

### Treatment of Pseudofolliculitis Barbae With a Compact Nd:YAG 1064-nm Laser Using 650-microsecond Technology

Michael H. Gold, MD

Gold Skin Care Center & The Laser and Rejuvenation Center  
Nashville, TN

#### Introduction

Pseudofolliculitis barbae (PFB) is a foreign body inflammatory reaction caused by ingrown hairs. PFB occurs most frequently in the beard areas of 45% to 83% of African-American men who shave.<sup>1</sup> When coarse curled hair is shaved, the tips become pointed. These sharp tips, by either extrafollicular or transfollicular penetration, grow into the skin and lead to the formation of painful, pruritic pustules and papules.<sup>1,2</sup> In extrafollicular penetration, the sharp hair tip curves backward toward the skin and pierces the epidermis close to the hair follicle,<sup>3</sup> then continues downward to the dermis. Inflammatory reactions occur in both the epidermis and dermis. Transfollicular penetration occurs when shaving is against the grain and the pointed hair tip grows downward and pierces the follicular wall, resulting in inflammatory papules.<sup>4</sup>

A variety of therapies are available for the treatment of PFB. Surgical depilation is associated with high morbidity,<sup>5</sup> topical agents (corticosteroids, retinoids, and antibiotics) seldom clear all papules and pustules,<sup>6</sup> chemical depilatories may irritate the skin,<sup>6</sup> and electrolysis is labor-intensive.<sup>5</sup> Alpha-hydroxy acid and chemical peels have been useful in some patients.<sup>1</sup> Lasers, including the long-pulsed alexandrite,<sup>7</sup> Q-switched Nd:YAG,<sup>8</sup> ruby,<sup>9</sup> and 800-nm diode<sup>5,10,11</sup> have also been used to treat PFB.

Traditional laser procedures, though effective, are limited by patient discomfort and prolonged healing times, both due to heat-induced skin damage. This report presents two of four case studies describing the use of a new compact Nd:YAG 1064-nm laser using micropulse technology for the treatment of PFB. The device has been used by the author for two years.

#### Case Reports

##### Case 1

A 28-year-old black male presented to the Laser & Rejuvenation Center of Gold Skin Care Center with a history of PFB unresponsive to previous treatments, which included antibiotics (systemic and topical) and topical benzoyl peroxide. Physical examination revealed hyperpigmented papular lesions on the neck and beard areas. After various laser and light source treatment options were reviewed with him in detail, the patient elected to have a series of treatments with the compact 1064-nm Nd:YAG laser using micropulse technology. After signing an informed consent form, the patient underwent a series of laser treatments (6 -7 J/cm<sup>2</sup>) with a collimated lens (6-mm diameter spot size), which permits the operator to work at any distance from the area undergoing treatment. One pass was given to the neck area and bilateral jaw lines. Treated areas were pre-cooled with a cool roller; no anesthesia was used. A soothing gel was applied after each treatment. After eight treatments spaced 4 weeks apart, PFB lesions had substantially cleared (Figures 2 and 3). Adverse effects were transient and limited to minimal erythema and edema.



Figure 2. Right anterior neck of patient before treatment, showing papules and pustules of pseudofolliculitis barbae.

Figure 3. Right anterior neck of patient after 8 treatments with the compact Nd:YAG 1064-nm laser device. Compare with Figure 1, note nearly complete resolution of papules and pustules.

##### Case 2

A 34-year-old black male presented with a long history of PFB, unresponsive to systemic and topical medications, including antibiotics. The patient had various laser and light therapy treatment options reviewed with him and elected to have therapy with the compact 1064-nm Nd:YAG laser using micropulse technology. An informed consent form was signed and the patient underwent a series of five Nd:YAG laser treatments at 4-week intervals with marked resolution of the PFB signs. The laser settings included an energy mode of 7 J/cm<sup>2</sup> with one pass

(with a collimated lens, 6-mm diameter spot size) given to the affected areas. Treated areas were pre-cooled with a cool roller; no anesthesia was used. A soothing gel was applied after each treatment. Clinical results are shown in Figures 4-7. Adverse effects were transient and limited to minimal erythema and edema.



Figure 4. Right anterior neck of patient before treatment, showing papules and pustules of pseudofolliculitis barbae.

Figure 5. Right anterior neck of patient after five treatments with the compact Nd:YAG 1064-nm laser device, showing nearly complete resolution of papules and pustules.

Figure 6. Right posterior neck of patient before treatment.

Figure 7. Right posterior neck of patient after five treatments with the compact Nd:YAG 1064-nm laser device, showing nearly complete resolution of papules and pustules.

## Discussion

In our experience, the 1064-nm Nd:YAG laser using micropulse technology benefits PFB patients in three areas: (1) the wavelength for safety with dark skin types, (2) the practical characteristics and utility of the compact and lightweight system, and in particular, (3) the pulse engineering for pain-free hair removal.

The ability to deliver very high power (wattage) enables this laser to supply sufficient fluence for hair removal in a relatively short pulse duration of 0.65 milliseconds. Using pulse duration shorter than the thermal relaxation time of dermal cells allows efficient, long-lasting and virtually pain-free hair removal. This property can be critical to patient acceptance of this procedure.

This 1064-nm Nd:YAG laser using micropulse technology overcomes the disadvantages of traditional laser devices by cooling of the laser itself using air driven by a small fan, rather

than a system of circulating water. This reduces mass to 22 lb/10 kg with significant cost reduction. In the author's opinion, the efficacy, portability, low cost, and ease of operation make this 1064-nm Nd:YAG laser with micropulse technology suitable for use in small physician offices, especially those in which practitioners wish to start laser procedures. The device is also suitable for use in satellite offices of large practices.

## References

1. Perry PK, Cook-Bolden FE, Rahman Z, et al. Defining pseudofolliculitis barbae in 2001: a review of the literature and current trends. *J Am Acad Dermatol.* 2002;46 (2 Suppl Understanding):S113-119.
2. Brown LA Jr. Pathogenesis and treatment of pseudofolliculitis barbae. *Cutis.* 1983 Oct;32(4):373-5.
3. Weaver SM 3rd, Sagral EC. Treatment of pseudofolliculitis barbae using the long-pulse Nd:YAG laser on skin types V and VI. *Dermatol Surg.* 2003;29:1187- 1191.
4. Kelly AP. Pseudofolliculitis barbae and acne keloidalis nuchae. *Dermatol Clin.* 2003;21:645-653.
5. Kauvar AN. Treatment of pseudofolliculitis with a pulsed infrared laser. *Arch Dermatol.* 2000;136:1343- 1346.
6. Ross EV, Cooke LM, Overstreet KA, et al. Treatment of pseudofolliculitis barbae in very dark skin with a long pulse Nd:YAG laser. *J Natl Med Assoc.* 2002;94:888- 893.
7. Nanni C, Brancaccio R, Cooperman M. Successful treatment of pseudofolliculitis barbae with a long pulsed alexandrite laser. *Lasers Surg Med [abstract].* 1999;Supplement 11:21.
8. Rogers CJ, Glaser DA. Treatment of pseudofolliculitis barbae using the Q-switched Nd:YAG laser with topical carbon suspension. *Dermatol Surg.* 2000;26(8):737- 742.
9. Chui CT, Berger TG, Price VH, et al. Recalcitrant scar- ring follicular disorders treated by laser-assisted hair removal: a preliminary report. *Dermatol Surg.* 1999;25:34-37.
10. Greppi I. Diode laser hair removal of the black patient. *Lasers Surg Med.* 2001;28:150-155.
11. Adrian RM, Shay KP. 800 nanometer diode laser hair removal in African American patients: a clinical and histologic study. *J Cutan Laser Ther.* 2000;2:183- 190.