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USE OF A COMBINATION INTENSE PULSED LIGHT AND RADIOFREQUENCY DEVICE FOR TREATMENT OF ACNE: A HISTOLOGIC ANALYSIS

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Background: Light and radiofrequency devices are being used with increasing frequency for the treatment of selected cases of acne vulgaris.
Aim: Histologic analysis of skin biopsies of areas treated for acne vulgaris with a combination intense pulsed light (400–980 nm) and radiofrequency energy device (Aurora®, Syneron, Inc. Yokneam, Israel).
Materials and Methods: Four subjects presenting with twenty or more inflamed, non-comedonal acne lesions were entered into the study. Inflamed lesions consist of papules, pustules, nodules, and cysts. The subjects were treated with the combination pulsed light and radiofrequency device at different settings according to the Fitzpatrick photo-type scale. Skin types I–IV received an Optical energy of 8–10 J/cm^2, while skin types V–VI received 6–8 J/cm^2. All skin types (I–VI) received a radiofrequency of 15–20 J/cm^3 during the treatment. Participants received a total of eight treatments during a month period, at a frequency of two treatments per week. Three 2-mm punch biopsies were taken from the temple region, one before treatment and then 1 week and 1 month after the initial treatment. Specimens were routinely processed. Special stains were used to study elastic tissue (von Gieson), reticulin fibers (reticulin technique), and collagen fibers (Trichrome Masson). Quantitative analysis in all specimens included the number of hair follicles showing perifolliculitis, the diameter of hair follicles, and the diameter of sebaceous glands.
Results: Both baseline and post-treatment biopsies showed focal perifollicular lymphocytic infiltrate consistent with perifolliculitis. However, there was a trend for a lower percentage of follicles with perifolliculitis seen on the last biopsy (7/12 vs. 2/6). There was a trend in reduction of the total area occupied by sebaceous glands seen in the last biopsy (0.092 vs. 0.07). Special stains did not reveal obvious morphologic differences regarding collagen and elastic tissue contents, when comparing pre- and post-treatment biopsies.
Conclusion: This histologic analysis suggests that part of the clinical improvement seen in patients with acne vulgaris treated with this combination of infrared light and radiofrequency is due to a decrease in size of the sebaceous glands and decreased perifollicular inflammation.

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COMBINED DIODE LASER AND RADIOFREQUENCY TECHNOLOGY FOR THE TREATMENT OF RHYTIDES

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Background: The combined diode laser (815 nm) and radiofrequency non-ablative system (Polaris, Syneron, Inc. Yokneam, Israel) is based on selective thermolysis of the dermal tissue using a combination of two different energy types: laser (Optical light) and conducted radio frequency (RF) current was used to evaluate its effect on facial rhytide reduction.
Objectives: To determine the safety and effectiveness of a combination of diode laser and radiofrequency for treatment of wrinkles and skin texture.
Methods: Thirteen subjects skin type Fitzpatrick I–VI, with mild to moderate rhytides of the face and neck (WES class II–III) received a frequency of 80–100 J/cm^3 (RF) and an optical frequency of 30–50 J/cm^2 (L) during three treatment sessions at three week intervals between each session. All patients were evaluated using standardized pre- and post-procedure photography. The degree of improvement was graded by the patients as well as by two independent physicians at 3 months and at 6 months post-treatment. The following scale was used: No improvement, 1–25% improvement, 26–50% improvement, 51–75% improvement, and 76–100% improvement.
Results: 40% of patients achieved at least a 50 to 100% improvement of rhytides at the six month evaluation using the above scale. 100% of subjects reported increase in skin smoothness. There were no reported treatment complications.
Conclusion: The present study demonstrates the efficacy of a combination diode laser and RF system in the reduction facial rhytides while improving skin texture through selective thermolysis utilizing combination of modalities. Activation of collagen remodeling and Skin tightening, by means of laser and radio frequency modalities are the main mechanisms of actions of this novel technology.

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PHOTOTHERMAL MATHEMATICAL MODELING FOR OPTIMAL LASER TREATMENT OF PORT-WINE STAINS

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Background and Objective: Flashlamp pulsed dye lasers (FPDL) are well accepted for the treatment of port-wine stains (PWS) using wavelengths of 585 or 595nm and pulse durations of 0.45 or 1.5 ms. However, the clinical outcomes are still inadequate and there is uncertainty as to which pulse durations and wavelengths are more effective. To help identify optimal pulse times and wavelengths for PWS treatment, we developed a mathematical model to simulate the effects of clinically applied laser parameters.
Materials and Method: A novel finite element method (FEM) model was developed to calculate the expected temperature distribution and degree of photocoagulation within blood vessels. The light and heat diffusion equations were simultaneously solved with the FEM. The latent heat of evaporation was included in the thermal analysis. The simulations were conducted for FPDL parameters of 585nm and 595nm and pulse durations of 0.45 and 1.5 ms and energy densities between 6–12 J/cm^2.
Results: The model suggests that the energy density at 595 nm needs to be 20% than that at 585 nm to achieve similar coagulation. At a given laser energy density, continuous pulses are predicted to be more effective than multi sub-pulses for both 0.45 and 1.5 ms pulse durations. The results are in agreement with clinical outcomes and histopathological findings from PWS patients and animal model.
Conclusion: The model predictions agree with clinical practice, where higher energy densities are used at 595 nm in comparison to 585 nm; and lower energy densities are required for ScleroPLUS versus Vbeam laser, which use continuous and multi pulses, respectively.