuvenation by intense pulsed light (IPL) and the mechanism thereof. METHODS: Fifty-eight patients with photo aging were treated with IPL of single, double, or triple pulse pattern for 3 – 5 times with the intervals of 3 – 4 weeks. Three weeks after the last treatment, photography was conducted and the pictures underwent grading by the physicians and patients according to blind method. Skin specimens of the posteroinferior ear lobe or the nape were obtained from 4 patients to undergo HE staining, Uana orcein staining of elastin, immunohistochemical staining for collagenous fibers of types I and III, and transmission electron microscopy was conducted in 2 of the 4 patients. Skin digitalized image analysis was conducted on 34 female patients to measure and analyze the depth and width of dermatographs, roughness of skin. RESULTS: After the third treatment, the wrinkles and skin texture of 62.1% of the patients showed improvement, and 84.60% of the pigmented lesions and 81.25% of the vascular lesions showed improvement. Pathology showed that type I and type III collagen increased while elastin decreased, and the fibers were orderly re-arranged. Transmission electron microscopy showed that after treatment the fibroblasts increased in number and became more active in secretion and there were more collagen fibers orderly re-arranged in the stroma. Digitalized image analysis showed significant improvement in skin smoothness, depth, arithmetic average roughness and average roughness of skin texture (all $P < 0.01$). CONCLUSION: IPL is effective to improve the skin texture. The mechanism may be the increasing of the activity of the fibroblasts, and hyperplasia and re-arrangement of collagen and elastin.

Acta Chir Plast. 2007;49(2):51-4.

Utilization of intense pulsed light in the treatment of face and neck erythrosis.

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Erythrosis is a clinical manifestation characterized by parossistic vasodilatations followed by fixed superficial venular dilatations localized at the face, neck, décolleté and pinnas. To date, a variety of lasers have been used for treating vascular skin lesions. This study will describe the response on these vascular lesions using the intense pulsed light (IPL) source. Twenty-two female patients and twelve men, aged between 19 and 65, had a phototype ranging from 2 to 4 on the Fitzpatrick scale. The technique is based on a pulsed light of high intensity obtained with a vascular filter of 560 nm. They underwent five treatments of twenty minutes each, at intervals of twenty-one days, with a variable fluency between 9-12 J/cm2 and impulse time of 10-20 ms. The sheaf used is a rectangular spot of 2 cm x 5 cm. In twenty-four patients we obtained a total regression of the cutaneous manifestation after 5 applications, whilst another two patients showed only an attenuation of the erythema. In five cases with erythrosis the erythema persisted after the end of the treatment, although the patients were satisfied with the evident benefits. In two patients affected by Civatte's poikiloderma of the neck we obtained differing results: In the first case an evident positive response of the clinical picture was perceived after only two application of the IPL; in the second case, the benefits were evident after 3-4 applications of IPL at a higher fluency of up to 14 J/ cm2. One patient in treatment with oral antibiotics showed good results from the first application with regression of the erythema up to its disappearance. Collateral effects are not reported,

although there was a long-standing (more than 48 hours) post-treatment erythema in only one case. The IPL system, with its broad range of technical variables, is an effective tool in achieving meaningful and lasting clearance of erythrosis.

Acta Chir Plast. 2007;49(2):47-50.

Rejuvenation of the aging face using fractional photothermolysis and intense pulsed light: a new technique.

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Photoaging is an inevitable occurrence for people who have a fair skin type, who live in a sunny climate, and who enjoy the outdoors. In the past the remedies for this condition were limited to dermabrasion or chemical peeling. Both dermabrasion and chemical peels have hazards of their own. With phenol peels, cardiac and renal toxicity was real concern. There is an increasing demand for an effective and safe laser treatment that repairs photoaged skin. Two treatment modalities, ablative skin resurfacing (ASR), and nonablative dermal remodeling (NDR), have been developed to address this demand. All currently available laser treatments, however, exhibit significant problems, and these laser systems typically operate safely and effectively only over a narrow, patient-dependent treatment range. This study aimed to analyze a new protocol of fractional rejuvenation and intense pulsed light for skin rejuvenation regarding its efficacy, safety, and complications. Twenty-nine patients (27 women and 2 men), age ranging from 40 to 73 years, answered the questionnaire and were included in the study. The use of intense pulsed light after the fractional rejuvenation allows us to enhance the effects of this new procedure especially in skin pigmentation disorders and telangiectasia and to continue to stimulate the deep dermal component.

J Cosmet Laser Ther. 2006 Jun;8(2):71-5.

Combination blue (415 nm) and red (633 nm) LED phototherapy in the treatment of mild to severe acne vulgaris.

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BACKGROUND AND OBJECTIVE: Acne vulgaris represents both a challenge to the treating dermatologist and a major concern for the patient. Conventional treatments have proved inconsistent with often unacceptable side effects and high rates of recurrence. Non-thermal, non-laser, phototherapy for acne with a combination of blue and red light has recently attracted attention. The present study was designed to assess the efficacy of this combination phototherapy.

METHODS: Twenty-four subjects, Fitzpatrick skin types II-V, with mild to severe symmetric facial acne vulgaris were recruited for the study. Subjects were well matched at baseline in terms of both age and duration of acne. Subjects were treated over eight sessions, two per week 3 days apart, alternating between 415 nm blue light (20 minutes/session, 48 J/cm2) and 633 nm red light (20 minutes/session, 96 J/cm2) from a light-emitting

diode (LED)-based therapy system. Patients received a mild microdermabrasion before each session. Acne was assessed at baseline and at weeks 2, 4, 8 and 12.

RESULTS: Twenty-two patients completed the trial. A mean reduction in lesion count was observed at all follow-up points. At the 4-week follow-up, the mean lesion count reduction was significant at 46% (p=0.001). At the 12-week follow-up, the mean lesion count reduction was also significant at 81% (p=0.001). Patient and dermatologist assessments were similar. Severe acne showed a marginally better response than mild acne. Side effects were minimal and transitory. Comedones did not respond as well as inflammatory lesions.

CONCLUSIONS: Combination blue and red LED therapy appears to have excellent potential in the treatment of mild to severe acne. Treatment appears to be both pain- and side effect-free.

Dermatol Surg. 2006 May;32(5):601-10.

Near [corrected] painless, nonablative, immediate skin contraction induced by low-fluence irradiation with new infrared device: a report of 25 patients.

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Erratum in:

- Dermatol Surg. 2006 Jun;32(6):preceding 773.

BACKGROUND: Nonablative radiofrequency (NARF) has been the only method for producing noninvasive skin tightening. Nevertheless, significant pain during the procedure is an important downside of this technology. A new nonablative medical device, Titan (Cutera, Inc., Brisbane, CA, USA), capable of fluences much lower than those possible with NARF, was tested as a less painful alternative. OBJECTIVES: To produce skin contraction leading to lifting of eyebrows and/or improvement of lower face and neck skin laxity using fluences below pain levels. PATIENTS AND METHODS: Twenty-five patients were treated. Standardized photographs were obtained preoperatively, after a few days, a few weeks, and up to 12 months after the procedure. RESULTS: Immediate changes were obtained in 22 of 25 patients. Examination of photographs revealed that the initial improvement was maintained throughout the follow-up period. CONCLUSION: Immediate true skin contraction persisting through the immediate, intermediate, and long-term follow-up was found in the vast majority of patients in this group. Edema as an artifact simulating immediate improvement was excluded by serial photographs taken during the follow-up period. Skin contraction occurred at low fluences, below the threshold of pain. This, to the best of our knowledge, has not been previously described in the medical literature.

Lasers Med Sci. 2007 Mar;22(1):1-3. Epub 2006 Nov 25.

A reasonable mechanism for visible light-induced skin rejuvenation.

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In recent years, much research has been done in the field of non-ablative skin rejuvenation. This comes as a response to the continuous demand for a simple method of treating rhytides, UV exposure, and acne scars. Numerous researches involve visible light-pulsed systems (20-30 J/cm(2)). The mechanism of action is believed to be a selective heat-induced denaturalization of dermal collagen that leads to subsequent reactive synthesis (Bitter Jr., Dermatol. Surg., 26:836-843, 2000; Fitzpatrick et al., Arch. Dermatol., 132:395-402, 1996; Kauvar and Geronemus, Dermatol. Clin., 15:459-467, 1997; Negishi et al., Lasers Surg. Med., 30:298-305, 2002; Goldberg and Cutler, Lasers Surg. Med., 26:196-200, 2000; Hernandez-Perez and Ibeitt, Dermatol. Surg., 28:651-655, 2002). In this study, we suggest a different mechanism for photorejuvenation based on light-induced reactive oxygen species (ROS) formation. We irradiated collagen in vitro with a broadband of visible light (400-800 nm, 24-72 J/cm(2)) and used the spin trapping coupled with electron paramagnetic resonance spectroscopy to detect ROS. Irradiated collagen resulted in hydroxyl radicals formation. We propose, as a new concept, that visible light at the energy doses used for skin rejuvenation (20-30 J/cm(2)) produces high amounts of ROS, which destroy old collagen fibers, encouraging the formation of new ones. On the other hand, at inner depths of the skin, where the light intensity is much weaker, low amounts of ROS are formed, which are well known to stimulate fibroblast proliferation.

Dermatol Surg. 2007 Feb;33(2):146-51.

Nonablative infrared skin tightening in Type IV to V Asian skin: a prospective clinical study.

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BACKGROUND: Nonablative skin tightening devices have been developed to treat facial and neck skin laxity without damage to the epidermis. There are at present two main approaches: the pioneer method by monopolar radiofrequency and the second by infrared light. OBJECTIVE: This study aims to determine the clinical efficacy and safety of nonablative infrared light in the treatment of facial and neck skin laxity in Type IV to V Asian skin. METHODS: This is a prospective noncomparative open study. Adult patients with facial and neck skin laxity were recruited for the study. Three treatment sessions spaced 4 weeks apart were performed. Photographic documentation was performed serially during the study period. Final clinical assessment was performed 6 months after the last treatment. Response parameters included patient self-assessment as well as doctor's assessment. RESULTS: Twenty-one patients were evaluated. All patients were of Fitzpatrick skin types IV and V. Patient assessments of response at 6 months after treatment were as follows: 19% reported mild improvement, 38% reported moderate improvement, and 43% reported good improvement. Doctor's assessments of photographs before and 6 months after treatment showed observable lifting of sagging skin folds in 86% of patients. Of these, 28% were assessed as significant-mild, 38% as significant-moderate, and 19% as significant-excellent. The treatments were associated with minimal pain and edema. The main side effect was isolated superficial blistering in 7 episodes of 63 treatments performed, which resolved without scarring in all patients. CONCLUSION: Direct application of infrared light with epidermal cooling is effective in achieving mild to moderate gradual clinical improvement in the treatment of facial and neck skin laxity. The procedure is associated with minimal downtime and is safe for use in darker skin, Types IV and V.

Combination 532-nm and 1064-nm lasers for noninvasive skin rejuvenation and toning.

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BACKGROUND: Noninvasive techniques for skin rejuvenation are quickly becoming standard in the treatment of mild rhytids and overall skin toning. Multiple laser wavelengths and modalities have been used with varying degrees of success, including 532-nm, 585-nm, 1064-nm, 1320-nm, 1450-nm, and 1540-nm wavelengths. OBJECTIVES: To evaluate a combination technique using a long-pulsed, 532-nm potassium titanyl phosphate (KTP) laser and a long-pulsed 1064-nm Nd:YAG laser, separately and combined, for noninvasive photorejuvenation and skin toning and collagen enhancement and to establish efficacy and degree of success. DESIGN: Prospective nonrandomized study with longitudinal follow-up. SETTING: Private dermatologic surgery and laser practice. METHODS: A total of 150 patients, with skin types I through V, were treated with long-pulsed KTP 532-nm and long-pulsed Nd:YAG 1064-nm lasers, separately and combined. For the KTP 532-nm laser, the fluences varied between 7 to 15 J/cm2 at 7- to 20-millisecond pulse durations with a 2-mm handpiece and 6 to 15 J/cm2 at 30- to 50-millisecond pulses with a 4-mm handpiece. The 1064-nm Nd:YAG laser fluences were set at 24 to 30 J/cm2 for a 10-mm handpiece. These energies were delivered at 30- to 65-millisecond pulse durations. All subjects were treated at least 3 times and at most 6 times, depending on patient satisfaction level, at monthly intervals and were observed for up to 18 months after the last treatment. MAIN OUTCOME MEASURES: All patients were asked to fill out a “severity scale” on which redness, pigmentation, rhytids, skin tone/tightness, texture, and patient satisfaction were noted before and after each treatment. Redness, pigmentation, rhytids, skin tone/tightness, and texture were also evaluated by the physician and another observer. RESULTS: After 3 to 6 treatments, 50 patients treated with the 532-nm KTP laser alone showed improvement of 70% to 80% in redness and pigmentation, 30% to 50% in skin tone/tightening, 30% to 40% in skin texture, and 20% to 30% in rhytids. Another 50 patients treated with the 1064-nm Nd:YAG laser alone showed improvement of 10% to 20% in redness, 0% to 10% in pigmentation, 10% to 30% in skin tone/tightening, 20% to 30% in skin texture, and 10% to 30% in rhytids. The third group of 50 patients treated with both KTP and Nd:YAG lasers showed improvement of 70% to 80% in redness and pigmentation, 40% to 60% in skin tone/tightening, 40% to 60% in skin texture, and 30% to 40% in rhytids. Skin biopsy specimens taken at 1-, 2-, 3-, and 6-month intervals demonstrated new collagen formation. CONCLUSIONS: All 150 patients exhibited mild to moderate improvement in the appearance of rhytids, moderate improvement in skin toning and texture, and great improvement in the reduction of redness and pigmentation. The KTP laser used alone produced results superior to those of the Nd:YAG laser. Results from combination treatment with both KTP and Nd:YAG lasers were slightly superior to those achieved with either laser alone.

J Cosmet Laser Ther. 2007 Dec;9(4):226-30

A self-reported clinical trial investigates the efficacy of 1072 nm light as an anti-ageing agent.

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BACKGROUND: Previous laboratory research has shown that human lymphocytes pre-irradiated with 1072 nm light are afforded some protection against subsequent ultraviolet light toxicity. OBJECTIVE: To investigate the possibility that 1072 nm light can prevent or reverse skin ageing which itself is known to be accelerated by ultraviolet light. METHODS: A randomized, prospective, double-blind, placebo-controlled, self-reporting study was performed to assess the effect of one daily treatment episode for a period of between 6 and 8 weeks on wrinkles and fine lines around the eyes as well as the appearance of bags under the eyes. RESULTS: Between 52% and 57% of volunteers were able to accurately identify an improvement in the fine lines and wrinkles of the treated areas of skin. Fewer volunteers, between 37% and 46%, observed an improvement in the bags under the treated eye or eyes, albeit with an emphatic statistical significance. CONCLUSION: Regular application of a non-thermal quantity of 1072nm light around the eyes demonstrated efficacy as an anti-ageing agent.

J Drugs Dermatol. 2007 Nov;6(11):1114-8.

Treatment of photoaging with a very superficial Er:YAG laser in combination with a broadband light source.

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BACKGROUND AND OBJECTIVE: Studies documenting improvement following combined laser and light-based devices are needed. The objective of this study was to evaluate clinical, histological, and ultrastructural changes in photodamaged facial skin following sequential treatment with ablative superficial erbium:YAG (Er:YAG) laser peels and nonablative intense pulsed light, or broadband light (BBL), treatments. STUDY DESIGN/MATERIALS AND METHODS: Fifteen subjects with photodamaged facial skin and Fitzpatrick skin types I to III underwent 3 monthly treatments with the Profile system (Sciton, Inc, Palo Alto, CA) utilizing very superficial MicroLaserPeel settings of 2.5 to 5.0 J/cm2 and BBL settings of 515-, 560-, or 590-nm filters, 10-msec pulse duration, and fluences of 12 J/cm2. Five subjects underwent pre- and post-treatment postauricular skin biopsies for evaluation of treatment-induced light and electron microscopic changes. RESULTS: Twelve subjects completed the study. Both blinded evaluator and subject assessment of clinical changes documented significant improvement in photodamaged skin, with the greatest improvement achieved in overall appearance and epidermal dyspigmentation. These results were largely maintained at 3 months following the last treatment. Light microscopy showed changes in the epidermis, collagen, and elastic fibers consistent with a wound repair mechanism to the depth of 250 to 350 microns. Electron microscopy revealed a slight decrease in the average collagen fiber thickness, pointing to an increase in type III collagen. CONCLUSION: A protocol utilizing multiple combined superficial Er:YAG ablative treatments and nonablative BBL treatments lead to a significant improvement in the clinical signs of photodamaged skin, with histological and ultrastructural evidence of new collagen formation.

Ann Plast Surg. 2007 Nov;59(5):479-83.

Comparison study of intense pulsed light versus a long-pulse pulsed dye laser in the treatment of facial skin rejuvenation.

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Currently, various nonablative skin resurfacing techniques are being used to rejuvenate facial skin, including lasers and intense pulsed light (IPL). There are few direct comparison studies between IPLs and lasers. The objective of our study is to compare the effectiveness of intense pulsed light versus a long-pulse pulsed dye laser (LPDL) in the treatment of facial skin rejuvenation. Ten Asian patients with Fitzpatrick skin types III-IV were enrolled in this study. One half of the face was treated with IPL (6 treatment sessions) and the other side was treated by LPDL (3 treatment sessions). An LPDL with a wavelength of 595 nm and spot size of 7 mm was used. Utilizing the compression method, lentigines were treated using a PDL with a fluence between 9-12 J/cm and a pulse duration of 1.5 ms. Wrinkles were treated with fluences between 10 to 12 J/cm and a pulse duration of 20 ms, using a pulse-stacking technique. An IPL with a type B handpiece was used. Lentigines and wrinkles were treated with fluences between 27 to 40 J/cm and a pulse duration of 20 ms. The improvement of lentigines was 62.3% and 81.1% for IPL and LPDL respectively. There was no significant difference between IPL and LPDL in wrinkle reduction. There was no scarring or pigmentary change seen with either device. Both

IPL and LPDL are effective for facial skin rejuvenation in Asians, but LPDL treatment is significantly better than IPL treatment in the treatment of lentigines. The use of the compression technique may allow this LPDL to be used effectively for facial rejuvenation and with fewer treatment sessions, when compared with the IPL.

J Cosmet Laser Ther. 2007 Sep;9(3):148-60.

Measuring key parameters of intense pulsed light (IPL) devices.

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BACKGROUND: Unlike medical lasers, intense pulsed light (IPL) devices are largely unregulated and unclassified as to degree of safety hazard. With the exception of most of the USA, the United Kingdom and parts of Europe, the Far East and Australia, the sale of IPLs is generally unrestricted, with the majority being sold into the beauty therapy and spa markets. Standards are only imposed on manufacturers for technical performance data and operating tolerances determined by CE-compliance under electrical safety standards or the EU Medical Device Directive. Currently, there is no requirement for measurement of key IPL performance characteristics. OBJECTIVE: To identify the key IPL parameters, emphasize their importance in terms of safe and effective treatment and provide examples of preliminary measurement methods. These measurements can highlight changes in an IPL device's performance, improving patient safety and treatment efficacy. METHODS: Five key parameters were identified as having an important role to play in the way light interacts with the skin, and therefore an important role in patient safety and effective treatment. Simple methods were devised to measure the parameters, which include fluence, pulse duration, pulse profile, spectral output and time-resolved spectral output. RESULTS: The measurement methods permitted consistent and comparable measurements to be made by two of the authors at working clinic locations on 18 popular IPL devices and allowed assessment of output variations. Results showed discrepancies between the measured IPL device outputs and those values displayed on the system or claimed by the manufacturers. The importance of these discrepancies and their impact is discussed. CONCLUSIONS: This study, of 18 popular devices in regular daily use in England and Wales, provides example methods for measuring key IPL device parameters and highlights the need for regular measurement of at least those five key parameters measured in this study. These methods can help service technicians to check performance and eliminate device malfunction.

J Drugs Dermatol. 2007 Aug;6(8):794-8.

Excimer laser for psoriasis: a review of theories regarding enhanced efficacy over traditional UVB phototherapy.

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BACKGROUND: Fiber-optically targeted ultraviolet B (UVB) therapy has been shown to clear plaques of psoriasis in a significantly fewer number of treatments and reduce overall cumulative UVB dose than traditional UVB phototherapy. OBJECTIVE: This article reviews existing theories in the literature attempting to explain the superior efficacy of targeted UVB. METHODS: Medline was used to perform a comprehensive review of the literature from 1965 to present. Only information from the English language journals are reported in this study. RESULTS: The theories proposed to explain the higher efficacy of the excimer (XeCl) laser relative to traditional UVB include the ability to use higher intensities of ultraviolet (UV) light and a more

efficient induction of T cell apoptosis. CONCLUSION: The possible explanations for the superior efficacy of the excimer laser over traditional UVB therapy for psoriasis include: 1) a higher intensity UV light to plaques, which is more effective in clearing psoriasis; 2) penetration into the dermis where it may induce T cell apoptosis, potentially to a greater extent than the wavelength or given energy level predicts; and 3) the difference in the delivery of UVB light may result in cell death and skin immune system suppression more effectively than traditional UVB.

J Photochem Photobiol B. 2007 Jul 27;88(1):51-67. Epub 2007 May 1.

A prospective, randomized, placebo-controlled, double-blinded, and split-face clinical study on LED phototherapy for skin rejuvenation: clinical, profilometric, histologic, ultrastructural, and biochemical evaluations and comparison of three different treatment settings.

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Light-emitting diodes (LEDs) are considered to be effective in skin rejuvenation. We investigated the clinical efficacy of LED phototherapy for skin rejuvenation through the comparison with three different treatment parameters and a control, and also examined the LED-induced histological, ultrastructural, and biochemical changes. Seventy-six patients with facial wrinkles were treated with quasimonochromatic LED devices on the right half of their faces. All subjects were randomly divided into four groups treated with either 830nm alone, 633nm alone, a combination of 830 and 633nm, or a sham treatment light, twice a week for four weeks. Serial photography, profilometry, and objective measurements of the skin elasticity and melanin were performed during the treatment period with a three-month follow-up period. The subject's and investigator's assessments were double-blinded. Skin specimens were evaluated for the histologic and ultrastructural changes, alteration in the status of matrix metalloproteinases (MMPs) and their tissue inhibitors (TIMPs), and the changes in the mRNA levels of IL-1ss, TNF-alpha, ICAM-1, IL-6 and connexin 43 (Cx43), by utilizing specific stains, TEM, immunohistochemistry, and real-time RT-PCR, respectively. In the results, objectively measured data showed significant reductions of wrinkles (maximum: 36%) and increases of skin elasticity (maximum: 19%) compared to baseline on the treated face in the three treatment groups. Histologically, a marked increase in the amount of collagen and elastic fibers in all treatment groups was observed. Ultrastructural examination demonstrated highly activated fibroblasts, surrounded by abundant elastic and collagen fibers. Immunohistochemistry showed an increase of TIMP-1 and 2. RT-PCR results showed the mRNA levels of IL-1ss, TNF-alpha, ICAM-1, and Cx43 increased after LED phototherapy whereas that of IL-6 decreased. This therapy was well-tolerated by all patients with no adverse effects. We concluded that 830 and 633nm LED phototherapy is an effective approach for skin rejuvenation.

Lasers Med Sci. 2007 Jun;22(2):93-9. Epub 2006 Nov 23.

Facial rejuvenation and light: our personal experience.

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The treatment of ageing skin remains a very hot topic, and many systems have been reported as having varying degrees of success. Nonablative lasers were developed to avoid the problematic and uncomfortable sequelae following laser ablative resurfacing, and while there was no downtime, there was also poor patient satisfaction. The same was true of the intense pulsed light systems. The use of different modalities in various combinations was found to offer much better results, however, such as a 595-nm pulsed dye laser followed by a 1,450-nm diode laser, and so on, all used at subablative thresholds. The recent entry of blue and infrared tunable plasma light and light-emitting diodes into the skin rejuvenation arena has attracted a great deal of attention. The authors suggest that no single modality can accomplish all the complex events required for effective skin rejuvenation, suggest that combination phototherapy is the best approach combined with an adjunctive epidermal care regimen, and demonstrate their development of this methodology.

J Drugs Dermatol. 2006 Sep;5(8):771-8.

Multicenter clinical perspectives on a broadband infrared light device for skin tightening.

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Modalities for skin tightening include radiofrequency (RF) energy, lasers, and combination RF and diode lasers. A new broadband infrared light device (BILD) (Titan, Cutera, Inc, Brisbane, CA) targets water to achieve dermal heating and collagen remodeling for skin tightening. Although thousands of procedures have been performed worldwide with this device, only one article (to the author's knowledge) describing its performance in skin tightening has been published. Three US dermatologists report their experience with and provide their perspective on facial skin tightening with the BILD system. As early adopters, they each have 12 to 18 months experience with this system. One author (A.F.T.) treated 42 patients twice at 1-month intervals over 18 months. The mean improvement score was 1.83 (scale 0 to 4, with 4 denoting maximum improvement) with an average follow-up time of 3.7 months. More than 90% of treated patients showed visible improvement. No complications were observed and patient satisfaction was high. This paper presents the general consensus of the authors on patient selection and treatment protocol, their modifications of the manufacturer's treatment protocol, and the outcomes of 42 patients treated by one author (A.F.T.). The observations were gathered separately and turned out to be very similar. The recommendations are presented to help practitioners achieve consistently good results and avoid complications with the BILD procedure.

Clin Exp Dermatol. 2006 Sep;31(5):638-41. Epub 2006 Jun 15.

A randomised double-blind study comparing the effect of 1072-nm light against placebo for the treatment of herpes labialis.

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BACKGROUND: Previous research demonstrated that 1072-nm narrowband laser light is effective in the treatment of cold sores. AIM: To evaluate the efficacy of an over-the-counter cold-sore treatment device

(Virulite CS) incorporating 1072-nm light-emitting diodes. METHODS: A randomised, prospective, double-blind, self-reported study was performed to compare the efficacy of at least six 3-min treatments of 1072-nm narrowband light against placebo, in the treatment of herpes labialis. RESULTS: The 1072-nm light-emitting diode device reduced cold-sore healing time to 6.3 days compared with 9.4 days for placebo (P=0.048). The time the cold sore took to form a crust was also reduced from 2.00 days for those treated with 1072-nm light, compared with 2.88 days for placebo (P=0.059) CONCLUSIONS: The significant difference between the mean healing times in the two groups demonstrates that the Virulite CS device is an effective means of treating herpes labialis.

J Drugs Dermatol. 2006 Sep;5(8):748-53.

Combined 633-nm and 830-nm led treatment of photoaging skin.

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OBJECTIVES: To evaluate the clinical efficacy and ultrastructural changes in photodamaged skin after combined 633-nm and 830-nm light-emitting diode (LED) treatments. METHODS: Thirty-six subjects received 9 LED treatments over the course of 5 weeks and were subsequently evaluated for final clinical improvement 12 weeks after treatment. Five subjects were also biopsied to determine the ultrastuctural posttreatment changes in collagen fibers. RESULTS: A statistically significant improvement in wrinkles was seen after profilometric analysis. The majority of subjects reported improvements in softness, smoothness, and firmness at all time points. Electron microscopic analysis showed evidence of post-LED treatment of thicker collagen fibers. CONCLUSIONS: 633-nm and 830-nm LED treatments play a role in the treatment of photodamaged skin. LED treatments can be used as either a primary or adjunctive treatment modality.

Yonsei Med J. 2006 Aug 31;47(4):485-90.

Effects of infrared radiation on skin photo-aging and pigmentation.

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Infrared radiation is increasingly and uncritically used for cosmetic and wellness purposes, despite the poorly understood biologic effects of such treatments on humans. In the present study, we investigated the effects of infrared radiation on collagen and elastin production in dermal fibroblasts, as well as the clinical and histopathologic effects of infrared radiation on photo-aged facial skin lesions. In order to determine the effects of infrared radiation on collagen and elastin production, dermal fibroblasts were exposed to infrared radiation for varying lengths of time and collagen and elastin contents were subsequently determined. Additionally, 20 patients with mild to moderate facial wrinkles and hyperpigmented lesions received daily treatments of far infrared radiation (900 to 1000 microm) for six-months. During the treatment, patients and a medical observer conducted independent photographic and clinical evaluations every 4 weeks, and skin biopsies were obtained for histological analysis at baseline and one month post-treatment. We found that the content of collagen and elastin produced by the fibroblasts increased after infrared radiation, and that this increase was proportional to the duration of irradiation exposure. Following 6 months of treatment, all patients reported good (51-75%) improvements in skin texture and roughness. Additionally, patients noted fair (25-50%) improvement in color

tone of the skin; however, improvements in hyperpigmented lesions were not observed. Objective medical evaluation of the patients indicated that roughness and laxity were fairly improved, but there was no significant improvement in hyperpigmented lesions. Histological examination failed to reveal any differences as well. These results suggest that infrared radiation may have beneficial effects on skin texture and wrinkles by increasing collagen and elastin contents from the stimulated fibroblasts. Therefore, skin treatment with infrared radiation may be an effective and safe non-ablative remodeling method, and may also be useful in the treatment of photo-aged skin.

Aesthet Surg J. 2006 Mar-Apr;26(2):136-52.

Efficacy of nonablative laser treatment for rhytids: a controlled study with objective evaluation via clinical, profilometric, and computer assessments.

Trelles MA, Levy JL, Alvarez X.

BACKGROUND: A 980-nm diode laser was evaluated in rhytids treatment to ascertain its short- and long-term efficacy, as well as its potential value as an adjunct to aesthetic surgery. SUBJECTS AND METHODS: Twenty subjects, 10 in each of 2 geographically distant sites, were treated with a 980-nm diode laser (macropulse of 1.9 seconds, two 200-ms micropulses, 25 J/cm(2) each). Group A subjects received 5 treatments, 15 days apart, with assessments at 1 and 6 months after the last treatment. Group B subjects received 2 treatment sessions, 30 days apart, with assessments at 1 and 6 months after the second treatment. The patient subjective satisfaction index (SI) was calculated, in addition to objective photographic, computer-based, profilometric, and histologic assessments. RESULTS: Results were rated more highly by objective evaluation than by subjective patient evaluation. Improvement peaked around 1 month after the final treatment, and by the 6-month assessment, the skin condition had started to deteriorate. Among all evaluation methods, only the histology values showed some improvement at the 6-month compared with the 1-month assessment point. Group A patients responded better than Group B patients, and side effects were minimal. CONCLUSIONS: A course of 5 treatments with the 980-nm diode laser gave positive short-term results in skin enhancement following nonablative rhytids treatment, which might have significance for the plastic surgeon when considering epidermal improvement after any surgical procedure. Introducing a “top-up” treatment, perhaps at the 3- or 4-month posttreatment point, supplemented with other adjunctive epidermal care regimens, might well increase overall efficacy and reverse the downward trend seen in all of the data except for histology. This strategy might well help the epidermis to better reflect the excellent histologic changes and is worthy of further study.

J Cosmet Dermatol. 2006 Mar;5(1):87-91.

Phototherapy in anti-aging and its photobiologic basics: a new approach to skin rejuvenation.

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Intrinsic aging and photoaging of the face are constantly ongoing, and eventually result in the typical “aged” face, with visible lines and wrinkles at rest, a variety of dyschromia and a tired, dull and lax epidermis over poorly organized elastotic dermal architecture characterized by many interfibrillary spaces. Both ablative and nonablative resurfacing have been reported as solutions, the former providing excellent results, but a long patient downtime, and the latter giving little or no downtime, but less-than-ideal results. In ablative

resurfacing, the epidermis is removed and replaced with a “new” epidermis, whereas in the nonablative approach the epidermis is spared through some form of cooling. In both approaches, however, the goal is to create controlled amounts of thermal damage in the dermis to stimulate the wound healing process, thus generating a tighter, better organized, “younger” dermal matrix. A better approach might be to apply prevention, rather than the cure, and to treat subjects in their very early 20s, before even fine lines have begun to appear. This “photoanti-aging” approach could be achieved with the use of very low incident levels of photon energy to stimulate the skin cells, both epidermal and dermal, at cell-specific wavelengths based on the photobiological findings of the literature over the past two decades or so, in order to increase their resistance to the effects of chronological and photoaging. Lasers and IPL systems could be used, but are extremely expensive and therapist-intensive. A new generation of light-emitting diodes (LEDs) has appeared as the result of a spin-off from the US NASA Space Medicine Program, which are much more powerful than the previous generation with quasimonochromatic outputs. These LEDs can offer target specificity to achieve photobiomodulated enhanced action potentials of the skin cells, in particular mast cells, macrophages, endotheliocytes, and fibroblasts, plus increases in local blood and lymphatic flow, in a noninvasive, athermal manner. New phototherapeutic LED-based systems have appeared to meet the need for a less-expensive but clinically useful light source to enable photoantiaging as a reality in clinical practice. Some studies proving the efficacy of LED therapy have already appeared, and based on their results LED therapy represents a potential new approach to prevention in anti-aging, so that further studies are warranted to prove its efficacy.

J Nippon Med Sch. 2006 Apr;73(2):75-81.

Light-emitting diode phototherapy at 630 +/- 3 nm increases local levels of skin-homing T-cells in human subjects.

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BACKGROUND AND AIMS: Red light phototherapy with laser sources has been used successfully for a number of indications. A new generation of quasimonochromatic 630 +/- 3 nm light-emitting diode (LED) systems has recently been yielding good results for the same indications, but no study has examined changes in visible red light irradiated skin at an immunological level. This study was thus designed to examine changes in skin-homing T-cell levels induced in normal human skin by visible red LED energy. SUBJECTS AND METHODS: Six adult male volunteers (35 approximately 48 years old) who satisfied all study criteria had the skin over the lateral aspect of the leg irradiated once per week for 8 weeks with a visible red (630 +/- 3 nm) LED-based system, with irradiance of 105 m/cm2, 15 minutes/session, and a radiant flux of 94 J/cm2. Skin biopsies were performed after the eighth treatment session, and cultures were prepared to assay the type and quantity of skin-homing T-cells using qualitative and quantitative polymerase chain reaction (PCR) techniques. Ultrastructural changes were also assessed with transmission electron microscopy. RESULTS: Transmission electron microscopy revealed mild fibroplastic changes in fibroblasts, with no acute inflammatory changes throughout the treatment session. Qualitative PCR showed the presence of both Th-1 and Th-2 T-cells, and quantitative PCR showed an increase in the numbers of both types of skin-homing T-cells, much more so for Th-2 than for Th-1. CONCLUSIONS: Visible red LED irradiation appears to activate the skin-homing immune system.

J Cosmet Dermatol. 2006 Mar;5(1):87-91.

Phototherapy in anti-aging and its photobiologic basics: a new approach to skin rejuvenation.

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Intrinsic aging and photoaging of the face are constantly ongoing, and eventually result in the typical “aged” face, with visible lines and wrinkles at rest, a variety of dyschromia and a tired, dull and lax epidermis over poorly organized elastotic dermal architecture characterized by many interfibrillary spaces. Both ablative and nonablative resurfacing have been reported as solutions, the former providing excellent results, but a long patient downtime, and the latter giving little or no downtime, but less-than-ideal results. In ablative resurfacing, the epidermis is removed and replaced with a “new” epidermis, whereas in the nonablative approach the epidermis is spared through some form of cooling. In both approaches, however, the goal is to create controlled amounts of thermal damage in the dermis to stimulate the wound healing process, thus generating a tighter, better organized, “younger” dermal matrix. A better approach might be to apply prevention, rather than the cure, and to treat subjects in their very early 20s, before even fine lines have begun to appear. This “photoanti-aging” approach could be achieved with the use of very low incident levels of photon energy to stimulate the skin cells, both epidermal and dermal, at cell-specific wavelengths based on the photobiological findings of the literature over the past two decades or so, in order to increase their resistance to the effects of chronological and photoaging. Lasers and IPL systems could be used, but are extremely expensive and therapist-intensive. A new generation of light-emitting diodes (LEDs) has appeared as the result of a spin-off from the US NASA Space Medicine Program, which are much more powerful than the previous generation with quasimonochromatic outputs. These LEDs can offer target specificity to achieve photobiomodulated enhanced action potentials of the skin cells, in particular mast cells, macrophages, endotheliocytes, and fibroblasts, plus increases in local blood and lymphatic flow, in a noninvasive, athermal manner. New phototherapeutic LED-based systems have appeared to meet the need for a less-expensive but clinically useful light source to enable photoantiaging as a reality in clinical practice. Some studies proving the efficacy of LED therapy have already appeared, and based on their results LED therapy represents a potential new approach to prevention in anti-aging, so that further studies are warranted to prove its efficacy.

Br J Dermatol. 2005 Dec;153 Suppl 2:57-62.

Cutaneous immunological activation elicited by a low-fluence pulsed dye laser.

Omi T, Kawana S, Sato S, Takezaki S, Honda M, Igarashi T, Hankins RW, Bjerring P, Thestrup-Pedersen K.

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BACKGROUND: Three years ago, the nonablative wrinkle reduction laser (a 585-nm laser, Chromogenex V3; Chromogenex Light Technologies, Llanelli, U.K.) was developed, and there have already been several reports about its clinical effectiveness. The Chromogenex V3 laser has also been reported to be effective in treating acne and atopic dermatitis. These results suggest that the Chromogenex V3 laser has some immunological role. In this study, we investigated immunological changes elicited by laser irradiation at the ultrastructural level and by analysis of interleukin (IL)-2 and IL-4 mRNA in skin homing T lymphocytes. MATERIALS AND METHODS: Eight healthy adult volunteers (mean age 56.3 years, range 25-66 years) were recruited for this study. Ultrastructural analysis was done 3 h after the laser irradiation, as well as 1 day, 3 days, 1 week, 2 weeks, 4 weeks and 5 weeks later. IL-2 and IL-4 mRNAs in skin homing T cells cultured for 6 weeks were semiquantitatively measured using reverse transcriptase-polymerase chain reaction. RESULTS: Ultrastructural observations revealed that at 3 h after laser therapy, neutrophils, monocytes and mast cells could already be seen in the extravascular dermis. These dermal acute inflammatory changes were observed also at 1 week after laser treatment. Two weeks after laser treatment, the capillaries showed an almost normal structure. Four weeks after laser treatment, many lymphocytes and fibroblasts were observed. The numbers of these lymphocytes increased further at 5 weeks after the laser treatment. One week after the laser irradiation, all subjects were positive for IL-2 mRNA and for IL-4 mRNA. The level of IL-4 mRNA was larger compared

with that of IL-2 mRNA in all subjects. CONCLUSION: The Chromogenex V3 is a 585-nm visible light laser, and it may affect the skin not only by selective photothermolysis but also by direct cutaneous immunological activation.

J Cosmet Laser Ther. 2006 Dec;8(4):177-83.

Cutaneous effects compared between higher fluence with fewer treatments and lower fluence with more treatments in a combined IR laser/radio frequency system.

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BACKGROUND AND AIMS: A combined infrared (IR) laser/radio frequency (RF) system has recently been reported to create rejuvenation-related cutaneous effects, but was associated with high levels of pain and some complications. The present study was designed to evaluate the cutaneous effects of the same system with a lower fluence and more treatments. METHODS: Twenty patients were randomly assigned into two groups of 10 individuals each: Group A was treated at 50 J/cm2/100 J/cm3 (laser/RF), respectively, two passes, three treatment sessions 30 days apart; Group B at 30 J/cm2/50 J/cm3, three passes, five treatment sessions 15 days apart. Objective comparisons were made at the same time points with a computer program based on the clinical photography. RESULTS: Group A noted more improvement in wrinkles than Group B at the first assessment, but both groups showed slight and progressive deterioration at the 2- and 6-month assessments. Improved skin appearance was maintained throughout in both groups. The authors recognize that the comparatively small number of subjects possibly limits the statistical power of the study. CONCLUSIONS: Lower fluences and more treatment sessions with the combined 900 nm laser/RF system were complication-free, produced improvements in the overall skin condition and less pain during sessions, suggesting that this combination may produce better patient compliance. Further treatment sessions may improve the results with implications in skin rejuvenation.

J Cosmet Laser Ther. 2005 Dec;7(3-4):177-89.

Optimising the design of a broad-band light source for the treatment of skin.

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Phototherapy has become a treatment of choice in many areas of medicine. Light can be used to deliver energy to tissue selectively targeting specific structures in order to induce the desired therapeutic outcome. The choice of optical parameters for a specific application is not simple. Wavelength, energy, exposure time and fluence can be varied and induce a wide range of tissue effects. The treatment of the skin with light is probably the one phototherapy application that is most developed in terms of technology and market maturity. White light systems are extensively used to address a range of skin conditions. However, different conditions have different physiology and hence require differing optical parameters. The technology standard is based upon systems, which have a number of different optical filters allowing the output to be tailored to the specific application. This paper discusses the advantages of a different type of system, namely the iPulse i300 (Cyden

Ltd, Swansea, UK), which uses a single dichroic reflectance filter and whose optical output is changed by varying other parameters in a carefully controlled manner.

Dermatol Surg. 2005 Oct;31(10):1285-9.

Effective treatment of rosacea using intense pulsed light systems.

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BACKGROUND: To date, a variety of lasers have been used for treating vascular skin lesions. Intense pulsed light (IPL) is a proven technology for vascular lesion management, such as rosacea. OBJECTIVES: The aim of this study was to test the effectiveness of IPL in treating vascular facial lesions in rosacea patients. METHODS: Sixty patients presenting with telangiectasia owing to facial rosacea were selected randomly from the patient population in the Department of Laser Therapy at the Medical Centre Maastricht, the Netherlands. Patients of various skin types (Fitzpatrick I-IV) were selected with an average age of 44.2 years. Five hundred eight sites were treated, with a mean of 4.1 treatments per site and an IPL spectrum ranging from 515 to 1,200 nm with different pulse durations between 4.3 and 6.5 milliseconds. The energy density varied from 25 to 35 J/cm2. RESULTS: Patients were assessed clinically and photographically. A mean clearance of 77.8% was achieved and was maintained for a follow-up period averaging 51.6 months (range 12-99 months). No correlation was found between the clearance of rosacea and patient-related or technical data. For approximately 3 years post-treatment, lesion recurrence was noted in 4 of the 508 treated facial sites. DISCUSSION: This study demonstrated that IPL treatment of facial rosacea is effective in obtaining clearance of 77.8%, with minimal side effects, and that treatment effects are maintained. CONCLUSION: The IPL system, with its broad range of technical variables, is an effective tool in achieving meaningful and lasting rosacea clearance.

Dermatol Ther. 2005 May-Jun;18(3):191-208.

Visible light treatment of photoaging.

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Recently, a number of new devices have been developed specifically to improve the visible signs of aging in a noninvasive way. These include visible or near-infrared lasers, intense pulsed light sources (IPL), light-emitting diode (LED), and radiofrequency devices. This paper reviews the use of visible light sources and examines the attributes of specific systems for noninvasive skin rejuvenation.

Lasers Med Sci. 2005;20(1):6-10. Epub 2005 May 21.

A single-blinded randomised controlled study to determine the efficacy of Omnilux Revive facial treatment in skin rejuvenation.

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To determine the efficacy of Omnilux Revive facial treatment in skin rejuvenation, twenty-three volunteers received randomised 20 min treatments three times a week for three weeks to one half of their face, with the untreated side acting as control. Regular assessments were carried out, focusing on parameters of subject satisfaction, photographic assessments, skin elasticity (Cutometer) and skin hydration (Corneometer CM825). Ninety-one percent of the volunteers reported visible changes to their skin. Blinded photographic evaluation reported a clinical response in 59% of the subjects. Objective analysis failed to show statistically significant changes in skin hydration or elasticity. The Omnilux Revive LED lamp is a safe alternative non-ablative skin rejuvenation treatment.

J Cosmet Dermatol. 2006 Mar;5(1):87-91.

Phototherapy in anti-aging and its photobiologic basics: a new approach to skin rejuvenation.

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Intrinsic aging and photoaging of the face are constantly ongoing, and eventually result in the typical “aged” face, with visible lines and wrinkles at rest, a variety of dyschromia and a tired, dull and lax epidermis over poorly organized elastotic dermal architecture characterized by many interfibrillary spaces. Both ablative and nonablative resurfacing have been reported as solutions, the former providing excellent results, but a long patient downtime, and the latter giving little or no downtime, but less-than-ideal results. In ablative resurfacing, the epidermis is removed and replaced with a “new” epidermis, whereas in the nonablative approach the epidermis is spared through some form of cooling. In both approaches, however, the goal is to create controlled amounts of thermal damage in the dermis to stimulate the wound healing process, thus generating a tighter, better organized, “younger” dermal matrix. A better approach might be to apply prevention, rather than the cure, and to treat subjects in their very early 20s, before even fine lines have begun to appear. This “photoanti-aging” approach could be achieved with the use of very low incident levels of photon energy to stimulate the skin cells, both epidermal and dermal, at cell-specific wavelengths based on the photobiological findings of the literature over the past two decades or so, in order to increase their resistance to the effects of chronological and photoaging. Lasers and IPL systems could be used, but are extremely expensive and therapist-intensive. A new generation of light-emitting diodes (LEDs) has appeared as the result of a spin-off from the US NASA Space Medicine Program, which are much more powerful than the previous generation with quasimonochromatic outputs. These LEDs can offer target specificity to achieve photobiomodulated enhanced action potentials of the skin cells, in particular mast cells, macrophages, endotheliocytes, and fibroblasts, plus increases in local blood and lymphatic flow, in a noninvasive, athermal manner. New phototherapeutic LED-based systems have appeared to meet the need for a less-expensive but clinically useful light source to enable photoantiaging as a reality in clinical practice. Some studies proving the efficacy of LED therapy have already appeared, and based on their results LED therapy represents a potential new approach to prevention in anti-aging, so that further studies are warranted to prove its efficacy.

J Cosmet Laser Ther. 2005 Dec;7(3-4):163-70.

The utilization of nonthermal blue (405-425 nm) and near infrared (850-890 nm) light in aesthetic dermatology and surgery-a multicenter study.

Lask G, Fournier N, Trelles M, Elman M, Scheflan M, Slatkine M, Naimark J, Harth Y.

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BACKGROUND: A major cause of skin aging is a chronic micro-inflammation triggered by UV radiation and external pollutants. It has been demonstrated that blue light diminishes inflammatory conditions and near infrared light enhances circulation. OBJECTIVES: To assess the effectiveness of a non thermal dual wavelength — blue (405 – 420 nm) and near infrared (850 – 900 nm) — light source in skin rejuvenation, in the reduction of the duration of post skin resurfacing erythema and in the acceleration of healing of post surgical conditions (face lift and breast augmentation). METHODS: We have utilized a non contact, hand free dual wavelength light source (iClearXL and Clear100XL, Curelight Ltd) to treat over 60 patients and perform three controlled studies in four centers. Follow up duration was three months. Control group for photo-rejuvenation consisted of patients treated with Glycolic peeling and daily appliance of vitamin C Control group for post skin resurfacing erythema duration consisted of patients untreated by the light source and control group for post surgical healing consisted of patients untreated by the light source or treated by the light source on one side only. RESULTS: Post skin resurfacing erythema duration is reduced by 90%. The healing of post surgical conditions is substantially accelerated and discomfort is reduced. The anti aging effect of the light source includes: reduction of pore size in 90% of patients with stable results at three months follow up, enhanced skin radiance in 90% of patients with stable results at three months follow up and smoothing of fine wrinkles in 45% of patients with stable results at three months follow up. The control group showed poor results which were stable for a duration of less than one month. CONCLUSIONS: A non thermal, non contact / hand free light source emitting at 405-420 nm and 850-900 nm considerably enhances aesthetic and surgical aesthetic procedures without consuming user time.

J Cosmet Laser Ther. 2005 Dec;7(3-4):196-200.

A study to determine the efficacy of combination LED light therapy (633 nm and 830 nm) in facial skin rejuvenation.

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BACKGROUND: The use of visible or near infrared spectral light alone for the purpose of skin rejuvenation has been previously reported. A method of light emitting diode (LED) photo rejuvenation incorporating a combination of these wavelengths and thus compounding their distinct stimulation of cellular components is proposed.Objective. To assess the efficacy and local tolerability of combination light therapy in photo rejuvenation of facial skin. METHODS: Thirty-one subjects with facial rhytids received nine light therapy treatments using the Omnilux LED system. The treatments combined wavelengths of 633 nm and 830 nm with fluences of 126 J/cm(2) and 66 J/cm(2) respectively. Improvements to the skin surface were evaluated at weeks 9 and 12 by profilometry performed on periorbital casts. Additional outcome measures included assessments of clinical photography and patient satisfaction scores. RESULTS: Key profilometry results Sq, Sa, Sp and St showed significant differences at week 12 follow-up; 52% of subjects showed a 25%-50% improvement in photoaging scores by week 12; 81% of subjects reported a significant improvement in periorbital wrinkles on completion of follow-up. CONCLUSION: Omnilux combination red and near infrared LED therapy represents an effective and acceptable method of photo rejuvenation. Further study to optimize the parameters of treatment is required.

Dermatol Surg. 2005 Sep;31(9 Pt 2):1199-205.

Clinical experience with light-emitting diode (LED) photomodulation.

Weiss RA, McDaniel DH, Geronemus RG, Weiss MA, Beasley KL, Munavalli GM, Bellew SG.

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BACKGROUND: Light-emitting diode (LED) photomodulation is a novel nonthermal technology used to modulate cellular activity with light. OBJECTIVE: We describe our experience over the last 2 years using 590 nm LED photomodulation within a dermatologic surgery environment. METHODS: Practical use of nonthermal light energy and emerging applications in 3,500 treatments delivered to 900 patients is detailed. RESULTS: LED photomodulation has been used alone for skin rejuvenation in over 300 patients but has been effective in augmentation of results in 600 patients receiving concomitant nonablative thermal and vascular treatments such as intense pulsed light, pulsed dye laser, KTP and infrared lasers, radiofrequency energy, and ablative lasers. CONCLUSION: LED photomodulation reverses signs of photoaging using a new nonthermal mechanism. The anti-inflammatory component of LED in combination with the cell regulatory component helps improve the outcome of other thermal-based rejuvenation treatments.

Di Yi Jun Yi Da Xue Xue Bao. 2005 Jan;25(1):109-10.

[Effect of intense pulsed light on heat shock protein 70 expression in skin]

[Article in Chinese]

Wang ML, Liu DL, Yuan Q.

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OBJECTIVE: To observe the effect of intense pulsed light (IPL) on heat shock protein 70 (HSP70) expression in skin and elucidate the biological mechanisms of photorejuvenation. METHODS: The skin of 15 SD rats was exposed to IPL in 3 regions at the energy density of 34 J/cm(2) in triple pulses with the duration of 4, 5 and 6 ms, respectively, and pulse delays of 20 and 25 ms. On days 1, 3, 5, 7, 15 and 30 after treatment, specimens of the treated and untreated skin were taken, respectively, for determination of HSP70 expression by immunohistochemistry. RESULTS: In treated regions, positive immunohistochemical staining was observed on day 1 in the epidermal keratinocytes, sebaceous gland cells and endothelial cells. The staining reached the highest intensity on day 7, gradually weakened on day 15, and disappeared on day 30. In the untreated areas, the cells were negative for immunohistochemical staining. CONCLUSION: Skin HSP70 expression can be enhanced by IPL, suggesting the role of HSP70 in photorejuvenation.

Acta Dermatovenerol Croat. 2004;12(1):42-50.

Phototherapy of psoriasis: review and update.

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Along with topical and systemic therapy, phototherapy is one of the three fundamental treatment options for managing psoriasis. The use of UVB continues to be one of the most important therapeutic interventions for mild to moderate psoriasis. An advance in UVB phototherapy has been the introduction of narrowband UVB lamps (311 nm). UVB lamps are superior to conventional broadband UVB in clearing psoriasis. PUVA is very

effective therapy and is still the most effective form of phototherapy for severe, extensive form od the disease. There has been a trend towards whole-body PUVA-bath. Advantages of PUVA bath are lack of gastrointestinal side effects and no need for post-treatment eye photoprotection because there is no systemic photosensitization. UVB and PUVA can be administered in combination with a variety of topical and systemic treatments to achieve more effective results more quickly. The most recent form of phototherapy, 308-nm excimer laser, holds promise for becoming a useful tool in the treatment of stable, localized psoriasis.

Arch Facial Plast Surg. 2004 Nov-Dec;6(6):398-409.

Nonablative laser and light therapies for skin rejuvenation.

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BACKGROUND: Multiple modalities have been described for skin rejuvenation, including ablative and nonablative therapies. Because of the prolonged recovery period associated with ablative procedures that injure the epidermis, nonablative skin treatments have grown increasingly popular. Various laser- and light-based systems have been designed or applied for promoting skin remodeling without damage to the epidermis. METHODS: Studies investigating the use of nonablative procedures for facial rhytids or acne scarring with clinical, histological, and objective quantitative measurements are systematically reviewed. RESULTS: Nonablative treatments are associated with clinical and objective improvements for the treatment of facial rhytids and acne scarring. Dermal remodeling seems to occur as a result of thermal injury, leading to dermal fibrosis without epidermal disruption. CONCLUSIONS: Although results are not as impressive as those of ablative treatments, nonablative procedures are effective in the treatment of photoaging and acne scarring. As technology in nonablative therapies continues to evolve, future laser and light sources may yield even more favorable results.

J Drugs Dermatol. 2004 Nov-Dec;3(6):605-10.

A novel non-thermal non-ablative full panel LED photomodulation device for reversal of photoaging: digital microscopic and clinical results in various skin types.

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Photomodulation is a process that manipulates or regulates cell activity using light sources without thermal effect. Previous studies of LED photomodulation have shown skin textural improvement accompanied by increased collagen deposition with reduced MMP-1 (collagenase) activity in the papillary dermis. The purpose of this study was to investigate a separate cohort of patients (N =93) with a wide range of Fitzpatrick skin types treated by LED photomodulation using the Gentlewaves full panel 590 nm high energy LED array with a specific sequence or code of pulsing in the millisecond domain. Results showed improvement of signs of photoaging in 90%. The majority of patients demonstrated improvement in peri-ocular wrinkles, reduction in Fitzpatrick photoaging classification, global skin texture and background erythema, and pigmentation. No side

effects were noted. LED photomodulation is a safe and effective non-painful non-ablative modality for improvement of photoaging.

Dermatol Surg. 2004 Aug;30(8):1085-90.

Intense pulsed light treatment of photoaged facial skin.

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BACKGROUND: It has been reported that intense pulsed light is efficacious for rejuvenation of photoaged skin, specifically the improvement of appearance of telangiectases and solar lentigines. OBJECTIVE: The objective was to define the treatment variables for photodamaged facial skin using a newer intense pulsed light system. METHODS: Twenty-three female subjects received three treatments using double-stacked pulses with fluences of 24 and 30 J/cm2. Response to treatment was evaluated using digital photography. Three signs of photoaging were evaluated: surface texture/roughness, mottled hyperpigmentation, and erythema/telangiectases. RESULTS: There was a shift in clinical grading from more to less severe on all three measures of photoaging. CONCLUSION: Intense pulsed light therapy was efficacious in ameliorating the clinical signs of photoaging. The device was well tolerated with minimal side effects.

Am J Clin Dermatol. 2004;5(4):211-6.

Phototherapy in the treatment of acne vulgaris: what is its role?

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Acne vulgaris is a common dermatosis affecting 80% of the population. To date, different treatments have been used to manage this condition. Antibacterials and retinoids are currently the mainstay of treatment for acne, but their success rate varies. Phototherapy is emerging as an alternative option to treat acne vulgaris. Studies examining the role of different wavelengths and methods of light treatment have shown that phototherapy with visible light, specifically blue light, has a marked effect on inflammatory acne lesions and seems sufficient for the treatment of acne. In addition, the combination of blue-red light radiation seems to be superior to blue light alone, with minimal adverse effects. Photodynamic therapy has also been used, even in nodular and cystic acne, and had excellent therapeutic outcomes, although with significant adverse effects. Recently, low energy pulsed dye laser therapy has been used, and seems to be a promising alternative that would allow the simultaneous treatment of active acne and acne scarring. Further studies are needed to clarify the role of phototherapy as a monotherapy or an adjuvant treatment in the current management of acne vulgaris.

Hautarzt. 2004 Jan;55(1):48-57

The excimer laser in dermatology and esthetic medicine

[Article in German]

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First reports about the use of the excimer laser in dermatology date back to 1997. It is seen as an improvement on conventional phototherapy and photochemotherapy because of the lower cumulative UV-dose involved, the shorter time frame required for treatment and the option of targeting individual lesions without affecting the surrounding healthy skin. In addition to the indications of psoriasis vulgaris, vitiligo and atopic eczema (for which there is now FDA approval in the US), the spectrum of possible uses for the excimer laser is growing rapidly, especially in the field of light-sensitive dermatoses. Case studies so far have ranged from post-operative hypopigmentation to acne vulgaris and from alopecia areata to parapsoriasis en plaque. The foremost priorities in the future will be to evaluate reproducible therapeutic regimens with realistic prospects of success in large-scale studies; assess potential iatrogenic risks in treatment; develop pathogenetic models for the mechanism of action; and define therapeutic approaches to new indications. This paper summarizes the publications to date and discusses our observations and experiences.

J Cosmet Laser Ther. 2003 Dec;5(3-4):168-74.

Long-term clinical results of IPL photorejuvenation.

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BACKGROUND: Non-ablative photorejuvenation is characterized by the reduction of intrinsic and extrinsic changes in photodamaged skin. Only short-term improvement has been documented previously. OBJECTIVE: To evaluate quantitatively the short-term and long-term clinical effectiveness of multiple full-face IPL treatments for non-ablative facial photorejuvenation. METHODS: A total of 47 patients with varying degrees of photodamaged skin and rosaceal dermatitis underwent a series of four to five IPL treatments with a Vasculight (Lumenis Corp). Treatments were conducted every 3-4 weeks. Photographs were taken at baseline and after the treatment series was completed at both 6 weeks and 6 months. Adverse effects and clinical improvement were documented. A patient satisfaction questionnaire was completed and reviewed at the 6-month evaluation period. RESULTS: Standardized evaluation of rhytids showed a statistically significant improvement in wrinkles at both evaluation endpoints. Some degradation occurred over time. Facial vascularity, dyschromia, and large pore size progressively improved from the 6-week measurement to the 6-month measurement. CONCLUSION: This clinical study demonstrates that non-ablative facial rejuvenation is associated with long-term clinical improvement of facial rhytids, abnormal vascularity and pigmentary disorders with minimal risks and side effects to the patient.

Curr Opin Ophthalmol. 2003 Oct;14(5):246-52.

Facial skin rejuvenation.

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PURPOSE OF REVIEW: In recent years, many new products and techniques have arisen that are useful in the rejuvenation of facial skin. Most of the therapies are directed at improving the results of photoaging. These cutaneous changes occur from chronic exposure to ultraviolet B light (290 to 320 nm) associated with sunburn, and ultraviolet AII light (320 to 340 nm), and ultraviolet AI light (340 to 400 nm) associated with photoaging.

Clinically chronic photoaging may result in fine wrinkles, texture abnormalities, pigment dyschromias, and actinic keratoses. RECENT FINDINGS: Many methods of patient assessment are available, but the most useful include the Fitzpatrick skin type classification and the Glogau photoaging scale. Although many therapies are available to reduce or even reverse many of these aging changes, patient education regarding lifestyle changes (especially smoking cessation) and sun avoidance need to be a critical foundation of treatment. Indeed, patient participation in their own skin care regimen is important for any program to be effective. Topical therapy including tretinoins, hydroxy acids, bleaching agents, and sunscreens are discussed herein. SUMMARY: The physician has an important role in understanding which treatment options are appropriate for mild, moderate, and severe photoaging, and in educating patients on the risks and benefits of each. This includes resurfacing modalities with microdermabrasion, chemical peels, and laser skin resurfacing.

LOW LEVEL LASER THERAPY IN DERMATOLOGY: AN OVERVIEW OF THERAPEUTIC POSSIBILITIES

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The first application of Low Level Laser Therapy (LLLT) was completed on dermatological disorders like skin ulcers, in early sixties. In the meantime, dermatological indications for LLLT have increased. Particular effects of LLLT are observed when laser beam is applied on the open wound, which healing can be significantly accelerated especially in patients with delayed or impeded wound healing like patients with circulatory disorders, diabetic patients, etc. LLLT triggers biostimulative-regenerative processes inside the cell and subsequently causes revitalisation of the issue as well. Second effect of LLLT refers to the vasodilatation and neovascularisation of local blood and lymph vessels, thus causing a better removal of waste products and, on the other hand, improved oxygenation and nutrition of damaged tissue. Analgesic and anti-inflammatory effects of LLLT are also significant when irradiating certain dermatological changes. All effects mentioned before will be discussed in details during the lecture. Therefore, LLLT is used today in dermatology in the treatment of the following conditions: – Ulcus cruris – Burns – Herpers infections – Scar tissue – Keliod – Sclerodermia – Rosacea – Neurodermitis – Eczema – Lichen ruber planus and scrofulosus – Psoriasis – Haemathoma – Etc. Each pathological condition will be explained, and optimal and individual energy densities will be presented in this lecture.

AESTHETIC TREATMENTS WITH LOW LEVEL LASER THERAPY

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If taking into the consideration the list of aesthetic disorders which can be treated with either Low Level Laser Therapy (LLLT) or surgical lasers, it is justified to say that laser is also the light of beauty. Although its first applications were focussed on serious diseases like skin ulcers and painful conditions, employment of LLLT in aesthetics has initiated in mid seventies. Aesthetic changes are mainly benign and they won't seriously damage the health state of patient's body, but aesthetic problems are strictly subjective and the same problem causes different psychological reaction in different persons. Development in modern medicine and technology brought many new techniques and devices, which are successfully used in aesthetics today. Laser is one of the highlights in aesthetics today where it is applied mostly for facial rejuvenation, because the face is psychologically the most sensitive aesthetic area of each person. Facial rejuvenation can be achieved with surgical lasers, which remove superficial layer of atrophic skin, leaving that area to be self- regenerated. It is

an invasive method, while the process of regeneration can last few weeks even months, with a prohibition of disposing to the sunlight. On the other hand, skin rejuvenation can be completed with use of LLLT or athermal lasers like HeliumNeon (HeNe) or infrared (IR). The first one is mostly applied in the treatment of superficial changes, while the IR laser is used for irradiation of deeper structures. LLLT obtains good results in aesthetics due to its three main effects: biostimulative-regenerative, analgesic and anti-inflammatory effect, which will be presented in this lecture. LLLT can be applied in aesthetics like monotherapy or complementary treatment modality to the topic medications. Frequent indications for LLLT in aesthetics are as follows: – Acne – Cellulite – Striae – Alopecia – Wrinkles – Lentigo senile This lecture will cover all relevant details related to LLLT and each condition, with application techniques and recommended individual optimal energy densities.

Soft Laser in Cosmetics

Laser Partner, 11.3.2003

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Abstract

Cosmetics is a well established and independent branch, apparently different from plastic surgery, esthetic dermatology and similar medical specialties, yet complementing them very effectively. However, is there any difference between individual beauty parlors? Definitely there is, but where? Enthusiasm, knowledge, experience, talents, good eyes and clever fingers – this is an absolute minimum in terms of a cosmetician`s "software". Speaking about "hardware", a good cosmetician needs a suitable place for the business, a chair, a table, a mirror … all the same. Then cosmetic milks, creams, masks, agents, all the beatiful jars, sprays and cups come … they all have them, too. So where is the difference, if any at all? The difference lies in modern technical equipment, in technical devices helping a cosmetician be more efficient, more successful, more up-to-date, and, first of all, more attractive for the clients. And here, undoubtedly, laser dominates.

Technical gadgets

Speaking about technical equipment, what options can a cosmetician have? Not many, really:

- Electrolytic epilator, though it is a bit an obsolete technique, a time consuming one, painful, unprecise, with imperfect results, and in case of electrocauter successive scarring may appear.
- Vacuum lymphodreinage unit, though this technique comes much more under medical specialists, especially as one of the means of consecutive treatment after oncological surgeries.
- Solarium – only a supplement from the point of view of cosmetics.
- Microdermabrasion seems an ideal option. It is capable of scraping off superficial layers of dead skin cells from the face, décolté, hands etc. with a flow of tiny crystals. Microdermabrasion is a great tool in hands of an experienced cosmetician, eliminating fine wrinkles, acne scarring, minor pigmented lesions, rough skin and the like. The skin gets regenerated, smoothened and cleansed, not only the skin looks better, but is also able to take in cosmetic preparations much better in the course of successive treatment.
- Polarized biolamps are also a possibility how to improve cosmetic treatments and care. However, we should avoid using monochromatic devices using different color filters or sources, for those only deprive us of the synergic effect of polychromatic light devices enabling the light to penetrate in different depths in tissue. A separate article on the use of biolamps in cosmetics was published in Laser Partner Clinixperience No. 45/2002.

- Laser is the real king of cosmetics. Surgical laser is able to ablate wrinkles, repair scars, remove pigmented lesions and age or sun spots, rid of unwanted tattoos and hairs. Some of the applications do not even have a non-laser alternative, such as permanent hair removal or elimination of naevi flamei. All the above mentioned applications, and many others, can only be performed with a surgical laser and by physitians. However, apart from those, there is another group of lasers, called soft lasers (a name very appropriate for cosmetics), or therapeutic, biostimulation, low-level lasers (low-level laser therapy – LLLT), and those will be the subject of this article.

Mechanisms of soft lasers

Laser is nothing else but light with specific features, and it is generally known that for every living cell light is of fundamental and unsubstitutable importance. This phenomenon can be noticeable best in plants assimilating light to be able to grow, however similar dependency applies to animal organisms, too. Lack of light causes growth disorders and can also result in psychic defects, depressions, or even in a specific disease called seasonal light deficiency.

Laser energy is absorbed in tissue through cytochrome cells, mitochondrial apparatus of individual cells transforming light energy into cellular energy. At the same time, passage of light improves permeability of cellular membranes, leading to their better nutrition, improved function and quicker cell division. These processes in tissue activate macrophages (responsible for absorption of noxious agents and support of healing processes), improve activity of fibroblasts (mast cells supporting collagen synthesis in tissue), and support improved production of specific enzymes. Apart from stimulation of growth and wound healing medicine can also make use of other characteristics of laser beam, such as ability to decrease pain through influencing neural peripheries, anfi-inflammatory effect, or stimulation of acupuncture points or physiological trigger points.

In cosmetics it is very important to choose a suitable laser device. The first decission to make is an appropriate wavelength of emitted light, i.e. its color. The rule is that red color (632 – 670 nanometers – nm) is convenient for superficial applications, not penetrating deep in tissue and thus all energy being absorbed in the skin and subcutis. On the other hand, infrared (IR) lasers with higher penetration depths are quite useless in cosmetics, whilst they come in very useful in massage and physiotherapy facilities . The second important value is the power output of a laser, which should be for cosmetics within the range of 10 to 40 miliwatt (mW). Lower output leads to excessive prolongation of application times necessary to irradiate recommended dosages of energy, and, on the other hand, suitable red lasers with higher output are usually very expensive. The third important issue to decide on is the construction of lasing device. You can buy a laser with a hand-held pinpoint laser probe, which will be suitable especially when treating little lesions (See Fig 1). On the other hand, when working on larger areas (whole face, décolté etc.), you might prefer a laser scanner automatically distributing light on required area and freeing your hands for another client (See Fig. 2). A laser with automatically adjusted parameters of therapy is recommended.

Figure 1: Treatment with a laser probe

Figure 2: Laser scanner

Soft laser in cosmetics

LLLT has many possible applications in cosmetics and laser can even lay the foundations of a specialized beauty salon. The following list has originated on the basis of years of experience, and can provide readers with a general overview of potentials of this useful and profitable method.

1) Healing of inflammatory and other pathologies

- Acne – one of the most frequent cosmetic problems, due to civilization impacts shifting more and more into middle age. Laser helps effective healing of papuli and pustuli even after a few applications, in most cases skin responding to laser treatment spontaneously and very quickly.
- Alopecia – supportive treatment of alopecias, hair growth stimulation and improvement of quality.
- Dermatitis – LLLT helps to improve inflammatory and other conditions on the skin.
- Eczema – laser can improve quality of life of the patients by diminishing some of the superficial manifestations of the disease.
- Herpes – one of the most effective applications. A herpes usually does not even appear if the painful spot is irradiated before eruption, or has a relatively mild symptoms. In other cases a scab can be expected to create on the herpes within a few hours after irradiation, avoiding unpleasant long lasting suppurative manifestations. LLLT shortens healing by more than fifty per cent, and is also suitable to treat post-herpetic neuralgia.

2) Post-procedure applications

- Healing of nail matrices – successful treatment also after nail design applications.
- Post cleansing treatment – quicker regeneration of skin suffering from red spots, minor edemas and haematomas, open and widened pores.
- Post epilation treatment – application of LLLT after wax or electric epilation significantly soothes irritated skin, healing up punctures in rather a short time. It is recommended to stimulate the area to be treated not only after the application, but also before the initial hair removal, due to analgetic effect of laser light, as well as due to more effective start up of healing processes.

- Permanent make-up – after mechanical penetration of pigments under the skin LLLT regenerates microscars, soothing irritated skin.

3) Scars management

- Post acne scarring – a long term treatment helps to improve the final condition.
- Scars – LLLT contributes to decolorization, smoothening and softening scars.
- Striae – regeneration of unwanted microscars and rhagadae in skin.

4) Improving the beauty of your clients

- Biostimulation of skin – overall soothing of the skin, improvement of its look, LLLT smothens and stretches the skin removing its minor defects.
- Cellulitis – laser should be understood as one of the components of comprehensive treatment, LLLT improving microcirculation of lymph and blood, locally decreasing the feeling of pressure and pain, releasing collagen threads.
- Dandruff – LLLT can help in combination with special anti-dandruff shampoos.
- Laser Mask (Le Masque de Laser) – application of a face mask, the performance of which is activated by irradiation with a laser beam, a combination of deep cleansing of tissue with biostimulation.
- Rejuvenation – improving the looks, smoothening and tightening of the skin.

- Wrinkles – soft laser is not able to rid of the wrinkles mechanically, however by improving the condition of the skin it contributes to its increased flexibility and elasticity.

5) Other cosmetic-related applications

- Chronic Fatigue Syndrome – thanks to its stimulative effects LLLT may become a part of comprehensive treament.
- Seasonal Light Deficiency (SLD) – application on epiphysis has been described as a means of suitable psychostimulation.
- Migraine – relief of negative manifestations of similar diseases may sometimes also be required.
- Myorelaxation – beauty parlors are sometimes associated with massage or fitness facilities where LLLT can be used to decrease muscle spasms prior to initial massages, or to release tension in case of neck and lower back pain.

Hygienic conditions for soft laser in cosmetics

It is generally believed that soft laser can be operated only by physicians, however this is not a correct opinion. Soft lasers can be commonly operating in, and their advantages can be made use of by, beauty parlors, haidressers salons, massage and regeneration facilities and the like, provided their users observing specific hygienic and safety regulations.

The first prerequisite is a proper training, familiarizing the staff with performance and mechanism of laser in living organism, with possibilities of indications and applications, with initial laser techniques, as well as with contra-indications and labor safety. A laser workplace must be adapted in such a way that an unwanted laser beam cannot hit anybody, all windows and mirrors must be covered by jalousie or curtains not transmitting laser light during laser operation. Corresponding laser safety eyewear is also required. Every laser workplace is subject to hygienic control classification.

Current medical legislation imposes a certain limitations on cosmeticians regardless to whether they work with laser or not. They must not break integrity of the skin, must not perform procedures on sick skin or mucosa, and must not manipulate scars and birthmarks. In fact most of beauty centers either co-laborate with doctors or work under direct supervision of medical specialists who can guarantee expert skin care in full extent. However, even within the frameworks of limited number of procedures, soft laser represents a reliable, effective, and attractive skin care.

Related articles

- Laser Partner No. 23/2001: P. Petrovska: Laser in dermatology
- Laser Partner No. 25/2001: T. Trobonjaca, Zlatko Simunovic: Aesthetic treatments with low level laser therapy
- Laser Partner No. 33/2001: R. Smucler et al.: Laser Mask increasing the potential of laser biostimulation in cosmetology and dermatology
- Laser Partner No. 45/2002: Bozena Apetaurova: Biolamp in cosmetic practice

Literature

- Jan Javurek: Fototerapie biolaserem – lecebna metoda budoucnosti, Grada Publishing, Praha 1995
- Zlatko Simunovic a kol.: Lasers in Medicine and Dentistry, Vitagraf Rijeka, 2000
- Jan Tunér, Lars Hode: Laser Therapy – Clinical Practice and Scientific Background, Prima Books, Grangersberg 2002

Case History of Laser Therapy of Extensive Burns and After-Burn Scars

Laser Partner, 27.5.2002

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Abstract

Unusual case history describing a long term treatment of extensive burns and after-burn scars with the use of LLLT on a baby patient.

The Parents

Their story started on 21st of September, 2000. Following mother`s two-months hospitalization, Claire was born before midnight. After three days, in the course of a routine check of the new-born baby, the hands of a nurse caught fire inside the incubator. The device was immediately in flames and so was its precious living contents. Fortunately, the resourceful nurse managed to take the baby out. However, despite of this, Claire sustained extensive burns on more than on one fourth of her body, and the fight for her life began. The doctor in charge as well as the entire medical staff managed to cool and treat the involved areas in the shortest possible time, including stabilization of vital functions. Claire had then been rushed to the Burns Center in Brno and handed over to the Intensive Care Unit of the Neonatal Department of Brno Faculty Hospital.

“When they came at night to tell me that there had been a misfortune, my reaction reflected the condition after a complicated pregnancy and a childbirth. I was confused and the only thing that struck me at the moment was – why just me? However, we have never admitted that it could not turn out well,” says Claire`s mother today. The incident of a burnig incubator and a burnt baby girl had shocked both medical and general public. Numerous clinics using same devices all over the country have been waiting for the outcome of the

investigation till now. Investigation was complicated also by the fact that the course of the incident cannot be reconstructed… Presumably, the cause was a discharge of static electicity on the hands of the nurse. However, any speculation about the fault of the medical staff is rejected by Claire`s dad: “When you see your own child wrapped from head to toe in dressings, connected by various tubes to machines supporting basic vital functions during forced sleep, the only thing you can do is to beg her in spirit to fight for her life, not to surrender. The life is worth it. According to burns experts even five per cent is critical for such a baby. Claire survived five times larger extent than that! She was strong enought to fight for her life, and she won. Apart from all the efforts taken by the doctors and medical staff, it was also thanks to her strong constitution”

Though her parents did not surrender, too. The week following the accident they both spent in the hospital with their baby. Together they overcame the most critical period, hoping that everything will turn out well. After ten days doctors started to ablate damaged skin, transplanting gradually healthy skin from other parts of the body. After another week Claire was disconnected from devices and her mother came back to the hospital in order to be able to milk the baby and to learn how to treat healing wounds. On 20th of October, less than a month after the incident, Claire was discharged from the hospital. At home, apart from common care for several weeks old suckling, the parents started massaging scars intensively several times a day, this care being usually accompanied by Caire`s loud disapproval. Waking up at five in the morning every day, massaging the baby and 20 kilometers by car to Jihlava for rehabilitation and laser therapy. Once a week also traveling 90 kilometers to Brno for check ups, expecting the results to come only after a longer time.

And how about the result? Scars after burns and transplantations are healing up successfully. Furthermore, regular laser irradiations and mechanical massages suited Claire very well, and according to her parents Claire might even be smarter than other babies of her age. After two months Claire`s parents asked the doctor, who had been on duty at the newborns department that unfortunate night, to become Claire`s godmother. Action of the team under her leadership helped Claire to come back from the death`s door. “Even today, speaking about it makes me shiver down my spine,” the doctor admits. Sometimes it is very hard to determine borderline between professional and private live. Definitely, the christening is a better thing to remember for her: “The girl is beatiful. I am happy it turned out well this way.”

Picture 1: October 15, 2000, Condition before discharged from hospital

Out-patients rehabilitation specialist

Tha patient was born on 21st September, 2000, when pregnancy was terminated in the 36th week of pregnancy by a Caesarian section. Before delivery mother had been hospitalized due to cervicouterinal insufficiency. The patient is born immature – 2850 grs. / 47 cms. – thus embedded in an incubator due to breath complications, transitoral hypoglycaemia, and newborns jaundice. On September 25th, at 00.50 the incubator ignited causing II – IV grade burns of the baby in the extent of about 20 per cent. Following sterile cover and overall therapy (sedation and infusion) the patient was moved in an ambulance to a specialized burns center. Patient`s finding described multiple combustiones II grade on 2 per cent of the body (healed up conservatively) and III – IV grade burns on 18 per cent of the surface of the body, where there was in two phases performed chemical necrectomy with subsequent autotransplantation with a medium-thick D-E graft in 1:1.5 ratio. Implants adhered in full extent, transplant source areas healed up well, too. Mother was trained in nursing care and they both were discharged on the 26th day for home care (weight 3310 grs.). The patient was taken over in dispensary of out-patients children`s burns department.

Henceforth pressure massages were carried on 3 times a day at home (30 minutes back, 30 minutes hand – by turns with application of Contratubex or Hiruroid ointments), together with laser therapy (LLLT) with a superficial scanner 670nm/25mW, dosage 2.6 J/cm^2 for 20 minutes on the most affected areas, i.e. an area of about 12.5 x 4 centimeters on the back and the left upper limb. LLLT daily for 6 months. Apart from that, irradiation with an IR laser probe 830nm/30mW, dose of 3 J/cm^2, applied on several localities (especially on a spot on the left elbow, the left thigh, the left wrist, and fingers 3, 4, and 5 on the left hand).

According to finding of November 15, 2000, scarry surfaces inflexible, slightly over the level, hyperaemic, deformities on the left little finger. Finding of November 29 – hypertrophic cicatrices on the trunk and left forearm gradually maturing, the course seems favourable. Only the condition of the area of left wrist and left

little finger unfavourable due to gradual luxations of metacarpophalangeal and distal interphalangeal joints caused by contracting hyperfrophic scars. According to our finding the main progress can be noticed on the back where especially the peripheral parts significantly improved. Minimum effect noticed on the most affected fingers of the left hand, especially the little finger.

From January 9, 2001, laser Maestro with an infrared LineScan scanner 830nm/200mW was lent to carry on with LLLT at home. Therapy performed for 20 minutes on the back, dosage 2 J/cm^2, output power decreased to 100 mW, identical dosage on the left hand, time 13 minutes and 20 seconds. Furthermore, a supplementary dosage on the most affected fingers of the left hand (area 3 cm^2, dosage 3 J/cm^2, output 200 mW, time 1 minute and 30 seconds). In addition to that, superficial irradiation with a pinpoint laser probe 670nm/10mW, dosage 2 J/cm^2. This therapy performed daily including weekends till February 14, 2001, other therapies, i.e. press massages and ointments, unchanged.

Finding of a specialized clinic as of January 10, 2001, mentioned improved condition, scarry areas gradually softening, contraction of left little finger remaining. Finding of February 7, 2001, identical, hypertrophic scars on lateral side of the left forearm slightly less hyperaemic. Finding on the little finger the same. From February 15, 2001, LLLT substituted by phototherapy with Biolamp, irradiation 3 times a day for 20 minutes. After 4 weeks LLLT introduced again for the period of 2 months, IR laser probe 830nm/40mW, dosage 3 J/cm^2 every day, pinpoint irradiation of the forearm on 2 spots, 10 points on the wrist and fingers, 6 points of irradiation on the back.

Overall evaluation of efficacy on November 22, 2001, i.e. after roughly 14 months, states significant improvement of the condition, especially on the back. There is an area of about 2 x 6 centimeters remaining inflexible and latticed after above mentioned plastic surgery, presumably with the prospect of a rather extensive excision being necessary in this terrain. Furthermore, a significant improvement especially on the left forearm, left thigh and on dorsal side of the wrist. Unfavourable situation is remaining in the area of the left little finger, but there has probably been a severe trophic defect after a IV. grade burn, hitting deep structures including bones and not yet fully developed joints. Gradually a severe contracture of little finger developed, and thus it had to be resolved by an amputation on April 4, 2002.

On the basis of above mentioned findings it is possible to imply quite clearly that the most significant improvement had taken place during the first two months of application of LLLT. The condition was improving further on, but not so distinctly as at the beginning. In general, it is possible to regard LLLT highly successful, but the imporance of its early introduction should be stressed once more.

Picture 2: The scars after a series of laser irradiation – 4 months after injury

Specialized burns clinic

A rare clinical case. A new-born baby girl suffered 72 hours after the birth (Sectio Caesarea) a thermal injury when an incubator caught fire due to not yet revealed circumstances. Total area of burnt skin was 18 per cent III. grade burns and 2 per cent II. grade burns. The newborn had been treated by a team of experts of the Faculty Hospital Brno (a neonatologist, an anaesthesiologist, a plastic surgeon, a physiotherapist) in the Newborn Department of the II. Children`s Clinic.

With regard to the extent and depth of the burns the newborn was artificially ventilated. The patient was resuscitated with crystalloid as well as by colloid suspensions, continuous antalgic sedative care, heparinization, substitution of antitrombine III, enteral and parenteral nutrition, immunity support by gamaglobulines and targeted medication by antibiotics according to results of microbiologic findings. Having stabilized the condition from the sixth day on, the team started a phased chemical necrectomy of the burnt areas as well as covering of the defects with artificial teguments. On the twelfth day after the injury we carried out autotransplantation with a thin dermoepidermal implant, ablated from both the thighs, right gluteus, and from the back. In the course of hospitalization no serious complications had occured, and 24 days after the injury with the burnt areas having been healed up the child was discharged for home care.

From day 32 application of LLLT started. The patient was visiting our clinic for regular check ups when her condition was evaluated with special regard to prevention against hypertrophic scars formation. Adequate therapy and rehabilitation exercise had been recommended. The first series of LLLT was completed 4 months after the injury. After following series of LLLT skin hyperpigmentation gradually discolored. The color of the skin was getting close to standard color, and the scars were flattening. Despite all efforts (combination of biostimulation and biophysical rehabilitation techniques) we still were not able to influence substantially deformities and contractures of scars on ulnar side of the little finger.

Thanks to excellent results in scar management in patients after a thermal trauma LLLT has became a common part of prevention against hypertrophic scars. It also helps to heal up chronic wounds. This therapy has best

results when applied on firm palpable scars, red in color and profusely vascularized. Excellent clinical results have been corroborating a positive effect of therapeutic laser on hypertrophic after-burn scars.

Picture 3: Condition 1 year after the injury

Laser manufacturer

From time to time you may happen to read in your newspapers an article hitting you much more than all the others do. However, with a little bit of sarcasm you can say that nespapers are all shocking news today, but anyway, something really can knock you back, that`s the way it is. And this was just the case of a burning premature baby girl in an incubator. In an incubator which should originally have kept the baby alive, but despite of this, oxygen flowing into the device on and on kept the baby burning.

Therapeutic laser means a significant support for a weakened organism, especially in terms of speeding up wounds healing, local diminishment of pain, and general biostimulation of body structures. In this particular case laser could stimulate healing of wound areas after autotransplantation, speed up integration of transplants, and especially help in post-operative rehabilitation of scars in order to soften and discolor them. Furthermore, there was a real risk of formation of keloid scars which would possibly block mobility or cause other problems in the future.

Soon we had found out that the burns clinic had had a laser available, and also the rehabilitation centre, which took over post operative care of the girl, was equipped with a laser scanner. Should this not be the case, we were ready to offer a long-term loan of a laser, just like we had done it in the past, for example in the case of a little schoolboy who had been poured over with an inflammable liquid and burnt by his schoolfellows, suffering burns on his hand and neck, or a woman who had been bitten in the face by a dog, or an ice hockey player who had had his cheek cut by a rival player`s skate blade, and so like. However, we could not help in this case, so we only gave an occassional call to the doctor, just to ask how therapy proceeds.

About a month later we were contacted by the father of the girl. It was early December, wintertime. He tried to explain that they were living in the Highlands, having to go by car every day more than 20 kilometers (on a road which sometimes gets negotiable by car very hard, as it happens from time to time during the winter in the countryside …) to the town for laser therapy. This meant waking up at 5 o`clock in the morning every day, then to carry on with massages of the baby, see their two other children off to school, and then go by car for

laser therapy, regardless to how the weather looks like. He asked us whether we could lend them a laser to proceed in the therapy at home. However, this was what we could not do, since working with a laser is subject to strict hygienic and security rules and, furthermore, the legislation does not allow us to distribute high-performance professional lasers to uninitiated public. At the end there was a possibility how to manage the situation thanks to human sympathy and understanding. The parents attended a laser medical training course, district hygienist officer inspected the house approving a “laser workplace” in one of the bedrooms, setting up binding rules for operating the laser. A laser scanner was installed, the parents being trained in how to operate the device. The parents closely cooperated with the doctor. This temporary and quite extraordinary solution could contribute to a quicker rehabilitation of the little patient, helping the whole family to overcome a dramatic epizode. Good luck, Claire!

Br J Plast Surg. 2003 Sep;56(6):607-10.

Intense pulsed light for the treatment of lentigines in LEOPARD syndrome.

Kontoes PP, Vlachos SP, Marayiannis KV.

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A 28-year-old female patient suffering from LEOPARD syndrome presented, asking for the removal of lentigines (covering her face and most of her body) for aesthetic reasons. Intense pulsed light technology has been already used successfully for the removal of various benign pigmented lesions and it proved effective in this very rare case as well.

Skin Therapy Lett. 2003 Apr-May;8(4):4-7.

Nonablative laser and light therapy: an approach to patient and device selection.

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Nonablative laser and light therapy is a relatively novel modality for the improvement of the visual appearance of photodamaged, scarred, and injured skin. A number of different wavelengths and devices have been purported to be efficacious for the delivery of nonablative therapy. Among the features that can be addressed are red spots and telangiectasia, pigmentation and lentigines, and their daily routines while benefiting from the cumulative effects of skin rejuvenation.

Dermatol Surg. 2002 Dec;28(12):1115-9.

Rejuvenation of photoaged skin: 5 years results with intense pulsed light of the face, neck, and chest.

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BACKGROUND: Photorejuvenation involves the use of lasers or light sources to reverse signs of photoaging. Multiple devices have been shown to be effective over the short-term. OBJECTIVE: To investigate the long-term clinical results on the face, neck and chest at 4 years using filtered flashlamp intense pulsed light (IPL) for treatment of photoaging changes of telangiectasias, dyspigmentation, and rough skin texture. METHODS: A chart review of 80 randomly selected patients with skin types I-IV who were treated by IPL during 1996 and 1997 was performed. Photos and patient self-assessment were graded for features of textural smoothness, telangiectasia severity, and blotchy pigmentation into four categories of worse, no change, slightly better (less than 50% improvement) and much better (greater than 50% improvement). RESULTS: At 4 years following initial treatment, skin textural improvement was noted in 83% of the subjects. Telangiectasias were improved in 82% of subjects, while pigmentation remained improved in 79%. The median number of treatments was 3. The face responded slightly better than the chest or neck. Most common side-effects included temporary mild crusting (19%), erythema (15%) and purpura (6%). CONCLUSION: Signs of photoaging including telangiectasias and mottled pigmentation of the face, neck, and chest, can be improved by IPL with a long-lasting result. Minimal or no downtime with minimal adverse effects can be achieved with the settings reported. Skin textural smoothing, although not easily quantified, is an additional benefit observed long-term.

Laser Surg Med. Abstract issue, 2002, abstract 242.

The effects of adding low energy laser irradiation after skin resurfacing in lowering complication.

Fereydson E, Samieh M.

Laser therapy is a valuable supportive therapy after skin resurfacing with CO2 laser. In a study by Fereydson. twenty patients had full face skin resurfacing with superpulse CO2 laser, 500 mJ/cm2. Ten patients had additional 780 nm laser therapy. This additional therapy lowered complications such as pain, erythema, infection rate and itching.

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lasting result. Minimal or no downtime with minimal adverse effects can be achieved with the settings reported. Skin textural smoothing, although not easily quantified, is an additional benefit observed long-term.

Plast Reconstr Surg. 2002 Sep 1;110(3):912-22; discussion 923-5.

Fat liquefaction: effect of low-level laser energy on adipose tissue.

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Low-level laser energy has been increasingly used in the treatment of a broad range of conditions and has improved wound healing, reduced edema, and relieved pain of various etiologies. This study examined whether 635-nm low-level lasers had an effect on adipose tissue in vivo and the procedural implementation of lipoplasty/liposuction techniques. The experiment investigated the effect of 635-nm, 10-mW diode laser radiation with exclusive energy dispersing optics. Total energy values of 1.2 J/cm(2), 2.4 J/cm(2), and 3.6 J/cm(2) were applied on human adipose tissue taken from lipectomy samples of 12 healthy women. The tissue samples were irradiated for 0, 2, 4, and 6 minutes with and without tumescent solution and were studied using the protocols of transmission electron microscopy and scanning electron microscopy. Nonirradiated tissue samples were taken for reference. More than 180 images were recorded and professionally evaluated. All microscopic results showed that without laser exposure the normal adipose tissue appeared as a grape-shaped node. After 4 minutes of laser exposure, 80 percent of the fat was released from the adipose cells; at 6 minutes of laser exposure, 99 percent of the fat was released from the adipocyte. The released fat was collected in the interstitial space. Transmission electron microscopic images of the adipose tissue taken at x60,000 showed a transitory pore and complete deflation of the adipocytes. The low-level laser energy affected the adipose cell by causing a transitory pore in the cell membrane to open, which permitted the fat content to go from inside to outside the cell. The cells in the interstitial space and the capillaries remained intact. Low-level laser-assisted lipoplasty has a significant impact on the procedural implementation of lipoplasty techniques.

Semin Cutan Med Surg. 2002 Dec;21(4):280-7.

Intense pulsed-light photorejuvenation

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Intense pulsed light photorejuvenation represents a novel mode of treatment of photodamaged skin. A broad-spectrum flashlamp (500-1200 nm) targets chromophores reversing pigmentation, vascular and pilosebaceous aberrations. Both cytokine mediated as well as thermally induced deep dermal remodeling may be achieved using the varied polychromatic wavelengths associated with this technology. Inflammatory dermatosis such as rosacea may also be addressed as well. A structural approach to non-ablative rejuvenation utilizing intense pulsed light is associated with high patient satisfaction and minimal adverse sequelae.

Biophysics of nonablative dermal remodeling.

Semin Cutan Med Surg. 2002 Dec;21(4):251-65.
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This article explores the physics of nonablative skin remodeling as well as the histologic sequelae. Although there have been several studies of nonablative skin remodeling, the exact mechanisms of action and thus the optimum device-specific parameters are not yet known. The article is divided into a discussion of the physics of laser-tissue interactions, followed by a review of the types of devices used for nonablative skin remodeling, and the histologic findings that follow treatment.

Hautarzt. 2002 Jun;53(6):385-92.

"Skin rejuvenation" by non-ablative laser and light systems. Literature research and overview

[Article in German]

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Currently, ablative laser therapy (with CO2/Er:YAG lasers) and deep chemical peeling are effective and promising methods of skin rejuvenation. The induction of collagen synthesis was observed after peelings with trichloroacetic acid or phenol as well as after treatments with the CO2 laser. In past years, the undesirable side effects and risks of these methods have led to intensified research in the fields of non-ablative facial rejuvenation and subsurfacing by means of ablative laser systems and intense pulsed light systems. The objective is to achieve selective, heat-induced denaturalisation of dermal collagen that leads to subsequent reactive synthesis but does not damage the epidermis. Recently, the results of numerous clinical and histological studies have indicated that these new technologies are successful. After critical review and assessment of current literature, we can say that in terms of their efficacy, non-ablative methods are not a comparable alternative to ablative skin resurfacing.

Biolamp in Cosmetic Practice

Laser Partner, 3.4.2002

Bozena Apetaurova, M. D., Ph. D.

Abstract

The paper of now deceased author deals with the use of polarized Biolamp in everyday cosmetic practice. It stemms from theoretical bases of effects of polarized light on various wavelengths on the skin and describes its general influence on metabolism and microcirculation in the tissue. Biolamp is an effective tool in treating acne, seborrhoic eczema, alopecias, herpes, wounds, ulcera, and in regenerating aging skin. Although all these complaints are primarily indicated for a therapeutic laser (LLLT), especially in extensive and serious cases, Biolamp has proven itself a successful complement of LLLT, or in minor cases even a simpler and inexpensive alternative of LLLT.

The Effects of Light

Cosmetics is a branch encompassing both prevention and therapy of skin diseases. It consists of skin cleansing, massages, the use of cosmetic agents and preparations and, last but not least, phototherapy with Biolamp as one of its forms.

Sun rays touching the Earth include in its spectrum parts with wavelenghs roughly between 300 to 4000 nanometres (nm). The band of visible light reaches from circa 430 to 750 nm. Shorter wavelengths mean ultraviolet light, whilst infrared (IR) light is emitted on longer wavelengths. Human body is used to these wavelengths.

Human organism in general, and human skin in particular react to irradiation within these wavelengths in different ways, often very selectively in rather a narrow frequency band, and this has been utilized in applications of therapeutic as well as of surgical lasers in cosmetics. In general we can say that the skin is relatively pervious for light irradiation between 300 and 1100 nm, thus this irradiation can penetrate the skin rather deep. Longer bands of IR irradiation with wavelengths longer than 1300 nm are absorbed well in the skin, this becomming evident in increasing the temperature of the skin.

Under excessive exposures ultraviolet light has generally mutagenic and cancerogenic effects and it is necesary to consider it harmful.

Irradiation in the shorter IR band of the spectrum within 750 – 1100 nm wavelengths is the main resource of energy for plants and some types of bacteria in the nature and, according to literature (1) it may also be a source of energy for cells of human organism.

Positive effects of light irradiation on treatment and healing of skin has been known for a long time. However, the knowledge of effects of its individual spectral parts and of its characteristics (polarization, for instance) has deepened only in the course of the last few decades, so that it might be possible to make the best of it for rational treatment, especially when modern technical means, such as Biolamp or a therapeutic laser, are so easily accessible.

Biolamp emits light in spectral range 430 – 2800 nm. Its light does not contain any ultraviolet, nor significant heat infrared parts. Light within the range of 750 to 1200 nm, i.e. in the range where human body cells are able to transform the energy of light radiation into cellular energy, is the most intensive. This, as well as other, not so very well known, effects of light irradiation have a positive effect on the skin.

In general, it is possible to state that thanks to this particular light energy cellular metabolism is improved and oxidation processes in cells intensified, both resulting in possible regeneration of damaged cells as well as in strengthening of healthy cells. Through improved oxidation of the tissue its resistence to infections is strengthened. Furthermore, division of fibroblasts, of which ligamentary cells diferenciate, is influenced positively as well as metabolism of collagen filaments is improved, as far as their production in the event of deficiency is concerned. Blood microcirculation, favouring quick resorption of oedemas in damaged tissues, is positively influenced, too.

Biolamp emits polarized light. Polarization is believed to improve mentioned positive effects, although photobiological basis of this mechanism has not yet been fully revealed.

Biolamp irradiation has generally biostimulative, anti-inflammatory, and regeneration effects on skin, and these can be advantageously utilized for a complimentary treatment in a cosmetic practice.

Treatment of Acne with Biolamp

One of the most frequent dermatoses is represented by acne. It affects cheeks, forehead, shoulders, back and chest. Unsightly look of the skin causes patients depressions, bringing often also psychic problems. It has been till today a grave therapeutic problem for cosmeticians as well as for physicians.

Acne is a chronic inflammatory affection, damaging a pilosebaceous unit multifactorially. Hyperkeratinization and obstructions of sebaceous follicles appear. Increased level of androgenes stimulates increase of production of sebum and multiplication of bacterial flora, particularly of Propionibacterium Acnes, causing successive inflammatory manifestations.

Primarily, clinical image of acne includes comedones. Furthermore, there appear papulae, papulocysts, cysts, apostemas, conglobates, and indurations.

Acne is classified according to the scope of affection. For cosmetic purposes it is usually suitable to distinguish between primary acne without inflammatory symptomas, and secondary acne accompanied by inflammatory manifestations, or between superficial and deep acne. Strategy of treatment and prognosis of the disease is determined according to the scope of involvement. There is a rule to begin the treatment as soon as possible, even though extent and clinical symptoms may appear only minor, for further complications and progression of the ailment can only hardly be foreseen.

Therapy should be approached comprehensively, and we should make full use of all diagnostic resources in order to be able to determine individually the best suitable treatment. Therapy requires good cooperation between therapist and patient, strictly observing dietary and hygienic regimes, as well as regular and thorough treating and cleansing of the skin at home.

Rational treatment is aimed at the overwhelming phenomenon. In fact it means to be concentrated on decrease of formation of comedones, suppression of creation of sebum, positive influence on bacterial flora, and quicker healing. Therapy can be either fully external, or externally-internal utilizing antibiotics, hormonal therapy, corticosteroids, retinoids etc. (3, 4, 5)

For a cosmetic care treatment of only superficial forms of acne with no major purulent affections is appropriate. In case of even minor inflammatory finding consulting a physitian-specialist is recommended.

Regular mechanical cleansing of affected spots on the skin holds a significant role in treatment of acne. Expertly thorough and gentle cleansing is the basic prerequisite of successful healing of acne (Editor: incl. among others deep cleansing of skin using the Laser Mask – see Laser Partner Clinixperience No. 33).

Agents utilized in cosmetic practice represent a broad and rich spectrum, however these are not subject matter of this paper. High hygienic care, as well as due choice of these agents should be paid attention to. We recommend using natural agents with no irritating conservatives and perfumes.

Treating deeper forms acne we shall change the strategy complementing standard external treatment by internal medication, based on long-term administration of antibiotics, hormonal preparations, corticoids etc. Regular monitoring of both clinical and laboratory values is necessary in these cases, due to possible side effects of these drugs on the organism.

The main effort in treatment of acne is always to use all possible non-invasive means to treat affected skin and to keep the skin in a good condition. One of these means is phototherapy and therefore I am now going to describe my good experience in using Biolamp.

In the course of twelve months I was treating total 47 patients with problematic acne affected skin, 39 women and 8 men. The youngest member of the group was a girl at the age of 13 years, the eldest was a 47 years old woman. Average age of the group was 26.6 years.

In all the cases I was proceeding in the same method, consisting of cleansing of the skin a using special foments and masks. Furthermore, a strict regimen and skin care products were recommended for home care. Cosmetic agents were pure natural, and were not changed for the whole period of following the patients. Biolamp was applied as a complementary means of treatment.

At the beginning of treatment of mentioned patients Biolamp was used as often as possible. It was applied on duly cleansed skin for the period of 5 minutes, at least 10 to 15 times, for 3 to 5 weeks. Following applications were changed according to results obtained. I consider this number of applications significant, for noticeable improvement occured after 3 to 5 irradiations at the earliest. Interruption for a longer time lead to relapses.

This gusty start has appeared necessary to obtain a good therapeutic effect. Best results were achieved when a patient having purchased a Biolamp applied it at home for about 3 minutes 3 times a day. In all the cases after such a therapy a great improvement was noticed, followed even by a complete heal-up in cases of a minor inflammatory finding.

Tactics of further time applications of Biolamp was directed by local findings. I usually applied Biolamp in once-a-week to once-a-month periods, for the whole time of further monitoring.

Majority of patients had noticed themselves aggravation of acne manifestations in certain periods (before menstruation, after viroses, after taking certain drugs etc.) and therefore made preventive visits during these risky periods in order to take more frequent irradiations with Biolamp in order to avoid, or even totally supress such a deterioration.

Other Cosmetic Applications of Biolamp

During a systematic one-year following of effects of Biolamp on acne-affected impure skin there was also a possibility to monitor its effects on other skin affections, simultaneously occuring in the patients. I am going to mention those with a noticeable positive effect of Biolamp irradiation.

So called seborrhoic eczema appears usually on the forehead at the borderline between skin and hairy part of head, being manifested by exfoliating itchy skin. However, it often affects the whole scalp. Exfoliation is sometimes markedly suggestive of dandruff. Greasy hair and its excessive defluvium are rather a rule. After application of Bioplamp on the face with the light spot reaching up over the forehead the condition improved remarkably. That was why I extended in these patients irradiation with Biolamp to the hairy scalp, too.

However, positive effects were obtained also against excessive hair loss after ilnesses, stress, drugs medication (especially antibiotics) etc.

On atopic eczema application of Biolamp was also a benefit upon standard dermatology treatment, according to professor Novotny`s statement. (2)

After a long term application of Biolamp I noticed significant regeneration changes, especially on older skin. Skin became smoother with wrinkles less noticeable, with a nice healthy look. I also achieved minor scars after secondary healing of acne getting smoothed away on different levels. I use Biolamp as a part of a complex cosmetologic care of aging skin.

Furthermore, very good results on herpes labialis vere recorded. Application of Biolamp for about 5 – 6 minutes twice a day in the very initial stage of the disease caused almost immediate halt of further progression. Herpes dried quickly without recrement.

I also have to mention good results in healing fresh wounds and on early phlogistic processes on the skin, as well as on varicose ulcers.

Conclusion

It is necessary to stress that Biolamp is no panacea. Biolamp should be regarded as an effective supportive treatment complementing standard methods and comprehensive skin care, if applied in suitable frequency and reasonable dosages. However, it should be mentioned that its effect appears after a longer application and thus an immediate success cannot be expected.

In the course of my monitoring I could not use a control group due to obvious reasons, for each patient has the right for all accessible means to be used on him/her in order for the best possible results be achieved in the shortest possible time. Therefore evaluation of results must obviously be subjective, being based not only on my findings, but also on reactions of my patients. The evaluation is unambiguously positive.

In cases of larger and substantial afflictions, deep scars and other diseases of the skin obviously treatment with a laser (LLLT) is recommended. Complementary and simple irradiation with Biolamp also proved successful, since results obtained by laser therapy can be stimulated and confirmed with no further progression of the disease.

Last but not least, using Biolamp is very simple, safe, and not requiring special precautions, meaning a great advantage not only for a cosmetic practice but also for its home use.

Literature

1. Warnke, U. W.: Wie Licht-Energie zu Zell-Energie wird. Arztliche Praxis, Jhg. 97, pp. 3039-3040, 1987.
2. Novotný, F.: Ekzémové onemocn?ní v praxi (Eczematic Diseases in Practice). Grada, Avicenum, 1993.
3. Hegyi, E., Kolibášová, K.: Stratégia výberu lie?ebných metód v terapii acne vulgaris (Strategy of Choosing Therapeutic Methods in Therapy of Acne Vulgaris). 1/4 s. Derm. 67, 1992, Nr. 5, pp. 281-284.
4. Rasochová, E.: Akné – plehlad sú?asných možností liecenia (Acne – a Review of Contemporary Possibilities of Therapy). Slovenský lekár, 1992, pp. 18-21.
5. Poláchová, I.: On Treating Acne Vulgaris with Antiandrogens. Acta Universitatis Palackianae Olomucensis, 1991, Tom. 129 Facultatis Medicae, pp. 133-137.

Dermatol Surg. 2001 Jul;27(7):627-31; discussion 632.

Photorejuvenation for Asian skin by intense pulsed light.

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BACKGROUND: Dermabrasion and deep chemical peeling are used in the treatment of photoaged skin. These ablative procedures are effective enough to produce a certain improvement but have often caused postinflammatory hyperpigmentation among Asian patients. To avoid such adverse effects, a new, nonablative procedure has been sought. OBJECTIVE: To determine the effectiveness of photorejuvenation for Asian skin using intense pulsed light (IPL). The specific parameters used, improvement ratios, side-effects, and downtime required are also discussed. METHODS: Ninety-seven patients were treated for photoaging using IPL. The cutoff filters of 550 nm and 570 nm were utilized for three to six treatments at intervals of 2 to 3 weeks. RESULTS: Treatment results were evaluated and rated by both patients and physicians at the end of the third treatment based on improvement in pigmentation, telangiectasia, and skin texture. A combined rating of "good" or "excellent" was given to more than 90% of the patients for pigmentation, more than 83% for telangiectasia, and more than 65% for skin texture. There were some minor complications in four cases: one had erythema that continued to the next day and three had minor blisters leaving no marks. CONCLUSION: Photorejuvenation using IPL is a completely safe and effective procedure even for Asian skin. It will be increasingly used for skin rejuvenation in the future.

Dermatol Surg. 2000 Sep;26(9):835-42; discussion 843.

Noninvasive rejuvenation of photodamaged skin using serial, full-face intense pulsed light treatments.

Bitter PH.

BACKGROUND: Photodamaged skin is characterized not only by rhytides, but also by epidermal and dermal atrophy, rough skin texture, irregular pigmentation, telangiectasias, laxity, and enlarged pores. There is growing interest in the development of noninvasive methods to treat photodamaged skin. Skin photorejuvenation is the visible improvement of photodamaged skin using a laser or other light source. A noncoherent, broadband, pulsed light source is effective in the treatment of vascular and pigmented lesions of

the skin. This study evaluates the role of intense pulsed light in the rejuvenation of photo aged skin. OBJECTIVE: The purpose of this study was to evaluate and quantify the degree of visible improvement in photodamaged skin following a series of full-face, intense pulsed light treatments. METHODS: Forty-nine subjects with varying degrees of photo-damage were treated with a series of four or more full-face treatments at 3-week intervals using a nonablative, nonlaser intense pulsed visible light source. Fluences varied from 30 to 50 J/cm2. Subject evaluation and skin biopsies were used to assess treatment results. RESULTS: All aspects of photodamage including wrinkling, skin coarseness, irregular pigmentation, pore size, and telangiectasias showed visible improvement in more than 90% of subjects with minimal downtime and no scarring. Eighty-eight percent of subjects were satisfied with the overall results of their treatments. CONCLUSION: Treatment of photodamaged facial skin using a series of full-face treatments with intense pulsed light is a new and effective noninvasive method of skin rejuvenation with minimal risk and no patient downtime.