

Hair Stimulation Following Laser and Intense Pulsed Light Photo-Epilation: Review of 543 Cases and Ways to Manage It

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BACKGROUND

Stimulation of terminal hair growth following photo-epilation is a poorly understood problem with significant clinical relevance. We have observed this problem in a number of patients in our dermatologic laser practice in Basque Country Spain. To better evaluate the incidence and character of this phenomenon a retrospective chart review was performed on all patients who received laser and intense pulsed light (IPL) photo-epilation at this single center within the 5-year period from December 1998 to December 2003. Patient images before and after treatments were compared (digital images after 1999 and non-digital images before year 1999) and the medical history reviewed.

METHODS

Five hundred forty-three patients with Fitzpatrick skin types II, III, and IV (13%, 68%, and 19%, respectively) ranging in age from 16 to 52 years received laser and/or IPL hair photo-epilation of the beard, neck and chin areas, excluding the upper lip. The number of treatments received by each patient ranged from 3 to 23. Hair epilation treatments were performed using a long pulsed 755 nm alexandrite laser (Gentlelase, Candela, Wayland, MA) and IPL source (Epilight, Lumenis, Santa Clara, CA) and a 1,064 nm Nd:YAG (Lyra, Laserscope, San Jose, CA). Only 10% of the treatments were performed with the 1,064 nm Nd:YAG laser. Treatments were usually performed every 2–3 months. The alexandrite laser was used in 85% of the treatments, IPL in 10% and Nd:YAG in 5%. The parameters used are listed in Table 1.

RESULTS

Of the 543 patients who received laser/IPL hair photo-epilation, 57 (10.49%) demonstrated an increase in hair growth compared to baseline. The increased hair growth occurred within the area that was treated and also in the areas bordering the treated area, and appeared thicker and darker than the hairs initially treated (Figs. 1 and 2). An additional 44 (8.10%) patients demonstrated no apparent reduction in hair growth following treatment. Four hundred twenty-four patients (78.08%) demonstrated a decrease in hair growth with ongoing treatments. Only 14 patients (2.5%) were discharged from the clinic due to near complete hair reduction. These results are summarized in Table 2.

The increased terminal hair growth occurred mostly in areas in which fine hair or both fine and coarse hair was present prior to initiation of treatment. Hair growth occurred with greater frequency in patients treated with the Alexandrite and IPL devices compared those treated with the Nd:YAG, however, the later device was used less frequently. Patients that developed terminal hair growth were in the following age groups: 19–31 years, 44 patients; 30–40 years, 8 patients; greater than 40 years, 5 patients. The onset of increased terminal hair growth was noted between the third and tenth treatment in 39 (72.2%) of 57 patients, and 11 (19%) of 57 between the third and fourth treatment. Most patients had a normal hormonal history. Sixteen patients had irregular menses or documented ovarian cysts.

Because the terminal hair growth occurred both within the treated areas and also at the periphery of treated areas it was thought that sub-therapeutic thermal energy delivered to nearby follicles induced terminal hair growth. Subsequent application of cold packs surrounding the treatment area during treatments and treating all patients with two passes has minimized the incidence of terminal hair growth (Fig. 3). Since we have instituted this method in our clinic 2 years ago, we have treated over 200 patients and have not had any patients with hair growth stimulation.

DISCUSSION

Despite the widespread use of lasers and IPL for hair reduction, the biologic mechanism of photo-epilation is largely unknown. Upon treatment with a laser or IPL device, light is absorbed over millisecond pulse durations by melanin contained within melanosomes in the hair matrix and within keratinocytes in the hair shaft [1,2]. Heat energy is transferred from the follicular matrix to the surrounding non-pigmented follicular epithelium and perifollicular dermis [1–4]. Sufficient thermal injury to the follicle and its surrounding tissue results in miniaturization of follicles such that they become clinically unapparent for a variable duration of time [2]. The precise target of thermal injury from adjacent melanosomes or the

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TABLE 1. Laser Hair Epilation Devices and Parameters

Device	Wavelength (nm)	Fluence (J)	Spot size	Pulse duration (milliseconds)	Cooling
Alexandrite gentle plus (Candela™)	755	12–18	12 and 18 mm	3	Cryogen spray 40 milliseconds/ 30 milliseconds
IPL (Epilight™)	645, 690, and 735	35–38	4.5 cm × 0.5 cm	3–20	Cold gel
Long pulsed Nd:YAG (Lyra™)	1,064	24–30	10 mm	35–50	Cold gel

subsequent biologic events that lead to clinical hair reduction is not understood. Potential targets include cells critical for follicular cycling, including the follicular stem cells located within the bulge area of the outer root sheath and cells of the follicular papilla [5]. This may include cell populations necessary for communication during follicular cycling as well as cell populations essential for follicular morphogenesis itself.

Histological studies have shown that within a photo-epilated area not all of the follicles are thermally injured

A**B**

Fig. 1. A: Before photo-epilation. **B:** Terminal hair growth stimulation within and around the photo-epilated area after 12 sessions. [Figure can be viewed in color online via www.interscience.wiley.com.]

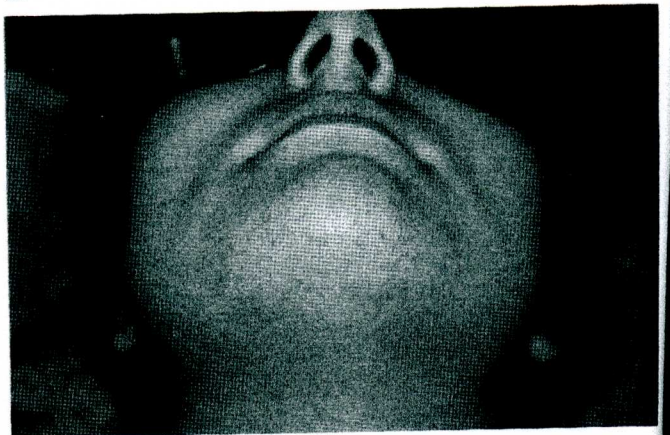
A**B**

Fig. 2. A: Before photo-epilation. **B:** Terminal hair growth stimulation within and around photo-epilated area after five sessions. [Figure can be viewed in color online via www.interscience.wiley.com.]

