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5 CLINICAL STUDIES THAT HIGHLIGHT INFRARED LIGHT THERAPY'S

Anti-Aging Effects

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5 Clinical Studies that Highlight Infrared Light Therapy's Anti-Aging Effects

A Controlled Trial to Determine the Efficacy of Red and Near-Infrared Light Treatment in Patient Satisfaction, Reduction of Fine Lines, Wrinkles, Skin Roughness, and Intradermal Collagen Density Increase

Clinical experience with light-emitting diode (LED) photobiomodulation

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

Green tea and red light: a powerful duo in skin rejuvenation

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

In recent years, a number of clinical studies have demonstrated the anti-aging benefits of a therapy called photobiomodulation (PBM) therapy, also known as low-level laser therapy (LLLT). PBM is a type of light therapy that uses low-level infrared light to stimulate cells and promote healing. A growing body of evidence suggests that PBM can help improve the appearance of fine lines and wrinkles, reduce inflammation, speed up wound healing, and even promote hair growth.

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INTRODUCTION

Clinical studies have found that infrared light therapy can stimulate collagen production, promote cell regeneration, and reduce fine lines and wrinkles. In one study, participants who received PBM therapy over eight weeks twice a week saw significant improvements in skin texture and elasticity compared to the control group. Another study showed that PBM therapy not only improved overall skin appearance but also specifically reduced crow's feet and forehead wrinkles. These clinical studies demonstrate the potential for infrared light therapy as a safe and effective anti-aging treatment.

However, it's important to note that the effects may vary depending on factors such as the intensity and frequency of the therapy sessions. As with any medical treatment, it's best to consult with a healthcare professional before starting photobiomodulation therapy. We'll take a closer look at some of the clinical studies that have been conducted on PBM and its anti-aging benefits.

A Controlled Trial to Determine the Efficacy of Red and Near-Infrared Light Treatment in Patient Satisfaction, Reduction of Fine Lines, Wrinkles, Skin Roughness, and Intradermal Collagen Density Increase

Objective:

The main objective of this study was to analyze the efficacy & safety of two novel light sources for large area and full body application, providing polychromatic, non-thermal photo biomodulation (PBM) for improving skin feeling and appearance.

Background data:

For non-thermal photo rejuvenation, laser and LED light sources have been proved to be safe and effective. Nonetheless, lasers and LEDs may have some disadvantages because of dot-shaped (punctiform) emission characteristics and their narrow spectral bandwidths. Because the action

spectra for tissue regeneration and repair consist of more than one wavelength, we investigated if it is favorable to apply a polychromatic spectrum covering a broader spectral region for skin rejuvenation and repair.

Materials and methods:

A total of 136 volunteers participated in this prospective, randomized, and controlled study. Of these volunteers, 113 subjects randomly assigned into four treatment groups were treated twice a week with either 611–650 or 570–850 nm polychromatic light (normalized to ⊠9 J/cm2 in the range of 611–650 nm) and were compared with controls (n=23). Irradiances and treatment durations varied in all treatment groups. The data collected at baseline and after 30 sessions included blinded evaluations of clinical photography, ultrasonographic collagen density measurements, computerized digital profilometry, and an assessment of patient satisfaction.

Results:

The treated subjects experienced significantly improved skin complexion and skin feeling, profilometrically assessed skin roughness, and ultrasonographically measured collagen density. The blinded clinical evaluation of photographs confirmed significant improvement in the intervention groups compared with the control.

Conclusion:

Broadband polychromatic PBM showed no advantage over the red-light-only spectrum. However, both novel light sources that have not been previously used for PBM have demonstrated efficacy and safety for skin rejuvenation and intradermal collagen increase when compared with controls.

Source:

Photomed Laser Surg. 2014 Feb 1; 32(2): 93–100.
DOI: 10.1089/pho.2013.3616 - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3926176

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Clinical experience with light-emitting diode (LED) photobiomodulation

Objective:

We describe our experience over the last 2 years using 590 nm LED photo modulation within a dermatologic surgery environment.

Background:

Light-emitting diode (LED) photo modulation is a novel nonthermal technology used to modulate cellular activity with light.

Methods:

Practical use of nonthermal light energy and emerging applications in 3,500 treatments delivered to 900 patients is detailed.

Results:

LED photo modulation 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 photo modulation 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.

Source:

Dermatol Surg. 2005 Sep;31(9 Pt 2):1199-205. doi: 10.1111/j.1524-4725.2005.31926. - https://pubmed.ncbi.nlm.nih.gov/16176771/

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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

Objective:

We investigated the clinical efficacy of LED phototherapy for skin rejuvenation through the comparison of three different treatment parameters and a control, and also examined the LED-induced histological, ultrastructural, and biochemical changes.

Background:

Light-emitting diodes (LEDs) are considered to be effective in skin rejuvenation.

Methods:

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.

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.

Conclusion:

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

Source:

J Photochem Photobiol B. 2007 Jul 27;88(1):51-67. Epub 2007 May 1 - https://pubmed.ncbi.nlm.nih.gov/17566756/

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Green tea and red light: a powerful duo in skin rejuvenation

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.

Source:

Photomed Laser Surg. 2009 Dec;27(6):969-71. doi: 10.1089/pho.2009.2547 -
https://pubmed.ncbi.nlm.nih.gov/19817517/

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

Objective:

This study investigated the potential of LED treatments with a 660 nm sequentially pulsed illumination formula in the photobiomodulation of these molecules.

Background:

Several studies shows that skin aging is related with a downregulation in collagen synthesis and an increase in matrix metalloproteinase (MMP) expression.

Methods:

Histological & biochemical changes were initially assessed in a tissue-engineered Human Reconstructed Skin (HRS) model after 11 sham or LED light treatments. LED effects were then analyzed in aged/photoaged individuals in a split-face single-blinded study.

Results:

The outcome of the study 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. Moreover, profilometry quantification proved that over 90% of individuals demonstrated a decrease in rhytid depth and surface roughness, and, via a blinded clinical assessment, that 87% experienced a decrease in the Fitzpatrick wrinkling severity score after 12 LED treatments. No side effects or downtime were reported.

Conclusion:

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.

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These findings suggest that LED at 660 nm is a safe and effective collagen-enhancement strategy.

Source:

J Invest Dermato. 2009 Dec;129(12):2751-9. doi: 10.1038/jid.2009.186. Epub 2009 Jul 9 - https://pubmed.ncbi.nlm.nih.gov/19587693/

To Sum Up:

Photobiomodulation, or LLLT (low-level laser therapy) is a safe, effective, and well-tolerated treatment for aging skin. The five clinical research studies we've listed are just a small sampling of the mounting evidence that infrared light therapy can help reduce wrinkles, fine lines, and other signs of aging.

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