

**Intense pulsed light technology and its improvement on skin aging from the patients' perspective using photorejuvenation parameters.****Daniel Laury, MD ¹****Dermatology Online Journal 9 (1): 5**

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Abstract

Intense pulsed light technology (IPL) has been used for photorejuvenation or the reversal of skin aging. There are few studies to address the putative benefits from the patients' perspective. This information is critical for adequate patient counselling and satisfaction. The goal of this study was to quantify the change in apparent facial age that can be expected from the patients' point of view. Using currently available parameters that have been individualized to patients' responses, five patients underwent treatment with IPL. Their subjective improvement scores were collected using visual analog scales. All patients showed improvement from their perspective. Quantification of this improvement showed that in this population, patients can expect, on average, a two year reduction in perceived age per treatment. This finding may be useful when discussing intense pulsed light technology with current patients and those prospective patients considering this procedure.

Introduction

Intense pulsed light technology involves application of a noncoherent, non-laser, broadband, filtered flashlamp source directed to the skin. Modification of various parameters allows flexibility in treatment. These include but are not limited to wavelength, energy fluence, pulse footprint, pulse duration, pulse delay, pulse sequence and temperature control of the skin.

The informed consent process involves a discussion of the procedure, enumeration of risks, discussion of anticipated results, and presentation of alternative options. At this time, patients have an opportunity to ask questions. This ensures that a patient has adequate information in order to direct care. Patient understanding of benefits and risks of a procedure is necessary for informed consent to take place. In addition, patient satisfaction with the outcome is generally linked to an understanding of what to expect. Not enough published information exists, regarding the benefits of intense pulsed light (IPL) technologies, to adequately counsel patients. Information from the patients' perspective has been lacking. Discussion of documented collagen improvements by biopsy and assurance that authorities in the field were satisfied with the technology are helpful. They fall short, however, when a patient asks, "How much younger will this procedure make me look?". A PubMed literature search was done using the key words "photorejuvenation, Multilight, intense pulsed light and IPL". No studies answered this specific question and there was a dearth of literature that could be used to quantify improvements from the patient's point of view.

Methods

This preliminary, prospective study was designed to answer the question "How much younger will this procedure make me look?". Recognizing that this would involve subjective data, various tools were considered. The idea of using the physician or a designated office staff was quickly discarded in an attempt to minimize bias. Using an independent blinded observer was reasonable but did not address the patient's perspective. The visual analog scale has been shown to have a high degree of subjective reproducibility. Having used this technique successfully in pain management, the author felt that a variation of such a scale would address many of these concerns. The scale ranged from 0 to 100 years old and was laid out horizontally with equal spacing between the ten year increments. A line under the scale was used to measure the patient's impression of facial age. To improve the quality of the data, the patient's mark was measured only where it crossed the line. This minimized the possibility of reading bias since the patients' drawn lines invariably were not perpendicular to the age line. The resulting numbers were then scored and sequential visits by the same patient were likewise compared to the previous numbers generated to calculate the differences noted over time. The eligible patients were asked to assess their apparent age on this scale at study beginning and then at three weeks increments, before each additional treatment. Sequential patients were used, however new patients only were allowed in the study. It was a voluntary study, yet all five patients queried agreed to help with the data collection.

A noncoherent, non-laser, broadband, filtered IPL flashlamp source was used in this study (Lumenis Inc., 2400 Condensa St., Santa Clara, CA, 95051). Over 2000 pulses of IPL were used in the course of the study. Settings were individualized by skin type but all patients started with the same settings for their individual Fitzpatrick skin type. Changes in the settings over time were individualized based on attention to skin characteristics during and after treatments. The actual starting settings for all patients were in the range of 550 - 570 nm at 30 - 50 joules with double or triple pulses using an appropriately calibrated ESC/Sharplan/Lumenis Multilight unit. The cooling gel used in all patients was commercially obtained ESC Medical System coupling water soluble clear gel stored in a refrigerated unit until just prior to use. Some of the patients used a topical analgesic which was not controlled for in this study. Post operative instructions were limited to generic counselling (sun exposure limitations...) and no creams or emollients were specifically recommended again in an attempt to minimize variables. Trained staff as well as the author were used interchangeably during the course of the study. The full course of treatment was established as five visits separated by three weeks each time. Patients that did not complete the treatment were not excluded since that was not an endpoint of the study. Rather, the per treatment benefits were being evaluated.

Results

As seen in **Table 1** and Table 2, there was a trend toward age reduction as documented by the patients. Importantly, all patients had subjective improvements. The lowest amount of subjective age reduction was 3.9 years (however this patient did not complete the full treatment) and the highest was 11.5 years. The average perceived age reduction was 1.9 years per treatment. Though the numbers of patients in this preliminary study were small, there was a trend toward improvements that were seen per visit; there was no threshold at which point patients began accumulating benefits. No complications were noted.

Table 2 N.B. all ages expressed in years

Pt	age at start	age at end	number of treatments	total age reduction	average age reduction per treatment
A	44.6	39.2	2	5.4	2.7
B	42.3	32.3	5	10.0	2.0
C	43.8	33.8	5	10.0	2.0
D	33.8	22.3	5	11.5	2.3
E	43.1	39.2	4	3.9	1.0
Total	207.6	166.8	21	40.8	1.9

Conclusions

The above information describes this preliminary, prospective, intent to treat study using IPL. Importantly, all patients showed improvement based on their calculation of perceived age. That indicates that there was no perceived worsening of aging signs and no perceived regression of improvements over the study period. Though using subjective data, bias in computing the improvements noted in this population is part of the endpoint.

Other studies have evaluated the outcomes after IPL treatments. Negishi et al. found a combined (physician and patient subjective improvement evaluation) 60% improvement in their evaluation parameters in more than 80% of Asian patients undergoing a similar five or more IPL treatments.[1] In another study also involving an Asian population and also using a combined score, his team found a rating of "good" to "excellent" in 90% for pigmentation, 83% for telangiectasia and 65% for skin texture. [2] Similarly, Kawada et al. found that 48% of patients had more than 50% of improvement and 20% had more than 75% improvement. [3] Goldberg and Samady used a patient satisfaction score as well as including an evaluator assessment component in their study comparing intense pulsed light and Nd:YAG laser on facial rhytids.[4] Several other authors have also demonstrated improvements.[5] Histology studies with and without a monitoring of clinical impression have demonstrated changes in another fashion.[1, 6, 7, 8, 9] However, histological information is difficult for patients to understand and often does not translate into clinically visible changes. Therefore, the specific answer to the question, "How much younger will this make me look?" is hard to answer from these other studies.

This preliminary study has a number of limitations some of which have been previously noted, e.g. small population size, subjective bias. Though the study was prospective, no placebo or blinks were in place. In addition, a larger study might take into consideration the operator differences in performing the procedures and the possible effect of the anesthetic gel. The Negishi studies bring into question the differences between results and ethnic origin. The population in this study was exclusively Caucasian. Additional consideration may be given as to whether three weeks is the optimal interval for treatments and whether strict adherence is important. Another time interval may give different results. It would be interesting to identify if there is any regression over time as well. A repeat questionnaire at a later date would be instructive.

Generally the intense pulsed light technology is safe as evidenced by the literature and the author's personal experience, though it still has potential for malfeasance.[10]

On average, patients considering IPL photorejuvenation therapy may be told that there is a 2 year perceived facial age improvement per visit. The informed consent process requires a discussion about the anticipated benefit to treatment. Incorporating the above information may be useful in counselling patients regarding this esthetic procedure.

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