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CRYOGEN SPRAY COOLING FOR EPIDERMAL PROTECTION DURING PULSED LASER TREATMENT OF PORT WINE STAINS

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Purpose: To achieve laser induced blanching of port wine stains (PWS) while protecting the epidermis from thermal injury by spraying a millisecond (ms) cryogen spurt onto the skin surface.

Methods: Selected PWS sites of volunteered individuals were irradiated with a flashlamp pumped pulsed dye laser (wavelength = 585 nm, pulse duration = 450 μs, spot size = 5-7 mm, fluence = 5-10 J/cm^2). 1,1,1,2 tetrafluoroethane (hydrofluorocarbon-134a; a non-toxic, non-flammable, and environmentally compatible chlorofluorocarbon substitute) (boiling point ≈ - 26 °C) spurts ranging between 20-100 ms were sprayed onto the skin surface immediately prior to laser irradiation. Infrared emission from skin was collected by a InSb focal plane array camera or a HgCdTe single element detector to measure the temporal radiometric temperature change. An algorithm was used to compute the spatial temperature distribution within skin from the temporal infrared measurements.

Results: Rapid surface temperature reduction ranging between 30-40 °C was obtained immediately prior to laser irradiation by ms cryogen spurts. Laser induced temperature increase due to melanin absorption was consistently maintained below 50 °C. As computed by the algorithm, temperature distribution within blood vessels was not affected by the cryogen spurt sprayed onto the skin surface.

Conclusions: Successful laser induced blanching of PWS without thermal injury to the epidermis is obtained when skin is cooled by ms cryogen spurts.

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LONG-PULSE, HIGH ENERGY PULSED DYE LASER TREATMENT OF PORT WINE STAINS ANDHEMANGIOMAS

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The purpose of this study was to examine whether the new, modified long pulse, high energy pulsed dye laser treatment could result in faster clearing of port wine stains and hemangiomas. A modified flashlamp pumped dye laser (Sclerolaser - Candela Corp.) has been developed that can be tuned to wavelengths of 585-600 nm. Compared to the 585 nm, 450 μsec pulsed dye laser (PDL), this laser can target larger caliber and more deeply situated vessels with its longer wavelengths and longer pulse duration of 1500 μsec . Side by side treatment of port wine stains with the long-pulse and high energy PDL utilized at wavelengths of 595 and 600 nm with a 5 mm spot size and fluence of 13 J/cm^2 and the 585 nm PDL with a 10 mm spot size and a fluence 5 J/cm^2 were performed. Responses were graded clinically at 4 week follow-up visits, and by blinded retrospective photographic analysis. Hemangiomas were treated with this laser at a wavelength of 595 nm, utilizing a 5 mm spot size and fluence of 10 J/cm^2, and responses were compared to historical controls. Preliminary results indicate faster clearing of hypertrophic port wine stains and hemangiomas with the long-pulse and high energy pulsed dye laser compared to the 585 nm PDL treatment.

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HAIR REMOVAL UTILIZING THE ESC EPILIGHT DEVICE.

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Purpose: To determine the effectiveness and safety of utilizing the Epilight hair removal system.

Method: Fifty patients were treated having skin types I through III and pigmented hair, utilizing a triple pulse of approximately 2.5 to 3.0 msec and a pause of 20 to 30 msec between pulses using a total energy of 40-50 J/cm^2 and a filter at either 590, 650, or 690 nm. Photographs were taken prior to treatment, a single treatment was done, and then patients were followed for a minimum of three months. An assessment of the hair growth in comparison to the original was made at monthly intervals. There was a subset of patients who had received monthly treatments.

Results: Sixty-two percent of the hair was removed in the average patient at three months post-operative. With additional treatment at monthly intervals, the efficacy was significantly increased. Side effects were few and included erythema, epidermal scaling or blistering in a small percentage of patients, but no pigmentary changes or scarring.

Conclusions: The Epilight hair removal system appears to be safe and effective in its early evaluation. Further testing is necessary to determine the permanence of hair removal as well as the effectiveness of multiple treatment sessions.

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CLINICAL EVALUATION OF A HIGH-ENERGY LONG-PULSE RUBY LASER FOR THE TREATMENT OF UNWANTED BODY HAIR

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Recently, there has been an explosion of interest in the use of lasers to remove unwanted body hair. Reports to date have not shown continued clinical efficacy and have underscored the fact that hair removal is usually not permanent. We had the opportunity to use a new long-pulse free-running ruby laser. This laser is capable of generating 40J/cm^2 with a pulse duration of 800u sec. and initially showed clinical efficacy in the removal of body hair. One hundred patients were entered in a pilot study in order to determine efficacy and side effects associated with the use of this laser to remove body hair. Bilateral studies were performed comparing sites treated once and monthly over a four month period. Initial results showed good to excellent hair removal without significant adverse cutaneous sequelae.

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LONG-PULSED RUBY LASER HAIR REMOVAL: comparison between 2 pulse widths (0.3 and 3 msec).

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A study performed on test areas in 13 subjects demonstrated the utility of a normal mode ruby laser (694 nm, 270 μsec) for hair removal: permanent hair removal was obtained in 2 subjects with a single treatment. It was postulated that lengthening of the pulse width could improve results by approaching the thermal relaxation time of the hair follicle.

The purpose of this study was to compare the efficacy of 0.3 and 3 msec laser pulses. For each pulse width, 100 subjects were treated at 10 test sites, using varying fluences (20-50J/cm^2). Half of the patients were pre-treated with bleaching cream (hydroquinone and triamcinolone in retin A cream) to see if reduction of epidermal melanin could reduce side effects. Of the 10 test spots, 5 received 1 treatment and the remaining 5, a second treatment, 1 month later.