Clinical experiences in Asian skin with new technology of ablative fractional Er:YAG Laser

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Development of Aesthetic Laser in Taiwan

- CO2
- Dye
- Ruby
- Q-Alex
- Q-Nd:YAG
- Er:YAG

CoolTouch IPL Sciton C6 Fraxel

CoolLipo Fr.CO2 Er:YAG

Development of Dr. Tseng’s Clinic

Development of Aesthetic Laser in Taiwan

- '92
- '97
- '99
- '03
- '05
- '06
- '07

Lynton Nd:YAG M2 Nd:YAG

Fidelis Er:YAG

StarLux IPL Y+G, cryog

StarLux IPL 1064, IR HP

Lux1540

Development of Dr. Tseng’s Clinic
QSRL PIH

IPL Burn

QSRL HYPO

QSRL PIH

QCd:YAG PIH

SCAR POST CO2 LASER FOR TATTO

Fig 4.29 Tattoo granuloma from an allergic reaction to the red dye ever in aqueous tattoo ink color in a multicolored tattoo, seen pre-operatively (A). Immediately after removal of the tattoo and at granuloma with the 0.5-0.5 second mode of the carbon dioxide laser (B), and 3 months later showing the residual erythematous permanent scar (C).
# Laser & IPL Side Effects

<table>
<thead>
<tr>
<th></th>
<th>Erythema</th>
<th>PIH or HYPO</th>
<th>Edema</th>
<th>Bulla</th>
<th>Crusting</th>
<th>Scar</th>
<th>Pitting Scar</th>
<th>Infection</th>
<th>Ulcer</th>
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<tr>
<td><strong>IPL</strong></td>
<td>✓</td>
<td>✓ ✓ ✓</td>
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<td><strong>Pigment</strong></td>
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<td>✓ ✓ ✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td><strong>Hair Removal</strong></td>
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<td>✓</td>
<td></td>
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<td>✓</td>
<td></td>
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<tr>
<td><strong>Vascular</strong></td>
<td>✓</td>
<td>✓ ✓ ✓</td>
<td>✓</td>
<td>✓</td>
<td>✓ ✓ ✓</td>
<td>✓</td>
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<tr>
<td><strong>Invasive</strong></td>
<td>✓</td>
<td>✓ ✓ ✓</td>
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<tr>
<td><strong>Thermage</strong></td>
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<td>✓ ✓ ✓</td>
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<td><strong>Fractional</strong></td>
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<td>✓ ✓ ✓</td>
<td>✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Search for Ideal SR Treatment

Non-Ablative
Low Efficacy - Short Downtime

Ablative
High Efficacy - Long Downtime
Fractional Photothermolysis: A New Concept for Cutaneous Remodeling Using Microscopic Patterns of Thermal Injury

Dieter Manstein, MD, G. Scott Herron, MD, PhD, R. Kehl Sink, PhD, Heather Tanner, MS, and R. Rox Anderson, MD

1Wellman Laboratories of Photomedicine, Department of Dermatology, Harvard Medical School, Boston, Massachusetts 02114
2Reliant Technologies, Palo Alto, California 94306
Search for Ideal SR Treatment

Fractional Story – Wound Healing Mechanism

Re-epithelization of micro treatment zones (MZT) is quicker due to:
- **Enough healthy cells** (epidermal stem cells and transient amplifying cells)
- **Short migration paths of keratinocytes** (quick arrival to wounded sites)
What is “fractional”? Safe, Effective and Short Downtime
FDA-Cleared Indications

- November 10, 2003
  - Dermatological procedures requiring the coagulation of soft tissue
- June 15, 2004
  - Treatment of periorbital wrinkles
  - Photocoagulation of pigmented lesions including lentigos (age spots), solar lentigos (sun spots), and dyschromia
- **Resurfacing** - the *only* non-ablative device cleared for resurfacing! (3/10/05)
- **Melasma** - the *only* device cleared for melasma! (7/5/05)
- **Acne scars and surgical scars** (3/20/06)
- **Fraxel® SR 1500** (3/29/06)

*Can be used on all skin types anywhere on the body!*
Fig. 4. Correlation of clinical and histological characteristics of FP in a subject with type VI skin, 1 day post-exposure with MTZs spaced on a 250 μm grid. A: Cross-polarized photomicrographs of skin surface; (B) LDH viability stain. Cylindrically shaped clear areas in the dermis represent loss of cellular metabolism at laser impact sites (i.e., MTZs). Brown spots visible in (A) are due to collections of melanin and micro-epidermal necrotic debris (MEND) structures measuring approximately 40 × 80 μm just beneath an intact stratum corneum.
Photo-Acoustic Effects

Laser Energy

(a) Naevus cells or materials

(b) Selective absorption

(c) Localized heating

(d) Removal in wound crust

Removal by phagocytosis
Microspot Histology Comparison

Non-ablative  Ablative  Ablative
Fr. Er-Glass  Fr.CO2    Fr.Er-YAG
Complications of Fractional CO₂ Laser Resurfacing: Four Cases

Douglas J. Fife, MD,1 Richard E. Fitzpatrick, MD,2 and Christopher B. Zachary, MBBS, FRCP3 *

1Department of Dermatology, Northwestern University, Chicago, Illinois 60611
2La Jolla Cosmetic Surgery Centre, La Jolla, California 92037
3Department of Dermatology, University of California, Irvine, California 92618

Fig. 3. Patient 2. Erosion and crusting on right lateral neck, 1-week postoperatively. [Figure can be viewed in color online via www.interscience.wiley.com.]

Fig. 4. Patient 2. Long-term follow-up: Scarring and platysmal banding of the right neck. [Figure can be viewed in color online via www.interscience.wiley.com.]

Fig. 5. Patient 2. Yellow esudate with surrounding erythema, postoperative day 3. [Figure can be viewed in color online via www.interscience.wiley.com.

Fig. 6. Patient 3. Linear streaking on the lower neck suggestive of scarring. Postoperative day 19. [Figure can be viewed in color online via www.interscience.wiley.com.]

Fig. 8. Patient 4. Patchy, soft eschar with yellow esudate on the left neck, postoperative day 3. [Figure can be viewed in color online via www.interscience.wiley.com.]

Fig. 10. Patient 4. After multiple treatments, most of scarring areas have resolved with residual hyperpigmentation and hypopigmentation. The vertical platysmal band is persistent. [Figure can be viewed in color online via www.interscience.wiley.com.]
Search for Ideal SR Treatment

- **High Efficacy**
  - Ideal
  - Frac. Ablative
    - Fractional ErYAG
  - Ablative
    - CO2 Laser

- **Low Efficacy**
  - Non-Ablative
    - Fractional ErGlass
    - NdYAG
  - Frac. Non-Ablative

- **Short downtime**
- **Long downtime**
Ablative Fr. Er-Yag Applications

Skin Rejuvenation Indications for Ablative Fractional Treatments

- Hyperpigmentations (Post-Inflammatory Hyperpigmentation - PIH, Melasma, Dyshromia)
- Photoaged (photodamaged) skin (freckles, age spots, vascular lesions, skin texture…)
- Wrinkles (moderate to severe rhytides)
- Scars (acne scars, surgical scars, traumatic scars, burn scars)
- Stretch marks
- Skin tightening.. (some new and exciting applications)
Dr. Tseng’s Regime

• I ALWAYS include the Fr. Er-Yag Laser as part of the regime

• General Parameters of Treatment:
  · Skin Rejuvenation  5 %, 3-14 mJ, MSP, 50HZ
  · Acne Scar  5-10%,14-Turbo 6-120mj, MSP-XLP

• Remember:
  Once the pigment has reduced to a satisfactory level, continue with the philosophy of “Preventing Pigment Gain”
SR, 38y/o, F, 2-5%, 6mj-turb3, MSP, 50Hz, 3 Sessions

before

after
SR, 56 y/o, F, 2-5%, 6mj-turb3, MSP, 50Hz, 3 Sessions
SR, 44 y/o, F, 2-5%, 7mj-turb2, MSP, 50Hz, 2 Sessions

before

after
SR, 35 y/o, F, 2-5%, 3mj-turb3, MSP, 50Hz, 3 Sessions
SR, 55 y/o, F, 2-5% , 8mj-turb3 ,MSP, 50Hz , 2 Sessions

before

after
Acne+SR, 41y/o, F, 2%, 3mj-trub3, MSP, 50Hz, 3 Sessions

before

after
Acne Scar 34y/o, M, 10%, 14mj-trub3, SP, 40Hz, 2 Sessions

before

after
Acne Scar 34y/o, M, 10%, 14mj-trub3, SP,40Hz, 2 Sessions

before

after
## Evaluation of Improvement After Ablative Fractional ER YAG laser for Skin Rejuvenation

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Assessment by the Physician (%)</th>
<th>Assessment by the Patient (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent (≥75%)</td>
<td>10(4.1)</td>
<td>8(3.1)</td>
</tr>
<tr>
<td>Good (50-75%)</td>
<td>134(51.9)</td>
<td>130(50.6)</td>
</tr>
<tr>
<td>Fair (25-50%)</td>
<td>99 (38.9)</td>
<td>103(39.7)</td>
</tr>
<tr>
<td>Poor (≤25%)</td>
<td>15(5.1)</td>
<td>17(6.6)</td>
</tr>
</tbody>
</table>
Rejuvenation efficacy of Fractional ErYAG

Facial Skin Rejuvenation (258 patients)

Fig. 2 Results of fractional Skin rejuvenation.
(2-5% of coverage, energy 6 mJ with Turbo 4 and MSP pulse duration)
# Evaluation of Improvement After Ablative Fractional ER YAG laser for Acne Scar

<table>
<thead>
<tr>
<th>Improvement</th>
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<th>Assessment by the patient(%)</th>
</tr>
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<tr>
<td>Excellent (≥75%)</td>
<td>3(7.1)</td>
<td>1(2.3)</td>
</tr>
<tr>
<td>Good (50-75%)</td>
<td>25(59.5)</td>
<td>28(66.9)</td>
</tr>
<tr>
<td>Fair (25-50%)</td>
<td>13(30.9)</td>
<td>12(28.5)</td>
</tr>
<tr>
<td>Poor (≤25%)</td>
<td>1(2.5)</td>
<td>1(2.3)</td>
</tr>
</tbody>
</table>
Acne Scar efficacy of Fractional ErYAG

Fig.1 Results of fractional ErYAG treatment of Acne scars.
(5-10% of coverage, 14 mJ, Turbo 6, MSP – LP pulse duration)
<table>
<thead>
<tr>
<th>Side effects</th>
<th>n(%)</th>
<th>Mean Duration, Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema</td>
<td>258(100)</td>
<td>2.8</td>
</tr>
<tr>
<td>Edema</td>
<td>258(100)</td>
<td>0.9</td>
</tr>
<tr>
<td>Mild crusting</td>
<td>241(93.7)</td>
<td>4.1</td>
</tr>
<tr>
<td>Acneiform eruption</td>
<td>9(3.8)</td>
<td>6.7</td>
</tr>
<tr>
<td>Postinflammatoryhyperpigmentation</td>
<td>0(0)</td>
<td>0</td>
</tr>
</tbody>
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## Side Effects After Ablative Fractional ER YAG Laser for Acne Scar

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<tr>
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<th>n(%)</th>
<th>Mean Duration, Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema</td>
<td>42(100)</td>
<td>5.6</td>
</tr>
<tr>
<td>Edema</td>
<td>42(100)</td>
<td>1.6</td>
</tr>
<tr>
<td>Mild crusting</td>
<td>40(95.2)</td>
<td>5.1</td>
</tr>
<tr>
<td>Acneiform eruption</td>
<td>2(4.8)</td>
<td>6.7</td>
</tr>
<tr>
<td>Postinflammatory hyperpigmentation</td>
<td>1(2.4)</td>
<td>14</td>
</tr>
</tbody>
</table>
Conclusions

• Fractional Er-Yag represents an alternative treatment of several dermatologic conditions without the adverse effects of classic ablative laser devices despite of darker skin patients.

• Ablative Fractional treatments are less effective than full ablative ones, but are offering shorter down time
Thank You

for Your Attention~