



E. Victor Ross, M.D.

GentleYAG™ Treatment of Hirsutism

E. Victor Ross, M.D.

Scripps's Clinic

La Jolla, California, USA

Introduction

Shorter wavelength (ruby, alexandrite, diode) lasers have performed admirably demonstrating permanent hair reduction to-date and indeed may still be the lasers of choice for very fine black hairs or less pigmented hairs of any diameter. The drawback to their use, however, has been the risk of epidermal damage, particularly in dark skin. This is especially true in very dark skin where results can often be described as unpredictable, even with conscientious use of conservative laser parameters.

The introduction of the 1064 nm laser has allowed for predictably safe treatment of very dark skin. The safety and efficacy of this wavelength at longer pulse durations (10-65 ms) in very dark skin has been shown in studies so long as the hairs are thick and black.^{1,2,3}

There have been two major criticisms of 1064 nm in hair reduction. One is the apparent lack of efficacy compared to shorter wavelength devices in lighter finer hairs, and two, the increased pain generally reported compared with shorter wavelength lasers (with treatment to the same endpoint).

One means to diminish the reported efficacy gap between 1064 nm and shorter wavelengths for lighter finer hairs is to reduce pulse duration. The purpose of this study is to examine the safety and efficacy of a shorter pulse, 1064 nm wavelength laser, the GentleYAG laser from Candela.

Methods

We have now treated over 100 patients over two months with a new 3 ms, 1064 nm laser equipped with dynamic cooling and a 12 mm spot. Fluences have ranged from 16-70 J/cm². The Dynamic Cooling Device™ (DCD™) duration settings have ranged from 40-50 ms, always using a 20 ms delay. EMLA has been used in those patients who reported marked discomfort during treatment. We have treated all skin types and hair types, but this report focuses on two typical patients with finer downy black hair often observed on the cheeks and foreheads of some female patients.

Results

During treatment most patients reported moderate pain without EMLA. Pain was mitigated by rubbing the skin with dry gauze just prior to laser impact. During irradiation, the surface stubble hair typically vaporized, even where it was fine. This was accompanied by the almost immediate appearance of pinpoint perifollicular edema. Interestingly, compared to longer pulsewidth lasers, the onset of the edema was faster, and the diameter of the papules was smaller. However, after ten minutes, the edema often would broaden beyond that typically observed with longer pulsewidth lasers after treating the same hair and skin types. By ten minutes after treatment, occasionally a 7-8 mm diameter of diffuse edema was observed coincident with the beam impact. This occurred more often in areas where the hairs were thicker, high fluences were applied and the skin was thinner (face and neck). Likewise in these areas, for fluences higher than 50 J/cm², purpura was sometimes observed in paler (skin type I-II) patients.

By one hour after treatment focal perifollicular edema had usually subsided. The less commonly observed diffuse edema sometimes required three days to resolve completely. Purpura resolved in about 4 days on the neck and 7-11 days in the bikini area.

One to two months after treatment, hair reduction was estimated at 50-80%, depending on the region. Most impressive was the reduction of finer facial hair that has proved resistant to treatment with longer pulsewidth lasers (30-70 ms) with similar wavelength and spotsizes (see Figures 1 and 2). Many patients with finer hair have been impressed with the short-term results of the GentleYAG laser (compared to longer pulsewidth Nd:YAG lasers). As it is unclear how long the hair reduction will persist, we will continue to follow these patients.

Discussion

The impressive early results observed with the GentleYAG are most likely attributable to the shorter pulse duration. Calculations show that over this critical pulsewidth range (i.e. 3 ms to 30 ms) that a hair bulb with a TRT of about 30 ms will achieve a peak temperature about 2-3X with the shorter pulse. For finer hairs (about 100 um bulbs) the ratio can be as high as 5X with the shorter pulse.

Because of the relatively small absorption of 1064 nm irradiation by melanin (about $\frac{1}{4}$ that for 810 nm light), effective fluences for like-pulsewidth Nd:YAG lasers are typically higher than shorter wavelength lasers. Because of the shorter pulsewidth of the GentleYAG, fluences as low as 40-50 J/cm² still result in satisfactory short-term hair reduction in fine black hair.

Despite the initial excellent results observed with the GentleYAG, there have been shortcomings associated with this short pulsed laser. Our initial impression is that the GentleYAG is somewhat more painful than some longer pulsed Nd:YAG systems, although this complaint is certainly variable according to the individual, body location, fluence, hair density and hair color. Another drawback is the appearance of purpura, which was most commonly seen with fluences in excess of 50 J/cm² in thin-skinned areas in paler patients, not the ideal target audience for this type of laser. Finally, the occasional long lasting edema (2-3 days), although not a major drawback, was unsettling to some patients.

Overall, one's first impression of the GentleYAG is that this device packs a punch. The high peak powers, cryogen spray cooling, and large spot allow for rapid treatment of large areas. Thin lighter hair previously resistant to treatment with 1064 nm appears to be susceptible to the shorter pulse durations. Most importantly, because of the efficacy in hair reduction, the laser has been enthusiastically received by our patients. They are willing to accommodate some discomfort as a trade off for smooth backs, silky bikini areas, glossy underarms and hairless faces.

Bibliography

1. Goldberg, D.J. and S. Silapunt "Hair removal using a long-pulsed Nd:YAG Laser: comparison at fluences of 50, 80, and 100 J/cm²." *Dermatologic Surgery*, 5:27 (2001) 434-6.
2. Alster, T.S., et. al, "Long-pulsed Nd:YAG laser-assisted hair removal in pigmented skin: a clinical and histological evaluation." *Archives of Dermatology*, 2001. 137(7): p. 885-9.
3. Ross, E.V., et. al, "Treatment of pseudofolliculitis barbae in skin types IV, V, and VI with a long pulse Nd:YAG laser." *J Am Acad Dermatol*, March 2001.



Figure 1—Pretreatment



Figure 2—Post-treatment

Candela Corporation
530 Boston Post Road
Wayland, MA 01778, USA
Phone: (508) 358-7637
Fax: (508) 358-5569
Toll Free: (800) 821-2013
www.clzr.com



CANDELA
BE CONFIDENT