

## Intense Pulsed Light (IPL™) System Enables Successful Treatment of Skin Type VI

Michael Gold, MD, & Sherri Street, CCE, Nashville, Tennessee, USA; Franklin Johnson, MD, & Maria Dovale, CMA, Mineola, New York, USA; Arthur Sumrall, MD, Indianapolis, Indiana, USA; and Mitchell Goldman, MD, La Jolla, California, USA

### INTRODUCTION

In our appearance-conscious society, excessive hair is often considered to be a cosmetic defect. There are numerous temporary methods, such as waxing, shaving, tweezing, and depilatories that the consumer can choose from in order to correct the condition; however, permanent hair removal remains elusive. Electrolysis, which is a tedious, painful procedure that requires numerous treatment sessions, is between 15 to 50% effective for permanent hair removal and can result in adverse effects such as scarring or pigmentary changes.<sup>1,2</sup>

Laser hair removal provides a revolutionary approach to long-term epilation of unwanted hair. Though the technology is relatively new, it has already proven to be successful in permanently removing some hairs and inducing prolonged delay in the re-growth of many hairs. Most patients can be treated with minimal discomfort and low risk of scarring and other complications.<sup>3</sup> Laser treatment is generally not recommended for very dark skinned patients due to the risk of pigmentary changes.

Intense Pulsed Light (IPL) therapy achieves hair removal through the same mechanism as laser hair removal. Delivering laser light or intense pulsed light to the skin generates selective destruction of the target via a process called selective photothermolysis.<sup>4</sup> The laser or pulsed light energy is absorbed by the target chromophore, in this case the pigment (melanin) found in the hair. Accumulation of intense heat causes destruction of the hair follicle, thereby disrupting the hair growth mechanism.

The IPL system is particularly successful and offers advantages over traditional laser treatment due to the physical properties of the device. The system delivers intense pulsed light in a broad wavelength spectrum from 590 to 1200 nm. Various cut-off filters can be selected, depending on the patient's skin type, to reach the appropriate target depth. The cut-off filters permit light wavelengths longer than the value of the filter to be delivered to the skin.



Fig. 1: Female with coarse, black hair and folliculitis on the back of the neck before and after a single treatment.

*Michael Gold, MD, and Sherri Street, CCE, Nashville, Tennessee, USA*

For treatment of dark skinned individuals, higher cut-off filters can be used to omit light at lower wavelengths, where absorption of light in epidermal melanin is greatest. With the 755-nm cut-off filter, safer treatment can be extended to skin type VI. Additional protection of epidermal melanin is achieved by the use of multiple synchronized pulses separated by controlled delay times. Reports in the literature have demonstrated the safety of IPL hair removal treatment of various body sites for skin types I-V.<sup>5,7</sup>

We report here on a multi-center study conducted in the United States that evaluated the efficacy and safety of treating very dark skinned patients (skin type VI) with the IPL system.

## METHODS

### Patients

A total of 64 skin type VI patients (58 female, 6 male), ranging in age from 13 to 57 years of age, were entered in a single treatment protocol. Dark brown, black, and black/gray hairs were removed from various areas of the face and body (i.e. stomach, axillae, legs, chest and arms) for a total of 85 anatomical sites. Due to the nature of the hair growth cycle, multiple treatments are necessary for long-term (>3 months) hair removal; however, the nature of this

study was to examine the ability of an IPL system (EpiLight®) using the 755-nm cut-off filter to safely remove unwanted hair on skin type VI. Thus, the results of a single treatment, evaluated up to 12 weeks after treatment, were considered adequate for this protocol.

### Treatment

An identical treatment regimen was utilized by the 4 treatment centers (in the United States) taking place in the study. Prior to enrollment in the study, a detailed medical history and physical examination were conducted with each patient. Photographs were taken, which documented hair appearance before treatment. A before treatment hair count was performed by averaging the number of hairs over three 1 x 1-cm locations. Patients were instructed to shave 1 week before treatment, so that hair growth would be approximately 0.2-5 mm long. A small test area was treated to evaluate skin response and patients returned after 1 or 2 weeks for treatment. A single treatment protocol was administered.

A thick layer of clear, cooled coupling gel was applied to the skin immediately before treatment. The gel served as a heat sink to ensure epidermal cooling during the pulse sequence and to improve optical coupling into the skin. The treatment head with the 755-nm cut-off filter was lightly applied to the skin



Fig. 2: Female with coarse, black hair and folliculitis in the bikini area before and after a single treatment.

Michael Gold, MD, and Sherri Street, CCE, Nashville, Tennessee, USA

and fluences of 24-26 J/cm<sup>2</sup> were delivered. Quadruple pulses of 2 to 3-msec duration were utilized with a 125-msec delay between pulses. Ice packs were applied to the skin after treatment, where necessary. No anesthesia of any kind was administered. The immediate treatment response was recorded and follow-ups were performed at 2, 4, 8, and 12 weeks. Hair density was calculated at each follow-up, photographs were taken, and any changes to the skin or hair were assessed.

## RESULTS

Hair counts were conducted immediately after treatment for 83 of the 85 anatomical sites and the average hair clearance was calculated to be 21.6%. Damaged hairs continued to fall out during the follow-up interval, so that the average hair clearance increased to 53.3% by week 2 (fifty-six sites examined). Hair counts recorded at weeks 4 and 8 (70 sites and 67 sites, respectively) were relatively constant with 58.5% clearance at week 4 and 58.3% clearance at week 8. All 85 anatomical sites were examined at week 12 to complete the protocol and the average hair clearance was calculated to be 68.1%.

Adverse effects, following treatment and observed at each follow-up, were mild and transient. The most common side effect was epidermal erythema, which occurred in 52 (61%) cases. Follicular erythema occurred in 6 cases and edema in 8 cases. By the 2nd

week follow-up, all of these side effects had resolved. Hyperpigmentation developed in 3 sites, observed at week 2. Two of these sites cleared during the 2-week interval before the next follow-up. By week 12, there was only 1 case of a pigmentary change - unresolved hyperpigmentation (first observed at week 2).

The treatment parameters, used in this study, resulted in an average clearance that is comparable to results observed in other studies on skin types I-V, as well as to results normally observed in the centers involved in this study. Furthermore, side effects were minimal and transient. However, experience garnered from treatment of numerous patients, since this protocol, has led to more refined treatment parameters. The following parameters are now commonly used for treatment of skin type VI patients: 755-nm cut-off filter; fluence of 31 J/cm<sup>2</sup>; triple pulses of 3.6 msec duration and 100 msec delays for the treatment of fine hair; and 755-nm cut-off filter; fluence of 30 J/cm<sup>2</sup>; triple pulses of 3.6 msec duration and 170 msec delays for the treatment of coarse hair.

The results clearly demonstrate that the IPL system with the 755-nm filter provides safe and effective photo-epilation for the removal of unwanted hair in skin type VI patients.



Fig. 3: Female with pseudo folliculitis barbi and hirsutism beneath the chin before and 1 year after last treatment.

Franklin Johnson, MD, and Maria Dovale, CMA, Mineola, New York, USA

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### **ESC Sharplan Headquarters - Corporate**

ESC Medical Systems, Ltd.  
Yokneam Industrial Park  
P.O.B. 240  
Yokneam 20692, ISRAEL  
Tel 972.4.959.9000  
Fax 972.4.959.9050

### **ESC Sharplan Headquarters - The Americas**

ESC Medical Systems, Inc.  
100 Morse Street  
Norwood, MA 02062 USA  
Tel 781.278.7600  
Tel 800.562.5916  
Fax 781.278.7700

### **ESC Sharplan Headquarters - Europe**

ESC Medizintechnik Vertriebs GmbH  
Leonardsweg 2  
D-82008 Unterhaching b. Munchen GERMANY  
Tel 49-89 6653 9305/06  
Fax 49 89 6653 9307

### **ESC Sharplan Headquarters - Asia**

ESC Japan Ltd.  
2nd Floor, No. 31 Kowa Building  
19-1, Shiokanedai 3-Chome  
Minato-ku, Tokyo JAPAN  
Tel 81 3 5447 1677  
Fax 81 3 5447 1680

Websites

[www.escomed.com](http://www.escomed.com)  
[www.skinandhealth.com](http://www.skinandhealth.com)