Comprehensive Non-ablative Laser Skin Rejuvenation Using a Novel 650 microsecond Pulsed Nd:YAG 1064nm Laser

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Abstract: This study was conducted to evaluate a novel Nd:YAG 1064nm laser with 650-microsecond pulse duration to perform comprehensive non-ablative skin rejuvenation, to improve texture and tightening through neocollagenesis but also to clear erythema, spider veins, pigmented conditions and active acne. Normally the treatment of this range of conditions requires 3 or 4 different types of lasers. The objective was to evaluate whether a single laser with a single wavelength can produce a similar result. 73 subjects with skin types I-VI and ages 15-77 were treated an average of 3.5 times each, with a treatment interval of 3-4 weeks. Treatment areas included the face, neck, hands and chest. The laser treatment was well tolerated with no anesthesia or any form of skin cooling. No complications were observed; subjects reported little or no treatment discomfort. Improvements in texture were observed as well as reduction in erythema, spider veins, melasma, pigmented lesions and active acne. Of the 73 subjects, 80% rated their satisfaction as Medium or High while 20% rated it as Low.

Background and Objective: Skin rejuvenation with non-ablative laser offers patients the possibility to obtain cosmetic improvements in many areas such as the face, neck, hands and chest including texture improvement for reduction of pore size, softening of fine lines and general skin tightening; clearance of vascular lesions including facial erythema and spider veins; pigmentary issues including melasma, lentigines and general PIH (post-inflammatory hyperpigmentation); and active acne in its various forms. Normally the treatment of this range of conditions has been performed with 3 or 4 different types of lasers and light-based therapies. The objective of this study was to evaluate an Nd:YAG 1064nm laser with 650-microsecond pulse duration and a peak power of more than 15,000 watts per pulse. The 1064nm energy from this laser is absorbed in three primary chromophores: hemoglobin, melanin and water. Hemoglobin is targeted for clearance of erythema, acne (thermocoagulation of sebaceous glands) and spider veins; melanin is targeted for melasma, sun damage and pigmented lesions; and water is targeted for neocollagenesis to improve texture and tightening, as well as superheating p. acnes bacteria to treat active acne. The efficacy of this laser on this uniquely broad range of conditions, aside from the underlying versatility of the 1064nm wavelength, is related to its ability to produce a very wide range of fluences at the 650-microsecond pulse duration, which in turn enables the clinician to treat areas with multiple passes or pulses of the laser even on tanned or darker skin tones, for maximum tissue response.

Study Design/Materials and Methods: 73 subjects with skin types I-VI and ages 15-77 were treated an average of 3.5 times each, with an average treatment interval of 3-4 weeks. Treatment areas included the face, neck, hands and chest. No other topical, oral or light-based therapies were combined in the treatment protocol. All subjects confirmed that they were not using Accutane or other photosensitizing medications, and were not pregnant. Subjects had all makeup and lotions removed immediately prior to treatment. All treatments were performed using a novel Nd:YAG 1064nm laser with 650-microsecond pulse duration (LightPod Neo laser from Aerolase Corporation, Tarrytown, NY). No anesthetics, cooling, or gels were used regardless of skin type, as the laser does not require any numbing or skin cooling. Laser energy was applied with slight overlapping of pulses and an average of 4 passes across affected areas at fluences ranging from 21-41 joules/cm2 in a painting motion to cover the treatment sites, to stimulate deep dermal collagen

remodeling and to begin the heating of vasculature for erythema and spider veins, sebaceous glands for acne and melanocytes for the hyperpigmented conditions. As a second step in the case of spider veins, acne and pigmented areas, higher fluences in the range of 64-255 Joules/cm^2 were applied. The higher fluences were applied as 1 or 2 passes on pigmented lesions, as a single pass along individual vessels, and several pulses stacked directly on acne lesions. After each treatment session, patients were provided with moisturizer for sensitive skin and advised to use sun block. All subjects were asked to rate their satisfaction with the procedure after the treatment, on a scale of Low, Medium or High.

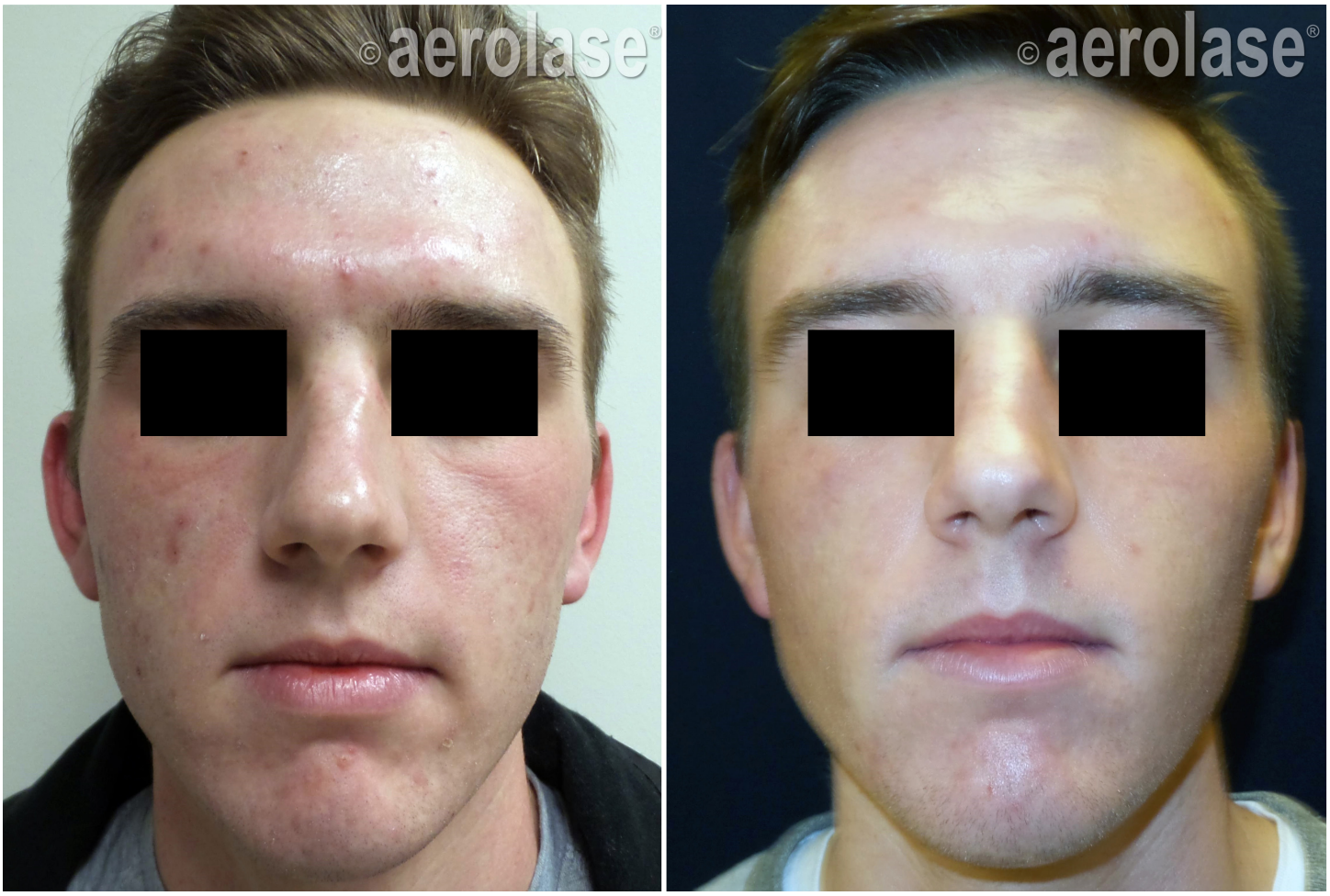
Results: The laser treatment was well tolerated without any anesthesia or any form of skin cooling; subjects reported little or no treatment discomfort. No scarring, purpura, hypo- or hyperpigmentation from the laser treatments were observed. Transient erythema was occasionally noted but it resolved within 1 to 4 hours. Most patients reported noticeable improvement in at least 2 or 3 of the targeted conditions including clearance of acne, erythema spider veins or pigmented spots, as well as improvements in texture (including a reduction in pore size in several patients). Patients also reported tightening, including reduction in fine lines and slight improvements in acne scars. Of the 73 subjects, 80% rated their satisfaction as Medium or High while 20% rated it as Low.

Conclusion: This study shows that a 650-microsecond pulsed Nd: YAG 1064nm laser can be safe and effective in performing comprehensive non-ablative skin rejuvenation without the use of any type of anesthesia or cooling.

COMPREHENSIVE NON-ABLATIVE LASER SKIN REJUVENATION USING A NOVEL 650 MICROSECOND PULSED Nd:YAG 1,064 nm LASER, Kevin Pinski, MD, Pinski Dermatology and Cosmetic Surgery, S.C., Chicago, Illinois, The Journal of Laser Surgery & Medicine, Vol 49, Issue 4, pp. 417-467, E77.

Before and After 4 Treatments

Before and After 7 Treatments



Before and After 3 Treatments

Before and After 1 Treatment

Before and After 2 Treatments

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