

Treatment of Photoepilation with SharpLight DPC Technology

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ABSTRACT

This paper describes the SharpLight photoepilation system with Dynamic Pulse Control (DPC) technology. The availability of the DPC in IPL Hair Removal enables a higher safety margin for effectively treating dark skin patients. Forty (40) patients of skin types II to V participated in 4 treatment sessions, performed every 3 month. Effective hair removal was observed in all cases with both, patient and practitioners, expressing high satisfaction with the procedure and its results. No adverse effects were observed apart from temporary erythema, in a few cases, which resolved without complications.

INTRODUCTION

Over the past decade, the trend in cultural and social perception of the “aesthetically ideal” amount of body hair has been toward less and less body hair, for both males and females.

The most common technique currently used in hair removal procedures is photoepilation: the use of lasers or filtered intense pulsed light (IPL) to cause hair-follicle coagulation. This technique is based on the theory of Selective Photothermolysis. It requires a series of treatment sessions spaced 1-3 months apart and is associated with minimal discomfort and side effects.

The photoepilation application is an IPL system which features Dynamic Pulse Control (DPC) technology and thermoelectric Skin Contact Cooling to enhance safety, comfort and efficacy on skin types I to V.

DYNAMIC PULSE CONTROL

Dynamic Pulse Control was developed to enable an additional dimension in controlling

safety and efficacy of photoepilation on all skin and hair types.

In addition to pulse duration control which is available on most lasers and IPL photoepilation Platforms, DPC enables pulse configuration control. For each fluence and pulse duration setting, light energy may be released in one of three DPC settings: Smooth Pulse, Long Pulse and High Pulse which is the most aggressive. Light skin patients and light/thin hair can tolerate more aggressive energy delivery while darker skin and dark/thick hair can be effectively removed with minimally energy delivery which is essential to assure safety.

Dynamic Pulse Control is enabled through the use of state-of-the-art pulse forming network (PFN) electronics designed specifically for the SharpLight systems. Setting of the DPC is based on patient skin type, hair color and hair thickness according to the following:

Smooth pulse: Delivers a “square” homogenous pulse with low peak power,

hence slow heating effect. Is indicated for skin types I to V and thick, dark hair.

Long pulse: Delivers a train of pulses at 50% duty cycle (on-time equal's off-time). It is indicated for skin type's I-IV and medium brown hair.

High pulse: Delivers a train of pulses with high peak power. It is indicated for skin type's I-III and fine light hair.

CONTACT COOLING

The hand piece incorporates a Sapphire light guide which is cooled to very low temperatures using a thermoelectric cooler (TEC). Due to a highly efficient design, epidermis temperature is maintained at around 5°C even when treating continuously large body areas. This integral skin contact cooling significantly enhances patient safety particularly when treating dark skin patients. In addition it enhances efficacy since it allows safe use of higher fluences and finally it improves patient comfort since these low temperatures induce an analgesic effect. As practitioners are well aware, patient's satisfaction in photoepilation is both a function of treatment efficacy as well as no pain and comfort during the treatment.

Both DPC pulse control and TEC contact cooling allows safe use of higher energy fluences which results in improved treatment efficiency with fewer treatment sessions.

MATERIALS AND METHODS

This photoepilation clinical study was performed with the Formax and Omnimax system equipped with the following hand pieces:

HR 580-950 nm, Orange filter

HR 635-950 nm, Red filter

HR 730-950 nm, Violet filter

HGR 635 nm, EasyMax 1 million pulses

System specifications are:

Dynamic Pulse Control (DPC):

Smooth, Long or High Pulse

Pulse duration: 15, 30, 40, 50 and 100 msec

Spot size- 6.4 / 3.4 and 1.5 cm²

Fluence range: from up to 30 J/cm² depending on the spot size

The study was conducted at the American Laser Clinic (AML) Rishon Le Zion, Israel from October 2007 to October 2008.

Forty (40) subjects, aged 20 to 60 years old, with Fitzpatrick's skin types II-V, underwent four treatment sessions spaced three months apart.

Of the 40 patients, 20 were male and 20 were female. 60% were less than 40 years of age.

Anatomical sites included: face, axils, bikini lines, chest, abdomen, shoulders, backs, arms and legs.

Treatment parameters applied were based on the test results as observed 30 to 60 minutes after light application. End point was mild diffused erythema with distinct per follicular response which shows up as circular erythema/edema around each follicle. In the case of skin type V patients a wait of at least 24 hours for a potential delayed response was practiced. All patients completed a medical-history questionnaire, and were screened for any contraindications.

All patients were briefed on the procedure, including potential complications and realistic expectations, and then signed an Informed Consent Form.

Body areas designated for treatment were photographed and then shaved.

No topical anesthesia or gel were required, nor were any applied.

No additional external skin cooling technique was required. A test was first conducted to determine the optimal treatment parameters for each patient.

Side effects of treatment, such as pain or excessive erythema or edema, as well as any adverse effects such as burns, hypopigmentation or hyper-pigmentation, were recorded.

Subjective overall patients' satisfaction with the procedure was recorded.

RESULTS

Use of the platform with DPC yielded the following results:

36 patients (75 %) exhibited very good immediate skin reaction with the recommended parameters; 2 patients (12.5%) exhibited only slight skin reaction and 2 patients (12.5%) exhibited over reaction with the recommended test parameters.

Only two cases of mild adverse events were recorded: erythema which lasted for a few hours then spontaneously resolved without any further complications.

All the patients were able to bear the treatment without excessive sensation of pain. No significant discomfort was recorded. Practitioner's satisfaction grades are summarized in table 1 and patients' satisfaction grades are summarized in table 2.

Table 1. Practitioner's Satisfaction Grade

| Response Category | Males | Females |
|-------------------|-------|---------|
| Very satisfied | 18 | 18 |
| Satisfied | | 2 |
| Not satisfied | 2 | |

Table 2. Patient's Satisfaction Grade

| Response Category | % of Treated Patients |
|-------------------|-----------------------|
| Very satisfied | 75 |
| Satisfied | 12.5 |
| Not satisfied | 12.5 |

Figure 1. Skin type IV, Male back and shoulders



Figure 2. Skin type IV, Female bikini line



Figure 3. Skin type IV, Female axils



CONCLUSIONS

This clinical study has demonstrated high safety and efficacy of the platforms in treating skin type III-V patients for photoepilation. The study resulted in very high patient satisfaction with 75% of the patients reporting high satisfaction.

No significant side effects and no complications were observed during the study.

The high level of safety and comfort observed by the practitioner and reported by the patients is attributed to both the DPC pulse control and TEC contact skin cooling. The availability of an additional 730nm hand piece potentially extends the applicability to darker skin types.

SUMMARY

Photoepilation has become the treatment of choice for male and female patients, on any body area where hair removal is desired for aesthetic purposes.

SLT platforms with DPC technology and Contact Cooling 4 hand pieces is a step forward in the research of maximum effectiveness and safety in the hair removal field.

The treatments assessments for the proposed protocol have yielded excellent results: 87.5 % positive reactions.

Erythema and per follicular edema were evident in a high percentage of the cases

The practitioners performing this study have many years of experience performing photoepilation with both lasers and other IPL systems. They found that the addition of the DPC as well as the contact cooling allows use of higher fluences, reduces the required number of treatment sessions, negates the need for anesthesia and minimizes side effects and complications.

Some of the patients had previously experienced treatments with other photoepilation Platforms and expressed clear preference for the Sharplight's treatment due to reduced sensation of pain and overall improved treatment comfort.

(75 %), which indicates hair follicle coagulation and subsequent hair reduction.

Adverse secondary effects were minimum (12.5 %) and transient, and there were no pain complaints.

87.5 % of the patients were very satisfied with the treatment, with the practitioners' work during the treatment sessions, and with the final, faster results.

The practitioners were highly satisfied with the treatments and the patients' responses to it, as it offers an easy method of operation and allows for uninterrupted treatment application within each session.

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