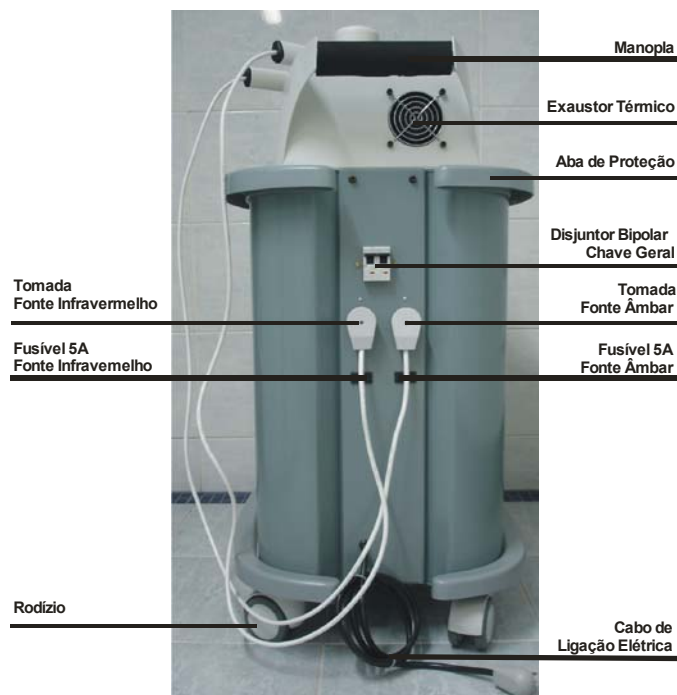
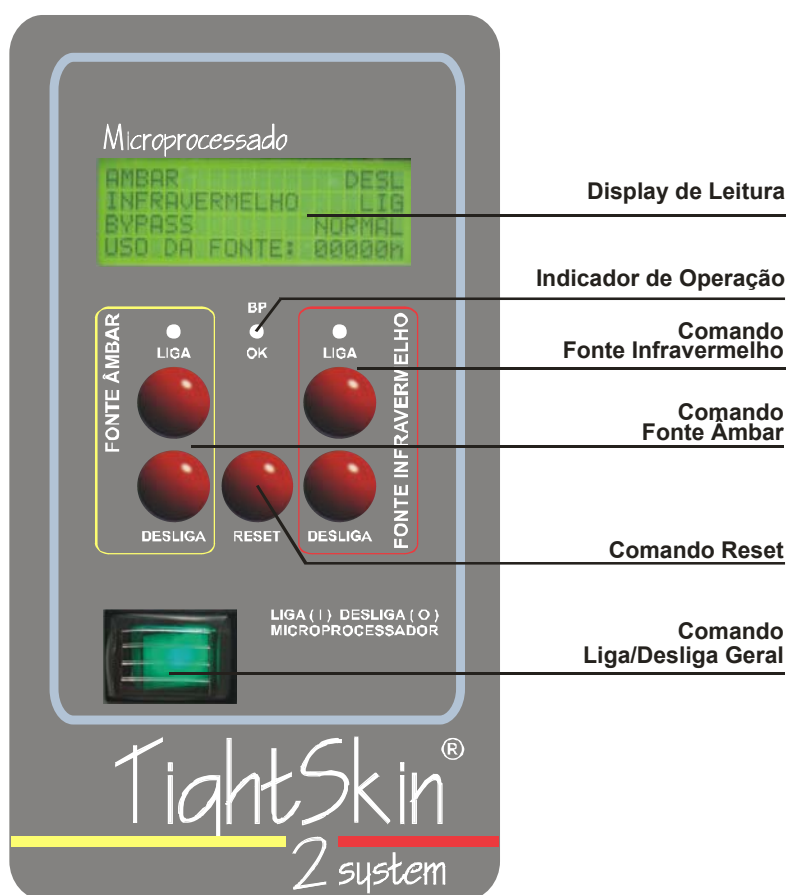


10. Manual de Referência Rápida



- Conectar o cabo de alimentação do aparelho em uma tomada de 220 V;
- **IMPORTANTE:** Conectar as Fontes de **Infravermelho** e **Âmbar** nas tomadas que se encontram na parte traseira do equipamento;
- Acionar o disjuntor/chave-geral localizado na parte traseira do equipamento;
- Acionar o botão **LIGA/DESLIGA** que se encontra no painel frontal, mudando a sua indicação de vermelho para verde.

Verificação do display do controlador



- Ao ligar o aparelho, o display apresentará as seguintes indicações:



Isso significa que as fontes âmbar e infravermelho estão desligadas e que o equipamento (BYPASS) está em condições normais de operação. Quando no display aparecer a indicação **BYPASS ATIVO**, deve-se desligar o equipamento, aguardar 5 minutos e religá-lo. Se a indicação persistir, entre em contato com a assistência técnica.

A indicação **USO DA FONTE** é relacionada ao número de horas que o par de fontes tem de uso. Esse número é alterado gradativamente conforme se tem o uso das fontes independentemente.

Durante a sessão

- Ao iniciar uma sessão, acionar o botão **LIGA** da **Fonte Âmbar**. No Display de leitura, aparecerá – Emissor Âmbar – **LIG**. Ao concluir, acionar o botão **DESLIGA** no mesmo setor, voltando o display para a condição **DESL**.
- Em seguida, para dar continuidade à aplicação, acionar o botão **LIGA** da **Fonte de Infravermelho**. No Display de leitura, aparecerá – Fonte Infravermelho – **LIG**. Ao concluir, acionar o botão **DESLIGA** no mesmo setor, voltando o display para a condição **DESL**.

Sinais sonoros de auxílio na contagem de tempo soarão a cada 65 segundos para cada uma das fontes a partir do seu início de funcionamento. Esses sinais, que são distintos para cada uma das fontes, servem para que o operador e o paciente tenham como controlar o tempo de aplicação de cada uma das fontes, conforme prescrito pelo especialista responsável.

Fonte Âmbar – 2 bips a cada 65 segundos

Fonte de Infravermelho –1 bip a cada 65 segundos

Parada e Desligamento

- **IMPORTANTE: Em caso de pânico ou emergência, pressionar o botão vermelho que se encontra no painel do equipamento, que desligará completamente o aparelho. Para reativar o aparelho, girar o botão no sentido horário.**
- Ao final do dia, recomenda-se o desligamento do aparelho em 2 (dois) pontos: no botão **LIGA/DESLIGA** no painel frontal e no disjuntor geral que se encontra na parte traseira do aparelho.

Reset

- O botão **Reset** deve ser utilizado somente após a troca das Fontes de Infravermelho e Âmbar, para que a indicação das horas de utilização das fontes possa voltar a zero, e assim se inicie nova contagem de horas de funcionamento das fontes.
- Para zerar as horas de uso das fontes, basta pressionar o botão reset e escolher a opção sim pressionando o botão liga da fonte Âmbar.
- As fontes de Infravermelho e Âmbar duram cerca de 4000 horas, após o que deverão ser substituídas. (verificar o contador de horas no display do painel de operações – após a

substituição zera o contador – ver na seção “Verificação do display do controlador” – sempre substitua as duas fontes).

- Assistência técnica e reposição das fontes poderá ser solicitada através do telefone 55 11 3086 3058 ou pelo site **www.tightskin.com.br**
- Assistência clínica poderá ser solicitada através do telefone 55 11 3086 3058 ou pelo site **www.tightskin.com.br**
- Assistência dermatológica poderá ser solicitada através do telefone 55 11 3086 3058 ou pelo site **www.tightskin.com.br**

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Laser skin rejuvenation
Pubmed resumos

ANDERSON, Richard Rox. *Nonablative Dermal Remodeling*. In: FITZPATRICK. **Dermatology in General Medicine**.

Enthusiasm for the long-term benefits of laser skin surfacing has been tempered by short-term adverse effects including pain, prolonged downtime, persistent erythema, postinflammatory hyperpigmentation, and the need for diligent and time-consuming postoperative wound care. Furthermore, permanent hypopigmentation or scarring, while rare, remain potentially disfiguring complications. To address these challenges, recent attention has focused on various lasers and IPLs capable of inducing selective dermal injury without epidermal ablation. The physical principles behind such nonablative dermal remodeling or “subsurfacing” are not new, but the actual efficacy and potential biological response mechanisms involved have yet to be elucidated in detail. It is clear that photothermal injury is the stimulus. Injury to vascular endothelial cells and fibroblasts may initiate a dermal remodeling process through the induction and release of soluble factors involved in normal wound healing such as collagenase, type I collagen and platelet derived growth factor.[60](#),[61](#) Ideally, thermal injury is confined to the dermis, thereby circumventing the prolonged wound healing, erythema and pain associated with ablative modalities such as laser skin resurfacing (LSR).

The first report of nonablative dermal remodeling stems from the anecdotal observation that pulsed dye laser treatment of facial telangiectases is associated with subtle softening of rhytides in the treated areas. Pulsed dye lasers have also been used to treat atrophic striae distensae with modest success, suggesting that selective injury of dermal vessels

P.2512

may influence dermal collagen remodeling.⁶² Encouraged by these preliminary observations, Zelickson et al. used a pulsed dye laser (585 nm; 450 msec; 7- or 10-mm spot size with 10 to 15 percent overlap; 3.0 to 6.5 J/cm²) to treat 20 subjects with photodamaged facial skin.⁶³ They observed subtle PDL-induced improvement in 9 of 10 patients with moderate and 4 of 10 patients with severe sun-induced rhytides. Representative skin biopsies taken 6 and 12 weeks after treatment showed that areas of solar elastosis had been replaced by superficial, thickened, grenz zones of organized collagen. These features, combined with the findings of increased dermal mucin and active fibroblasts, were all suggestive of dermal collagen remodeling. Interestingly, lower fluences may be more effective. The FDA has cleared a 0.3-msec pulsed dye laser operating at low fluence without skin cooling for this indication; comparative studies are lacking.

More recently, lasers and IPLs capable of inducing nonablative dermal remodeling with little or no associated purpura have been developed and marketed specifically for this indication. The lasers, including the 1320-nm Nd:YAG, 1540-nm erbium glass, and 1440-nm diode lasers, all feature penetrating wavelengths absorbed by water, with essentially zero melanin or hemoglobin absorption. Epidermal sparing is achieved via a combination of approaches including contact or cryogen spray cooling and intradermal beam focusing. Nelson et al. first reported using a 1320-nm Nd:YAG laser in combination with cryogen spray cooling to achieve selective dermal injury in porcine dermis, using laser fluences of up to 36 J/cm². Similar fluences without cryogen spray

cooling caused epidermal blistering and necrosis.⁶⁴ Subsequently, Menaker et al. used a cryogen spray-cooled 1320-nm Nd:YAG laser to treat periocular rhytides and postauricular skin in 10 healthy volunteers (three treatments, every 2 weeks; parameters: 1.32 μm; 20-msec macropulses; 32 J/cm²; 5-mm spot size; 33 percent overlap; DCD (or dynamic cooling device) 20 ms spray time/10 ms delay time).⁶⁵ They assessed rhytid severity, pigment alterations, scarring and patient discomfort at 1 and 3 months posttreatment, noting minimal rhytid improvement in 4 of 10 patients. Four of 10 postauricular skin biopsies (taken 1 month after treatment) showed a statistically insignificant increase in dermal collagen. Of note, four patients developed posttreatment hyperpigmentation, and three patients developed periocular blistering followed by pitted scarring.⁶⁵ A larger study by Kelly et al. found statistically significant improvement only in subjects

with severe periorbital rhytides, assessed at 6 months follow-up. They also noted blistering when the surface temperature of treated skin exceeded 50°C (122°F), with pinpoint scarring occurring at four sites in two blistered subjects (2.8 percent).[66](#)

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61. Zelickson B, Kist D: Pulsed dye laser and photoderm treatment stimulates production of type I collagen and collagenase transcripts in papillary dermis fibroblasts [abstract]. Lasers Surg Med 13:33, 2001⁺

62. McDaniel D et al: Treatment of stretch marks with the 585 nm flashlamp-pumped pulsed dye laser. Dermatol Surg 22:332, 1996⁺

[Bibliographic Links](#)

63. Zelickson B et al: Pulsed dye laser therapy for sun damaged skin. Lasers Surg Med 25:229, 1999⁺

[Bibliographic Links](#)

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P.2515

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[Bibliographic Links](#)

66. Kelly K et al: Cryogen spray cooling in combination with nonablative laser treatment of facial rhytides. Arch Dermatol 135:691, 1999⁺

Lee S. Fitzpatrick RE.	
Institution	Albert Einstein College of Medicine, Bronx, New York, USA. cameron@postharvard.edu
Title	Review of photorejuvenation: devices, cosmeceuticals, or both?. [Review] [65 refs]
Source	Dermatologic Surgery. 31(9 Pt 2):1166-78; discussion 1178, 2005 Sep.

Both the public and the medical profession have placed a lot of attention on reversal of signs of **aging** and photodamage, resulting in numerous cosmeceutical products and nonablative laser techniques designed to achieve these results. OBJECTIVE: The purpose of this report is to briefly review both the cosmeceutical products and nonablative laser techniques that appear to be most promising based on published studies. After this review, recommendations for potential enhancement of benefits by combining cosmeceuticals and laser treatments will be explored. RESULTS: Pulsed dye **lasers** targeting microvessels, intense pulsed light targeting both melanin and microvessels, and midinfrared **lasers** targeting dermal water and collagen all appear to have some ability to improve **skin** texture, color, and wrinkling. Retinoids, vitamin C, alpha-hydroxy acids, and topical growth factors may also stimulate repair mechanisms that result in similar improvements in photodamaged **skin**. CONCLUSION: Although supported only by theoretic considerations and anecdotal reports, it seems logical that the concurrent use of appropriate cosmeceuticals with nonablative laser photorejuvenation should result in enhanced benefits

Concomitant treatment of psoriasis of the hands and feet with pulsed dye laser and topical calcipotriol, salicylic acid, or both: a prospective open study in 41 patients.

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BACKGROUND: Psoriasis of the hands and feet is a chronic disease which is often resistant to the usual topical therapies. It has considerable morbidity and seriously affects the quality of life of patients. OBJECTIVE: We sought to prospectively evaluate the efficacy and safety of pulsed dye laser (PDL) treatment of psoriasis of the hands and feet. METHODS: In all, 41 patients with therapy-resistant psoriasis of the hands and feet were treated once every 4 to 6 weeks with PDL at 585-nm wavelength, 450-microsecond pulse duration, 7-mm spot diameter, and 5- to 6.5-J/cm² fluence. Calcipotriol ointment and salicylic acid 5% to 10% ointment were used as keratolytic agents. Treatment efficacy was evaluated by blinded

comparison of photographs of the lesions taken before and after PDL treatment in each patient. RESULTS: A good to very good improvement in the lesions was observed in 76% of the patients after treatment. An average duration of remission was 11 months. Side effects were transient purpura, moderate discomfort during the treatment, transient hyperpigmentation or hypopigmentation, and incidental transient crustae. LIMITATIONS: This was an open prospective study with a limited number of patients who were concomitantly treated with calcipotriol and salicylic acid ointment. Patients with photointolerance, on medication with phototoxic or photoallergic drugs, and with widespread psoriasis were excluded. CONCLUSIONS: Concomitant treatment with PDL and topical calcipotriol, salicylic acid, or both was a satisfactory modality for treating psoriasis of the hands and feet. There was a subjective improvement in the symptoms and quality of life in all patients.

[Br J Dermatol.](#) 2005 Dec;153 Suppl 2:57-[Related](#) [Articles,](#)
62. [Links](#)

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 Am Acad Dermatol.](#) 2005 Nov;53(5):775-82.[Related Articles.](#)
Epub 2005 Sep 23. [Links](#)



Dermal matrix remodeling after nonablative laser therapy.

Orringer JS, Voorhees JJ, Hamilton T, Hammerberg C, Kang S, Johnson TM, Karimipour DJ, Fisher G.

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OBJECTIVE: Nonablative laser therapy is widely practiced for cutaneous rejuvenation. We sought to quantify dermal molecular changes after exposure of photodamaged skin to nonablative laser energy. METHODS: Nonablative laser therapy of forearm

skin using either a 585-nm wavelength pulsed dye laser or a 1320-nm wavelength neodymium:yttrium-aluminum-garnet laser was performed. Serial biopsy specimens were obtained at baseline and various times after treatment. RESULTS: Statistically significant increases in type I procollagen messenger RNA expression occurred after exposure of photodamaged skin to each laser. Induction was 47% (P < .05) and 84% (P < .05) above baseline levels 1 week after laser therapy among those treated with the pulsed dye and neodymium:yttrium-aluminum-garnet lasers, respectively. Substantial induction of type III procollagen, various matrix metalloproteinases, and primary cytokines was also demonstrated. Responses with respect to all molecules studied were highly variable. LIMITATIONS: This study addresses molecular changes after a single laser exposure whereas clinically, serial treatments are often provided. CONCLUSIONS: Nonablative laser therapy may result in quantifiable alterations in molecules associated with remodeling of the dermal matrix, although responses vary greatly among patients.

[Dermatol Surg.](#) 2005 Sep;31(9 Pt 2):1199-[Related Articles.](#)
205. [Links](#)

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.

[Lasers Surg Med.](#) 2005 Jul;37(1):2-8.

[Related Articles.](#)

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Our approach to non-ablative treatment of photoaging.

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Department of Dermatology, Johns Hopkins U School of Medicine, and MD Laser Skin and Vein Institute, 54 Scott Adam Road, Baltimore, MD 21030, USA.

BACKGROUND AND OBJECTIVES: Many laser, light and energy emitting devices are utilized for skin rejuvenation. **STUDY DESIGN/MATERIALS AND METHODS:** The clinical approach to multiple problems of photoaging are discussed and an algorithm for approach by problem is presented. **RESULTS:** Clinical use of various modalities such as LED photomodulation, intense pulsed light, pulsed dye laser, KTP laser, radiofrequency and fractional resurfacing are presented with successful parameters, developed over several years, utilized on a daily basis in a busy cosmetic dermatology clinic. **CONCLUSIONS:** Significant improvement in the appearance of signs and symptoms of photoaging, including telangiectasias, mottled pigmentation, irregular surface texture, wrinkling and skin sagging can achieved by relatively non-invasive means. (c) 2005 Wiley-Liss, Inc.

[Photodermatol Photoimmunol Photomed.](#) 2005 [Related](#) [Articles,](#)
Aug;21(4):204-9. [Links](#)



Biophysical, histological and biochemical changes after non-ablative treatments with the 595 and 1320 nm lasers: a comparative study.

[Dang Y](#), [Ren Q](#), [Hoecker S](#), [Liu H](#), [Ma J](#), [Zhang J](#).

Institute for Laser Medicine & Biophotonics, Shanghai Jiaotong University, Shanghai, China.

BACKGROUND/PURPOSE: The objective was to compare the efficiencies of the 595 nm pulsed dye and the 1320 nm Nd : YAG laser non-ablative rejuvenation. **METHODS:** KM mice were irradiated with the 595 nm pulsed dye and the 1320 nm Nd : YAG lasers. Histological changes were evaluated immediately, 1, 7, 21, 30 and 60 days after the two laser treatments. Skin hydration and hydroxyproline content were measured to quantify the degree of improvement of the skin's water-holding capacity and the rate of hydroxyproline synthesis. **RESULTS:** Although not statistically significant, the 1320 nm Nd : YAG laser treatment induced 9.7% greater improvement of skin hydration than the 595 nm laser while the 595 nm pulsed dye laser treatment led to a thicker dermis and 8.7% greater increase of hydroxyproline than the 1320 nm laser. More than 50% increase of collagen type I was observed in 75% of 595 nm laser-treated sites and 42% of 1320 nm laser-treated sites, and more than 25% increase of collagen type III was observed in 75% of 595 nm laser-treated sites and 50% of 1320 nm laser-treated sites. The 595 nm laser treatment was better in increasing the amount of collagen fibers, especially collagen type I ($P < 0.05$). **CONCLUSION:** Our results demonstrated that the 595 nm laser appeared to be more effective in increasing new collagen formation, while the 1320 nm laser was superior to the 595 nm laser in improving the skin's water-holding capacity.

[Photomed Laser Surg.](#) 2005 Apr;23(2):161-[Related](#) [Articles,](#)

6.

[Links](#)

Mary Ann Liebert,

Low-level laser irradiation promotes proliferation and differentiation of human osteoblasts in vitro.

[Stein A](#), [Benayahu D](#), [Maltz L](#), [Oron U](#).

Department of Zoology, The George S. Wise Faculty of Life Sciences, Tel-Aviv University, Tel-Aviv, Israel.

OBJECTIVES: The aim of the present study was to investigate the effect of low-level laser irradiation on proliferation and differentiation of a human osteoblast cell line. **BACKGROUND DATA:** It was previously found that low-level laser therapy (LLLT) enhances bone repair in experimental models. **MATERIALS AND METHODS:** Cultured osteoblast cells were irradiated using He-Ne laser irradiation (632 nm; 10 mW power output). On the second and third day after seeding the osteoblasts were exposed to laser irradiation. The effect of irradiation on osteoblast proliferation was quantified by cell count and colorimetric MTT (dimethylthiazol tetrazolium bromide) assay 24 and 48 h after second irradiation. **RESULTS:** A significant 31-58% increase in cell survival (MTT assay) and higher cell count in the once-irradiated as compared to nonirradiated cells was monitored. Differentiation and maturation of the cells was followed by osteogenic markers: alkaline phosphatase (ALP), osteopontin (OP), and bone sialoprotein (BSP). A two-fold enhancement of ALP activity and expression of OP and BSP was much higher in the irradiated cells as compared to non-irradiated osteoblasts. **CONCLUSION:** We conclude that LLLT promotes proliferation and maturation of human osteoblasts in vitro. These results may have clinical implications.

[Dermatol Surg.](#) 2005 Jan;31(1):1-9.

[Related Articles,](#)

[Links](#)

Multicenter study of the safety and efficacy of a 585 nm pulsed-dye laser for the nonablative treatment of facial rhytides.

Hsu TS, Zelickson B, Dover JS, Kilmer S, Burns J, Hruza G,
Brown DB, Bernstein EF.

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OBJECTIVE: The objective of this study was to assess the safety and efficacy of a 585 nm flashlamp pulsed-dye laser for the nonablative treatment of facial rhytides. **METHODS:** A multicenter prospective randomized controlled study on 58 volunteers was performed. A split-face approach was adopted, with one periorbital region acting as a control and the other receiving either one or two treatments. Patients were photographed and imaged three-dimensionally before and after treatment. Histologic sections were analyzed. **RESULTS:** Three-dimensional topographic evaluation showed improvements of 9.8% ($p = .0022$) and 15% ($p = .0029$) in surface roughness for single and double treatments, respectively. Histology revealed an increase in type I collagen messenger ribonucleic acid expression, type III procollagen, chondroitin sulfate, and grenz zone thickness. Two treatments resulted in greater improvement than one treatment. **CONCLUSION:** Clinical improvement was achieved following a single treatment. Further improvement was observed following a second treatment. The subjective evaluation of clinical improvement was consistent with both histologic and topographic quantitative measurements.

[Dermatol Surg.](#) 2003 Oct;29(10):997-9; [Related Articles,](#)
discussion 999-1000. [Links](#)



Collagen remodeling after 585-nm pulsed dye laser irradiation: an ultrasonographic analysis.

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Laser and Dermatologic Surgery Center, Washington University College of Arts and Sciences, St. Louis, Missouri 63017, USA.

BACKGROUND AND OBJECTIVES: Nonablative dermal remodeling is an evolving technology that has generated great interest among both laser surgeons and patients. Evidence indicates that dermal collagen formation is the key mechanism of action for the nonablative techniques. We studied, with ultrasound, new collagen formation after nonablative laser irradiation. **METHODS:** Ten patients with facial rhytids underwent a single treatment with a 585-nm pulsed dye laser. The patients were all female, ranging in age from 47 to 67, and were Fitzpatrick skin types I-III. Laser parameters were as follows: an energy fluence of 2.4 to 3.0 J/cm², a pulse duration of 350 microsec, and a spot size of 5 mm with no overlap. Ultrasonographic assessments of dermal collagen were taken at baseline and at 30 and 90 days after treatment. **RESULTS:** Ultrasonography demonstrated an increase in dermal collagen after a single treatment with the 585-nm pulsed dye laser. The greatest degree of neocollagenesis occurred periorcularly. **CONCLUSION:** A single treatment with a 585-nm pulsed dye laser appears to increase dermal collagen. This increase in dermal collagen can be assessed with noninvasive cutaneous ultrasound.

[Dermatol Surg.](#) 2004 Oct;30(10):1292-8. [Related Articles,](#) [Links](#)



Combined nonablative skin rejuvenation with the 595- and 1450-nm lasers.

[Trelles MA](#), [Allones I](#), [Levy JL](#), [Calderhead RG](#), [Moreno-Arias GA](#).

Instituto Medico Vilafortuny, Antoni de Gimbernat Foundation,
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BACKGROUND: Histologic findings are not echoed in the visible effect in the epidermis after skin rejuvenation. **SUBJECTS AND METHODS:** Ten women (Group A) received five treatment sessions with a 595-nm pulsed dye laser immediately followed by a 1450-nm diode laser. Two other demographically similar

groups of 10 patients each, Groups B and C, were treated with the 595-nm pulsed dye laser or the 1450-nm diode laser alone, respectively. RESULTS: Good dermal collagen remodeling was observed in Group A. Overall better and faster results were seen in Group A. The 6-month clinical outcome was best in Group A followed by Group C and Group B. CONCLUSIONS: Wavelengths of 595 plus 1450 nm for skin rejuvenation produced good results with much higher patient satisfaction than those obtained with the 595- or 1450-nm wavelengths alone.

[Dermatol Surg.](#) 2004 Jul;30(7):979-82. [Related Articles,](#) [Links](#)



Clinical, histologic, and ultrastructural changes after nonablative treatment with a 595-nm flashlamp-pumped pulsed dye laser: comparison of varying settings.

[Goldberg DJ](#), [Sarradet D](#), [Hussain M](#), [Krishtul A](#), [Phelps R](#).

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BACKGROUND: The flashlamp-pulsed dye laser has been used for nonablative dermal remodeling. OBJECTIVE: We conducted a study analyzing the clinical, histologic, and electron microscopic findings after treatment with different flashlamp-pulsed dye laser settings in the same subject. RESULTS: Most subjects showed mild to moderate improvement after flashlamp-pulsed dye laser treatment. There was no statistical difference in the clinical, histologic, or electron microscopic findings with a variety of laser treatment settings. CONCLUSION: Nonablative dermal remodeling can be accomplished with not only a variety of different technologies, but also with the same laser using markedly different settings.

[Dermatol Surg.](#) 2003 Dec;29(12):1192-5;[Related Articles,](#)

discussion 1195.

[Links](#)



A pilot study on the treatment of facial rhytids using nonablative 585-nm pulsed dye and 532-nm Nd:YAG lasers.

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BACKGROUND: There have been reports of successfully using the pulsed dye laser and long-pulse Nd:YAG laser to improve skin wrinkles. **OBJECTIVE:** To evaluate the efficacy of these lasers in the treatment of moderate to severe wrinkles. **METHODS:** Seven subjects had one side of their periorbital wrinkles treated with pulsed dye laser (585 nm, 0.45 ms, 2.5 J/cm², single-pass 10% overlap, three treatments at 6 weeks apart). The second part of the study involved using the long-pulse Nd:YAG laser (532 nm, 2 ms, 7.0 J/cm² with cooling, three laser passes, three treatments at 6 weeks apart) to treat the contralateral wrinkles in five subjects. Pretreatment and posttreatment photographs were taken, and blinded assessors were asked to choose the better of the two unlabeled photographs. **RESULTS:** Assessors found that two of the seven subjects had a better posttreatment photograph in the pulsed dye laser-treated group. Three of five subjects had a better posttreatment photograph in the long-pulse Nd:YAG laser-treated group. None of the subjects reported any subjective improvements. **CONCLUSION:** Neither the pulsed dye laser nor the long-pulse Nd:YAG laser at the previously mentioned parameters produced any improvement in moderate to severe facial wrinkles.

[Dermatol Surg.](#) 2002 Oct;28(10):942-5;[Related Articles,](#)
discussion 945. [Links](#)



Selective nonablative treatment of acne scarring with 585 nm flashlamp pulsed dye laser.

[Patel](#) [N](#), [Clement](#) [M](#).

Department of Medicine/Dermatology, UCLA School of Medicine, Los Angeles, California, USA.

BACKGROUND: Selective nonablative wrinkle reduction with low-fluence pulsed dye laser has been shown to provide cosmetic benefits by stimulating the production of dermal collagen. The clinical efficacy for improving the appearance of acne scarring using selective nonablative laser treatments has yet to be established. **OBJECTIVE:** To evaluate the improvement in the appearance and topography of acne scarring following application of a 585 nm pulsed dye laser with a temporal profile and pulse duration designed specifically to target healthy microvasculature in the dermis. **METHODS:** Ten patients (mean age 34.8 years) with Fitzpatrick skin types I-IV and shallow to moderately deep, saucerized facial acne scars were enrolled in a prospective trial to receive a single laser treatment of both cheeks. Patients were evaluated at 30, 60, 90, and 120 days to assess the degree of clinical improvement. The evaluation process included assessment of pre- and posttreatment photography by two independent observers, patient assessment surveys, and surface profilometry using silicone imprints in order to quantify the degree of clinical improvement. **RESULTS:** All 10 patients reported visible cosmetic improvement in the treated areas while surface profilometry showed that, on average, the depth of the acne scars was reduced by 47.8%. No adverse effects of this treatment were reported. **CONCLUSION:** The treatment of acne scars utilizing a 585 nm pulsed dye laser with a temporal profile and pulse duration designed specifically to target healthy microvasculature in the dermis may be a safe and effective noninvasive alternative for a natural result.

[J Cosmet Laser Ther.](#)

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2001 Sep;3(3):129-36.

MetaPress

A double-blind, side-by-side comparison study of low fluence long pulse dye laser to coolant treatment for wrinkling of the cheeks.

Rostan E, Bowes LE, Iyer S, Fitzpatrick RE.

Dermatology Associates of San Diego County, CA, USA.

BACKGROUND: Nonablative laser resurfacing with various lasers and light sources can improve skin texture and fine lines. The 595 nm pulsed dye laser has been reported to improve rhytides through nonablative mechanisms, minimizing the side effects and recovery period associated with traditional ablative resurfacing techniques. **OBJECTIVE:** The purpose of this study was to investigate the efficacy of the long pulse flashlamp pumped pulsed dye laser (LPDL) in improving rhytides and stimulating collagen synthesis and dermal remodeling. **METHODS:** The cheeks of 15 women with moderate to severe photoaging were treated on one side with a series of four monthly LPDL treatments, while the contralateral cheek was treated with cryogen coolant only. Clinical grading was performed at monthly intervals for up to 3 months after the fourth LPDL treatment. Skin biopsy before treatment and at 4-6 weeks was also performed for histologic evaluation and staining for type I procollagen. **RESULTS:** Eleven of 15 patients demonstrated improvement of the laser-treated cheek while only three of 15 patients the demonstrated improvement on the cryogen-treated cheek. A statistically significant ($p = 0.0035$) improvement in clinical grading of photodamage was noted in the treated side versus the control. In those patients who improved with LPDL treatment, an improvement of 18.1% in the mean pre- and post-treatment clinical grading scores was observed. Histologic evaluation demonstrated an increase in activated fibroblasts with positive procollagen staining on the LPDL-treated cheek. **CONCLUSION:** The 595 nm LPDL may be used in the treatment of moderate to severe wrinkles. A mild improvement may be expected with minimal to no side effects.

[Dermatol Ther.](#) 2005 May-Jun;18(3):191-208. [Related Articles,](#) [Links](#)



Visible light treatment of photoaging.

[Dierickx CC,](#) [Anderson RR.](#)

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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 Surg Med.](#) 2005 Apr;36(4):270-80. [Related Articles,](#) [Links](#)



Intradermally focused infrared laser pulses: thermal effects at defined tissue depths.

[Khan MH,](#) [Sink RK,](#) [Manstein D,](#) [Eimerl D,](#) [Anderson RR.](#)

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BACKGROUND AND OBJECTIVES: To produce controlled, spatially confined thermal effects in dermis. **STUDY DESIGNS/MATERIALS AND METHODS:** A 1 W, 1,500 nm fiber-coupled diode laser was focused with a high numerical aperture (NA) objective to achieve a tight optical focus within the upper dermis of skin held in contact with a glass window. The delivery optics was moved using a computer-controlled translator to

generate an array of individual exposure spots. Fresh human facial skin samples were exposed to a range of pulse energies at specific focal depths, and to a range of focal depths at constant pulse energy. Cellular damage was evaluated in frozen sections using nitro-blue tetrazolium chloride (NBTC), a lactate dehydrogenase (LDH) activity stain. Loss of birefringence due to thermal denaturation of collagen was evaluated using cross-polarized light microscopy. The extent of focal thermal injury was compared with a model for photon migration (Monte Carlo Simulation), heat diffusion, and protein denaturation (Arrhenius model). RESULTS: Arrays of confined, microscopic intradermal foci of thermal injury were created. At high NA, epidermal damage was avoided without active cooling. Foci of thermal injury were typically 50-150 microm in diameter, elliptical, and at controllable depths from 0 to 550 microm. Both LDH inactivation and extracellular matrix denaturation were achieved. CONCLUSION: Spatially confined foci of thermal effects can be achieved by focusing a low-power infrared laser into skin. Size, depth, and density of microscopic, thermal damage foci may be arbitrarily controlled while sparing surrounding tissue. This may offer a new approach for nonablative laser therapy of dermal disorders. Copyright 2005 Wiley-Liss, Inc.

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Mary Ann Liebert,

**Temperature-controlled 830-nm low-level laser therapy of
experimental pressure ulcers.**

[Lanzafame RJ](#), [Stadler I](#), [Coleman J](#), [Haerum B](#), [Oskoui P](#),
[Whittaker M](#), [Zhang RY](#).

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OBJECTIVE: This study was performed to evaluate the effectiveness of near-infrared low-level laser therapy (LLLT) treatment of pressure ulcers under temperature-controlled

conditions. BACKGROUND DATA: Little information is available regarding the potential thermal effects of near-infrared photo-radiation during LLLT. METHODS: Pressure ulcers were created in C57BL mice by placing the dorsal skin between two round ceramic magnetic plates (12.0 x 5.0 mm, 2.4 g, 1 K Gauss) for three 12-h cycles. Animals were divided into three groups (n = 9) for daily light therapy (830 nm, CW, 5.0 J/cm²) on days 3-13 post ulceration in both groups A and B. A special heat-exchange device was applied in Group B to maintain a constant temperature at the skin surface (30 degrees C). Group C served as controls, with irradiation at 5.0 J/cm² using an incandescent light source. Temperature of the skin surface, and temperature alterations during treatment were monitored. The wound area was measured and the rate and time to complete healing were noted. RESULTS: The maximum temperature change during therapy was 2.0 +/- 0.64 degrees C in Group A, 0.2 +/- 0.2 degrees C in Group B and 3.54 degrees C +/- 0.72 in Group C. Complete wound closure occurred at 18 +/- 4 days in Groups A and B and 25 +/- 6 days in Group C (p <= 0.05). The percentage of the wound closure at 14 days was 75.4 +/- 7.2% and 77.7 +/- 5.6% for Groups A and B, respectively (NS differences). However, animals in Group C demonstrated a wound closure of 36.3 +/- 4.8% (p < 0.05). CONCLUSIONS: These results demonstrate that the salutary effects of LLLT on wound healing are temperature independent in this model.

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Partial ablation of porcine stratum corneum by argon-fluoride excimer laser to enhance transdermal drug permeability.

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To enhance skin permeability to medicine, the argon-fluoride excimer laser (ArF laser) was used to partially ablate the stratum corneum. Skin permeability to dextran (20 kDa) was studied in the Yucatan micro-pig skin in vitro. The cumulative amount of dextran permeating across the full-thickness skin was not detected for 30 h in the unirradiated skin; we obtained up to 90.5 microg/cm² in laser-irradiated skin. In the case where the total laser energy was kept constant at 7.1 J/cm², permeability was mainly influenced by laser fluence rather than laser pulses. Many granular structures of about 2 microm were found on the stratum corneum surface of ablated skin. Size and density of these structures were changed according to irradiation conditions. Skin permeability may be estimated by these structural changes. Our partial stratum corneum ablation by ArF laser could be suitable for transdermal drug delivery.

[Int J Dermatol.](#) 2003 Sep;42(9):738-40.

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

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BACKGROUND: Super Lizer trade mark is a linear polarized light instrument, which has been used with good effect in orthopedics and anesthesiology to treat arthralgia and neuralgia with a high output of infrared radiation. **AIM:** To test Super Lizer trade mark 's efficacy for the treatment of alopecia areata. **METHODS:** Fifteen patients over 18 years of age, diagnosed with alopecia areata and displaying symptoms of patchy hair loss, were topically irradiated with infrared radiation using the Super Lizer trade mark. The patients were irradiated intermittently for an interval of 3 min once every week or every 2 weeks. **RESULTS:**

Seven of 15 (46.7%) of the irradiated areas showed hair regrowth 1.6 months earlier than the nonirradiated areas (chi2 official approval, P = 0.003). With regard to adverse effects caused by Super Lizer trade mark treatment, only one patient complained of a sensation of heat in the irradiated area. CONCLUSIONS: These findings suggest that Super Lizer trade mark, with its noninvasive properties, is a useful apparatus for the treatment of mild forms of alopecia areata.

[Photodermatol Photoimmunol Photomed.](#) 2003;19(4):203-12. [Related Articles, Links](#)



Immunomodulatory effects of low-intensity near-infrared laser irradiation on contact hypersensitivity reaction.

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BACKGROUND/PURPOSE: Contact hypersensitivity (CHS) reaction is a useful model for studying the skin immune system and inflammatory reactions in the skin. In this study, an experimental model of CHS reaction was employed to assess immunomodulatory effects of near-infrared (near-IR) low-intensity laser (LIL) irradiation, which is used as adjuvant therapy in dermatology, physical medicine, rheumatology, etc., because of its declared anti-inflammatory, biostimulative and analgesic effects. **METHODS:** The effects of near-IR LIL irradiation ($\lambda=904$ nm, irradiance 60 mW/cm², fluence 3.6 J/cm²) on CHS reaction to 1-chloro-2,4-dinitrochlorobenzene (DNCB) in Albino Oxford rats were examined by irradiating experimental groups of animals before the induction phase of CHS reaction, while nonirradiated animals and animals that received vehicle instead of hapten served as controls. Ear-swelling assay, histopathological examination of H&E preparations of ear skin, computer-assisted image analysis of dermal infiltrate, ear skin organ culture with the determination of cutaneous production of tumour necrosis factor-alpha (by ELISA assay) and nitric oxide

(by Griess' assay) were used for measuring the effects of LIL in the elicitation phase of CHS reaction. Cellularity, dendritic cell content, flow cytometry and proliferation assays (spontaneous and in the presence of IL-2 and concanavalin A) of the draining lymph node cells (DLNC) were performed for the assessment of LIL irradiation effects in the induction phase. RESULTS: In the irradiated group of animals, ear swelling was significantly diminished compared to control animals (101 \pm 11.5% vs. 58 \pm 11.6%, $P < 0.01$). This was accompanied by a highly significant decrease in the density of dermal infiltrate (22 \pm 0.81 vs. 14.2 \pm 1.75 cells per unit area, $P < 0.01$) and a significant decrease in nitrite levels in the medium conditioned by organ-cultured ear skin (17.63 \pm 1.91 vs. 3.16 \pm 1.69 μ M NaNO₂; $P < 0.01$), while TNF- α concentration was not changed. Cellularity and dendritic cell content in DLNC population, as well as the expression of TCR- α , CD4, CD8 and CD25, were not changed between irradiated and nonirradiated animals. Proliferation rates of DLNC cultured for 72 h were significantly lower in irradiated animals (17.3 \pm 4.1 vs. 13.9 \pm 0.9 $\times 10^3$ c.p.m.; $P < 0.01$). In cultures of DLNC with added rIL-2 or 0.5 μ g/ml of concanavalin A, proliferation rates were also significantly decreased in irradiated animals (34.7 \pm 3.5 vs. 31.2 \pm 2. c.p.m. in IL-2-supplemented culture, $P < 0.01$; 70.9 \pm 6.4 vs. 58.3 \pm 9.1 $\times 10^3$ c.p.m. in concanavalin A-supplemented culture, $P < 0.01$). However, this effect was overcome in the presence of the higher concentration of concanavalin A (2.5 μ g/ml) (nonirradiated 38.7 \pm 3.1, irradiated 123.1 \pm 7.3 $\times 10^3$ c.p.m., $P < 0.01$). CONCLUSION: LIL irradiation showed a systemic immunomodulatory effect on CHS reaction to DNCB in rats. Decreased ear swelling observed in the elicitation phase was associated with diminished proliferative responses of the DLNC in the induction phase of CHS reaction. Further experimental work is needed to examine the possible mechanisms of these effects.

Nonablative laser resurfacing using the long-pulse (1064-nm) Nd:YAG laser.

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BACKGROUND: Lasers with infrared wavelength ranges have been used in nonablative rejuvenation of skin. In this process, cooling of the epidermis allows for laser energy heat-induced injury to the dermis without ablation of the epidermal layer. This dermal injury is theorized to produce improvements in skin quality. In addition, long-pulse Nd:YAG lasers target melanin less efficiently, allowing safer treatment of patients with all skin types. In this study, we evaluate the use of the 1064-nm Nd:YAG laser for the purpose of rejuvenating the aging face. **MATERIALS AND METHODS:** Fifty-one patients were enrolled in the study. Patients with Fitzpatrick skin types I through V were included. Standard photographs were taken before the first and after the last treatment. The Nd:YAG laser treatments were initiated with a chilled tip-cooling device. At each treatment session, patients were given self-assessment questionnaires. At completion of the study, 3 physicians performed masked evaluations of patient pretreatment and posttreatment photographs. **RESULTS:** Thirty-four of 51 patients completed at least 7 treatments, had posttreatment photographs, and were entered into the study. Follow-up ranged from 1 to 6 months. No adverse events were noted. Masked analysis and patient subjective scores demonstrated a subtle improvement in several skin variables. Patient-assigned Fitzpatrick Scale scores declined after 6 treatments for coarse wrinkles (-22.3%; $P<.01$), skin laxity (-36.3%; $P<.01$), and overall improvement (-40.6%; $P<.01$). Physician-graded scores demonstrated decreases in coarse wrinkles (-11.9%; $P<.01$), skin laxity (-17.3%; $P<.01$), and overall improvement (-20.0%; $P<.01$). **CONCLUSIONS:** Nonablative resurfacing techniques are well suited for patients requesting rejuvenating treatments of the aging face with minimal downtime. Although improvements in photodamaged skin are subtle and

gradual, the 1064-nm Nd:YAG laser was well tolerated by patients of all skin types.

[Semin Cutan Med Surg.](#) 2002 Dec;21(4):288-[Related](#) [Articles,](#)
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Combination visible and infrared lasers for skin rejuvenation.

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Noninvasive techniques for skin rejuvenation are quickly being established as a new standard in the treatment of mild rhytides and overall skin toning. Multiple laser wavelengths and modalities have been tried for this procedure with varying degrees of success. These lasers include 532 nm, 585 nm, 1064 nm, 1320 nm, 1450 nm, and 1540 nm wavelengths. This study evaluates a combination technique by using a long-pulsed 532 nm potassium titanyl phosphate (KTP) laser and a long-pulsed 1064 nm Neodymium:yttrium aluminum garnet (Nd:YAG) laser, both separately and combined, for noninvasive photorejuvenation and skin toning/collagen enhancement, and establishes efficacy and degree of success. A total of 150 patients were treated with the long-pulsed KTP 532 nm (Aura; Laserscope, San Jose, CA) and long-pulsed Nd:YAG 1064 nm (Lyra; Laserscope) lasers both separately and combined. Patients included skin types I through V. The fluences varied between 7 and 15 J/cm² at 7 to 20 ms pulse duration with a 2-mm handpiece, and 6 to 15 J/cm² and 30 to 50 ms with a 4-mm handpiece for KTP. The Nd:YAG fluences were set at 24 to 30 J/cm² for a 10-mm handpiece and 30 J/cm² for a SmartScan Plus scanner (Laserscope, San Jose, CA). These energies were delivered at 30 to 65 ms pulse durations. All patients were treated at least 3 times and at most 6 times at monthly intervals, and were observed for up to 18 months after the last treatment. All 150 patients exhibited a mild to moderate degree of improvement in the appearance of rhytides, moderate

degree of improvement in skin toning and texture, and great improvement in the reduction of redness and pigmentation. The KTP used alone was superior to the Nd:YAG laser in terms of results. The KTP and Nd:YAG laser combination was superior to either laser used alone.

[Semin Cutan Med Surg.](#) 2002;21(4):274-9. [Related Articles, Links](#)

Are all infrared lasers equally effective in skin rejuvenation.

[Alster](#) [TS,](#) [Lupton](#) [JR.](#)

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In an attempt to limit the prolonged postoperative healing associated with ablative laser skin resurfacing and in response to growing public interest in less invasive treatment modalities, nonablative laser and light source technology was developed. Over the past few years, several clinical and histologic research studies have been conducted to determine the relative efficacy of these nonablative systems. These systems stimulate dermal collagen remodeling using wavelengths and concomitant tissue cooling that limit injury to the epidermis, thereby minimizing or eliminating postoperative sequelae. While nonablative lasers do not supersede already established ablative laser technologies, they supplement the treatment armamentarium, making a wider range of treatment options available and enhancing the ability to correlate the needs of individual patients more closely with the specific advantages offered by a particular modality.

[J Cosmet Laser Ther.](#) 2002 Mar;4(1):9-14. [Related Articles, Links](#)

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Non-ablative cutaneous remodeling with a 1.45 microm mid-infrared diode laser: phase II.

Hardaway CA, Ross EV, Paithankar DY.

Department of Dermatology, Naval Medical Center San Diego,
San Diego, CA 92134, USA.

BACKGROUND: Presented here is phase II of a three-part study of non-ablative cutaneous remodeling with a 1.45 microm diode laser configured with cryogen spray cooling. In phase I, safe heating and cooling parameters were established by examining gross and microscopic changes induced by the laser. Phase II examines clinical changes and side effects in the treatment of single facial rhytids. **METHODS:** Two men and seven women with Fitzpatrick skin phototypes I-III were treated. Single facial rhytids were treated on three separate occasions 3 weeks apart (six periorbital and three perioral). Single, control wrinkles on the contralateral sides were treated with cryogen spray cooling alone. Subjects were treated with single passes with a 5mm spot for the first two treatments. Owing to a modification in the handpiece design, a 4mm spot was used for the third and final treatment. The average power was 12 W. At each treatment visit, heating times ranged from 200 ms to 300 ms, applied as a series of heating/cooling cycles. One treatment 'cycle' lasted for 100 ms and consisted of continuous laser heating interspersed with programmable parallel cryogen spray cooling bursts. **RESULTS:** Patients were assessed 1 day, 1 week, 4 months, and 6 months after treatment. Treatments were well tolerated, and no patient required pain control pre or post operatively. Mild erythema and edema were noted immediately after treatment and typically cleared within 2-3 days. Superficial, branny hyperpigmentation occurred in six patients at both treatment and control sides. This discoloration resolved within 1 week of treatment and left no residual pigment alterations. No whitening or residual scarring occurred. Rhytid scores improved from a baseline score of 2.3 to 1.8 at 6 months after treatment ($p>0.05$). Patient acceptance of the treatment was high, but most felt that there was little improvement of the treated rhytids. **CONCLUSION:** Although the 1.45 microm diode laser is capable of targeting dermal collagen and stimulating fibrosis at depths where solar elastosis resides, clinical improvement of rhytids was mild and did not correlate well with the degree of histologic changes noted in phase I.

[Vasa](#). 2001 Nov;30(4):281-4.

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Low level laser treatment of primary and secondary Raynaud's phenomenon.

[al-Awami M](#), [Schillinger M](#), [Gschwandtner ME](#), [Maca T](#),
[Haumer M](#), [Minar E](#).

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BACKGROUND: Patients who had been treated with low level laser (LLL) for their digital ulcers reported an impressive improvement of their symptoms of episodic digital ischaemia. Therefore this pilot study was performed to evaluate the efficacy of LLL as a new non-drug non-invasive treatment for patients with primary and secondary Raynaud's phenomenon (RP). **PATIENTS AND METHODS:** Forty patients (29 female, 11 male, mean age 51 years) with active primary (28%) and secondary (72%) Raynaud's phenomenon received 10 sessions of LLL distant irradiation during winter months. Assessment of subjective and objective parameters was performed at baseline, one week after the last session and three months later. Variations of subjective parameters as number of daily acute episodes and severity of discomfort were assessed by a coloured visual analogue scale. A standardised cold challenge test using computed thermography of continuous temperature recordings by means of infrared telethermography was used to assess the digital blood flow. **RESULTS:** A significant improvement was noticed clinically and thermographically after 6 weeks and 3 months, respectively ($p < 0.0001$). **CONCLUSIONS:** These data suggest that LLL treatment has a good short and medium term effectiveness in patients with Raynaud's phenomenon.

[Lasers Surg Med](#). 1999;25(1):1-7.

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Free electron laser infrared wavelength specificity for cutaneous contraction.

[Ellis DL](#), [Weisberg NK](#), [Chen JS](#), [Stricklin GP](#), [Reinisch L](#).

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BACKGROUND AND OBJECTIVE: Short pulsed and scanned CO₂ lasers that target water molecules are currently used for cutaneous resurfacing. These CO₂ resurfacing lasers produce acute cutaneous contraction, which can be quantitated as a measure of the laser's effect. We postulated that targeting the vibrational and rotational modes of proteins with specific infrared laser wavelengths might be more effective at inducing cutaneous contraction than the CO₂ resurfacing lasers. **STUDY DESIGN/MATERIALS AND METHODS:** The Vanderbilt University Free Electron Laser (FEL) was used at wavelengths between 6.0-8.6 microm. The cutaneous contraction and histologic thermal damage observed was compared to that seen with a scanned CO₂ resurfacing laser. **RESULTS:** Peaks of cutaneous contraction at 7.2-7.4 and 7.6-7.7 microm were found, which were three-fold more efficient at producing cutaneous contraction than the 10.6 microm CO₂ laser. The 7.2 microm wavelength is associated with the CH bend of C-CH₃, 7.4 microm to the CH bend of O=C-CH₃, 7.6 microm to the C-C-C stretch, and 7.7 microm to the amide III (C-N-H) absorption band for proteins. Using light microscopy, an approximately 40 microm denaturation zone of dermal collagen was found at all FEL wavelengths tested, regardless of the effectiveness of cutaneous contraction. **CONCLUSION:** The mechanism of action of these infrared wavelengths on cutaneous contraction is unknown, but appears to be independent of the amount of collagen denatured as observed by light microscopy. Infrared lasers such as the FEL that target vibrational and rotational modes of proteins therefore hold promise for cutaneous application at selected wavelengths. Copyright 1999 Wiley-Liss, Inc.

[Diabetes Care](#). 1998 Apr;21(4):580-4.

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Low-intensity laser irradiation improves skin circulation in patients with diabetic microangiopathy.

[Schindl A](#), [Schindl M](#), [Schon H](#), [Knobler R](#), [Havelec L](#), [Schindl L](#).

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OBJECTIVE: Diabetic foot problems due to angiopathy and neuropathy account for 50% of all nontraumatic amputations and constitute a significant economic burden to society. Low-intensity laser irradiation has been shown to induce wound healing in conditions of reduced microcirculation. We investigated the influence of low-intensity laser irradiation by means of infrared thermography on skin blood circulation in diabetic patients with diabetic microangiopathy. **RESEARCH DESIGN AND METHODS:** Thirty consecutive patients with diabetic ulcers or gangrenes and elevated levels of glycosylated hemoglobin were randomized by blocks of two to receive either a single low-intensity laser irradiation with an energy density of 30 J/cm² or a sham irradiation over both forefoot regions in a double-blind placebo-controlled clinical study. Skin blood circulation as indicated by temperature recordings over the forefoot region was detected by infrared thermography. **RESULTS:** After a single transcutaneous low-intensity laser irradiation, a statistically significant rise in skin temperature was noted ($P < 0.001$ by ANOVA for repeated measurements), whereas in the sham-irradiated control group, a slight but significant drop in temperature ($P < 0.001$) was found. Subsequently performed contrasts for comparison of measurements before and after irradiation revealed significant temperature increases at 20 min of irradiation time ($P < 0.001$), at the end of the irradiation ($P < 0.001$), and 15 min after stopping the irradiation ($P < 0.001$). In the sham-irradiated feet, the drop in local skin temperature was

not significant at 20 min ($P = 0.1$), but reached significance at the end of the sham-irradiation procedure ($P < 0.001$) and 15 min after the end of sham irradiation ($P < 0.001$). CONCLUSIONS: The data from this first randomized double-blind placebo-controlled clinical trial demonstrate an increase in skin microcirculation due to athermic laser irradiation in patients with diabetic microangiopathy.

[Dermatol Surg.](#) 2005 May;31(5):584-6. [Related Articles,](#) [Links](#)

Hair growth induced by diode laser treatment.

[Bernstein](#) [EF.](#)

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BACKGROUND: Although hair reduction by long-pulsed red and infrared lasers and light sources is generally quite effective, paradoxical hair growth has rarely been observed following treatment. OBJECTIVE: To report a case of thick hair growth following 810 nm diode laser treatment and its subsequent treatment. METHODS. A 24-year-old man who had previously had laser hair reduction on his posterior neck was treated to a test area on his upper back. RESULTS: Thick terminal hair developed in the treated area subsequent to laser treatment. Further treatment of this area removed the terminal hair but resulted in terminal hair growth in an annular distribution surrounding the treatment site. CONCLUSIONS: Diode laser treatment rarely stimulates terminal hair growth. This phenomenon should be studied to better understand hair growth cycles and to help develop more effective treatments for hair loss and hair growth.

[Int J Dermatol.](#) 2003 Sep;42(9):738-40. [Related Articles,](#) [Links](#)



Linear polarized infrared irradiation using Super Lizer is an

effective treatment for multiple-type alopecia areata.

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

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Title	Comparison of the effects of pulsed dye laser, pulsed dye laser + salicylic acid, and clobetasole propionate + salicylic acid on psoriatic plaques.
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Abstract

BACKGROUND: Studies show that pulsed dye laser (PDL) has some clinical benefits on psoriasis with a low clearance rate. In addition, it has been suggested that applying keratolytics before treatment might be helpful in PDL therapy. Topical corticosteroids remain the most commonly prescribed agents for psoriasis. **OBJECTIVE:** This study was designed to compare the efficacy of the PDL treatment with that of PDL treatment after salicylic acid on psoriatic plaques. The other goal of this study was to compare the efficacy of the PDL treatment with that of clobetasol propionate treatment. **METHODS:** Twenty-two patients with chronic, stable psoriatic plaques that involved less than 20% of their body were included in the study. Three similar-appearing psoriasis plaques in these patients were selected. Whereas the first plaque received only PDL, the second plaque received PDL after salicylic acid, and the third plaque received clobetasol propionate ointment and salicylic acid. Evaluation of the study plaques was carried out by the modified Psoriasis Area and Severity Index (mPASI) score and by measuring the area of the plaques. **RESULTS:** Of the 21 patients, 19 completed the study. Although the decrease in mPASI scores was determined to be maximum for clobetasol propionate + salicylic acid-treated plaques and minimum for only PDL-treated plaques, the decrease was statistically significant in all groups when compared with baseline ($p < .003$). At the 3- and 6-week evaluations, there was a statistically significant difference between clobetasol propionate + salicylic acid-treated plaques and the two PDL-treated plaques ($p < .003$); however, the difference observed at the 9-, 12-, and 15-week evaluations was statistically significant only between clobetasol propionate + salicylic acid-treated plaques and PDL-treated plaques ($p < .003$). When the baseline and 15-week evaluations were compared, there was no statistically significant increase in the mean lesion areas of clobetasol propionate + salicylic acid-treated psoriatic plaques ($p > .003$), but there was a statistically significant increase in the mean lesion areas of two PDL-treated psoriatic plaques ($p <$

.003). **CONCLUSION:** The results of this study showed that the effect of PDL could be increased when salicylic acid was added to treatment, although there was no statistically significant difference between both treatment protocols. However, clobetasol propionate + salicylic acid treatment is more effective than both PDL and PDL + salicylic acid treatment.

**Publication
Type**

Clinical Trial. Journal Article.