Optimizing the Efficacy and Comfort of Laser Hair Removal Treatment

A Review of Laser Hair Removal Products with Mary P Lupo MD

Introduction

For years, hair removal has been the top cosmetic laser procedure, only being surpassed in 2012 by laser photorejuvenation as the most commonly performed aesthetic laser procedure (2012 American Society for Dermatologic Surgery, Procedure Survey). New, more automated systems are helping simplify laser treatments for physicians and their supervised staff, which makes the equipment more appealing and easier to use in the office to address the demand for laser hair removal (LHR).

Physicians who wish to maintain or increase their share of the laser hair removal market must find ways to differentiate themselves from competitors and to offer a treatment that is optimized for efficacy and comfort. While a practitioner's skill and expertise play a large role in the treatment experience, the choice of laser hair removal system also has significant impact on patient satisfaction in both the near and longer term. Data indicate that the two LHR areas with which physicians are most concerned are patient pain and efficacy (Medical Insight, Inc., Global Aesthetic Market Study, January 2013.) Here we compare the data describing the efficacy, pain, and treatment time for the LightSheer® DESIRE™ (Lumenis®, Inc.) and Vectus™ (Palomar Medical Technologies, Inc.) LHR systems and demonstrate that the LightSheer DESIRE provides more effective hair removal with less pain and time.

Efficacy

Several published clinical studies have evaluated the efficacy of the LightSheer systems, alone or in comparison with other LHR systems. A study conducted in 29 Chinese women compared the safety and efficacy of the LightSheer (LS) 9 mm x 9 mm ChillTip handpice (LSET) with a 1064 nm Nd:YAG laser system (Ruohong et al., 2010). In this study, each woman served as her own control, with one axilla treated with the LSET and the other treated with the Nd:YAG laser. Patients were treated three times, each at 4-week intervals. Cold lubricating gel was applied prior to treatment with the LSET. Reported outcomes in this study included hair shaft diameter, regrowth rate, hair reduction, and treatment-associated pain, which were assessed before the first treatment, and 4 weeks after each of three treatment sessions. Hair reduction as a percentage of the quantity of hair present at the start of treatment was significantly greater for the LSET compared with the Nd:YAG laser at first (60.09 ± 15.84% vs. 41.44 ± 18.37%) and second follow-up (78.56 ± 11.28% vs. 64.50 ± 12.83%). Hair reduction was not calculated at the third follow-up visit because the amount of regrowth at that time point was insignificant. This study provides evidence that the LightSheer more effectively reduces the amount of hair compared with an Nd:YAG laser.

Another study compared the LSET handpiece with the Lumenis LS High-speed (LSHS) handpiece (Zhou et al. 2011). Although both systems utilize an 800 nm diode laser, compared with the LSET, the LSHS has a bigger spot size (22 mm x 35 mm vs. 9 mm X 9 mm respectively) and lower energy density (4.5-12 J/cm ^{2} vs. 10-100 J/cm^2). Additionally, the LSET minimizes pain through the use of contact cooling (ChilTip™ Technology), while the LSHS achieves this objective through the use of vacuum-assisted HIT™ (High-Speed integrated Technology). In this study, 36 Chinese women had one axilla treated with the LSET and the other treated with the LSHS. Each axilla was treated three times at 4-6 week intervals.

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Hair reduction and patient-reported pain scores were assessed at each visit. Three months after the final treatment, there was no significant difference in the hair reduction rate between the LSET and LSHS-treated sides (72 ± 18% vs. 73 ± 18%), although pain scores were lower with the LSHS These results demonstrate that the reduced energy density of the LSHS does not compromise efficacy of hair reduction even though it provides patients with a more comfortable treatment experience.

The impact of the large spot size and vacuum-assisted HIT™ used in the LSHS has further been evaluated in clinical trials. In one study, 34 women underwent axillary treatment with the LSHS for three treatment sessions at 4- to 6-week intervals (Ibrahimi and Kilmer, 2012). Patients rated their pain using the Visual Analog Scale (VAS) following each treatment session. Long-term follow-up visits were conducted at 6 and 15 months, at which hair clearance analysis was conducted.
At the 6-month follow-up, the average hair clearance following three treatment sessions in all 34 patients was 54 ± 24% (p < .001). For the 23 patients who returned for the 15-month follow-up visit, average hair clearance was 42 ± 25% (p < .001). Of these 23 patients, 43.5% had hair reduction in the range of 50% to 75%. At the 15-month follow-up, statistically significant decreases were also observed in hair thickness (19 ± 18%, p < .001) and hair color (10 ± 13%, p < .001).The authors hypothesize that the technological advances incorporated into the LSHS correlate with greater patient and physician satisfaction. This is due in part to the large spot size of the LSHS which reduces the number of pulses required to cover a desired area and enables faster treatment times, as well as to a favorable pain profile (Figure 1).

Although the LSHS handpiece, utilizes lower level of fluence (12J/cm^2), it was shown to provide comparable hair reduction results to the LSET (25 - 30 J/cm^2) with 3-month follow-up after five treatment sessions (Halachmi and Lapidoth, 2012). Halachmi et al. attribute it to several factors as the effect of the vacuum in creating a three-dimensional geometry combined with the gold platted chamber, which improves the delivery of the light relative to the flat surface of the LSET.

In contrast to the growing body of peer-reviewed literature that supports the efficacy of the LightSheer technology, the only efficacy data available for the Vectus system appear in a non-peer-reviewed, company-written paper, which describes a single, 8-patient study (Lowery et al.). In this study, the 8 patients served as their own controls, with the LightSheer used to treat one axilla and the Vectus used to treat the other. These 8 patients were subdivided into two groups, with 4 patients undergoing treatment with the small optics of each system, and 4 undergoing treatment with the large optics. Although the authors state that there was a statistically significant difference in hair reduction 6 months following completion of all three treatment sessions (18 ± 16%, p < 0.01) favoring the Vectus system, it should be noted that this value reflects data from all 8 patients even though treatment varied among subjects. Additionally, no data are provided on the average fluence for the 8 patients. The small overall sample size of this study and the even smaller sample size for the treatment subsets make it difficult to draw definitive conclusions about the efficacy of the different systems relative to each other and calls the statistical analysis into question, as does the lack of a standard error analysis for their average values of hair reduction in the various treatment groups. Moreover, the 6-month hair reduction of 46% for the LS reported in this study is below the 6-month hair reduction reported in several peer-reviewed studies of the LS. although the authors claim that this result is "similar" to the 54 ± 24% reduction reported by Ibrahimi and Kilmer (2012).
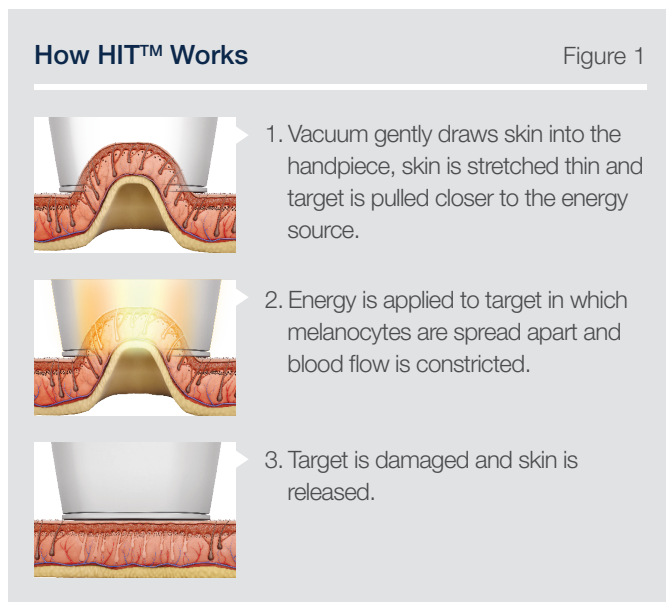
Pain

Patient pain is one of the two most concerning areas for physicians performing LHR (Medical Insight, Inc., Global Aesthetic Market Study, January 2013.)

The LightSheer DESIRE includes vacuum-assisted HIT™ (High-Speed Integrated Technology) which is designed to increase patient's comfort during and after treatment. The suction created by the vacuum stretches the skin, making it thinner and bringing the hair follicle and the energy source into closer proximity with each other. This enables effective treatment at lower fluence levels, which eliminates the need to apply topical anesthetics and increases patient comfort.
The stretching of the skin also spreads melanocytes apart, thus

reducing the number of competing chromophores in the skin and allowing more efficient delivery of laser energy to the hair follicle. The benefits of this technology with respect to reducing treatment-related pain have been documented in multiple studies in which patients report that the LightSheer treatment is less painful than other laser hair removal systems, including the Vectus.

A study conducted in five men found that mean VAS was lower for the LSHS (2.2 ± 0.37) than for the LSET (3.2 ± 0.6) when used for removal of back hair (Xia et al. 2010). In this study, each man was treated with the LSHS in three different areas on the right back and with the LSET on three different areas of the left back. The authors conclude that the LSHS handpiece has a tendency to be more comfortable compared with the sapphire-cooled handpice of the LSET.

How HIT™ Works   Figure 1

1. Vacuum gently draws skin into the handpiece, skin is stretched thin and target is pulled closer to the energy source.

2. Energy is applied to target in which melanocytes are spread apart and blood flow is constricted.

3. Target is damaged and skin is released.

An internal analysis conducted by Lumenis found that average VAS scores were significantly lower for the LSHS (2.2 ± 0.5) than for the Vectus large spot size (3.9 ± 0.5) (p < .01) In this analysis, 15 patients (7 female, 8 male) were treated with the LSHS on one side and the Vectus on the other side (treatment areas included calf, back, neck, chest, axillae, bikini line, and arm). Seven patients were treated with the LSHS first followed by the Vectus; 5 were treated with the Vectus followed by the LSHS; and 3 were treated with both devices in parallel using similar fluences. These data also support the utility of the

LightSheer HIT™ in reducing pain during laser hair-removal procedures.

The LightSheer has also been shown to provide improved patient comfort compared with an Nd:YAG laser system (GentleLase Pro-U, Candela Corp.). In a study of 29 Chinese women, patients' pain, as rated by the VAS was significantly lower on the LSHS treated axilla compared with the Nd:YAG-treated axilla following the second and third treatment sessions. Overall, patients found the LSHS treated side less painful than the side treated with the Nd:YAG laser. (Ruohong et al., 2010) Ibrahimi et al. (2012) showed that 39% of the patients treated with the LSHS, reported no (0) to slight pain (2) and hypothesize that the advantages in the device design associate with greater patient and physician satisfaction.

Zhou et al. (2011) suggest that the significantly low levels of pain obtained during treatment with the LSHS are due to the negative pressure generated by the vacuum-assisted technology which activate touch and pressure receptors of the skin thereby blocking the transmission of pain signals to the brain.

Another study found the LightSheer to be less painful than a hair-removal system using a 755 nm alexandrite laser (GentleLase, Candela Corp.) (Amin & Goldberg 2006). In this study, 10 subjects were treated with the LSET the GentleLase, and two intense-pulsed light systems on the back or leg. Each subject was treated with each device in non-overlapping areas. The mean pain score was 2.8 ± 0.8 for the LSET and 4.1 ± 1.8 for the GentleLase. The authors conclude that hair-removal devices utilizing contact cooling appear to cause less discomfort than devices that use alternative cooling methods.

Taken together, these data provide evidence that the LightSheer is less painful than the Vectus and other laser hair removal systems.

Treatment Time
The treatment time for hair removal procedures is important to both patients and physicians. For patients, shorter time mean less inconvenience. For physicians, faster treatment allows more patients to be seen in a given unit of time, increasing office productivity and revenue.

In a study comparing the LightSheer HIT™ handpiece and the

LSET sapphire-cooled handpiece the authors conclude that treatment with the LSHS is faster (Xia et al. 2010). An internal analysis conducted by Lumenis on 15 patients undergoing laser hair-removal in a variety of treatment areas found that the mean treatment time was 0.1 ± 0.02 hours (average of 6 minutes) of the LightSheer and 0.16+0.02 hours (average of 9.6 minutes) of the Vectus.

Although the promotional literature for the Vectus claims that full treatment of the male back can be done in 5 minutes, this interval does not include time required to measure melanin levels (1 minute), apply gel (2 minutes), or remove gel (1 minute). These additional steps increase total treatment time to 9-10 minutes for the Vectus, compared with 6 minutes to fully treat the male back using the HS handpice of the LightSheer DESIRE.

Physician Perspective

I have been using a LightSheer device since I first began offering my patients LHR in 1999. The ongoing improvements in technology found in each of these systems have allowed me to provide my patients with a safe, effective, and comfortable LHR experience. In addition to developing high quality LHR systems, I have found that Lumenis also provides excellent customer support, helping to make sure that my practice gets the most value out of its investment in the LightSheer product line.

My office conducts LHR procedures on 25-30 patients each month, and patients report a high level of satisfaction with the procedure and the results of their LightSheer treatment. I routinely use the LightSheer system for a variety of aesthetic purposes, including removal of hair from the axilla, face, bikini line, and legs for female patients, and the back and neck for male patients. I have also had very positive experiences using the LightSheer system for non-aesthetic procedures to treat folliculitis, pseudo folliculitis, inflammatory lesions and granuloma. One reason that patients have such a positive experience when I use a LightSheer system for LHR is that the procedure produces little to no pain during or after treatment. This is due to the HIT™ that is incorporated into the LightSheer handpiece, which helps to bring follicle closer to surface, enabling effective treatment at lower energy level.

Also, the sensation of suction provides "distraction" anesthesia

that reduces the sensation of pain that may arise from heating of the skin.

In addition to its increased level of comfort, another aspect of the LightSheer DESIRE that I find to be highly advantageous is its ability to target pigment within the hair follicle effectively. Light absorbed by melanin generates heat, which damages the follicle and results in long-lasting hair removal and permanent hair reduction. The efficacy of this targeting is greatest when there is a high degree of contrast between the color of the skin and hair. Consequently, I've seen very positive outcomes for patients who have darker hair and lighter skin, but don't consider this a practical approach to treating very light hair or fuzz.

The market for LHR is becoming increasingly crowded and competitive due to the growth of medi-spas and other providers of aesthetic services. From time to time this competition has impacted the number of patients that come to me for LHR. However, patients who visit a medi-spa or aesthetician often come back to me because they find treatment in my office with a LightSheer device to be faster and more comfortable while providing more effective hair removal. As a result, the LightSheer system not only provides value to my patients by giving them a better experience, it adds value to my practice by differentiating the care that I provide from that of the competition.

My highly trained and experienced laser technician is another reason that my patients return to my office for LHR even when they have other options. Training my technician to use the LightSheer was fast and simple, and created additional opportunities to generate revenue for my practice by allowing the technician to conduct LHR procedures while I see other patients. My patients have an added level of comfort in knowing that the technician performing their LHR treatment was trained by a physician, and that I am immediately available for unusual or more complex LHR cases.

My patients are a priority, and managing my practice effectively is essential for meeting my patients' needs today and in the future. The LightSheer products help me to achieve both those objectives by providing my patients with fast, comfortable, and effective hair removal while positioning my practice for success in an increasingly competitive market.

About Mary P Lupo MD

Dr. Lupo is a board certified dermatologist and clinical professor of dermatology at Tulane University School of Medicine. She is a fellow of the American Academy of Dermatology and American Society for Dermatologic Surgery. Dr. Lupo serves as a member and as advisory board member for numerous organizations. She also served as the Louisiana vice-chair for the Dermatology Foundation Leaders Society Campaign. She is a founding director of The Cosmetic Boot Camp, an innovative CME program that teaches board certified core aesthetic physicians the latest techniques for aging skin correction. Dr. Lupo is the author of more than 60 published articles and book chapters, and she has been a speaker on various dermatological topics at more than 250 national and international meetings and seminars. She is often quoted in national beauty magazines on various dermatological topics from acne to aging skin and from skin cancers to fillers and cosmeceuticals. She has appeared on E! Entertainment Network, the Food Network, CNN news, and The View as well as local CBS, NBC, ABC and FOX affiliates in New Orleans.

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