# MICROLASERPEEL™

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TM – Sciton Corp, Palo Alto, CA

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*Abstract*

## Background

Light chemical peels and microdermabrasion have enjoyed recent popularity for treatment or mild photoaging. However, clinical efficacy for these modalities is extremely poor from both patients and physicians perspective. Er:YAG lasers have been effective in treating mild to moderate photoaging but need for either regional or general anesthesia as well as the significant recovery period has limited its use.

## Objective

We sought to utilize an Er:YAG laser with topical anesthesia and low fluence to ascertain its efficacy in treating mild to moderate photoaging.

## Methods

45 patients aged 28-75 with skin types 1-3 and mild to moderate facial rhytids were treated with topical anesthesia and lased with a Sciton Contour Er:YAG laser set at ablation only, 12.5-17.5 j/cm2, 50% overlap with the computer pattern generator. 12/45 patients underwent neck resurfacing at fluences from 7.5-15 j/cm2 and 5/45 underwent upper chest resurfacing at fluences of 5-7j/cm2. 10/45 patients underwent deep periocular resurfacing at the time of Microlaserpeel. Four patients were treated a second time at 1 month.

## Results

2 patients who did not receive antivirals developed minor herpes simplex infections that responded to oral valacyclovir. Most patients were completely healed with minor redness only at 3-4 days post procedure. 33/45 patients were started on and tolerated a skin care

regimen at 1 week post procedure. Results were judged to be excellent in thin skinned individuals and good in thicker skinned patients.

## Conclusions

We concluded that one pass Er:YAG resurfacing under topical anesthesia is effective for treatment of mild to moderate photoaging.

Light chemical peels and microdermabrasion have enjoyed recent popularity for treatment of mild photoaging. However, clinical efficacy for these modalities is extremely poor from both patients and physicians perspective. Deeper resurfacing techniques including medium depth chemical peels, dermabrasion and laser resurfacing are efficacious in treating photodamage. However, the need for intravenous sedation or general anesthetic and the protracted post operative course associated with deeper procedures have caused many physicians and patients to seek alternatives. Erbium:YAG (Er:YAG) laser systems, with a wavelength of 2940nm, allow for extremely precise skin ablation, with accurate assessment of resurfacing depth[2-4]. The Er:YAG laser is very efficiently absorbed by water and produces minimal thermal injury (approximately 5-10um)[3-6]. A study of Er:YAG resurfacing with topical anesthesia showed feasibility in treating photodamage but the moderate results obtained appear to be fluence and laser related[7]. We sought to utilize Sciton Er:YAG laser, a high power scanned Er:YAG laser, with topical anesthesia and low fluence to ascertain its efficacy in treating mild to moderate photoaging.

## *Materials and Methods*

Since November 2000, 45 patients underwent Microlaserpeel (MLP) which was defined as a full facial low fluence Er:YAG laser resurfacing performed with topical anesthesia. 8/45 patients underwent a variation of this procedure called Extended Microlaserpeel (XMLP) which was defined as a Microlaserpeel with deeper periocular resurfacing with the periocular portion performed with infiltrative local anesthesia. 20/45 patients underwent additional neck and 7/45 additional chest resurfacing. Age ranges were 28-75. 4 patients underwent 2 procedures spaced a minimum of 1 month apart.

No patients were pre-treated with hydroquinone or retinoic acid. 37/45 patients received prophylactic antibiotics (cephalexin 500mg QID) and antivirals (valacyclovir 500mg BID) and continued their use until epithelization was complete.

Prior to procedure the patient's faces were cleaned with alcohol and topical anesthesia of 5% Lidocaine and 3.5% Prilocaine[1] was placed for 45-60 minutes under occlusion. The topical anesthetic was then removed and laser safety precautions observed. External brushed metal eye shields[2] were placed for MLP while internal shields were placed for XMLP.

All patients underwent Erbium:YAG laser resurfacing using the Sciton Profile laser[3] set at ablation only, 12.5-17.5 j/cm2, 50% overlap with the computer pattern generator. 20/45 patients underwent neck resurfacing at fluences from 7.5-15 j/cm2 and 7/45 underwent upper chest resurfacing at fluences of 5-7j/cm2. 8/45 patients underwent additional deep periocular resurfacing (XMLP) with 2 passes at settings of 7.5-15 j/cm2 ablation and 50-100u coagulation after injecting 5cc 1% Lidocaine with Epinephrine 1:200,000 per side.

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Post operatively all patients were treated using an open dressing technique of Vaseline or Aquaphor[4] with instructions for 4 facial washes/day with peroxide or vinegar solution until epithelization was complete. Following epithelization a mild cleanser and moisturizer (Cetaphil)[5] was used. 1-2 weeks post procedure patients were recommended a

[1] Sea View Pharmacy, Santa Clara, CA
[2] Oculoplastic, Montreal, Canada
[3] Sciton Corp, Palo Alto, CA
[4] Aquaphor
[5] Cetaphil, Galderma Laboratories, Fort Worth, Texas

Tretinoin based skin care line (OBAGI)[1] but were started on the Tretinoin steps gradually starting with every 3rd night application and advancing to every night as tolerated.

## *Results*

2 patients who did not receive antivirals developed minor herpes simplex infections that responded to oral valacyclovir. There were no bacterial infections or other wound healing complications. Most patients undergoing MLP were completely healed with minor redness only at 3-4 days post procedure. Patients who underwent XMLP (deeper periocular resurfacing) had facial redness equivalent to the MLP group but as expected experienced longer epithelialization (4-5 days) and more prolonged periocular redness (3-12 weeks). 33/45 patients were started on OBAGI skin care regimen at 1 week post procedure and tolerated the regimen without problems.

4 patients with thicker skin underwent 2 MLP placed 1-2 months apart. No additional epithelialization time or redness was noted.

## *Discussion*

The Erbium:YAG laser with a wavelength of 2940nm is 10 times more avidly absorbed by water than the carbon dioxide laser(2) and is well suited to precise skin resurfacing, due to its high water affinity and lack of thermal injury (2-6) . The lessened thermal effect leads to less post operative morbidity than the carbon dioxide laser especially prolonged erythema and long term complications, namely hypopigmentation(8). Early studies utilizing the Erbium:YAG laser at low fluences (<10 J/cm2) demonstrated its effectiveness for treating superficial (epidermal) skin lesions (9). The introduction of higher energy scanning Erbium:YAG lasers, enabled higher tissue fluences and more

[1] OMP, Beverly Hills, CA

confluent treatment[10].) Variable pulse-width Er:YAG lasers combined the high energy scanner with the ability to selectively determine the laser pulse duration and through this the resultant thermal deposition[11-12]. Er:YAG lasers have been proven to be effective (both short and long term) in the treatment of wrinkles associated with sun damage, superficial and deep dermal lentigines, as well as some facial scars[8-12].

However, the need for nerve blocks, intravenous sedation or general anesthesia has limited its use to patients needing deeper procedures. Patients with minimal to moderate photodamage were more likely to receive a light chemical peel or repeated treatments of microdermabrasion rather than undergoing a procedure requiring an anesthetic. In addition, new state regulations often require an anesthesiologist and accredited operating facility for performance of intravenous sedation making a light laser procedure cost prohibitive.

Our goal was develop a light laser procedure for the treatment of mild to moderate photodamage utilizing a topical anesthetic and with a healing period of 3-4 days. The depth of resurfacing that we felt would give us the best result for the recovery period anticipated was a deep epidermal ablation. Complete epidermal obliteration we felt was outside he intended recovery period anticipated and by previous experience and trial and error we found this to be true. Epidermal facial depth varies from approximately 60-100 microns depending upon facial area and variations in skin thickness[6,10]. As the Sciton laser has a very accurate ablation model as noted by previous histological experiments[12] we felt that 50-70 microns of projected ablation depth at variable overlap of 30% - 50% would serve our needs. The laser projects an ablation depth equal to 4 microns/j/cm2 so 15j/cm2 would project as 60 microns of ablation depth. This data was quantified in

previous studies[12]. The fluence used in this study, degree of overlap and resultant tissue destruction, laser used and strength of topical anesthetic differ from that used in previous trials of topical Er:YAG laser resurfacing and may account for the more significant results obtained[7].

The development of newer topical anesthetics was crucial to the success of this project and our protocol has undergone some evolution since attempting this procedure 2 years prior to publication. Firstly, we have moved to a stronger topical anesthetic, finding the commercially available agents not effective enough for this procedure. We have tried various commercially available and custom compounded agents but have found the best for us is custom compounded 5% Lidocaine/3.5% Prilocaine in a methylcellulose base. Secondly, we have found that proper skin degreasing and makeup removal with alcohol is essential to the absorption of the topical anesthetic. Thirdly, proper occlusion for 45-60 minutes of topical anesthetic with a plastic wrap is important. Fourthly, a mild sedative like diazepam 5mg and a mild pain medication such as acetaminophen with codeine helps in performing this procedure. Lastly, timely lasing following removal of the anesthetic gel is important. Prompt application of aquaphor or Vaseline helps with post operative pain. These caveats while simple seem to improve the procedure as noted by our experience and of others attempting to perform this procedure.

The use of antiviral agents was originally thought unnecessary due to the non complete epidermal ablation. However, the outbreak of 2 of the first 8 patients not prescribed prophylactic antiviral agents with Herpes Simplex infections led us to prescribe antiviral agents and antibiotics to all patients as previously outlined in the carbon dioxide literature[13-14].

The post treatment of most patients with a skin care regimen containing tretinoin is our belief in long term skin improvement with tretinoin containing regimens. The implementation of tretinoin and a bleaching cream at 1-2 weeks post procedure has led to a low incidence of temporary post inflammatory hyperpigmentation. We do not feel that there is any need for skin pretreatment with these agents as prophylactic post-treatment appears to be sufficient to avoid pigmentary complications. This appears to be of considerable advantage over the Obagi Blue Peel and other TCA peels that seem to work better with skin pretreatment[15-16]. In fact, the combination of a Microlaserpeel and skin care appears to be a head start to a skin care regimen especially for those people seeking quicker results than can be achieved from skin care alone.

The development of the Extended Microlaserpeel arose from many patients who sought consultation for loose lower eyelid skin with or without excess fat. We simply chose to perform a deeper lower eyelid resurfacing with infiltrative eyelid anesthesia (and occasional transconjunctival blepharoplasty) and perform a Microlaserpeel of the rest of their face for confluence.

The neck and chest resurfacing also grew from the original facial resurfacing to even the skin texture. Neck resurfacing has been controversial but at the light settings we have performed appears to be safe with minimal morbidity[17-20]. Note that chest resurfacing may take a long time to heal and that older patients may have extremely thin skin and that while 20 microns of ablation is adequate for younger patients 10 microns of ablation may lead to delayed healing in some older patients.

In conclusion, Microlaserpeel and its variations appear to be a useful addition to improvement of mild to moderate photodamage. Further histological studies and variations in overlap need to be performed.

***Table 1***

*Laser settings*

| Area | Fluence-ablation j/cm2 | Fluence-coagulation j/cm2 | Passes | Density |
|---|---|---|---|---|
| Forehead | 12.5-17.5 | 0 | 1 | 30-50% |
| Periorbital | 12.5-17.5 | 0 | 1 | 30-50% |
| Periorbital (Extended Microlaserpeel) | 15-20 | 12.5-25 | 2 | 50% |
| Perioral | 12.5-17.5 | 0 | 1 | 30-50% |
| Cheeks | 12.5-17.5 | 0 | 1 | 30-50% |
| Neck | 10 | 0 | 1 | 30-50% |
| Chest | 2.5-5 | 0 | 1 | 30-50% |

**Figures**

1. a. Preoperative view of a 36 year old female with acne scars and rough textured skin.

   b. 2 days following 60 micron Microlaserpeel.

   c. 4 days following Microlaserpeel.

   d. 3 months following Microlaserpeel.

2. a. Preoperative view of a 35 year old female unhappy with lower eyelids and facial texture.

   b. 6 weeks following Extended Microlaserpeel.

   c. Preoperative eyelid view

   d. 6 weeks following Extended Microlaserpeel. Note mild periocular erythema.

3. a. 70 year old woman referred for neck lines following facelift. Note bunching of skin lateral to submental area.

   b. 4 months following 40 micron Microlaserpeel of neck with additional 50 microns of coagulation applied to submental area.

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