FRACTIONAL LASERS IN CLINICAL PRACTICE: PARAMETERS, PEARLS, PITFALLS

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DISCLOSURES

Medical Advisory Board
Zeltiq
Syneron / Candela
Cynosure

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Cynosure
Cutera
MedAct
Allergan
Dusa
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MoMelan
Lithera
Kythara
Miramar
Florin
Cytrellis

Stockholder
Zeltiq
OnLight Sciences

NON-FRACTIONAL ABLATIVE CO₂ LASER SIDE EFFECTS OF LASER RESURFACING

<table>
<thead>
<tr>
<th>Symptom</th>
<th>% Patients (n=104)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperpigmentation</td>
<td>2.8</td>
<td>1.5 months</td>
</tr>
<tr>
<td>Hypopigmentation</td>
<td>16.3</td>
<td>3-10 weeks onset</td>
</tr>
<tr>
<td>Hypersensitivity</td>
<td>4.8</td>
<td>1.5 months</td>
</tr>
<tr>
<td>Scarring</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Infection</td>
<td>0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Scarring post CO₂ resurfacing
FRACTIONAL LASER TREATMENT

Human Tissue – Cross Section

Results:
- Complete reepithelialization in 24 hrs.
- Clear collagen denaturation from papillary dermis into mid reticular dermis
- Healing occurs from viable tissue. Zones of spared tissue contain clusters of epidermal stem cells and Transit Amplifying (TA) cells

In Vivo Histology
(16 days post exposure)

DEVICE | WAVELENGTH | SPOT SIZES | INJURY DEPTH
--- | --- | --- | ---
Fraxel SR 1550 Dual | 1550 nm, 1927 nm Fiber laser | Telescopic variability | 1.114 mm
Lux 1540 | 1540 nm laser | 10 mm – 15 mm | 760 microns
Affirm | 1440 nm laser and xenon pulsed light | Up to 10 mm | 100 – 300 microns
Clear & Brilliant Permea | 1440 nm 1927 nm | 10mm 15mm | 150-1550 microns 190-200 Microns
Emerge | 1410 nm | 12x18 | 450 microns

NON-ABLATIVE FRACTIONAL (FRACTIONATED) LASERS / LIGHT SOURCES
THULIUM FIBER LASER (1927NM)
HISTOLOGY

5 mJ  10 mJ  15 mJ  20 mJ

HISTOLOGY COMPARISON

Pearl Fractional (YSGG)
- 600 micron ablation
- 60 microns bottom coag
- 20 microns edge coag

SmartXide DOT (CO2)
- ~150 micron ablation (left image)
- ~250 micron ablation (right image with 3 stacked pulses)
- ~200 microns bottom coag
- ~100 microns edge coag

Fraxel Re:pair (CO2)
- ~up to 1.5 mm ablation
- ~200 microns bottom coag
- ~70 microns edge coag

PEARL FRACTIONAL (YSGG)
- 600 micron ablation
- 60 microns bottom coag
- 20 microns edge coag

SMARTXIDE HISTOLOGY
- ~250 micron ablation (left image)
- ~300 micron ablation (right image with 3 stacked pulses)
- ~200 microns bottom coag
- ~100 microns edge coag

Fraxel Re:pair (CO2)
- ~up to 1.5 mm ablation
- ~200 microns bottom coag
- ~70 microns edge coag

ANNULAR COAGULATION
OF DERMAL COLLAGEN

100 μm  100 μm
HEALING SUMMARY FOLLOWING 
FRAXEL RE:PAIR® TREATMENT 
(MULTIPLE SUBJECTS)

With the 135 micron Spot Size Handpiece

ABLATIVE FRACTIONAL DEVICES

- Diversity of laser systems
- Differences include:
  - Wavelength
  - Delivery method – stamped vs. scanning
  - Depth of ablation
  - Extent of thermal injury
  - Speed of treatment

FRACTIONAL ABLATIVE DEVICES

<table>
<thead>
<tr>
<th>FRACTIONAL ABLATIVE DEVICES</th>
<th>WAVELENGTH</th>
<th>AVERAGE LESION</th>
<th>SPOT SIZE</th>
<th>DELIVERY SYSTEM</th>
<th>DENSITY COVERAGE</th>
<th>MESSAGING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraxel Laser</td>
<td>10600 nm</td>
<td>Full control of epidermal + dermal up to 150 mJ</td>
<td>Fixed &lt; 200 µm</td>
<td>Continuous motion tracking system</td>
<td>5 – 70%</td>
<td>No reported cases of delayed onset hypopigmentation after 500 treatments and over 2.5 years of patient follow up. Treatment is performed using parameters up to 4 - 5 times faster than any other fractional laser device. Immediate reduction of photodamage (5-70% less) in a single treatment. Limited downtime, minimal edema and pigmented lesions. Integrated smoke evacuator eliminates the need for staff evacuation.</td>
</tr>
<tr>
<td>Lumenis Bridge Therapy (Active FX and Deep FX)</td>
<td>10600 nm</td>
<td>Active FX: 320 µm</td>
<td>Fixed: 1.3 mm for Active FX 120 µm for Deep FX</td>
<td>Scanning stamp pattern</td>
<td>55-100% coverage: Active FX 50-50% coverage: Deep FX</td>
<td>&lt; 10 min for full face treatment. Single pass with the gold standard and now available delays treatments and bridging the gap between dyschromia and pigmented lesions. Bridge therapy ≤ 50%. Single pass, fewer treatments, painless, fast recovery, no consumables.</td>
</tr>
<tr>
<td>Sciton Pro-Fractional</td>
<td>2940 nm</td>
<td>20-1000 µm</td>
<td>250 microns</td>
<td>Scanning stamp pattern (up to 20mm X 20mm)</td>
<td>1-50% coverage</td>
<td>≤ 5 treatments, less pain, fast recovery, no consumables.</td>
</tr>
</tbody>
</table>
### Fractional Ablative Devices

<table>
<thead>
<tr>
<th>Device</th>
<th>Wavelength</th>
<th>Approx. Spot Size</th>
<th>Delivery System</th>
<th>Density/Coverage</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lasering</strong></td>
<td>10600 nm</td>
<td>20-500 µm</td>
<td>Stamp</td>
<td>40% Fixed</td>
<td>60% Reduced procedure, No topical or cooling</td>
</tr>
<tr>
<td><strong>Mixto SX</strong></td>
<td>10600 nm</td>
<td>Unknown</td>
<td>Stamp</td>
<td>40% Fixed</td>
<td>60% Reduced procedure, No topical or cooling</td>
</tr>
<tr>
<td><strong>Deka</strong></td>
<td>2710 nm</td>
<td>20 µm</td>
<td>Stamp</td>
<td></td>
<td>60% Reduced procedure, No topical or cooling</td>
</tr>
<tr>
<td><strong>Alma Coolair</strong></td>
<td>10600 nm</td>
<td>30-60 µm</td>
<td>Stamp</td>
<td></td>
<td>60% Reduced procedure, No topical or cooling</td>
</tr>
<tr>
<td><strong>Cutera Pearl</strong></td>
<td>2790 nm</td>
<td>80 µm</td>
<td>Stamp</td>
<td></td>
<td>60% Reduced procedure, No topical or cooling</td>
</tr>
<tr>
<td><strong>CO₂ RE</strong></td>
<td>10,600 nm</td>
<td>30-1060 µm</td>
<td>Stamp</td>
<td></td>
<td>60% Reduced procedure, No topical or cooling</td>
</tr>
</tbody>
</table>

### Non-Ablative and Ablative

**Non-Ablative**
- Rejuvenation
- Pore size
- Fine lines
- Acne scars
- Surgical scars
- Actinic Keratosis
- Mild to moderate tightening
- Dyschromia
- Sriae
- Melasma

**Ablative**
- Rejuvenation
- Pore size
- Fine lines
- Acne scars
- Surgical scars
- Moderate tightening
- Deeper lines
- Some dyschromia
- Festoons

### Clear Advantages

**Non-Ablative**
- Actinic Keratosis (1927nm)
- Actinic Chelitis (1927nm)
- Diffuse photodamage (1927nm)
- Off the face
- Pore size

**Ablative**
- Tightening
- Atrophic scars
- Surgical scars
- Vertical lip lines
- Deeper rhytides
- Cosmetic tattoos
- Festoons
- Eyelid lifting
- Facilitate healing with tattoo removal
POST-OP COMPARISON
1 Day Post CO₂ 1 Day Post Non-Ablative Fractional

FRACTIONAL PHOTOTHERMOLYSIS
Non-Ablative Fractional 1550nm
70mJ-40% density

FRACTIONAL PHOTOTHERMOLYSIS
Non-Ablative Fractional 1550nm
70mJ-40% density
EYELID TIGHTENING AND IMPROVED EYELID APERTURE THROUGH NONABLATIVE FRACTIONAL RESURFACING

Sean A. Sukal, M.D., PhD. Anne M. Chapas, M.D., Leonard J. Bernstein, M.D., Elizabeth K. Hale, M.D., Karen H. Kim, M.D. and Roy G. Geronemus, M.D.

Dermatol Surg 2008; 34:1454-58

LASER & SKIN SURGERY CENTER OF NEW YORK
“EYELID TIGHTENING AND EYELID APERTURE THROUGH NONABLATIVE FRACTIONAL RESURFACING”
Dermatol Surg 2008; 34:1454-58

<table>
<thead>
<tr>
<th>Patient Percentile</th>
<th>Degree of Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>28%</td>
<td>1% - 25% improvement</td>
</tr>
<tr>
<td>26.9%</td>
<td>25% - 50% improvement</td>
</tr>
<tr>
<td>25.8%</td>
<td>50% - 75% improvement</td>
</tr>
<tr>
<td>19.4%</td>
<td>75% - 100% improvement</td>
</tr>
</tbody>
</table>

*Scarring, hypopigmentation, hyperpigmentation, persistent erythema and post operative wounding were not observed.

FRACTIONAL PHOTOTHERMOLYSIS

Non-Ablative Fractional 1550nm – ACNE SCARRING
70mJ-35% density
PRIMOS

- Measures surface topography of the skin and can be used to follow depth of acne scars over the course of treatment
- Measures a 30 by 30 mm area of skin
- Sensitive and reproducible

Primos Evaluation of 60 Acne Scars treated with the Fraxel laser
Average Quantitative Improvement – 50%

FRACTIONAL PHOTOTHERMOLYSIS

Non-Ablative Fractional 1550nm – HYPOPIGMENTATION
70mJ-35% density
FRACTIONAL PHOTOTHERMOLYSIS

Non-Ablative Fractional 1550 Nm
70mJ-35% density

THE SAFETY AND EFFICACY OF FRACTIONAL PHOTOTHERMOLYSIS FOR CORRECTION OF STRIAE DISTENSAE

Stotland M, Chapas AM, Brightman LA, Sukal S, Hale E, Karen J, Bernstein LJ, and Geronemus RG.

Journal of Drugs in Dermatology
September 2008; 7:857-61

STUDY DESIGN

• 20 female pts with atrophic mature striae distensae
• Ages: 18-59 years
• Skin phototypes: I-VI
• Treatment sites: abdomen, breast, hips, and buttocks
• Laser: 1550 nm, 12-18 mJ, 250 mtz/cm² (microthermal zone density), 8 passes for a total of 2000 MTZ/cm², 15 mm laser aperture with cold air cooling of skin surface
RESULTS

• 18 of 20 pts completed study to 3 months, 11 pts returned for 6 month follow up

• Photographic analysis:
  ➢ 3 objective observers
  ➢ Mean: 2.44 (0-4 scale) corresponding to ~ 36% at 3 mo
  ➢ Mean: 2.33 (0-4 scale) corresponding to ~ 33% at 6 mo

• Pt subjective evaluations:
  ➢ Mean: 2.76 (0-4 scale) corresponding to ~ 43%
  ➢ 12/18 pts with > 50% improvement
  ➢ 6/18 pts note > 75% improvement

• Histology:
  ➢ Pre and 3 month post tx histology without significant change.
  (Small sample size and taken from 2 pts with the smallest noted change for both subjective and objective measurements)

FRACTIONAL PHOTOTHERMOLYSIS

Pre Tx 3 mo Post Tx
Non-Ablative Fractional 1550nm 70mJ-35% density

Rated as 75% improvement

FRACTIONAL PHOTOTHERMOLYSIS

Pre Treatment 6 mo. Post Treatment
NON-ABLATIVE FRACTIONAL 1550nm 70mJ-35% density
"SIDE EFFECTS AND COMPLICATIONS OF FRACTIONAL LASER PHOTOTHERMOLYSIS: EXPERIENCE WITH 961 TREATMENTS"

GRABER E, TANZI E, ALSTER T.
DERM SURG. VOL 34 ISSUE 3, PAGES 301-307

- 961 treatments
- 7.6% resulted in development of complications
- 1.87% were acneiform eruptions
- 1.77% were herpes simplex virus outbreaks
- PIH in darker skin types

THULIUM 1927NM NON-ABLATIVE

1927NM THULIUM LASER

- 1927nm Fractionated Thulium Laser (Fraxel Dual, Solta Medical, Hayward, CA)
- Fluence of 5-20 mJ, coverage 0-70%
- Moderate to high water absorption
- Ideal for superficial resurfacing

Courtesy of Laser & Skin Surgery Center of New York®
1927-NM FRACTIONAL RESURFACING OF FACIAL ACTINIC KERATOSES: A PROMISING NEW THERAPEUTIC OPTION.


AK CLEARANCE DURING TREATMENT PHASE

<table>
<thead>
<tr>
<th>Treatment Phase</th>
<th>Post 1st treatment</th>
<th>Post 2nd treatment</th>
<th>Post 3rd treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=10</td>
<td>62.7% (Range 16.6-100%)</td>
<td>84.3% (Range 54-100%)</td>
<td>88.5% (Range 54-100%)</td>
</tr>
</tbody>
</table>

AK CLEARANCE DURING FOLLOW-UP PHASE

<table>
<thead>
<tr>
<th>Follow-Up post Final TX</th>
<th>1 month</th>
<th>3 months</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=7</td>
<td>90.6% (Range 72.7-100%)</td>
<td>84.0% (Range 71.4-100%)</td>
<td>85.1% (Range 71.9-100%)</td>
</tr>
</tbody>
</table>

Courtesy of Laser & Skin Surgery Center of New York®
TOLERABILITY / SAFETY

- Well-tolerated.
- No incidents of scarring or infection
- Erythema and peeling lasting 4-5 days on average.
- Average Pain Score during treatment: 2.71/10 (Range 0-9)

THULIUM LASER 1927NM
NON-ABLATIVE

Baseline

10mJ-65% density

100% Clearance

7 AK

1 Month Fup

32 AKs

71.9% Clearance

10mJ-65% density
Baseline

3 month F/U

74 AK

83.8% Clearance (12 AK)

10mJ-65% density

Courtesy of Laser & Skin Surgery Center of New York®

THULIUM LASER 1927NM
NON-ABLATIVE

Baseline

3 month F/U

15 AK

80% Clearance (3 AK)

10mJ-65% density

Courtesy of Laser & Skin Surgery Center of New York®

THULIUM LASER 1927NM
NON-ABLATIVE

F/U Post 2 Treatments

10mJ-65% density
THULIUM LASER 1927NM
NON-ABLATIVE

Baseline

ACTINIC CHEILITIS
1927nm 10mJ-65% density

F/U Post 2 Treatments

15 AK

80% Clearance (3 AK)

1927nm 10mJ-65% density
THULIUM LASER 1927NM
NON-ABLATIVE

10mJ-65% density

THULIUM LASER 1927NM
NON-ABLATIVE

HYPOPIGMENTATION
10mJ-65% density

THULIUM LASER 1927NM
NON-ABLATIVE

10mJ-65% density
THULIUM LASER 1927NM
NON-ABLATIVE

HYPOPIGMENTATION
10mJ-65% density

THULIUM LASER 1927NM
NON-ABLATIVE

ENLARGED PORES
10mJ-65% density

Conventional vs. Low Density Fractional

<table>
<thead>
<tr>
<th>Category/Characteristic</th>
<th>CLEAR + BRILLIANT™</th>
<th>Fraxel® DUAL 1550/1927 Laser System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser Classifications</td>
<td>Class III</td>
<td>Class IV</td>
</tr>
<tr>
<td>Wavelength</td>
<td>1440 nm (+/-20 nm)</td>
<td>1927 nm (+/-10 nm)</td>
</tr>
<tr>
<td>Peak Laser Power</td>
<td>1440nm: 3 Watts (Nominal)</td>
<td>1927nm: 1 Watt (Nominal)</td>
</tr>
<tr>
<td>Pulse Duration</td>
<td>4-5ns</td>
<td>1927nm: &lt; 10 ms</td>
</tr>
<tr>
<td>Nonthermal spot size</td>
<td>1927nm: 50 - 150 μm</td>
<td>1550nm: 120 – 362 μm</td>
</tr>
<tr>
<td>Nonthermal spot energy</td>
<td>1927nm: 5-10 mJ</td>
<td>1550nm: 4 – 70 mJ</td>
</tr>
<tr>
<td>Treatment density</td>
<td>1440nm: 40 – 50 MTZs per cm² per pass</td>
<td>1927nm: 10-48 MTZs per cm² per pass</td>
</tr>
<tr>
<td>Treatment Width</td>
<td>1440nm: Approx. 5% to 10%</td>
<td>1927nm: 5% to 27%</td>
</tr>
<tr>
<td>Treatment Depth</td>
<td>1440nm: 282-384 μm</td>
<td>1927nm: 167 μm</td>
</tr>
<tr>
<td>Total Energy Delivered per Full Face Treatment (260 cm² area)</td>
<td>1440nm: 1.284 kJ</td>
<td>1927nm: 0.649 kJ</td>
</tr>
<tr>
<td>Lesion Diameter</td>
<td>1440nm: 120-202 μm</td>
<td>1927nm: 221 μm</td>
</tr>
<tr>
<td>Lesion Depth</td>
<td>1440nm: 282-384 μm</td>
<td>1927nm: 167 μm</td>
</tr>
</tbody>
</table>

Courtesy of Solta Medical
EMERGE VS. ICON 1540

<table>
<thead>
<tr>
<th></th>
<th>Emerge</th>
<th>Icon 1540</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td>1410 nm</td>
<td>1540nm</td>
</tr>
<tr>
<td>Treatment Window</td>
<td>12 mm x 8 mm</td>
<td>XD 12 x12 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF 15mm x round</td>
</tr>
<tr>
<td>Fluence/Energy</td>
<td>10 mJ to 30 mJ</td>
<td>XD 10 to 70 mJ/mb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF 8 to 60 mJ/mb</td>
</tr>
<tr>
<td>µC Diameter</td>
<td>Up to 350µ</td>
<td>XD up to 200µ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF up to 200µ</td>
</tr>
<tr>
<td>Pitch</td>
<td>0.2 mm to 3.5 mm</td>
<td>XD 2 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF 1 mm</td>
</tr>
<tr>
<td>Density of µC</td>
<td>31 to 123 µc per cm²</td>
<td>XD 22 mJ/mm²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF 115 µJ/cm²</td>
</tr>
<tr>
<td>Pulse Width</td>
<td>Max 30 ms</td>
<td>10-20ms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XD 10-100µ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF 75µ</td>
</tr>
<tr>
<td>Depth of Penetration</td>
<td>450 µ</td>
<td>XD 1060 µ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>XF 750 µ</td>
</tr>
<tr>
<td>Delivery Modes</td>
<td>3 modes</td>
<td>Stamping, tile cascade</td>
</tr>
</tbody>
</table>

PIGMENT REMOVAL IN MENDS

Results: Outward migration of melanin in the MENDs 3 days after treatment.

LOW DENSITY LOW ENERGY FRACTIONAL
LOW ENERGY LOW DENSITY 1927 NM

PIH
7mJ-10% density

ABLATIVE FRACTIONAL RESURFACING

Anesthesia Requirements:

- Topical
- Local
- Regional
- IV sedation
- General

FULL FACE PROTOCOL – ANESTHESIA FOR MODERATE TO AGGRESSIVE TREATMENTS

- Topical
- Regional nerve block
- IM Toradol
- Forced air cooling
- IV sedation
RAPID HEALING PROGRESSION
ABLATIVE FRACTIONAL RESURFACING

Before
Day 1
Day 2
Day 3
Day 4
Day 5
Day 6

Photographs Courtesy of Deb Atkin, M.D.

ABLATIVE FRACTIONAL RESURFACING

FRAXEL RE:PAIR

70mJ-50% density

Courtesy of Roy G. Geronemus, M.D.

ABLATIVE FRACTIONAL RESURFACING

FRAXEL RE:PAIR

70mJ-50% density

Courtesy of Roy G. Geronemus, M.D.
ABLATIVE FRACTIONAL RESURFACING
FRAXEL RE:PAIR
LOWER EYELID

30mJ-40% density

ABLATIVE FRACTIONAL RESURFACING
FRAXEL RE:PAIR

30mJ-30% density

Pre-Tx  3 month follow up

ABLATIVE FRACTIONAL RESURFACING
FRAXEL RE:PAIR

30mJ-30% density

Courtesy of Roy G. Geronemus, M.D.
ABLATIVE FRACTIONAL RESURFACING
FRAXEL RE:PAIR

70mJ-50% density

Courtesy of Roy G. Geronemus, M.D.
ABLATIVE FRACTIONAL RESURFACING

FRAXEL RE:PAIR

70mJ-50% density

Courtesy of Roy G. Geronemus, M.D.

ABLATIVE FRACTIONAL RESURFACING

FRAXEL RE:PAIR

70mJ-50% density

Courtesy of Roy G. Geronemus, M.D.

ABLATIVE FRACTIONAL RESURFACING

FRAXEL RE:PAIR

PRE TX
POST TX 1
70mJ-50% density - 1 PASS ONLY

Courtesy of Roy G. Geronemus, M.D.
LASER & SKIN SURGERY CENTER OF NEW YORK
"SUCCESSFUL TREATMENT OF ACNEIFORM SCARRING WITH CO2 ABLATIVE FRACTIONAL RESURFACING"
LASERS IN SURGERY AND MEDICINE

ABLATIVE FRACTIONAL RESURFACING

70mJ-50% density

ABLATIVE FRACTIONAL RESURFACING

70mJ-50% density
FRAXEL RE:PAIR – ACNE SCARS

<table>
<thead>
<tr>
<th>Texture</th>
<th>1 month post procedure</th>
<th>1 month post procedure</th>
<th>3 months post procedure</th>
<th>3 months post procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>assessment</td>
<td>investigator assessment</td>
<td>Subject</td>
<td>assessment</td>
</tr>
<tr>
<td>Texture</td>
<td>1.75</td>
<td>1.92</td>
<td>2.27</td>
<td>2.39</td>
</tr>
<tr>
<td>Atrophy</td>
<td>1.42</td>
<td>1.75</td>
<td>2.11</td>
<td>2.19</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>1.5</td>
<td>1.83</td>
<td>2.42</td>
<td>2.46</td>
</tr>
</tbody>
</table>

"SUCCESSFUL TREATMENT OF ATROPHIC POSTOPERATIVE AND TRAUMATIC SCARRING WITH CARBON DIOXIDE ABLATIVE FRACTIONAL RESURFACING"

Weiss E, Chapas A, Brightman L, Hunzeker C, Hale E, Karen J, Bernstein L, Geronemus R

Arch Dermatol. 2010;146(2):133-140
SURGICAL SCAR LEFT CHEEK

Pre Tx 1

6 Month Post 3 AFR

40mJ-50% density

2A. Surgical scar (dotted line) 6 months post 3 AFR treatments. 2B. Topographical image of surgical scar (solid red line) 6 months post 3 AFR treatments. The decrease in both green & blue areas within red line represents a 57.5% reduction in scar volume & 36.3% reduction in max depth.

1A. Baseline photograph of surgical scar (dotted black line). 1B. Baseline topographical image of surgical scar (solid red line). Dark red color is reference plane. Green areas represent depressions, and blue areas represent areas of greatest depression.

Baseline Surgical Scar

Surgical Scar 6 Months Post Final Treatment

Baseline Scar Volume = 11.38mm³

Scar Volume 6 Months Post Final Treatment = 4.84mm³

Volume Improvement = 57.5%

Max Depth Improvement = 36.3%

SURGICAL SCAR LEFT UPPER LIP

Pre Tx 1

3 Month Post Tx 3

70mJ-50% density
ABLATIVE FRACTIONAL RESURFACING

SCAR
60 mJ - 40% density

ABLATIVE FRACTIONAL RESURFACING

SCARS-TYPE IV V
30 mJ - 40% density

ABLATIVE FRACTIONAL RESURFACING

Active Fx
30 mJ - 100W
FRACTIONAL CO₂ LASER-ASSISTED DRUG DELIVERY

Merete Haedersdal MD, PhD, DMSc, Fernanda H. Sakamoto MD, William A. Farinelli BA, Apostolos G. Doukas PhD, Josh Tam PhD, and R. Rox Anderson MD

Lasers Surg Med

COMPLICATIONS OF FRACTIONAL CO₂ LASER RESURFACING: FOUR CASES

FIFE D, FITZPATRICK R, ZACHARY C

Lasers in Surgery and Medicine
41:179-184 (2009)
DYSTROPHIC CALCIFICATION AND ACCENTUATED LOCALIZED ARGYRIA AFTER FRACTIONATED CARBON DIOXIDE LASER THERAPY OF HYPERTROPHIC SCARS

Amanda R. Shaub, MD; Patrick J. Brown, MD; Todd T. Kobayashi, MD; Michael R. Lewin, MD; Chad M. Hivnor, MD

JAMA Dermatol 2014
Mar 1;150(3):312-641:179-184

A PICOSECOND 755NM LASER WITH DIFFRACTIVE LENS ARRAY FOR SCARRING AND REJUVENATION

• The diffractive lens array is a specialized optic that delivers varying levels of heat at a fixed spot size and fluence

• 70% of the fluence is delivered by high energy pulses that are 500 microns apart

• Lower level heating surrounds these defined areas of higher level pulses
DIFFRACTIVE LENS ARRAY

500 microns between high energy pulses

Baseline

One month after one treatment

Baseline

One month after three treatments
Baseline One month after six treatments

Courtesy of David McDaniel, M.D.

FRACTIONAL BIPOLAR RADIOFREQUENCY
Matrix RF
Syneron
Bipolar radiofrequency
64 pin tip
144 pin tip
Tunable program

Matrix RF
SUBLATIVE REJUVENATION
Cone vs. Pyramid

Fractional Skin Resurfacing
Sublative Rejuvenation

Epidermal to dermal ratio of disruption

COMPARISON OF FRACTIONAL TECHNOLOGY

Er:Glass 1550/400nm
Thulium 1927nm
CO2 10.600nm
Bi-Polar RF (1MHz)
**Matrix RF**

Skin Impact At Various Time Stages

- Immediately Post Tx
- 2 Days Post Tx
- 5 Days Post Tx

Program A

**Matrix RF**

64 Pin Tip

Histology

Program B
Program C
Program C

- Baseline
- 1 month post Tx #2
- 6 week post tx #3

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Laser & Skin Surgery Center of New York