

Skin Rejuvenation on Skin Types I To V Using a 300-microsecond Pulsed Er:YAG 2940nm Laser in Sub-Ablative Mode

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Abstract

Laser resurfacing has been a popular procedure to reverse the effects of aging. CO₂ and Erbium:YAG lasers are highly effective in treatment of wrinkles and acne scars. These ablative lasers have long down-time and limit patient’s activities. These lasers can result in significant pigmentary changes and if not used with a proper technique by well trained laser surgeons, it can result in disfiguring scarring. Due to these limitations, almost all available lasers were tried to use for non-ablative resurfacing. These reduced the down-time and risk of complications but effectiveness was not comparable. Fractional lasers were introduced to get same kind of results. Non-ablative fractional laser did not produce same effectiveness as ablative CO₂ or Er:YAG lasers. This led to the development of Ablative fractional lasers. Ablative lasers have been used at low fluence, but in ablative mode to treat mild photoaging and acne scars. This study is to evaluate the use of an Erbium:YAG laser in a “sub-ablative” mode where there is a heating of the surface tissue with no ablation.

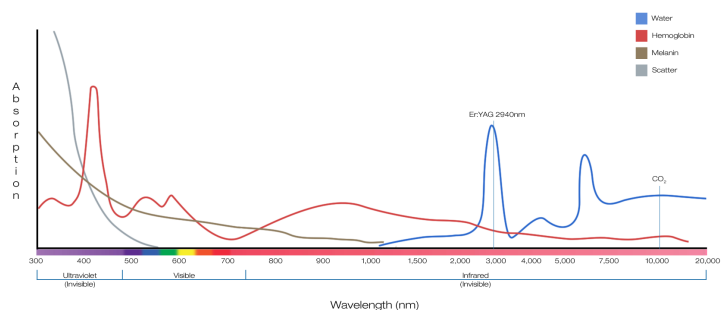
In this multi-center study 35 subjects were treated with 3 passes in a sub-ablative mode. The treatments were repeated 2-4 times. No topical anesthesia or skin cooling was required. Subjects tolerated the procedure well.

Subjects experienced slight peeling of facial skin, if any, for 2-4 days after the treatment. There was improvement in skin texture, pore size, pigmentation, etc. There were no complications, except one subject developing transitory mild hyperpigmentation. This study shows that Er:YAG laser in a sub-ablative mode is safe, gentle and effective for facial skin rejuvenation.

Background & Objectives

Many ablative, fractional ablative and non-ablative fractional lasers are used for skin rejuvenation with varying results but with significant downtime. This study was conducted to evaluate the safety and efficacy of a 300-Microsecond Pulsed Er:YAG 2940nm Laser for skin rejuvenation in skin types I-V using a “sub-ablative” mode.

Figures showing Absorption Coefficient of Water:



Study Design and Methods

35 subjects with skin types I to V, age 35 to 65 underwent 2 to 4 treatments in 1-2 weekly interval with a 300-Microsecond Er:YAG 2940nm Laser with no anesthetics and/or cooling. Three laser passes were applied in each session at a 1.5Hz repetition rate, and a fluence of 1.0 – 1.2 J/cm² which is below the skin ablation threshold. All subjects had various degrees of photo damaged skin, large pores, uneven skin texture and 4 had acne scars. 15 subjects were treated on the face, 14 – face and neck, and 6 face, neck and chest. Results were evaluated for evenness of the skin, improvement of skin appearance and texture, reduction of pigmentation, and for patient satisfaction. Photographs were taken before and after treatments. Follow up was up to 1 year.



Application of Erbium:YAG energy in sub-ablative mode

Results

All subjects felt a deep sensation of warmth and skin tightening during the treatment but no pain. Sunblock was applied post-treatment and subjects returned to their normal routine. Hyperemia and mild edema appeared 2-3 hours after the treatment, lasting up to 8 to 12 hours. Treated skin peeled between 2-4 days after these treatment revealing a rejuvenated skin. No complications or pigmentary changes were observed, except one subject developed a temporarily mild hyperpigmentation. All subjects showed visible improvement of texture and skin evenness, reduction of pigmentation and pore size. All subjects reported an improved cosmetic appearance and high satisfaction.

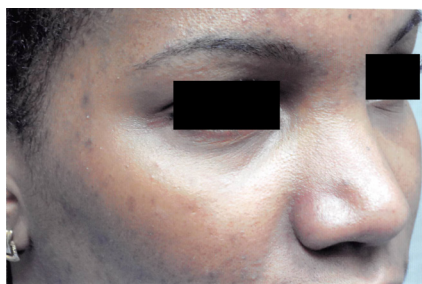
Conclusions

The 300-Microsecond Pulsed Er:YAG 2940nm Laser in sub-ablative mode is safe, gentle and effective for the rejuvenation of all skin types with no discomfort or downtime associated with the treatment.

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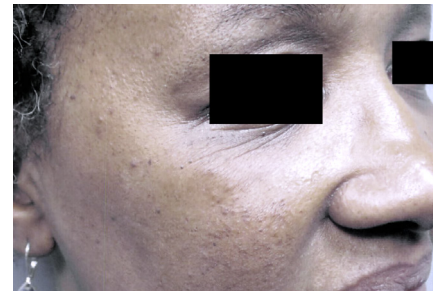


Before

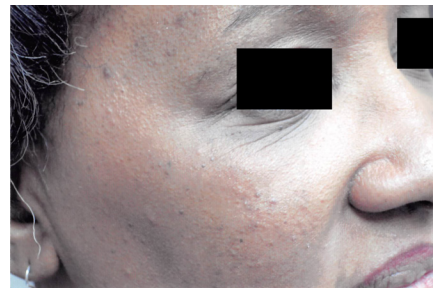


After 1 Treatment

Before and one week after 1 treatment on skin type 5



Before

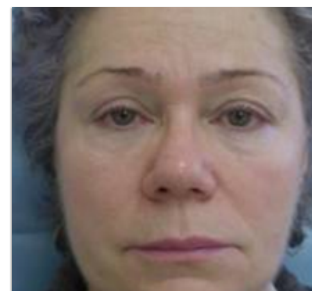


After 1 Treatment

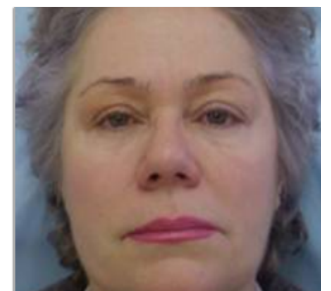
Before and one week after 1 treatment on skin type 5



Immediately After 1 Treatment



Before



After 1 Treatment

Figures showing appearance immediately after treatment and before and 1 week after the treatment in 60 y/o female: