Intense Pulsed Light Versus Flourescent Pulsed Light for Photodamaged Skin: A Split-Face Comparison

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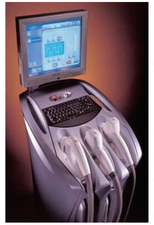
ABSTRACT

Intense pulsed light (IPL) has been the standard for treating photodamage nonablatively. This prospective, randomized, controlled, single-blind split-face trial compared two multi-technology broadband pulsed light platforms for the treatment of photodamage: The Lumenis One IPL system (Lumenis Corporation, Santa Clara, CA) and the upgradeable Harmony pulsed light system (Alma Lasers, Chicago, IL). Eight volunteers (skin types I–IV, mean score 2 on the 0–4 Global Score for Photoaging) received three to five treatments three weeks apart utilizing the Lumenis One on one half of the face and the Harmony on the other. Parameters were aggressive and determined by test spot application with endpoints of mild erythema and heat. Patients received three complete passes during each treatment session. Refrigerated cooling gel was applied prior to treatment. No topical anesthesia was used. Investigator and patient self-assessments, as well as evaluation of before and after photographs by two blinded dermatologists, showed similar fading of dyspigmentation, telangiectasias and erythema, as well as similar textural improvement. Patient assessment of discomfort during treatment was also comparable. There were no adverse effects.

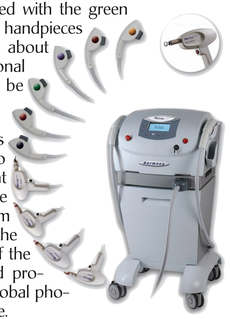
INTRODUCTION

For more than ten years intense pulsed light (IPL, 500–1200 nm) has been a popular nonablative modality for telangiectasia, erythema, lentigo, dyspigmentation and reduced skin quality secondary to photoaging. In 2000, visible improvement in wrinkling, dyspigmentation, telangiectasia, coarseness, and pore size was shown in more than 90% of patients in a full-face study of IPL by Bitter,[1] in which downtime was minimal and patient satisfaction surpassed 88%.

At least six manufacturers actively market IPL devices in the United States, and thousands of competing systems have been sold. However, to the author's knowledge, there have not been any split-face trials comparing the efficacy of various IPL devices. Lumenis One is from Lumenis Corporation (Israel, US headquarters in Santa Clara, CA), a platform with a Universal IPL handpiece capable of delivering wavelengths from 515 to 1200 nm with multiple cut-off filters in the 515 to 755-nm range. It is also the most expensive IPL on the market today and is quite large (154 kg., 67x47x159 cm), requiring it to be serviced on site. The Lumenis One can also be equipped with a long-pulsed Nd:YAG (1064-nm) handpiece and an 810-nm diode laser handpiece for hair removal. The retail price of the basic unit (left) with the Universal IPL handpiece costs about $90,000, not including the additional equipment.



The Harmony (Alma Lasers, Israel, US headquarters in Chicago) is a multi-technology platform that can accommodate 11 different handpieces delivering pulsed light, Q-switched and/or long pulsed Nd:YAG, Er:YAG, fractional Er:YAG, infrared light (800–1320 nm) for nonablative skin tightening, and more. The device weighs 40 kg with dimensions of 65x45x40 cm. Due to this small footprint and weight, the Harmony unit can be shipped to Chicago for depot servicing. Downtime due to device malfunction is reduced to about one day because Alma Lasers sends out a "loaner" device via overnight carrier. Depot service is usually half the cost of traditional on-site technical service and provides more rapid turn around time. The Harmony device equipped with the green and yellow pulsed light handpieces used in this study costs about $60,000, and an additional nine modalities can be added.



The purpose of this prospective study was to determine if fluorescent pulsed light from the Harmony (right), a system that is less then half the size, weight, and price of the Lumenis One IPL, could provide similar results for global photorejuvenation of the face.

METHODS

Eight volunteers recruited from a single group practice received a series of three to five split-face treatments three weeks apart, in which one half of the face was treated with the Harmony pulsed light device, and the other half was treated with the Lumenis One IPL device. All patients were Caucasian (mean age 45 years, skin types I–IV) with a modest degree of photoaging (mean score 2 on the 0–4 Global Score for Photoaging) including dyspigmentation, erythema, telangiectasias, and tactile roughness.

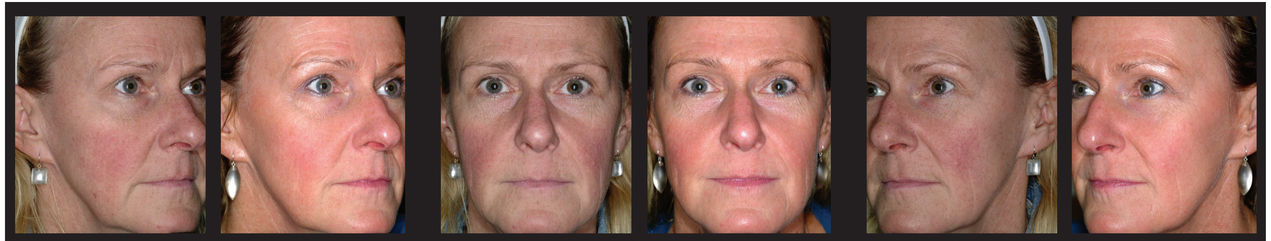


Figure 1. A 40-year-old woman (skin type II) before and after five split-face pulsed light treatments at 3-week intervals. Left face (Harmony): two passes with green head (540 nm, 15–20 J/cm², 10–12 ms pulse duration) followed by one pass with yellow head (570 nm, 16–20 J/cm², 10–12 ms pulse duration). Right face (Lumenis): 515/560/590-nm cut-off filters, double pulses (4.0/4.0 ms, 20-nms delay); 590-nm cut-off filter, triple pulse (3.0/3.0/3.0 ms, 30-ms delays); three passes at 17 to 20 J/cm².

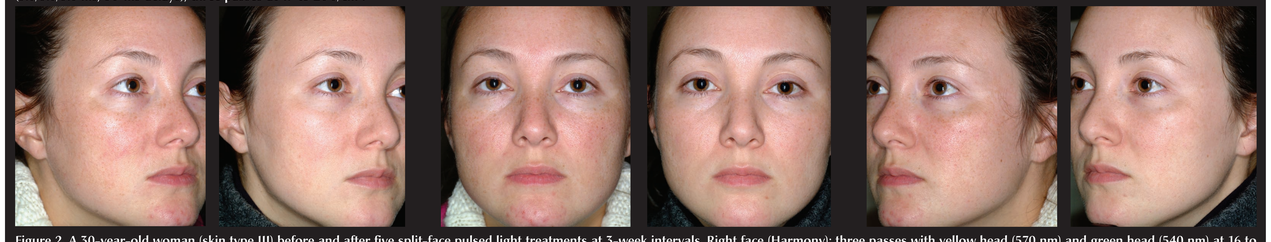


Figure 2. A 30-year-old woman (skin type III) before and after five split-face pulsed light treatments at 3-week intervals. Right face (Harmony): three passes with yellow head (570 nm) and green head (540 nm) at 16 to 19 J/cm² and 10-ms pulse duration. Left face (Lumenis): three passes with 560-nm cut-off filter, double pulses (4.0/4.0 ms, 20-nms delay) and 16 to 19 J/cm².

Following informed consent the patients washed their faces, and a thin layer of refrigerated cooling gel was applied to all treatment areas. No topical anesthesia was used on either facial half. One side of the face was treated with the Lumenis One using the 515-nm, 560-nm and 590-nm cut-off filters (double pulsed, 3.0–4.0 ms pulse durations, 10–20 ms pulse delay). Three passes were done using aggressive fluences (14–21 J/cm²), chosen following a test pulse that achieved a clinical endpoint of erythema and heat. The contralateral side of the face was treated with the Harmony platform using the green (540–950 nm) and yellow (570–950 nm) fluorescent pulsed light handpieces (single pulsed light, 10–12 ms pulse durations). Three passes were done using aggressive fluences (14–20 J/cm²) chosen following a test pulse that achieved a clinical endpoint of erythema and heat. Patients were instructed not to actively tan between treatments, and to use sunscreen when venturing outside.

Photographs of the frontal and oblique views of the face were taken of all subjects before treatment and one month after treatment, using a Canfield Fuji S2 digital camera with a standard fixed focal distance and chin rest to assure consistency. Patients washed their faces prior to photography.

RESULTS

All eight patients completed the study. Two blinded dermatologists evaluated telangiectasia, erythema, mottled pigmentation, and textural improvement on a 1–4 scale (1=0–25%, 2=26–50%, 3=51–75%, 4=76–100%) by comparing pre treatment and post-treatment photographs.

Table 1 shows the results for the improvement of telangiectasia and erythema, pigmentation and skin texture as graded by evaluators. There were no clinically obvious differences.

Table I: Patient Improvement

	Telangiectasia & Erythema		Pigmentation		Skin Texture	
Patient	Harmony	Lumenis One	Harmony	Lumenis One	Harmony	Lumenis One
1	3	4	4	4	3	4
2	3	3	3	3	4	4
3	3	3	4	4	3	4
4	3	3	4	4	4	4
5	3	3	3	3	4	4
6	4	4	4	4	3	3
7	4	3	3	3	3	3
8	2	3	3	3	3	3

*As graded on a scale of 1 to 4 where 1=0–25% improvement, 2=26–50% improvement, 3=51–75%improvement, 4=76–100% improvement.

DISCUSSION

Photographs taken one month following the final treatment were compared by blinded evaluators to similar photographs taken at baseline. Investigators did not see any objective difference between the two sides of the faces with respect to dyspigmentation, vascular changes, or textural improvement.

Patients were asked to evaluate the pain associated with each treatment, and to compare the results of the left and right sides. At the conclusion of the study patients evaluated their results by comparison with pretreatment photographs, and were asked if they saw any differences between the left and right sides of their faces. None of the patients reported any subjective difference between the two sides of their faces with respect to dyspigmentation, vascular changes, or textural improvement, and they unanimously rated both sides' global improvement as equal. Additionally, both treatments were equally well-tolerated, with no difference in the incidence or profile of adverse effects.

The Harmony platform is smaller, lighter, less expensive to purchase and maintain, and can be upgraded with a variety of additional light-based modalities the Lumenis One does not offer. Because efficacy between the two instruments is basically equal with regard to photoaging, Harmony has a clear advantage over the Lumenis One for a clinician who wishes to offer other light-based modalities without purchasing another system.

CONCLUSIONS

After treatment, comparison of facial halves did not reveal any clinically obvious differences by investigator evaluation or patient self assessment. Both treatments were well tolerated, with no difference in the incidence or profile of adverse effects. In an increasingly competitive marketplace for cosmetic light-based treatments, the more cost effective, multi-technology Harmony platform offers a competitive advantage over the overall costs of multiple stand-alone systems without compromising efficacy.

DISCLOSURE

The author has received honoraria and equipment discounts from both Lumenis and Alma Lasers. The study was devised and funded by the author.

REFERENCE

1. Bitter P. Non-invasive rejuvenation of photodamaged skin using serial, full-face intense pulsed light treatments, Dermatol Surg 2000;26,835-843.