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Skin and Tissue Tightening Using the Candela GentleYAG® Laser

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Introduction

A variety of lasers has now been approved for the treatment of facial wrinkles—from 532 nm to 1450 nm devices. The mechanism of action for this improvement is the creation of a zone of heat-dependent microinjury within the dermis (the exact depth and extent of the injury being wavelength-dependent), resulting in the generation of new connective tissue that literally "pushes" the wrinkle from the inside out.

Likewise, improving facial skin laxity is a function not only of heat-dependent microinjury, but also of thermally induced collagen contraction. Skin tightening appears to require a greater and deeper heat delivery into the skin versus wrinkle treatments.

Because of the deeper depths of energy absorption within the skin and its underlying structure, not all wrinkle reduction devices can benefit us with skin tightening and lifting. The earliest observations of noninvasive skin tightening and lifting depended on radiofrequency (RF), and this was thought to be the only way to deliver energy through the skin to the collagen substructure. Technologies, such as lasers, were mistakenly thought to be incapable of delivering sufficient energies deep enough into the skin.

However, the longer pulsed 1064 nm laser with dynamic cooling has now been shown to give the same tightening, if not even a better response of lifting and tightening of the skin, than even the best radiofrequency-performed procedure, with even less risk of adverse effects than the older radiofrequency-based procedure. The 1064 nm, variable pulsed Nd:YAG laser is a "workhorse" for laser medicine, with established capabilities for treating leg veins and hair removal, as well as being the most "forgiving" laser wavelength for patients of darker skin color. The thermal injury created by the 1064 nm wavelength, attributable to the absorption coefficients of its main targeted chromophores, melanin and hemoglobin, and, to a much lesser extent, water, has now been proven to also provide collagen contraction and improvement in skin tightening and lifting.

This paper reports on the safety and efficacy of using Candela's GentleYAG® laser to treat the facial laxity with observed lifting and tightening, as well as preliminary observations of an excellent similar response on both the abdomen and thigh areas.

Method

The first subject in this illustration was a woman in her mid-50s with a skin type II. She was treated with a single treatment session on the face and neck using a variable pulsed, Nd:YAG laser at the following treatment parameters: 10 mm spot size, 20 j/cm^2, 50 ms pulse duration, and at 0 Dynamic Cooling Device™ (DCD™). A stacking of two laser pulses at 2 Hz was delivered, with a sequence of six succession passes over a full anatomic area (for example, first the right cheek, then the left cheek, with no overlap). Treatments were completed quickly because of both the large spot size of 10 mm and the rapid 2 Hz repetition rate. A topical anesthetic cream was applied prior to the laser treatment. Most importantly, the patient was treated well within a tolerable range of comfort in terms of her perception of heat. Figure 1 is an illustration of the average response immediately after treatment. The patient commented, "I felt heat, but it wasn't uncomfortable."

The second subject of this study was female in her early 40s with skin type III. The patient's abdomen was treated once using the following 1064 nm laser treatment parameters: 10 mm spot size, 50 J/cm^2, 50 ms pulse duration, and 30/20 DCD. Double-stacked laser pulses were delivered in three successive passes with no overlap. Treatments were completed quickly

with DCD

GentleYAG®

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at the laser's 1.5 Hz repetition rate. A topical anesthetic cream was applied prior to the laser treatment. (Figure 2)

The third subject of this study was a female, in her late 40s with skin type II. The patient's thighs were treated once with two devices, the left thigh with an RF device and the right thigh with 1064 nm energy at the following 1064 nm laser treatment parameters: 10 mm spot size, 50 J/cm^2, 50 ms pulse duration, and 30/20 DCD. Double-stacked laser pulses were delivered in three successive passes with no overlap. (Figure 3)

Results

Before-and-after photographic evidence of treatment efficacy is dramatic and persuasive. These three patients received single treatment sessions, but could continue with additional treatments, as the results of treatment appear to be incremental; although the exact spacing of treatment for maximum end results requires additional investigation.

Discussion

I originally purchased my GentleYAG 1064 nm wavelength laser from Candela to treat patients of all skin types for unwanted hair and discreet vessels on the face and legs. My original skin-tightening experience, both as an investigator and as a practicing clinician, with RF energy, although promising, was disappointing for many of our patients, both as to the marginal gain as seen and to the cost of treatment.

It is my experience that the GentleYAG is the superior device for both skin and tissue tightening in terms of speed, efficacy, treatment reproducibility, and safety. The GentleYAG is also the preferred technology of my patients.

While additional research is needed to further specify optimal 1064 nm treatment parameters, interest in noninvasive, minimal-downtime procedures to improve skin laxity is at an all-time high and growing.

Candela's 1064 nm laser, the GentleYAG, is unique among Nd:YAG lasers in its fluence range, spot size, pulse duration, and methodology of epidermal protection, the cryogen-based DCD.

Treatment versatility—now including skin and tissue tightening—is yet one more example of what separates the GentleYAG from not only other Nd:YAG lasers, but also from other skin-tightening devices.

Figure 1: Patient 1, pre and post-treatment.

Figure 2: Patient 2, pretreatment and one-month post-treatment.

Figure 3: Patient 3, pre and post-treatment. Patient's left thigh was treated with the RF device and the patient's right thigh treated with the 1064 nm device.

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