Treatment of aging skin using the SharpLight Omnimax
“Stacked” multiple modality platform

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Abstract

Background: Lasers have proven extremely effective in the treatment of a variety of cutaneous skin concerns including, pigmented lesions, vascular lesions, rhytides, and skin laxity, among others. Originally developed as single wavelength treatment platforms, lasers were generally limited to targeting one chromophore at a time. With breakthrough advances in technology, however, treatment of multiple chromophores can be achieved with one system that incorporates several lasers and light sources. In actual clinical practice however, patients with photo aging often present with a variety of issues that span multiple chromophoric groups. For example it is common to see patients whose photoaging skin includes lentigines, telangiectasia, fine lines and lack of elasticity. Historically, adequate treatment of these issues would involve a regimen requiring the use of multiple lasers, applied at different times, sometimes days apart, in different geographical locations in a clinic. The typical patient experience, therefore, would consist of several visits to the clinic and a prolonged wait time before the final result was achieved.

Introduction

Lasers used to treat skin conditions were originally designed around a single wavelength, which generally was used to treat one chromophore or target molecule. Because of this physical limitation, each device was only able to treat a small group of issues associated with that particular chromophore. In actual clinical practice however, patients with photo aging often present with a variety of issues that span multiple chromophoric groups. For example it is common to see patients whose photoaging skin includes lentigines, telangiectasia, fine lines and lack of elasticity. Historically, adequate treatment of these issues would involve a regimen requiring the use of multiple lasers, applied at different times, sometimes days apart, in different geographical locations in a clinic. The typical patient experience, therefore, would consist of several visits to the clinic and a prolonged wait time before the final result was achieved.

Methods: The SharpLight Omnimax device was used to treat 10 patients with photo aged skin. Patient selection criteria was designed to target patients exhibiting a wide range of photo aging characteristics. Specifically, each patient included in the study presented with static lentigines, dynamic lentigines, rhytides, skin laxity, dyschromia, and telangiectasia. 4 treatment sessions were undertaken on every patient with 2-3 weeks between each sitting. Using only the multimodality Omnimax platform, three types of treatments using three different modalities were used at each session. All treatments included intense pulsed light with cut off filters 580nm and/or 535 nm, followed by an infrared treatment and then an Erbium YAG 2940 nm resurfacing treatment, which were administered in that order every time.

Results: Patients reported an improvement in texture, tone, color, and wrinkles. 100% expressed an improvement in the overall look of their skin. Review of before and after photographs also demonstrated an improvement in lentigines, dyschromia, telangiectasia and fine lines.

Conclusion: Stacked modality treatment sessions using the SharpLight Omnimax device to simultaneously treat the many signs of photo aged skin in a single session. This one platform enables the simultaneous treatment of lentigines, telangiectasia, rhytides, and dyschromia in a single treatment session. The multiple modalities provided by the SharpLight Omnimax device enable a more efficient and rapid delivery of treatment, which increases convenience for the patient. Additionally, more efficient treatment times allow physicians to optimize their time management practices, which helps reduce costs for all involved.

Conclusion

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elastosis, and poikiloderma of Civatte. In addition, the ability
to specifically choose filters allows the treatment of
pigmented lesions such as lentigines, ephelides and other
melanotic lesions.

The SharpLight Omnimax system also includes a proprietary
feature called Dynamic pulse Control (DPC) to allow
variability in settings. DPC optimizes the light pulse
configuration for specific skin pathology as well as the
various Fitzpatrick skin types and grants the practitioner
more control by providing the ability to adjust the fluency,
pulse duration, interpulse delay, and contact cooling
periods.

Infrared technology included in the SharpLight Omnimax
system has been demonstrated to create heat in the dermis
which promotes collagen remodeling. In the SharpLight
Omnimax system this is accomplished using the "Max IR"
handpiece, which leads to immediate skin tightening and
new collagen production. As part of its design, an integrated
thermoelectrically cooled sapphire window, controls the
surface temperature of the skin during treatment which
maintains patient comfort.

The resurfacing component of the SharpLight Omnimax is
an Erbium YAG 2940 fractional laser which allows the
specific tissue ablation associated with limited residual
damage. In contrast to ablative resurfacing, fractional
resurfacing accelerates post treatment wound healing by
leaving areas of intact skin. Clinically this leads to transient
erythema, rapid healing and minimal downtime.

Bringing all of these treatment modalities together in the
SharpLight Omnimax system should enable a stacked
modality treatment method that includes the unique DPC,
the Max IR infrared and the Erbium YAG 2940 nm fractional
resurfacing. This stacked modality method in turn should
provide patients with a treatment experience that improves
pigmented and vascular lesions, skin tightening and textural
improvement in a single convenient session. The SharpLight
Omnimax system, therefore, promises to enable patients
and practitioners to obtain results in a shorter period of time
with significantly less logistical coordination and effort.

Patients and Methods
10 patients (9 females and one male) were treated in this
study. Patient age ranged from 48 to 62 and the group
included representatives from skin types I-IV.

Patient Inclusion Criteria:
Clinical signs of facial photo aging were the recruitment
criteria for the study. In addition to subjective concerns
patients had about their appearance, signs of photo aging
including rhytides, both static and dynamic, lentigines,
dyschromia telangiectasia and skin laxity were clinically
confirmed in all patients. Each participant understood the
nature of the treatment, as well as, the potential benefits and
risks.

Patient Exclusion Criteria:
Patients were excluded for: tanning within a 6 week period,
oral isotretinoin or acitretin within 6 months, a history of
hypertrophic or keloid scarring and photosensitivity
disorders or taking a systemic medication that would cause
photosensitivity. Other exclusion criteria consisted of
malignant disease, epilepsy, pregnancy or nursing,
endocrine disease, systemic lupus erythematosus or other
collagen vascular disease, psoriasis vulgaris, hematologic
coagulopathy, epidermolysis bullosa or pemphigus vulgaris,
or pemphigus foliaceus, or any chronic or acute disease

could affect clinical outcome. Patients with a history of oral
herpes simplex were given Valcyclovir as herpes simplex
virus prophylaxis.

Prior to treatment, photographs were taken using
standardized AP and lateral views. Similar photographs
were taken at the conclusion of the 4 sessions that
composed the study. In preparation for the study patients
completed a patient personal data form, received a physical
examination, and had a medical history recorded. The
diagnosis was discussed with each patient and informed
consent was obtained after a careful discussion of the
benefits and possible risks of the treatment plan and
procedures.

Treatment Protocol
During this study the SharpLight Omnimax device was used
to deliver all treatments. Prior to full face treatment, a test
spot was exposed using the 580 nm headpiece light device
to determine optimal fluence, pulse duration and pulse
configuration parameters resulting in mild erythema without
adverse effects. All patients tolerated the test dose well.

After test spot success, each patient was started on the
actual treatment regimen with the SharpLight Omnimax
device, which was used to perform all procedures. The
treated areas for all patients were confined to the face and
neck and consisted of 4 treatments sessions during which
each patient received 3 different treatment modalities.
The first was intense pulsed light using cutoff filters of 580 nm
and or 535 nm depending on patient presentation and
response to previous treatment. 3 passes of DPC were done
each session. Clinical endpoints for each patient were mild
erythema. The settings for each patient were individualized
but ranged from 10-21 j/cm². Specific settings for each
patient can be reviewed in chart 1.

Following the DPC treatment, SharpLight Omnimax infrared
(IR) treatment was undertaken using energy levels between
20-30 j/cm² with precooling and post cooling technology.
Three passes of IR were performed during each treatment
session and patient feedback was obtained during treatment
which allowed the pre and post cooling parameters to be
adjusted accordingly. The on time and cooling time for each
patient were individually derived based on subjective and
objective tissue response by the patient to the treatment.

Finally an ablative procedure was performed, using the
SharpLight Omnimax Erbium: YAG 2940nm fractional laser.
The micro peel technique consisted of two passes of the
fractional laser, with parameters set at: 3 Hz, 1.2 ms and
1.2 j/cm² with a 9.5 mm x 9.5 mm spot size.

Upon completion of the SharpLight Omnimax treatment, a
cold compress was applied according to patient comfort
and necessity. Treatments sessions were scheduled 2-3 weeks
apart and after each treatment session, follow-up calls were
made to patients between 24 hours to 48 hours to assess
response to treatment and address any questions.

Results
After each SharpLight Omnimax treatment and follow up
visit, patients were evaluated on their subjective experience
to the treatment regimen. Subjects were asked to grade
their experience with the procedure as well as their results.
The satisfaction scale was a four point scale: 1 - Very
satisfied, 2 - satisfied, 3 - somewhat satisfied, 4 - not
satisfied.
Subjectively, 100% of patients reported an improvement in tone, texture and color, as well as, an improvement in the overall look of their skin. Scores from the four point scale revealed 8 patients who were very satisfied, 1 patient who was somewhat satisfied and one patient who was satisfied. 90% of patients were satisfied to very satisfied.

**Recommendations**

To maximize results with the SharpLight Omnimax, pretreatment and post treatment protocols were established.

**Pretreatment protocol**

Pretreatment preparation includes the avoidance of ultraviolet radiation, prophylaxis in appropriate patients for herpes simplex virus and education regarding expectations.

**Post Treatment Protocol**

Patients were instructed to apply a bland moisturizer in the first 24 hours and then begin to wash with a mild liquid non foaming cleanser after 24 hours. Retinol, vitamin A acid and its derivatives, glycolic, mandelic, lactic and salicylic acids were all to be avoided for 48 hours post treatment. Patients were also advised to avoid picking or any manipulation of the face during the healing period. A sunscreen of SPF 30 or higher with both UVA and UVB coverage was applied for 24 hours after each treatment.

**Conclusion**

Unlike single modality treatment platforms, the SharpLight Omnimax incorporates multiple modalities in one system, which enables patients to see better, faster results. Additionally, an improved efficiency is gained for the physician by reducing the time required for treatment, the investment required for equipment, and the physical clinic space needed to provide first rate services.

The SharpLight Omnimax device achieves better and faster results for aging skin through the use of a stacked modality treatment regimen that addresses the multiple skin concerns within a single session. The system includes the proprietary DPC technology, a Max IR infrared and an Erbium YAG 2940 nm fractional treatment, which enables this kind of versatility in treating the variety of signs and symptoms associated with aging skin.

Results of this study, which employed the stacked modality treatment regimen, showed that 90% of patients were either very satisfied, or satisfied with their treatment experience. 100% of patients stated their level of satisfaction was high enough that they would recommend treatment to others. In addition to being effective with 100% of patients seeing improvement in skin tone and color, the treatment led to no adverse side effects.

The SharpLight Omnimax device is compatible with a wide range of hand pieces, each with a multitude of treatment parameter options. In this study, multiple hand pieces were used including a DPC hand piece, a Max IR infrared hand piece and an Erbium YAG 2940 nm hand piece. The thermoelectric cooling mechanism of the SharpLight Omnimax system, was also essential in providing comfortable treatment sessions for the patient, while protecting the epidermis.

Overall, the multiple modality regimen has several advantages over single modality treatment systems. One critical advantage is how heat penetrates the skin when multiple modalities are used. Combining these treatment methods allows for greater heat dispersion to the dermis, which in turn enhances collagen production and remodeling. Furthermore, patients and clinicians see faster results from the various treatments, which can be performed all at once, unlike single modality treatments that are spread out over time.

**References**


Dr. Lisa Kellett is a Dermatologist certified in 1997 in both Canada and the United States. She is the founder and principal dermatologist at DLK On Avenue specializing in cosmetic dermatology and laser surgery. She graduated with Honours at University of Toronto with a degree in Medicine and went on to do an internship and a second year residency in Internal Medicine at the University of Western Ontario. She then completed a Dermatology residency at the University of Toronto. She is a fellow of the Royal College of Physicians and Surgeons of Canada, and a member of the Canadian Laser Aesthetic Surgery Society, the Toronto Dermatological Society and the College of Physicians and Surgeons of Ontario.

Dr. Kellett has extensive experience in the use of medical technology including the development of new technology and has been at the forefront of using cutting edge devices in cosmetic and laser dermatology. Due to her innovation in the field of cosmetic dermatology, she has lectured widely about developments in laser surgery and has been a leader in the industry for over 15 years.

Dr. Kellett has been involved as a consulting dermatologist to laser companies to influence new product development. She has been widely featured also in the media including print, radio, online and television such as Flare, Fashion, Elle, Globe and Mail, Toronto Star, National Post, Ottawa Citizen, Zoomer, Reader’s Digest, Canadian Living, Chatelaine, Huffington Post, Macleans, Now, Elevate, Todays Parent, Alive, Best Health, Glow, Global, CBC, CTV, City TV, Marilyn Denis show, e talk, E! Network, W5, Slice network, ET Canada, Canoe Network among others.
| #01JT | F | 51 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec10/15-18/1.2j 1 pass Vascular msec10/15-18/20j 1 pass 535VP-LVL msec10/15-18/16j 1pass to cheeks/nose | Infrared Precool 5 sec On time 3 sec 1.15/20j 2 passes | Fractional 7X7 / 4Hz msec1.1/2 1-2passes | 3 | Somewhat satisfied | Erythema |
| #02DS | F | 51 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec15/18-15/18j 1 pass Pigment msec12/16-18j 1pass Vascular msec10/11-16j 1pass | Infrared Precool 5 sec On time 3 sec 30j Face 20j Neck 15j 2 passes | Fractional 7X7 / 3Hz msec1.2/1.2 1-2passes | 1 | Very satisfied | One day of puffiness. Recovery 3 days. |
| #03HL | M | 56 | Face & neck (DPC above hairline) | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Pigment msec15/15-10/14-18/2 passes Vascular msec10/11-16j 1pass | Infrared Precool 5 sec On time 3 sec 30j Face 20j Neck 15j 2 passes | Fractional 7X7 / 3Hz msec1.2/1.2 1-2passes | 1 | Very satisfied | Well tolerated |
| #04CW | F | 62 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec15-20/11-12-16 1 pass Pigment msec12/16-12-16 1 pass Vascular msec10/11-13-16j/cm² 1 pass | Infrared Precool 5 sec On time 3 sec 30j Face 20j Neck 15j 2 passes | Fractional 7X7 / 3Hz msec1.2/1.2 3passes | 1 | Satisfied | Erythema transient throbbing for a few hours |
| #05GA | F | 59 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec15/13-13-16j /2pass Pigment msec12/11-13-16j/1pass Vascular msec10/11-13-15j/1pass 535VP DVP-LVL msec12/11-16j to dark brown spot cheeks and nose | Infrared Precool 5 sec On time 3 sec 30j Face 20j Neck 15j 2 passes | Fractional 7X7 / 4Hz msec1.2/1.2 3passes | 1 | Satisfied | Well tolerated |
| #06AB | F | 49 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec15/12/1-12-19j/1pass Pigment msec11/15-20/23/1pass Vascular msec12/12-15/1pass | Infrared Precool 5 sec On time 3 sec 30j Face 20-15j Neck 15j 2 passes | Fractional 7X7 / 3Hz msec1.2/1 2passes | 1 | Satisfied | Well tolerated |
| #07AP | F | 51 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec20/10/12-20j 1 pass Pigment msec12/12-20 1 pass Vascular msec12/12-20 | Infrared Precool 5 sec On time 3 sec 30j Face 20j Neck 15j 2 passes | Fractional 7X7 / 2Hz msec1 1j 1.2 3passes | 1 | Satisfied | Quite tolerable, erythema that resolved in 48 hours |
| #08AJ | F | 62 | Face | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec10/15/15-13j 1 pass Vascular msec10/13-20/1 pass 535VP LVL msec10/11-17-19j Nose & cheeks | Infrared Precool 3.5 sec On time 2-5 sec 20-25j 2 passes | Fractional 7X7 / 4Hz msec1.1/2 2passes | 1 | Satisfied | Burning sensation immediately after, relieved by ice packs |
| #09PW | F | 51 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec10-15/11-15-21 1 pass Pigment msec10/15-20j 1 pass Vascular msec10/11-15 | Infrared Precool 3-5 sec On time 2-5 sec 20-25j 3 passes | Fractional 7X7 / 3Hz msec1.1/2 2passes | 1 | Satisfied | Transient erythema |
| #010JB | F | 55 | Face & neck | 4 | Combination DPC Infrared Fractional | Partial | DPC 580SR | Textural msec10-15/11-15-21 1 pass Pigment msec10/15-20j 1 pass Vascular msec10/11-15 | Infrared Precool 4-5 sec On time 2-4 sec Face 30j Neck 25j | Fractional 7X7 / 2Hz msec1 1j 1.2 3passes | 1 | Satisfied | Transient erythema |