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### **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.

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