LASER & SKIN

Lasers & Energy Devices Used To Treat Medical Problems:

WHAT'S NEW IN 2024?

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DISCLOSURES

Medical Advisory Boards

Acclaro, Aesthetics Biomedical, Allergan, BellaMia, Cutera, Cytrellis, Dominion Aesthetics, Endo Med, Engage Technologies, Evolus, FA Corporation, Galderma, Lumenis, Lutronic, Merz, Revance Aesthetics, Solta/Valeant, Syneron Candela, Venus Concepts

Research Support

Acclaro, Aesthetics Biomedical, Allergan, Avita, Medical, BTL, Cutera, Cytrellis, Dominion Aesthetics, Endo Med, Galderma, Loreal, Lutronic, Revance Aesthetics, Sofwave, Venus Concepts

Stock:

Accure, Skincare, AVAVA, Blueberry, Cutera, Cytrellis, Dominion Aesthetics, Engage Technologies,Revance Aesthetics

MAUI DERM 2024

Cutaneous Laser & Energy Based Device Surgery

- Vascular Lesions
  - Port Wine Stains / Hemangiomas
  - Facial vessels
  - Leg veins
  - Vascular anomalies
  - Blue rubber bleb nevus syndrome
  - Osler-Weber-Rendu
  - Lymph-hemangiomas
  - Others
- Tattoos & Pigmented Lesions
  - Decorative, cosmetic, traumatic tattoos
  - Birthmarks, CALM, Becker's Nevi
  - Nevi
  - Melasma
- Hair Removal
  - Hair containing grafts post surgery
- Resurfacing
  - Ablative – wrinkles, acne scars
  - Non-Ablative – skin toning, rejuvenation
- Scars, Stretchmarks
  - Acne scars
  - Traumatic scars
  - Striae
- Tumors/Growths
  - BCC, SCC in situ
  - Sebaceous hyperplasia
  - Adenoma sebaceum
  - Rhinophyma
- Hyperhidrosis
- Acne

Fully Ablative Lasers Remove ALL Superficial Photodamage

- Clears the entire epidermis!
  - Seborrheic and **actinic keratoses**
  - Lentigos, actinic bronzing
  - Smooths sebaceous hyperplasia, nevi, and other superficial irregularities
- Can go into the papillary dermis
  - Some superficial vessels
  - Fine lines and crinkling
- BCCs and superficial SCCs
  - Important to know/guess the depth of malignancy
  - Aggressive curettage - Depth matters!

Actinic Cheilitis

CO_2 90-100mJ, 55w→ 3-9-6 → 3-9-5

Pre

Immediate post

1 week post

1 month post

2 months post

7 months post

Actinic Cheilitis

CO_2 90-100mJ, 55w→ 3-9-6 → 3-9-5

Pre

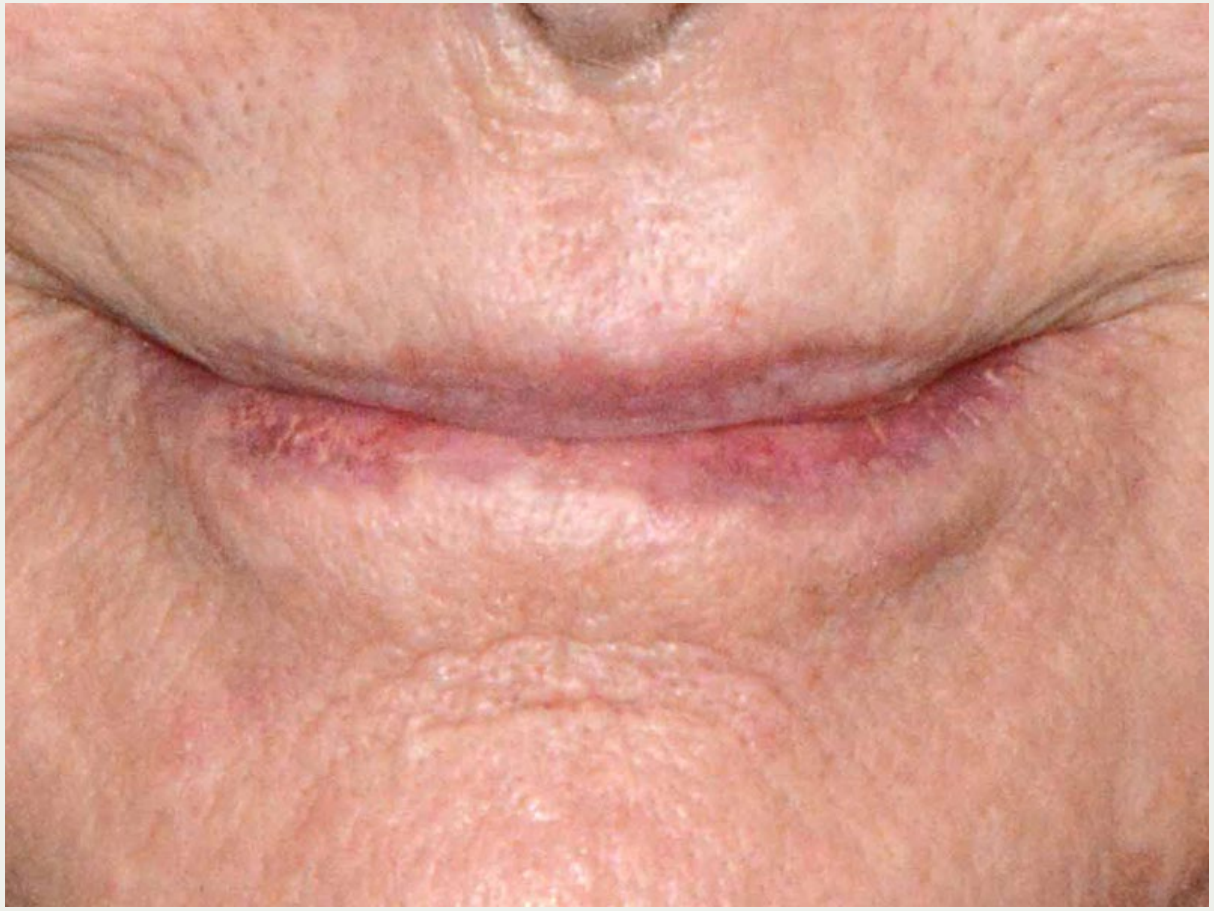
6 days post

13 days post

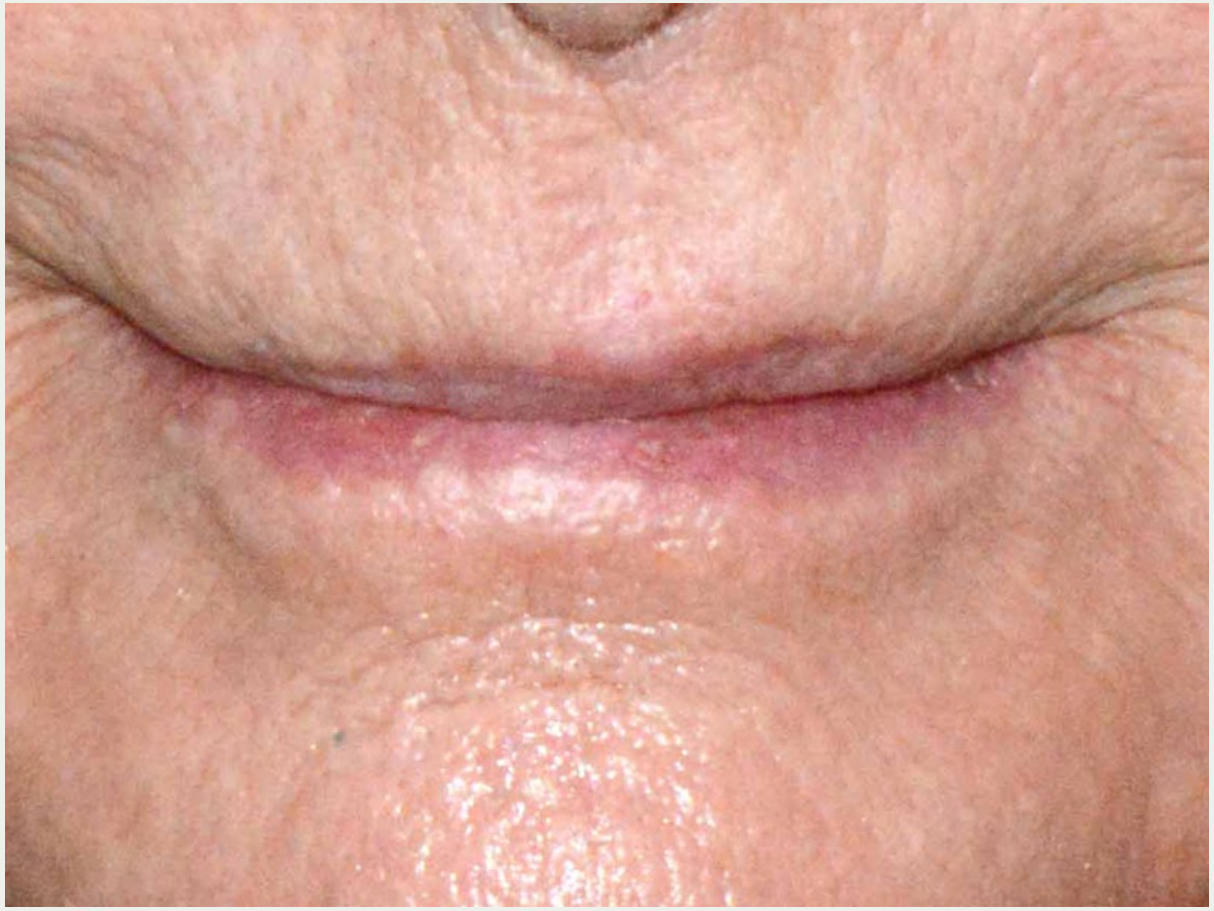
6 months post
Stayed clear 8 years

Actinic Cheilitis

CO_2 90-100mJ, 55w→ 3-9-6 → 3-9-5



Pre



19 days post, stayed clear at least 3 yrs

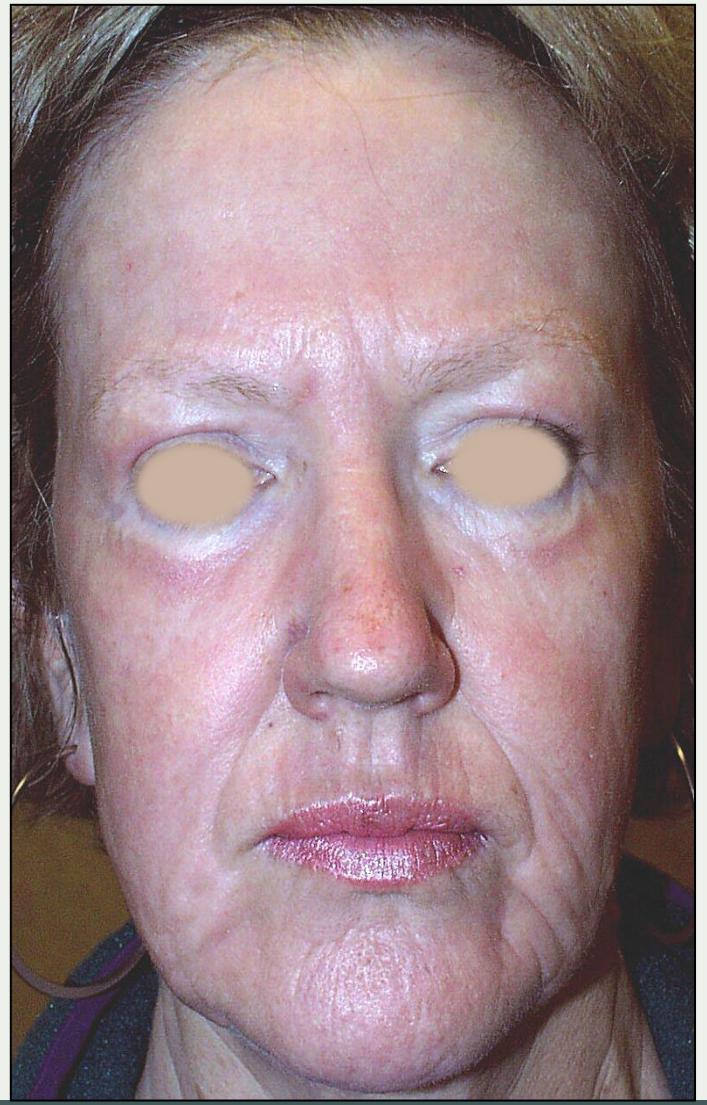
Fully Ablative CO_2 Resurfacing

LONG term removal of actinic damage!

No other tx except topical vitamin C

9.5 yrs post resurfacing

CO_2 Resurfacing > 10 yrs No Recurrence



Note:

- 1-month post-op tighter lids and fuller lips, erythema lower eyelids
- No recurrence of AKs for > 10 years in areas resurfaced

CO_2 & Erbium + spot tx to AK's

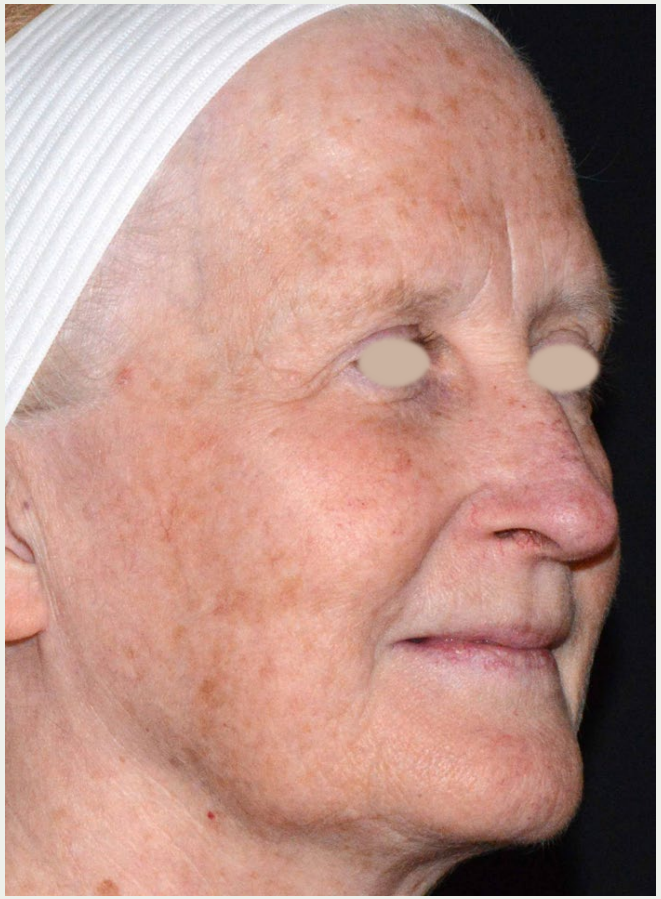
Pre

7 weeks post
CO2/Erbium

10 weeks post
CO2/Erbium
3 weeks post PDL

Fully Ablative CO_2 Resurfacing

No new BCCs on face for at least 3 years!



Pre

6 months post

Non-Ablative Fractional 1550/1927 Laser

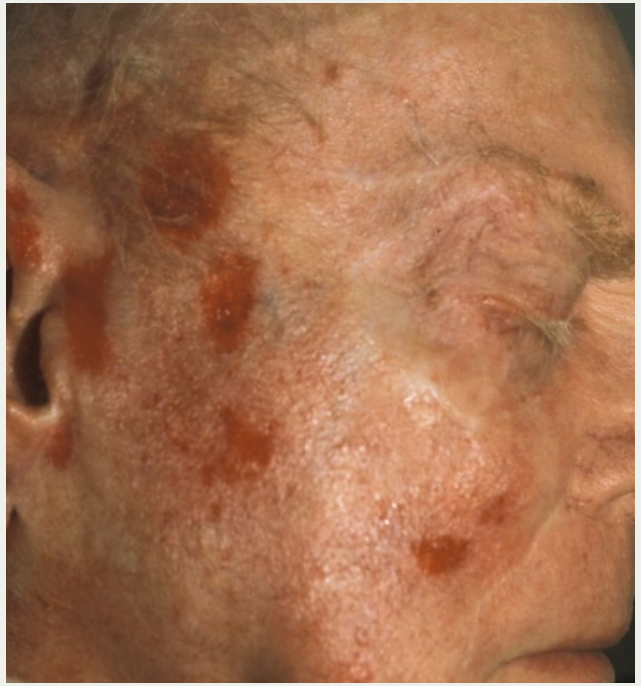
Actinic Keratosis

Before 1927 nm Tx
Lesion Count: 25

1 Month Post 4 Treatments
Lesion Count: 3

Photographs courtesy of Leonard Goldberg, MD

Fully Ablative CO2 – Multiple Superficial BCCs



Pre tx

Post tx

Pre tx

Post tx

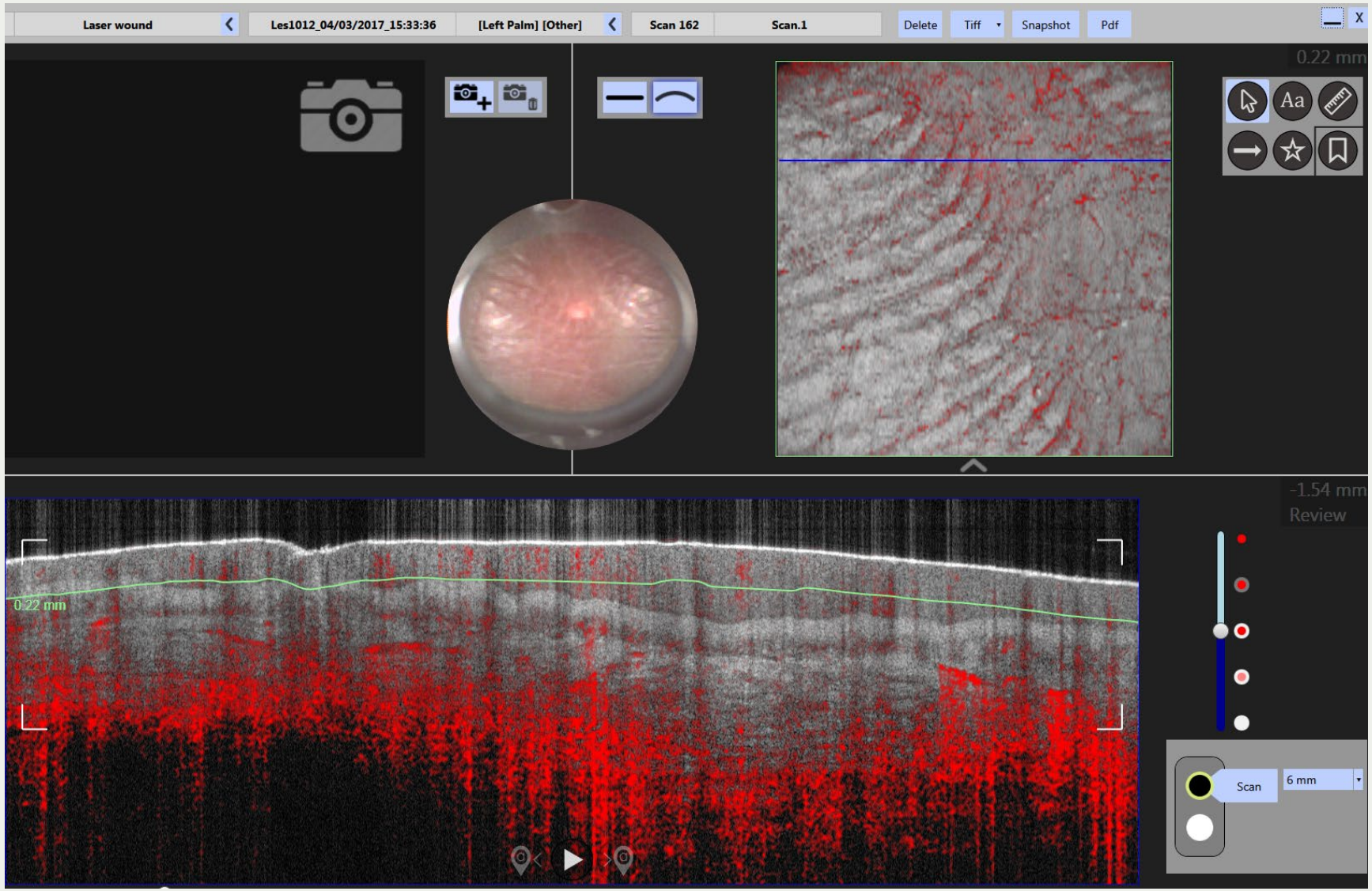
Fully Ablative CO2 over entire face with 1-2 extra passes over BCCs in an 80+-year-old male with hx of over 100 BCCs! No recurrences or new BCCs in tx'd area.

Fractional Resurfacing for Hypertrophic Scars

- Laser variables
  - *Wavelength- Erbium or CO_2 so can go deep*
  - *Power of machine*
    - *High energy so can go deep with least thermal damage*
  - *Lower Density*
    - *% heated/coagulated and % ablated tissue*

For scars want HIGH energy to go deep (can measure scar depth now), less coagulative damage and LOW density

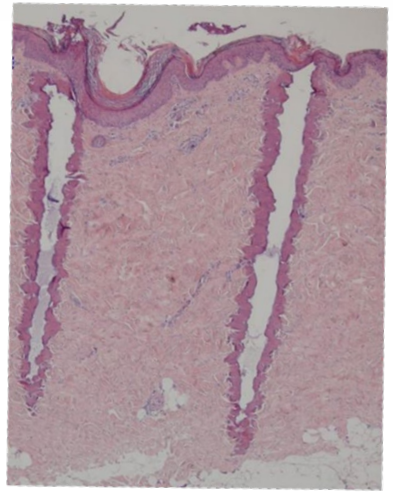
OCT Imaging to see Depth of Scar



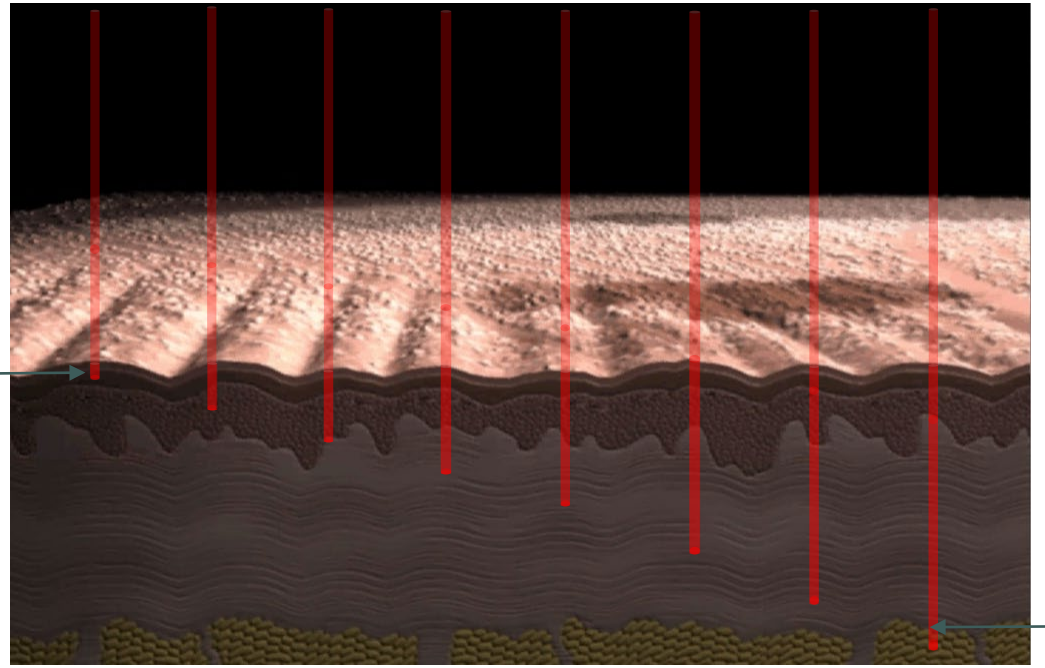
Deep Fractional Scanner

Spot Size: 0.12 mm (120 microns)

Depth: 75-3500 µm



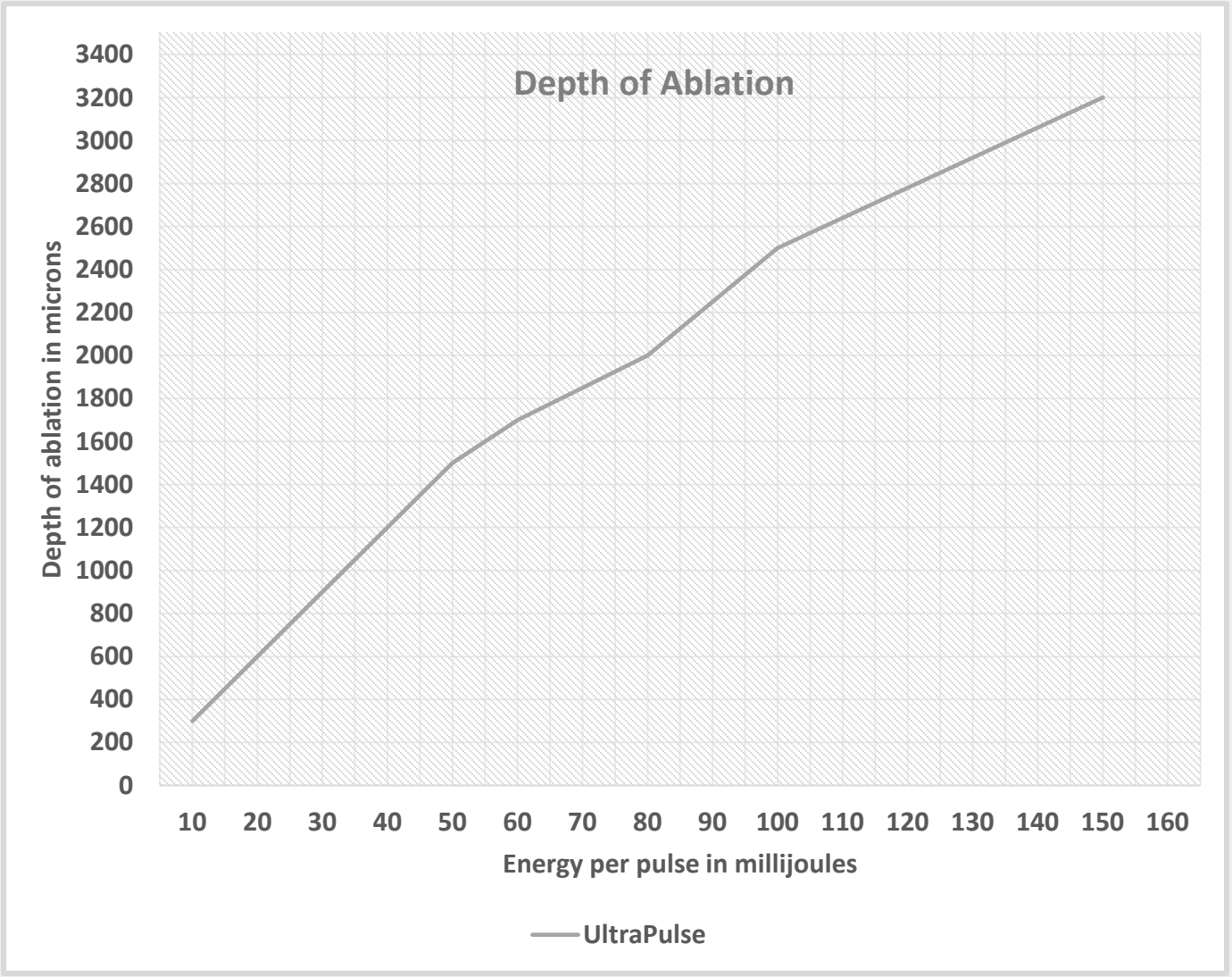
Energy - 150mJ; density - 3%
Depth of up to 4mm



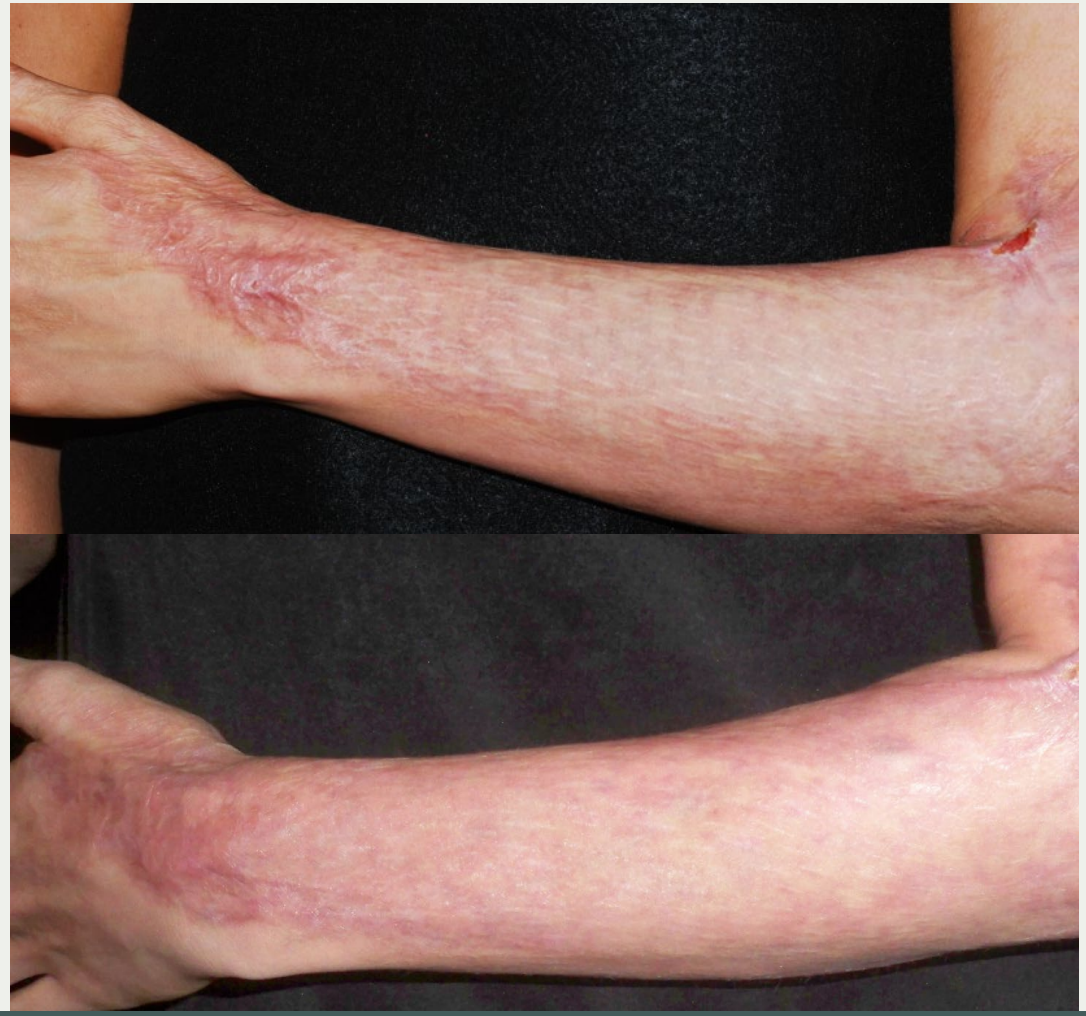
2.5mJ
75um deep

150mJ
3500um deep

Depth of Ablation for High Pulse Energy CO_2 Laser



Improved Range of Motion & Healing of Ulcer/Contracture



Photos courtesy of J. Waibel, M.D.

Single Deep Fractional CO_2 Treatment

Note textural improvement and elevation of chin

Pre

7 months post

Single Deep Fractional CO_2 TX

Note: increased ROM and oral opening.

Suzanne Kilmer M.D.

Pre

7 months post

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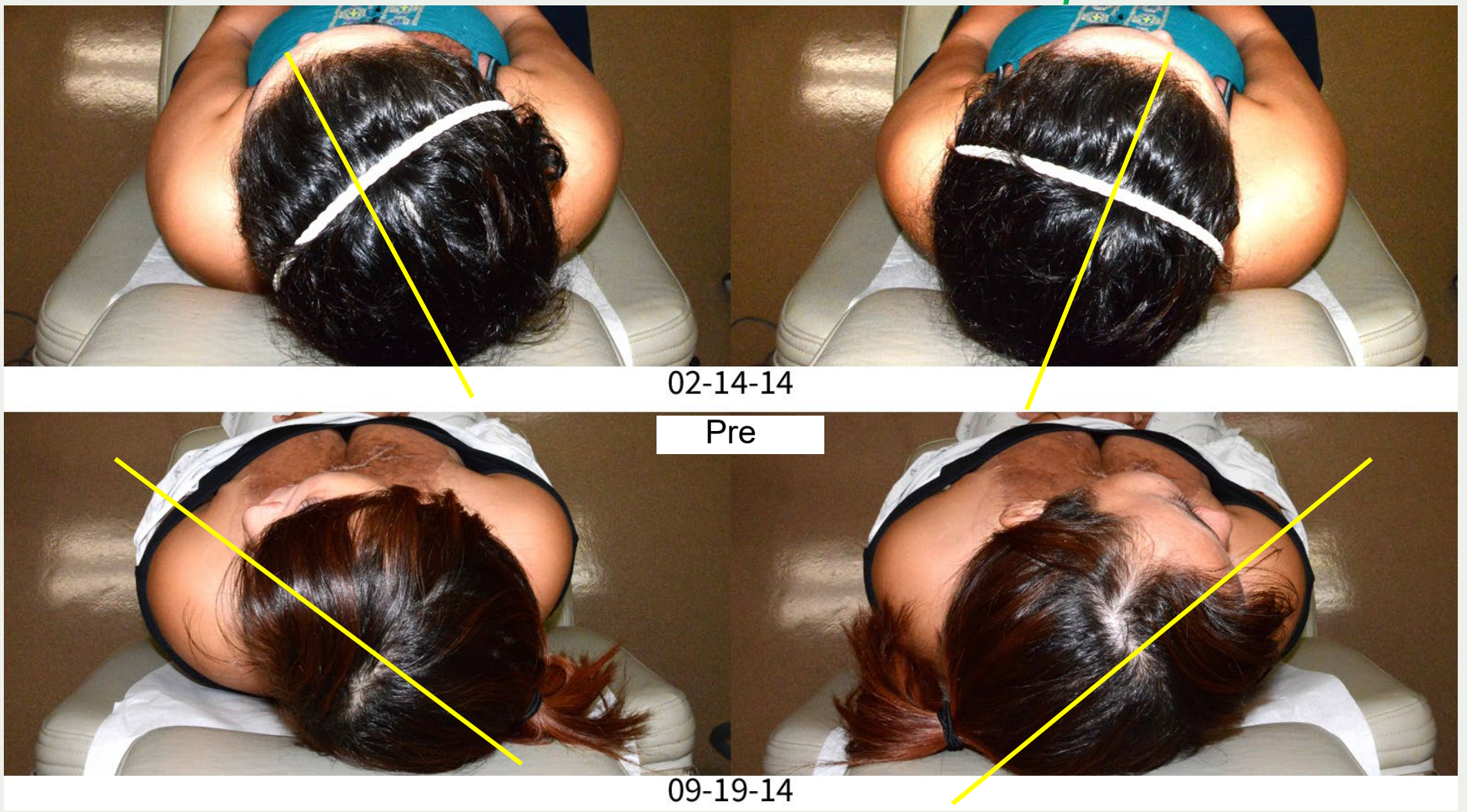
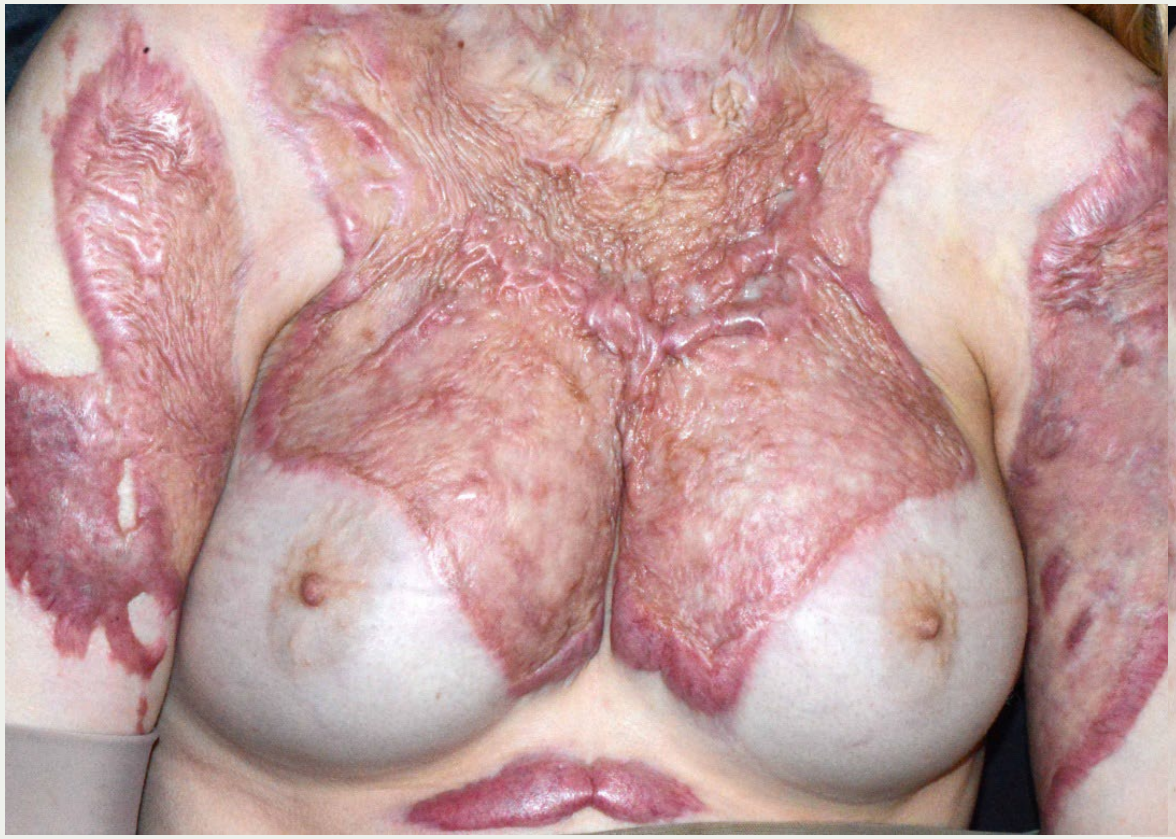
Single Deep Fractional CO_2 Treatment

Note increased ROM and nasal tip show



Deep Fractional CO_2, PDL & Kenalog Tx

(Pt is Keloid Former)



Pre

Post 10 tx

2 yrs of combo TXs post-accident

5-Ablative Fractional 2910nm,
2- Fully Ablative (DEEP & SCAR FX
8- Pulsed Dye Laser
1- Pulsed 532 Laser
13-ILK

Welding Accident
11 treatments over 14 months,

Pre tx

14 mos post 1st Tx

12th tx

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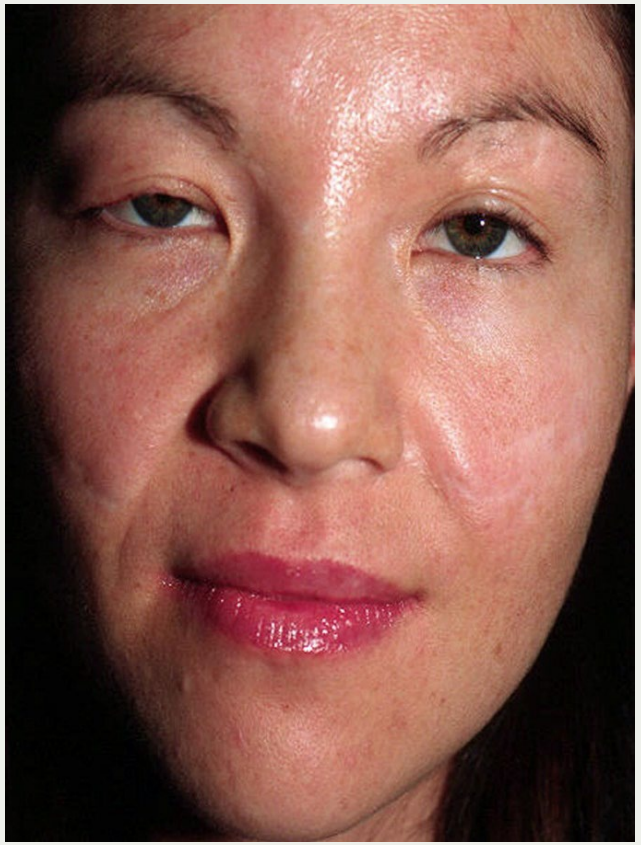
PDL + Erbium + CO_2

Pre

2 mo post



4 years post

CO_2 + Erbium + PDL

Pre

4 mo post

Single Fractional Ablative Tx

Scar: Non-Ablative Fractional 1450nm

Pre tx

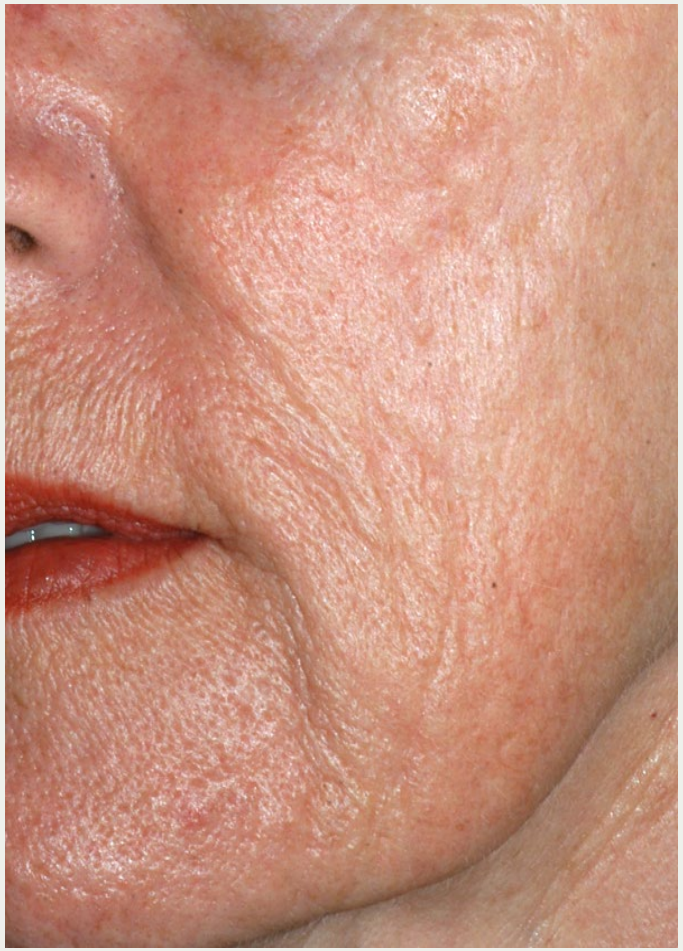
Post tx with 70mj

Non-Ablative Fractional

Pre

4-month post 1 tx

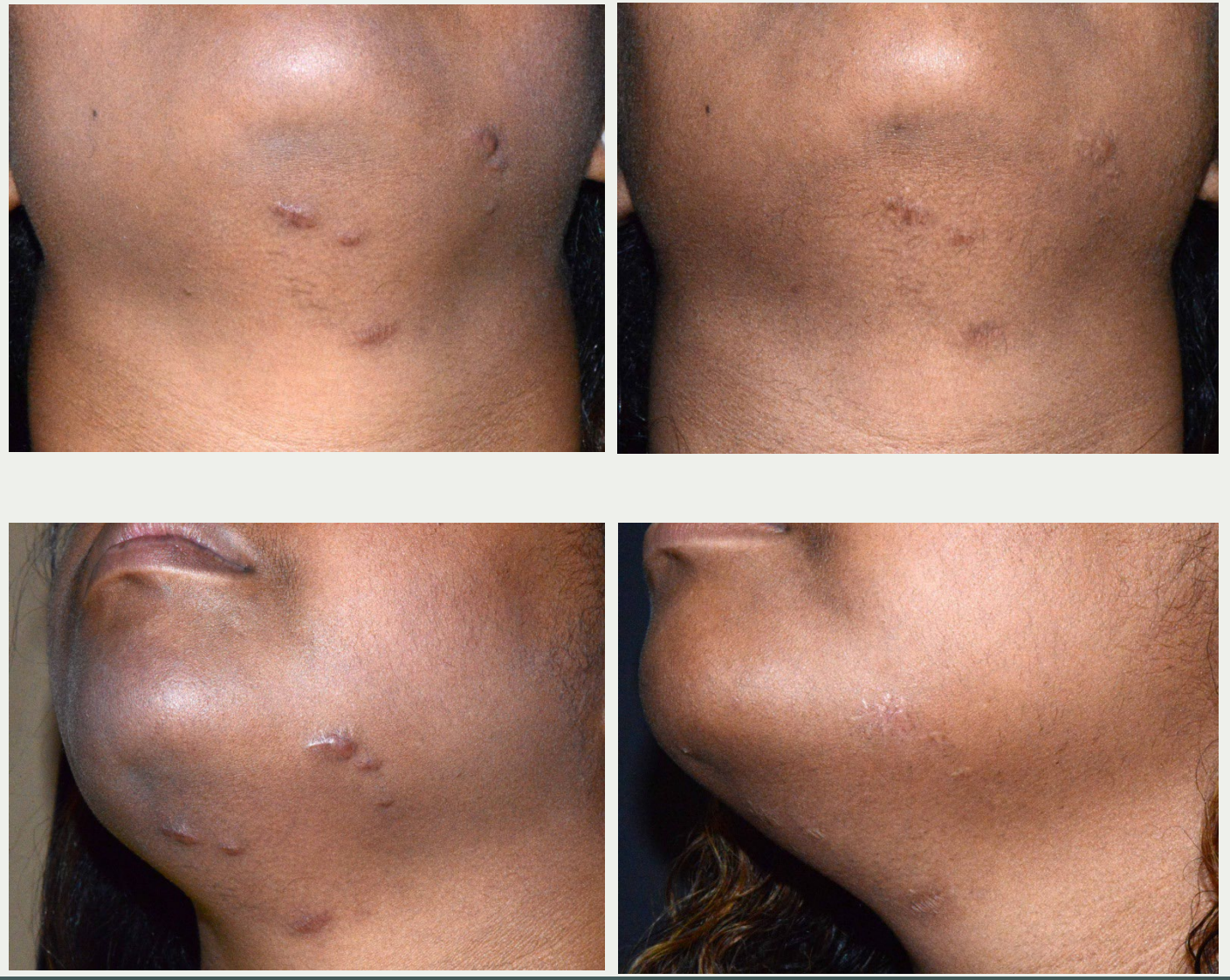
Non-Ablative Fractional



Pre

4-month post

Non-Ablative Fractional 1565nm

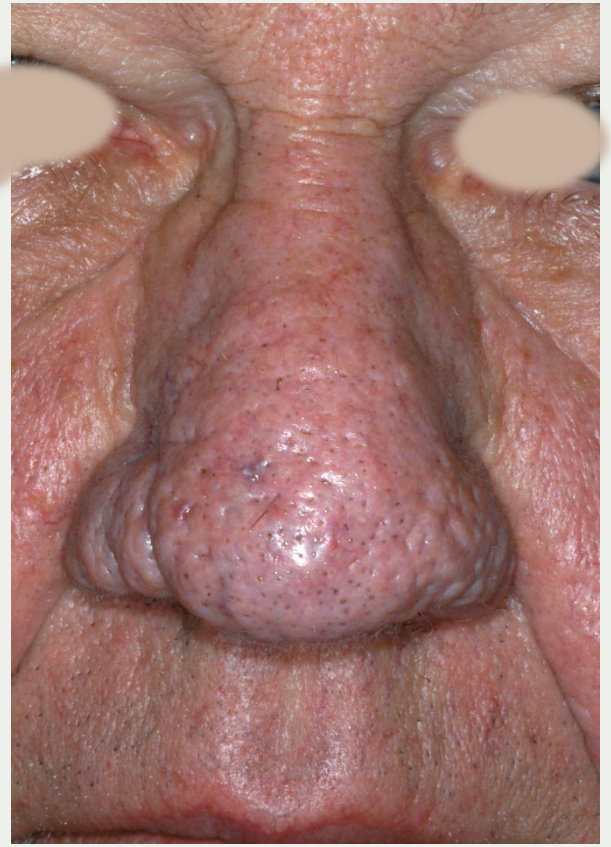


Summary

- HELD
  - High Energy
    - Greater than 50mj. Often 70mj to 150mj?
  - Low Density
    - Much less than 10%. Usually 1%, 3%, or 5%
- Improved Range of Motion and Healing of Ulcer/Contracture
- Less sensitive to touch
- Improved cosmesis – color and texture!

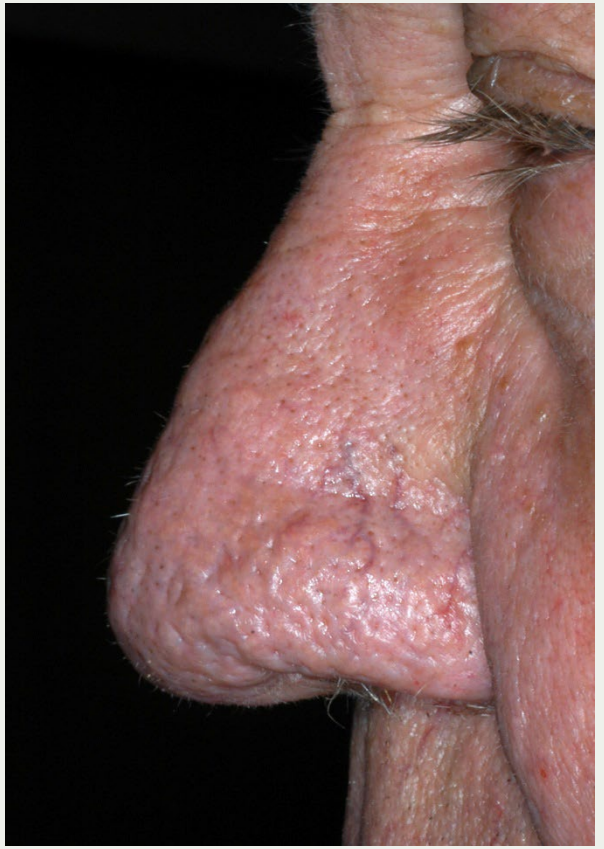
Rhinophyma

Pre



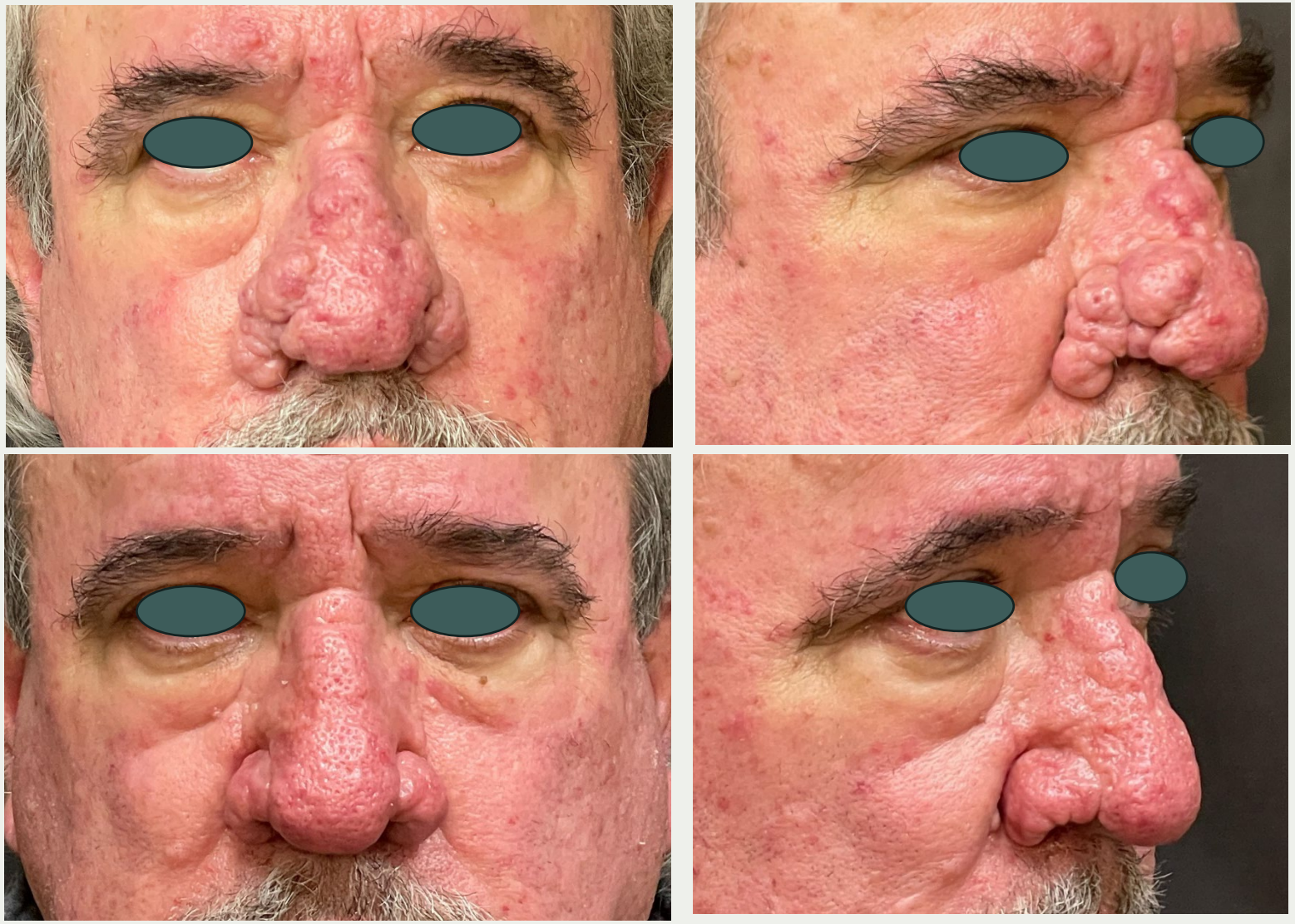
4 months post

Pre



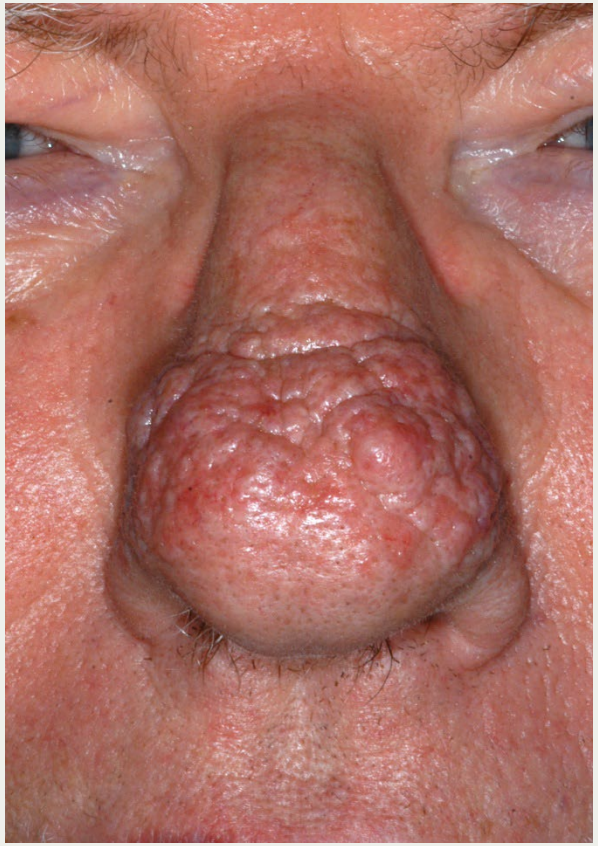
4 months post

Rhinophyma



Rhinophyma – Fully Ablative

Rhinophyma



Pre

8 months post

Pre

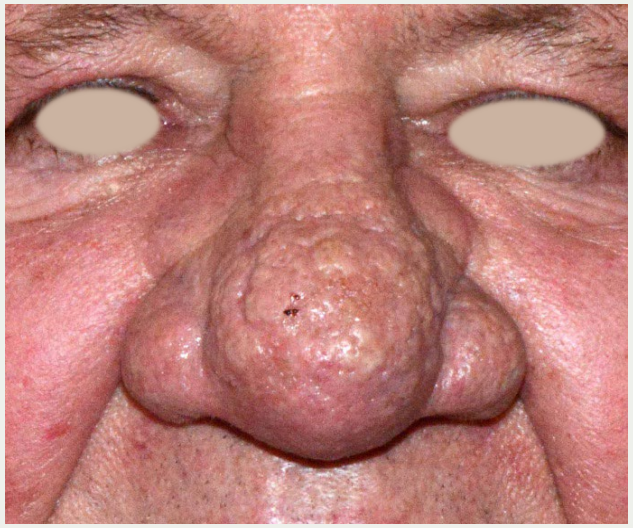
8 months post

Rhinophyma - Why Fractional CO_2?

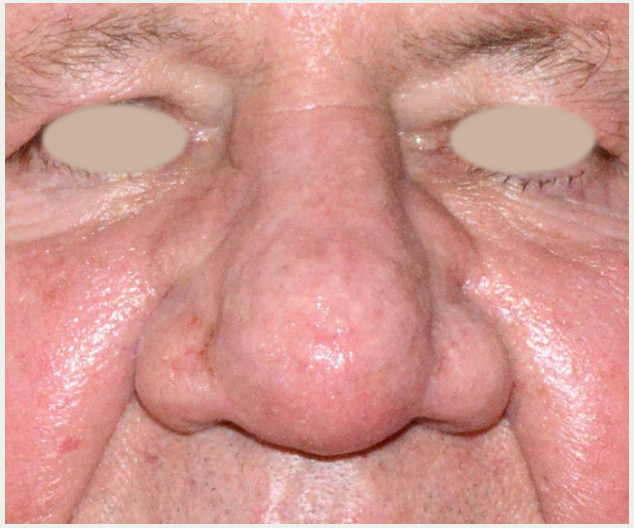
- Use of Fractional CO_2 maximizes improvement while lowering risk of hypopigmentation and scarring
  - May extend length of improvement when using deep fractional settings
  - Shortens healing time
- Can start with fully ablative to smooth out nodular (or even cutting mode) then do fractional ablative
  - May decrease risk of recurrence with less downtime than more aggressive fully ablative
- Even with highly aggressive settings they heal in 7-10 days
- CO_2 has more coagulation, so less bleeding!

Rhinophyma – Fractional Ablative CO_2

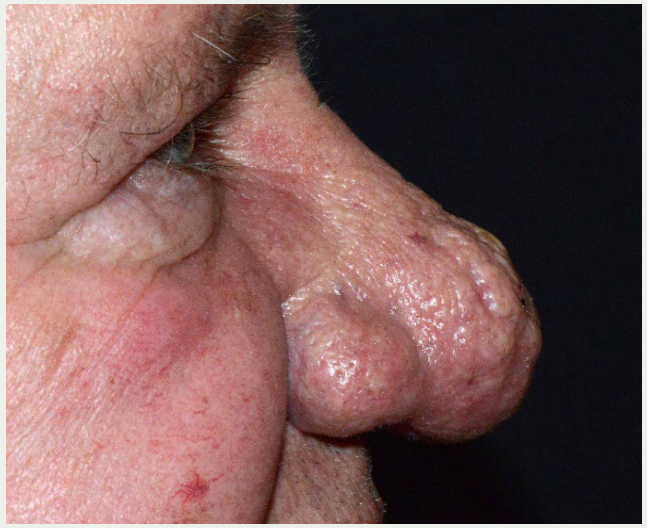
150 mJ/6-12% + 50 mJ/5-20% + 20 mJ/5-20%



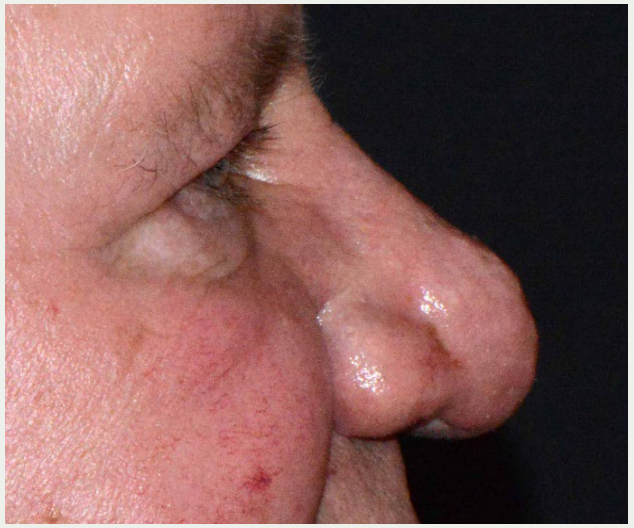
Pre



2 weeks post
fractional ablative
Treated with lighter settings



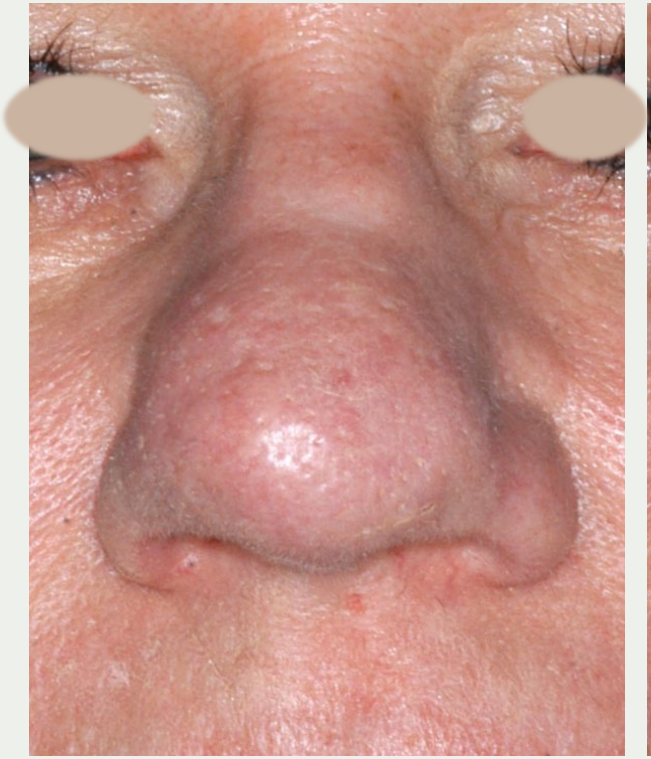
Pre



2 weeks post
fractional ablative

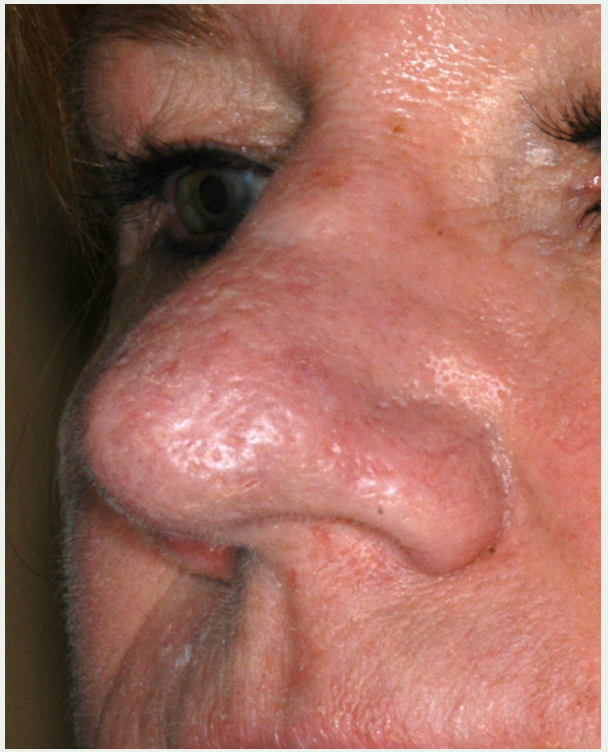
Rhinophyma – Female

Deep (4mm) Fractional Ablative

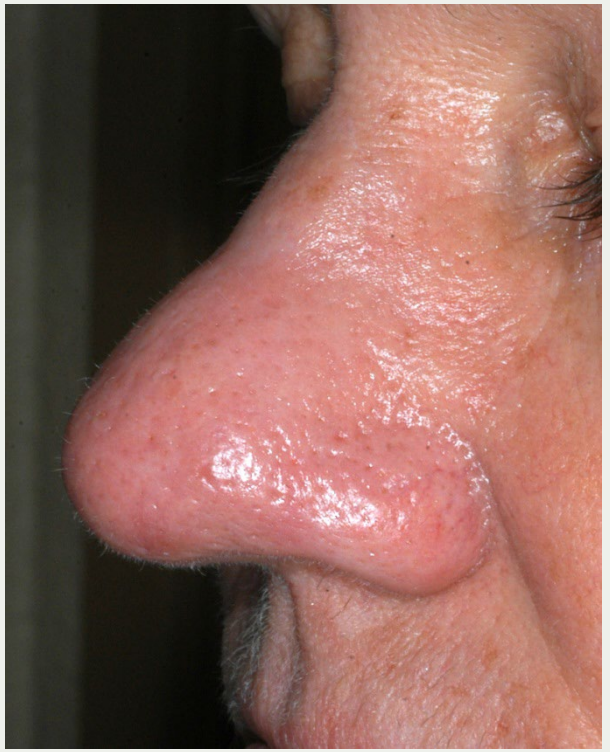


Pre

1 month post
fractional ablative



Pre



1 month post
fractional ablative

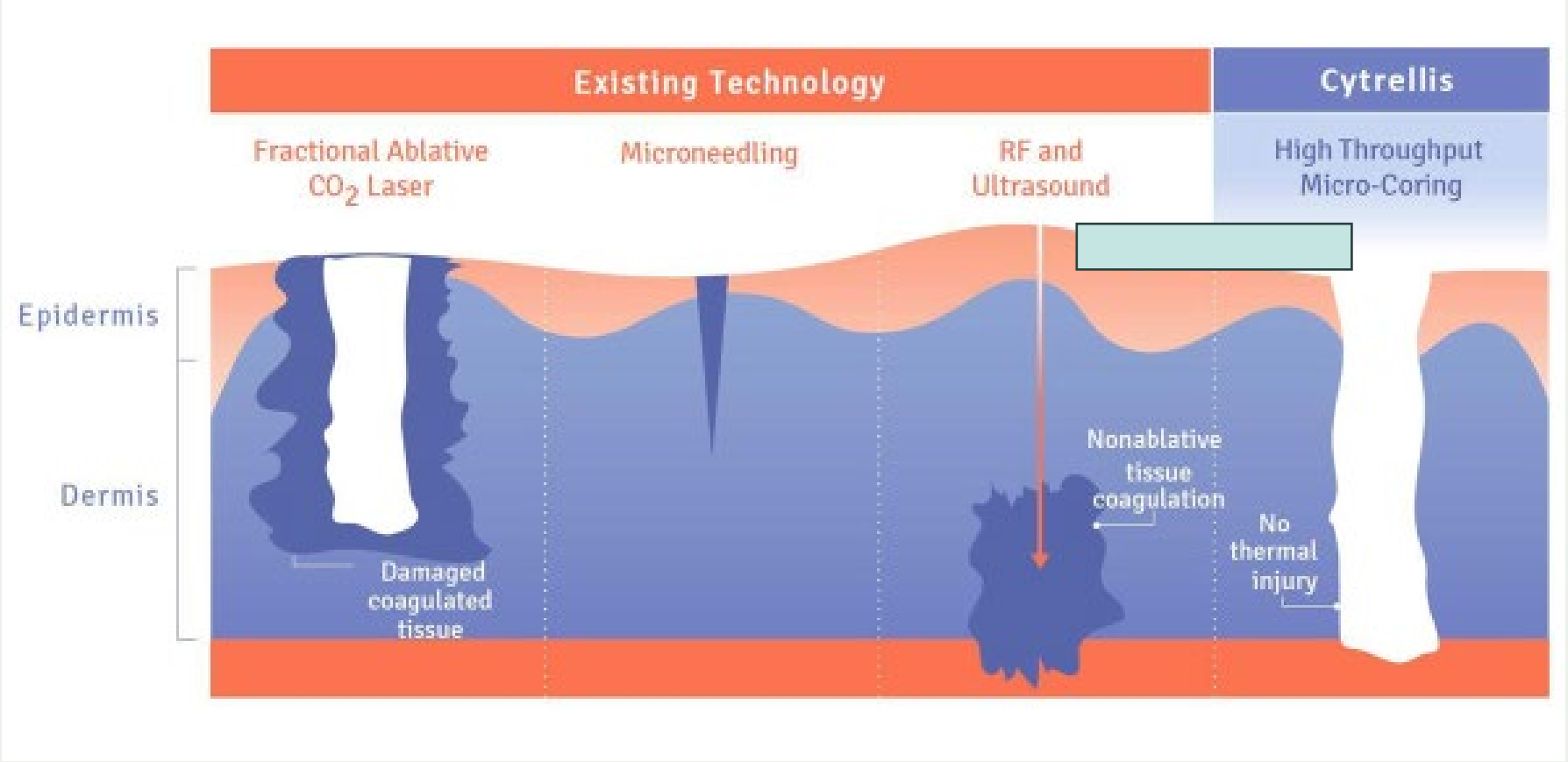
Xanthelasma

CO_2

Baseline

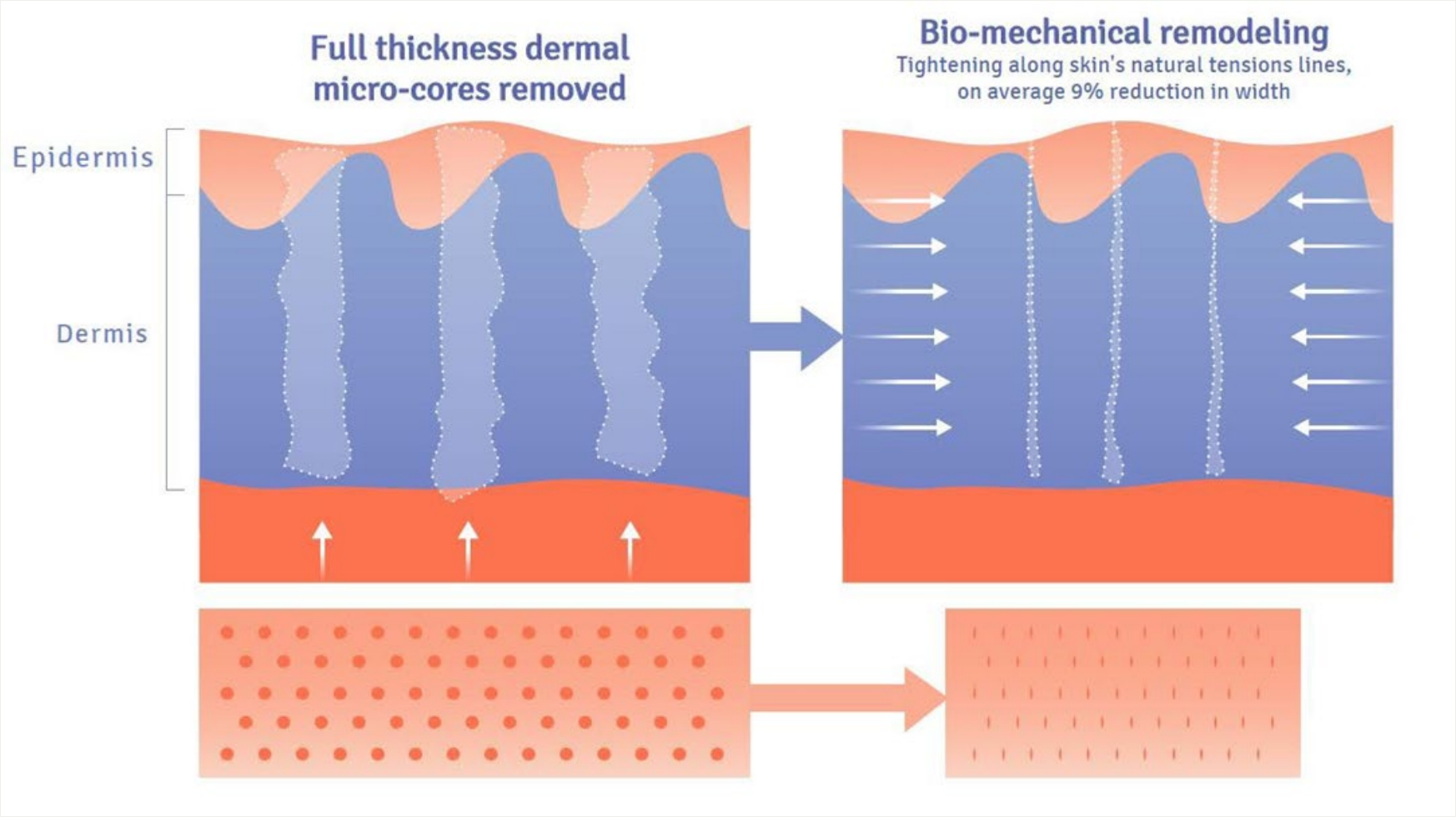
1 yr post CO2

Changing the Way, We Think About Treating Sagging Skin



Full dermal thickness removal without energy removes excess skin vs. other treatments' use of heat

Entirely New Category of Treatment: Dermal Micro-Coring



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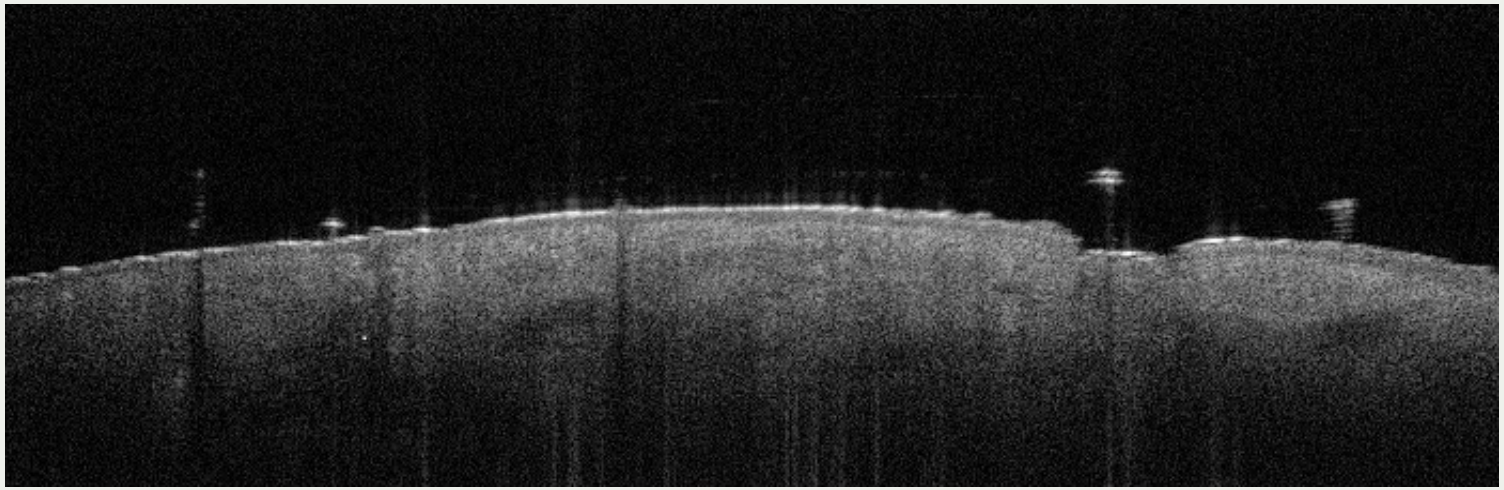
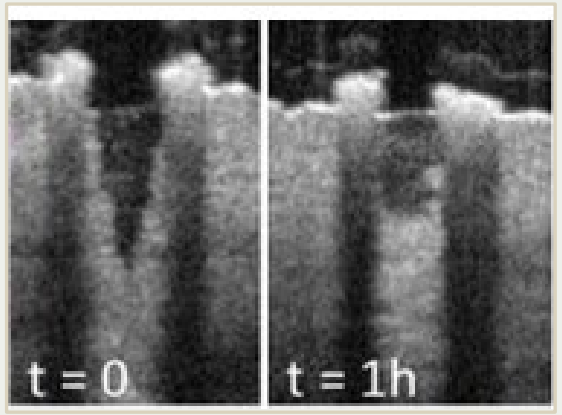
OCT Images Demonstrate Immediate Hole Closure vs Laser



Post Dermal Micro-Coring Treatment
At 10 min, channels appear closed, possibly cause of faster healing*



Post Ablative Laser Treatment
Channels open at 1 hour post treatment**

*OCT (Optical Coherence Tomography) images courtesy of Jill Waibel, MD 2018, captured using Vivosight technology (Michelson Diagnostics)
**Time related closure of AFXL-channels (25 mJ/microbeam) *"Spatiotemporal closure of fractional laser-ablated channels imaged by optical coherence tomography and reflectance confocal microscopy",* Banzhaf, CA, MD. et.al, Vol. 48, Issue 2, Dermatology and Plastic Surgery, 2/2016, pp 157-165

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Micro-coring: Stria

3 wks post 2nd tx

64 yr. old with Dry Eye Syndrome
Optipulse IPL

Pre

Immediately post Tx

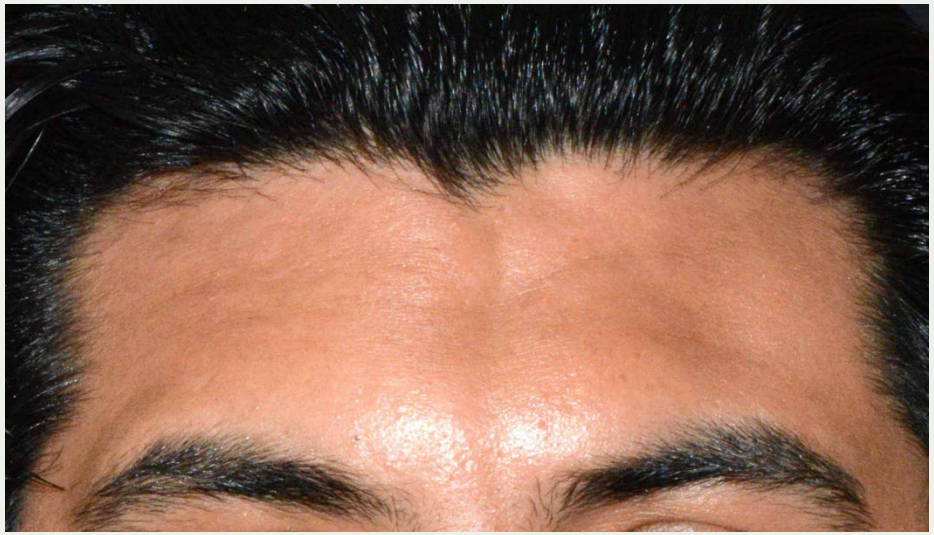
Hair Containing Skin Grafts

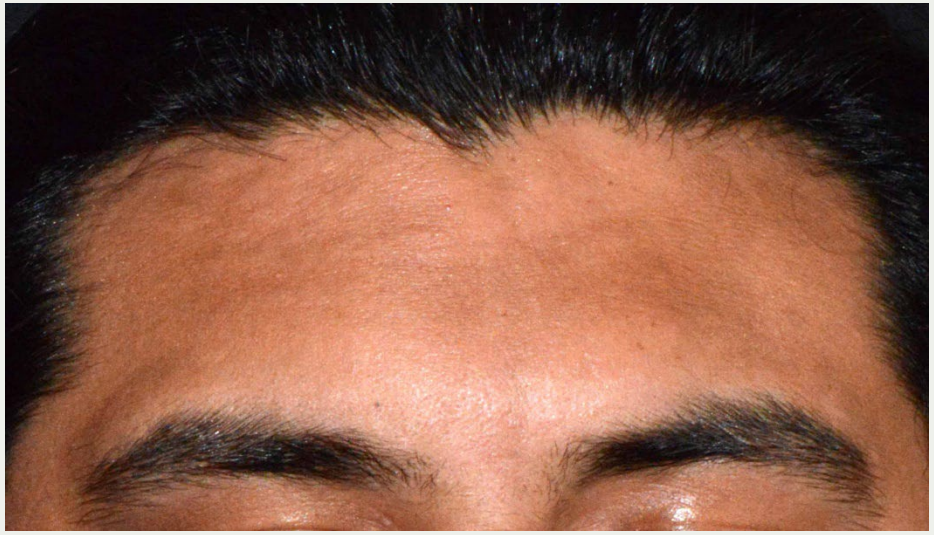
Sarcoidosis

Tx with PDL (+ Prednisone?)

04-14-11 05-04-11 07-20-11 02-06-12

Linear morphea of the forehead (en coup de sabre)





Pre-op pic

2 months post HA Filler - 1 syringe
Lasted 2 years then came back in for more
(was still better than pre-op pic)

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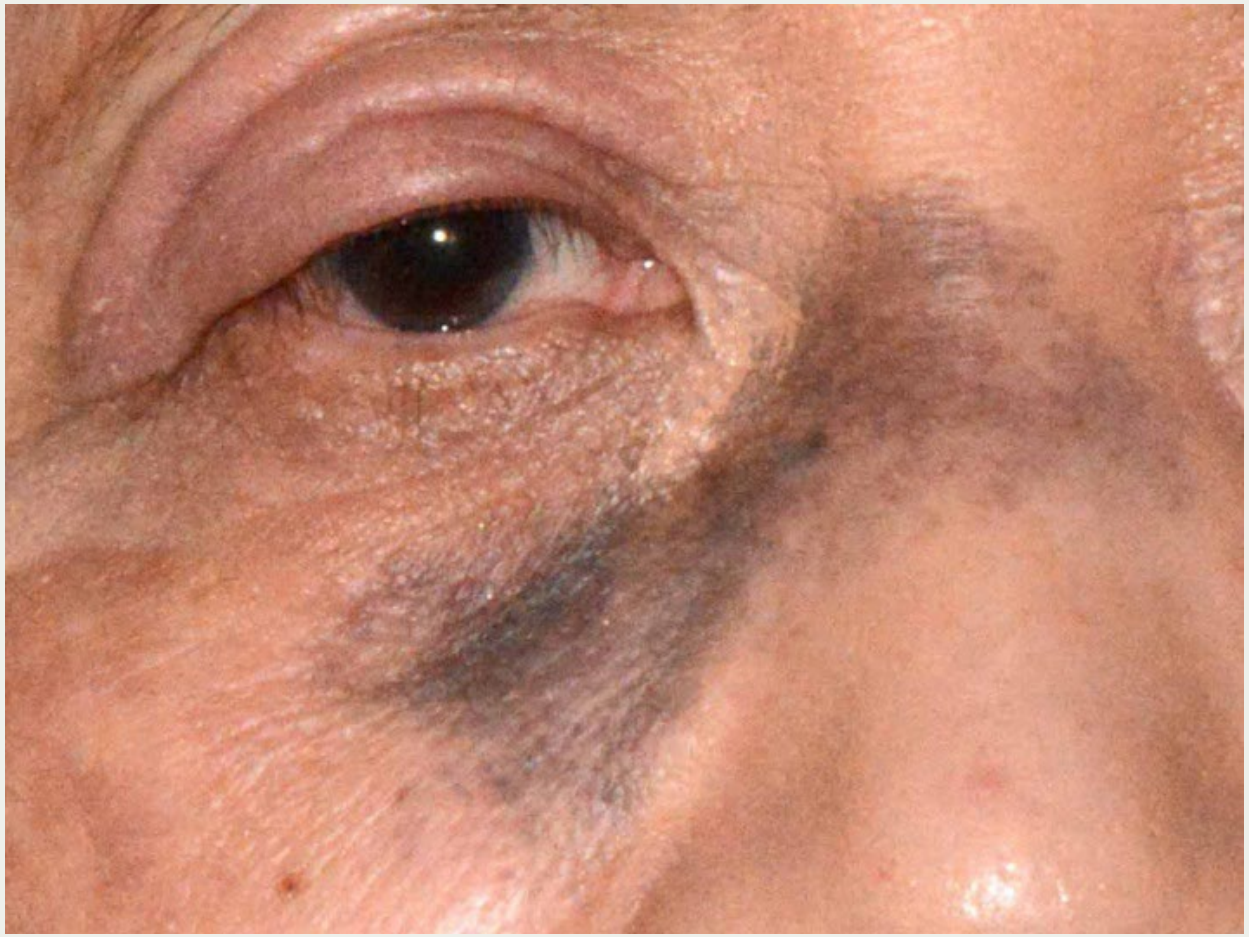
Picosecond to Nevus of Ota

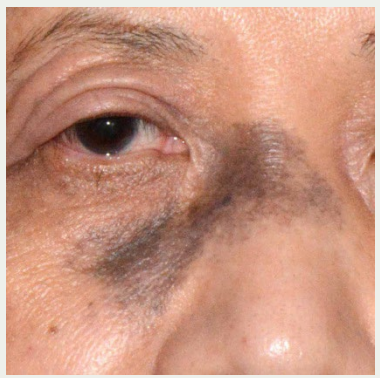


Pre

3 months post 9 tx

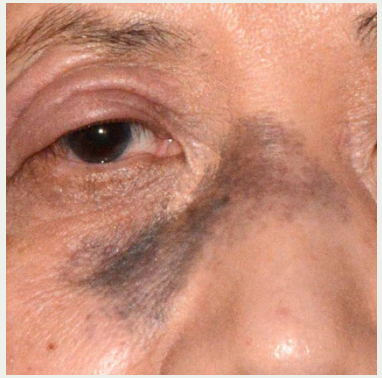
Picosecond to Nevus of Ota

Unresponsive to QS Laser



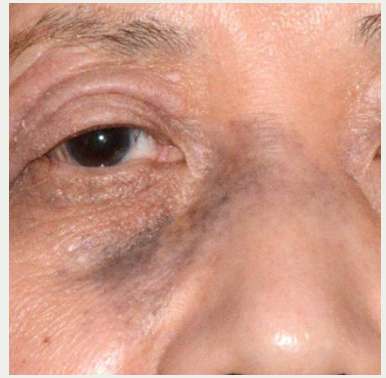
Tx 1 - 07-03-13
Spectra (lower eye)
1064 8mm 1.5 Jcm2
Pico (nose)
755 3.5mm 2.8Jcm2

Tx 2 - 08-29-13
Spectra (lower eye)
1064 8mm 2.0 Jcm2
Pico (nose)
755 2.5mm 4.0 Jcm2

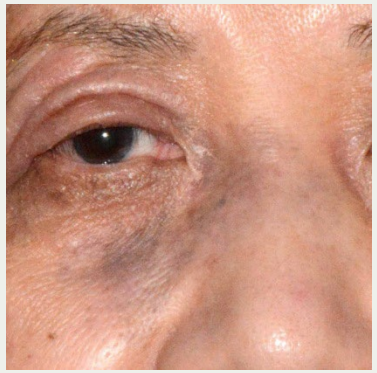


Tx 3 - 10-17-13
Pico
755 2.0mm 6.37 Jcm2

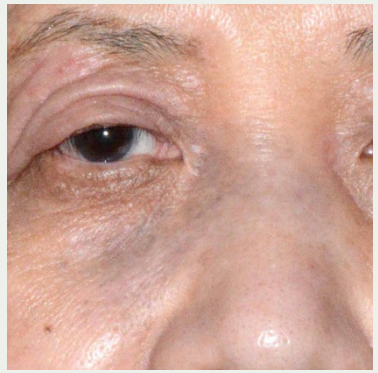
Tx 4 - 12-05-13
Pico
755 2.2mm 5.26 Jcm2



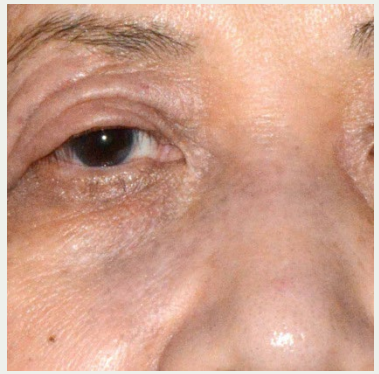
Tx 5 - 01-15-14
Pico 755 2.2mm 5.26 Jcm2



Tx 6 - 04-29-14
Pico 755 2.1mm 5.77 Jcm2



Tx 7 - 06-24-14
Pico 755 2.1mm 5.77 Jcm2



Tx 8 - 08-19-14
Pico 755 2.0mm 5.77 Jcm2

Tx 9 - 10-21-14
Pico 755 2.0mm 5.77 Jcm2

01-13-15

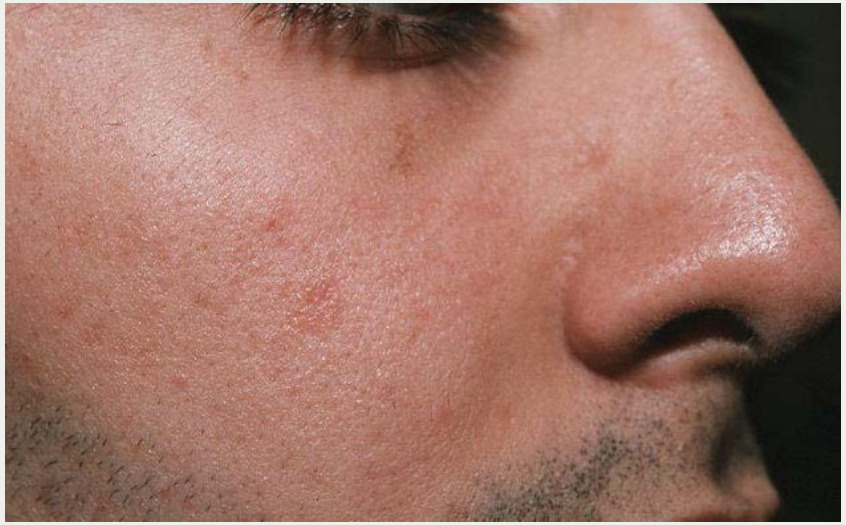
Picosecond to Nevus of Ota

Pre

2 months post 3 tx

Pico 755 2.1mm 5.77 Jcm2

Intradermal Melanocytic Nevi - Diode Laser Treatment



1 year post 3rd tx

- Thick, dark nevi on male (type IV)
  - 1st tx: 40 J/cm2, 20ms
  - 2nd tx: 50 J/cm2, 30ms
  - 3rd tx: 60 J/cm2, 30ms
  - All with cooling & at 1-month intervals

Congenital Nevus

Excision

+ CO2

+ QSRL

Pico to Minocycline Pigmentation

Pico test site cleared better than QS so fully treated with pico

Pre-Test Spot

11 weeks post 1 tx

Argyria

Deposition of ingested colloidal silver along the nerve endings gives blue-grey discoloration and makes for a very painful but effective Q-Switch laser treatment!
Use lowest fluence that gives immediate clearing

Argyria

- Deposition of ingested colloidal silver along the nerve endings gives blue-grey discoloration and makes for a very painful but effective Q-Switch laser treatment!
- Use lowest fluence that gives immediate clearing

Beckers Nevus: 755nm, 3 mn

Neurofibromatosis - Fractional CO_2

Pre

8 days post

Fractional CO_2 Laser
Collagenoma

Pre

Post single fractional CO2 tx

PWS – Fractional Ablative

- Significant improvement hypertrophic and nodular lesions
- Marked textural improvement in both new and previously treated lesions
- Lack of honeycombing is advantageous, especially for large truncal lesions
  - Fractional CO_2 practical for large surface areas
  - Deep Fractional CO_2 adjustable spot size allows for focal of blebs with different settings and around small spaces
- Improvement continues at least 2 months
  - Distal extremity lesions require even longer healing time

PWS Treated with Fractional CO_2

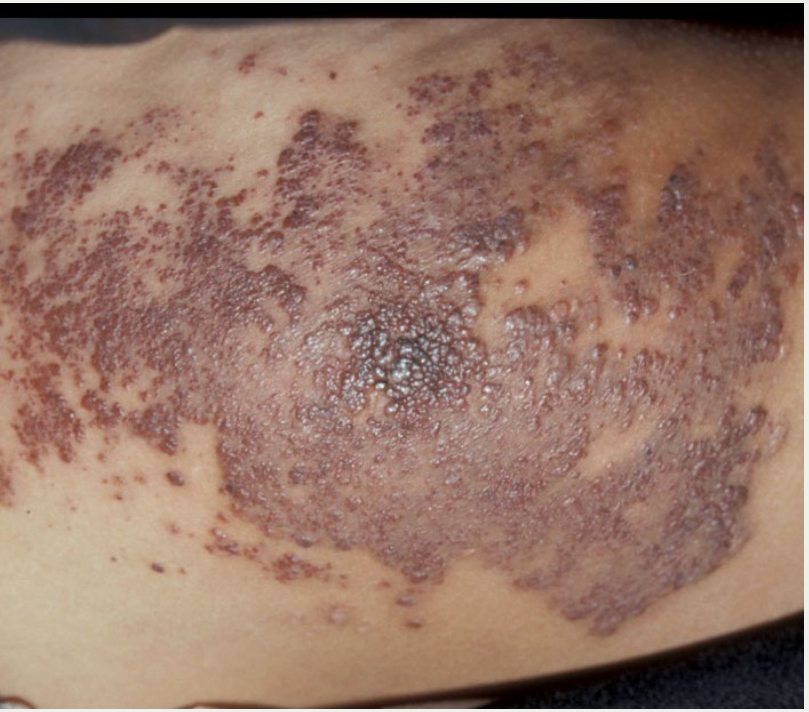
Pre 1064nm Nd:YAG

Pre-Fractional CO_2

2 mo Post Fractional CO_2
Pre PDL

- Significant improvement hypertrophic and nodular lesions
- Marked textural improvement in both new and previously treated lesions
- Lack of honeycombing is advantageous, especially for large truncal lesions
  - Fractional CO_2 practical for large surface areas
  - CO_2 adjustable spot size allows for focal of blebs with different settings and around small spaces
- Improvement continues at least 2 months
  - Distal extremity lesions require even longer healing time

Lymph-hemangioma



Pre LP Alex

Post 2 tx

Post 4 tx

Lymph-hemangioma

Pre-Fractional CO_2 tx

Immediate PO

3 wk PO

7 wk PO

9 mo PO

Single tx was more effective than 4 LP Alex tx with no weeping at 2 months post op and minimal only with exercise at 9 months

Hemangioma Resolution with Fibro-fatty Residua

Baseline

1 month post 3 treatments

Baseline

1 month post 3 treatments

- Use fractional lasers to shrink tissue.
  - *Can go deep and tighten up boggy skin without scarring*
  - *Eliminates need for excision and safer (and better) than ablative resurfacing*
- Often improves hypopigmented scars
- Improvement seen even in areas with movement

PDL + LP Alex+ Fractional CO_2

Vascular Lesions
LP Alexandrite (755nm) Laser

- Use to treat darker bluish-purple lesions
  - *De-oxyhemoglobin absorption peak at 755nm*
- Typical settings: 12 mm, 3ms, 20-40 J/cm2, no overlap
  - Lower fluences with hemangiomas
  - Then change to 8 mm to increase fluence to 50-70J/cm2
- Cooling important (40-50 ms with cryogen spray)
- Use cautiously!
  - Targets melanin including hair
  - Extreme care within orbital rim
  - More bruising

Blue Rubber Bleb Nevus Syndrome

Pre LP Alex

Post 1 LP Alex tx

Blue Rubber Bleb Nevus Syndrome

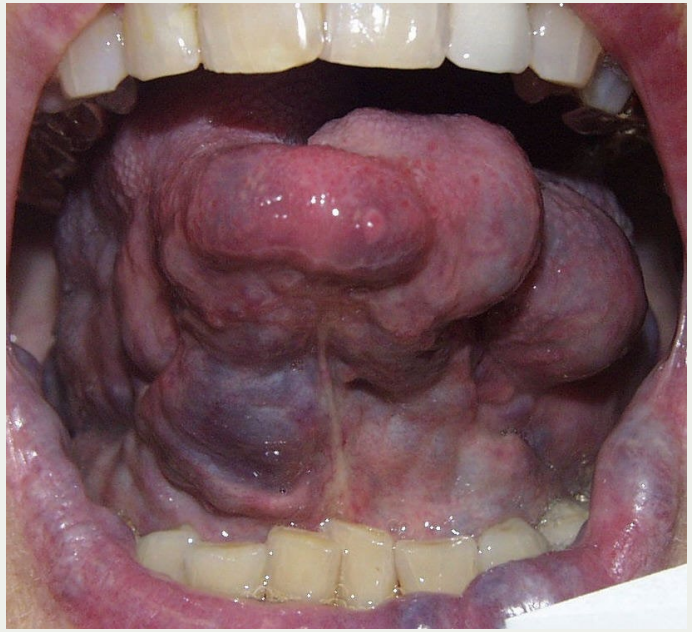
Pre LP-Alexandrite 755nm, 3ms

Post 2 LP Alexandrite tx
15 mm 20-30J/cm^2

Blue Rubber Bleb Nevus Syndrome

Pre LP Alex

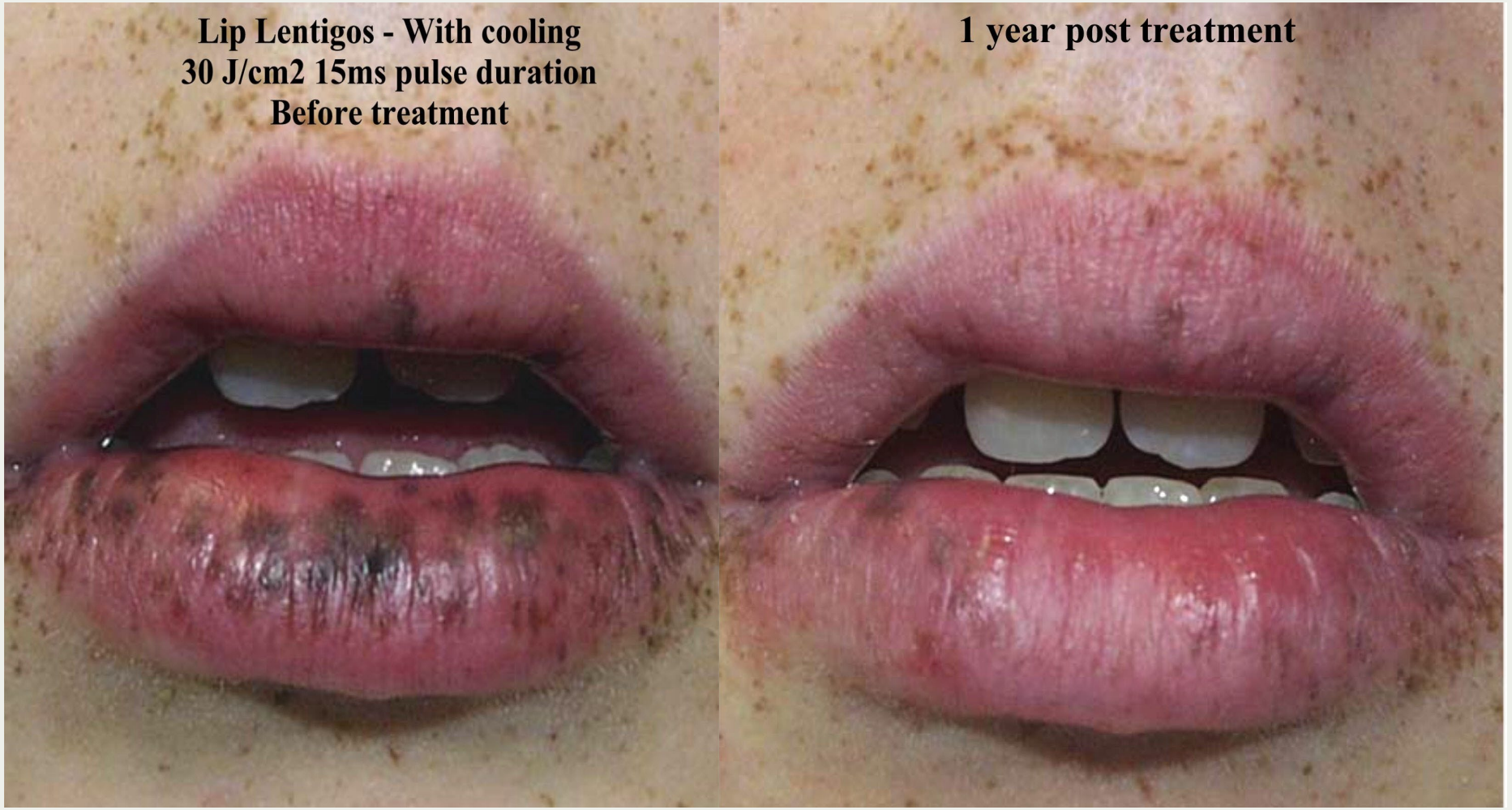
Post 2 LP Alex tx



Pre LP Alex

Post 2 LP Alex tx

Labial Lentigos
Recurred post QS Laser tx



Epidermal Nevus

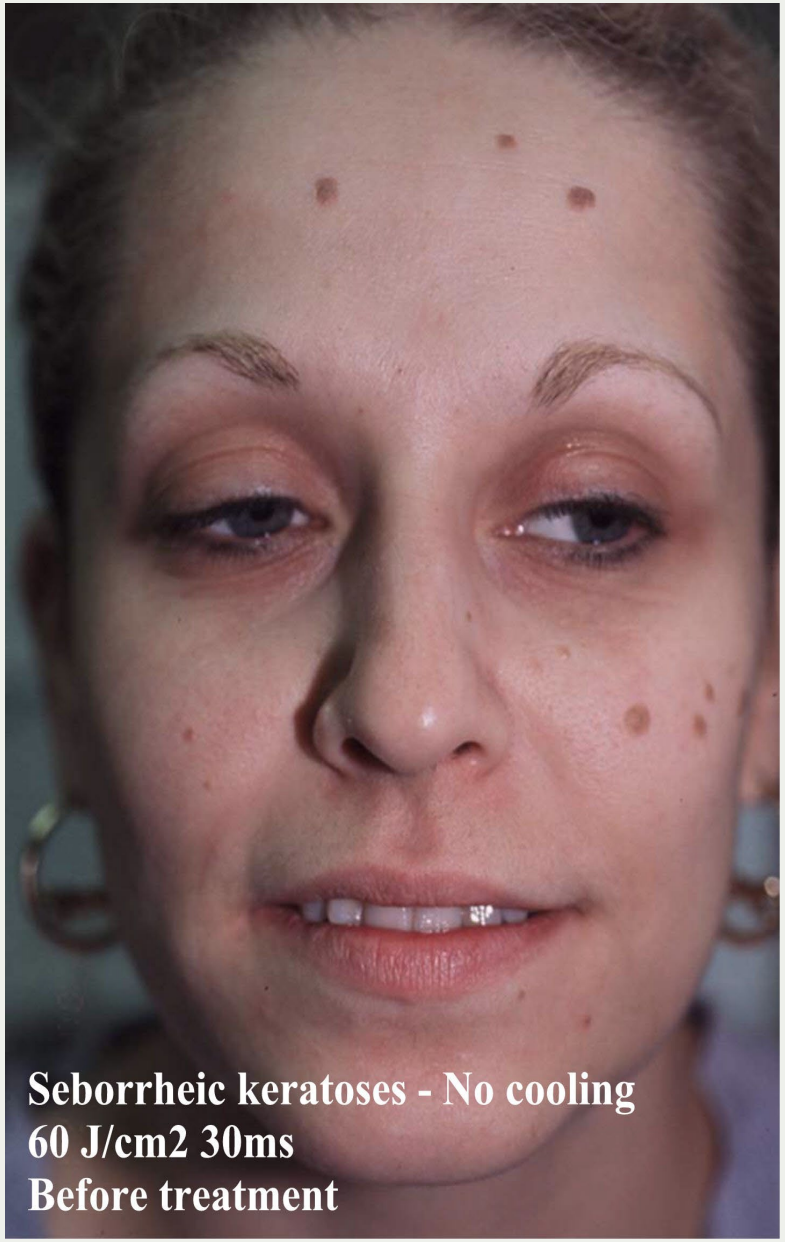
Pre GentleLase tx

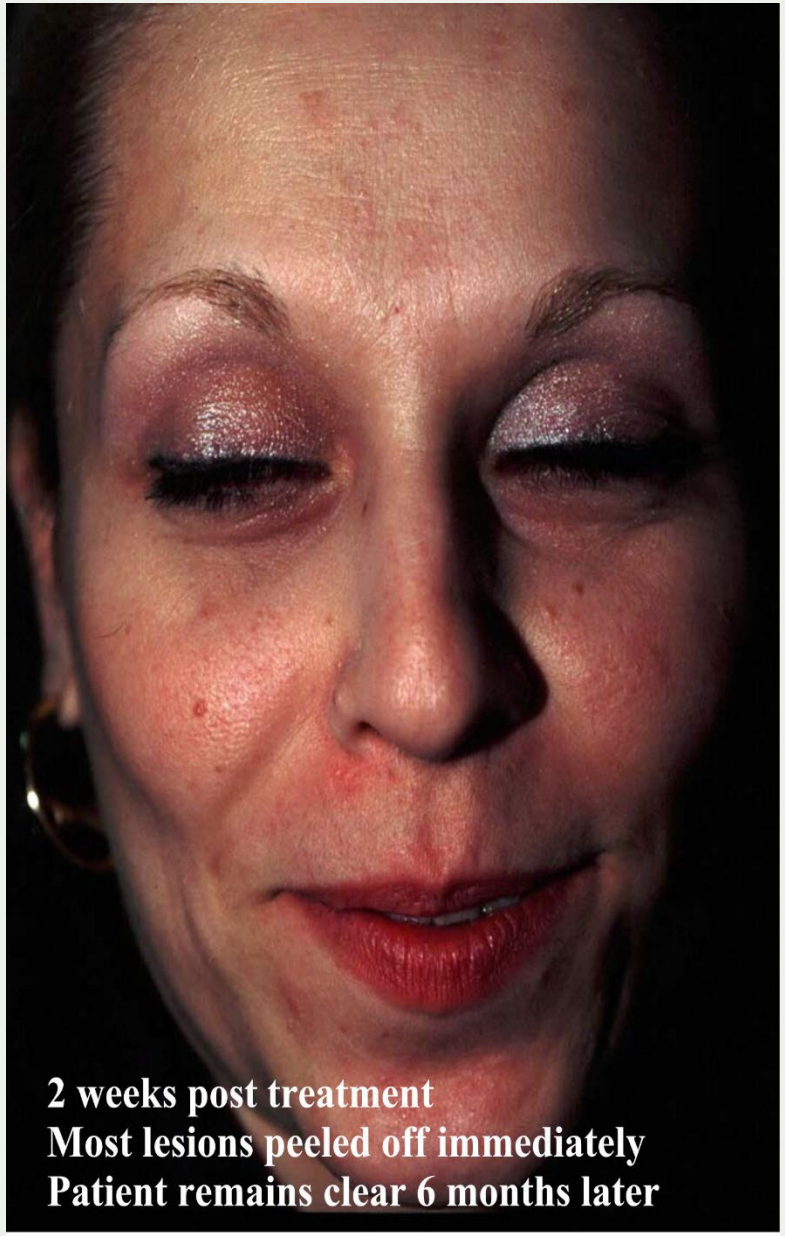
4 mo post tx

9 mo post op

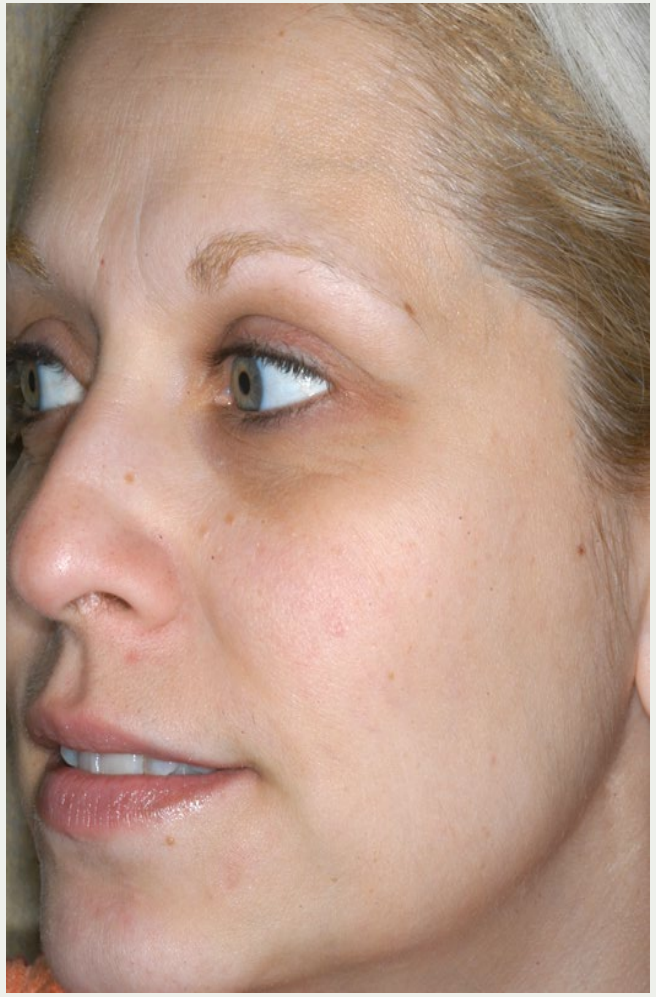
Epidermal Nevus

Shaved off then treated with CO_2 laser


Seborrheic keratoses - No cooling
60 J/cm2 30ms
Before treatment


2 weeks post treatment
Most lesions peeled off immediately
Patient remains clear 6 months later

Seborrheic Keratoses



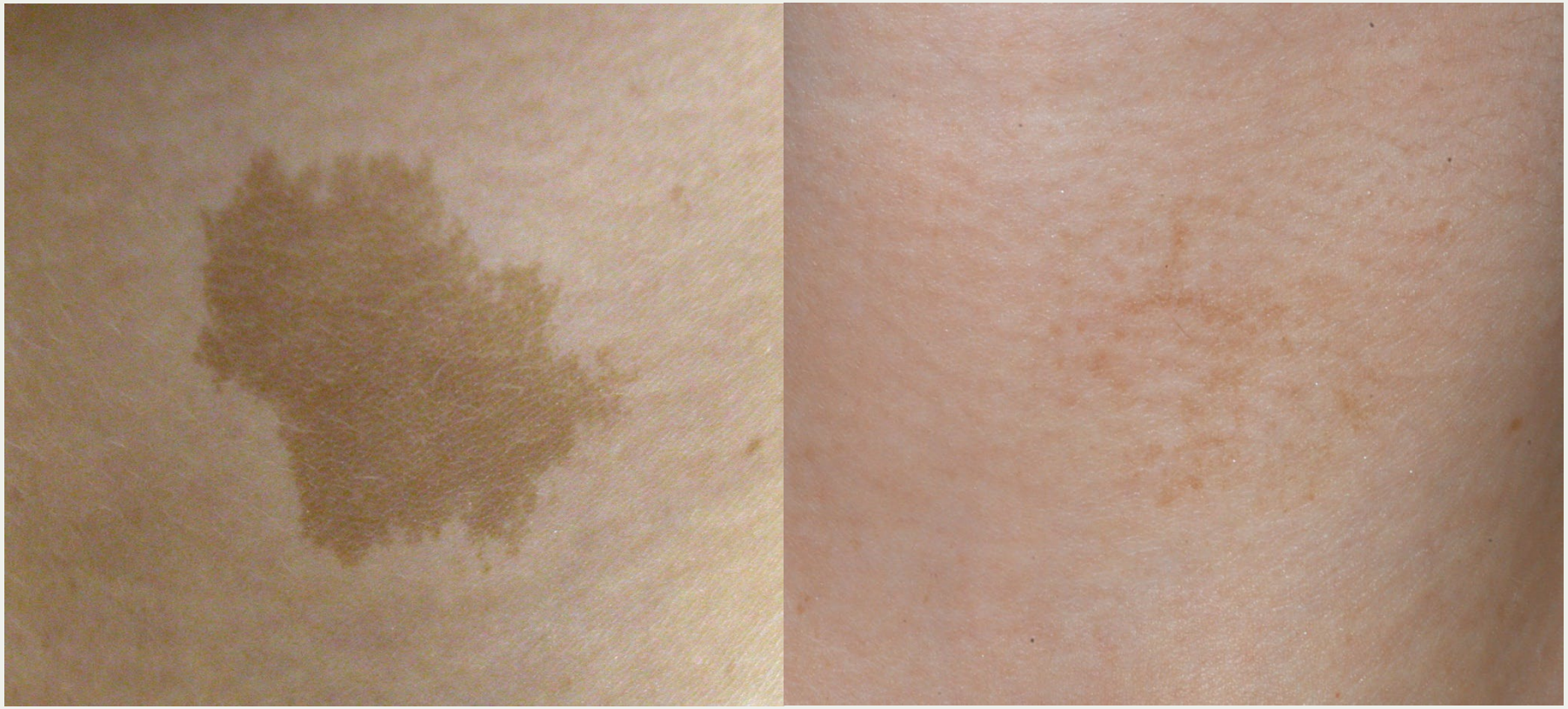
CALM- 755nm, 3mn

Calm-755 nm, 3ms

Pre tx | Post 4 tx | Post 6 tx

8mm spot, 60 J/cm2, 0 – 20% cooling

Cafe Au Lait Macule



Pre tx

1 yr post 6 tx

PIPA – Q-Switched Nd:YAG

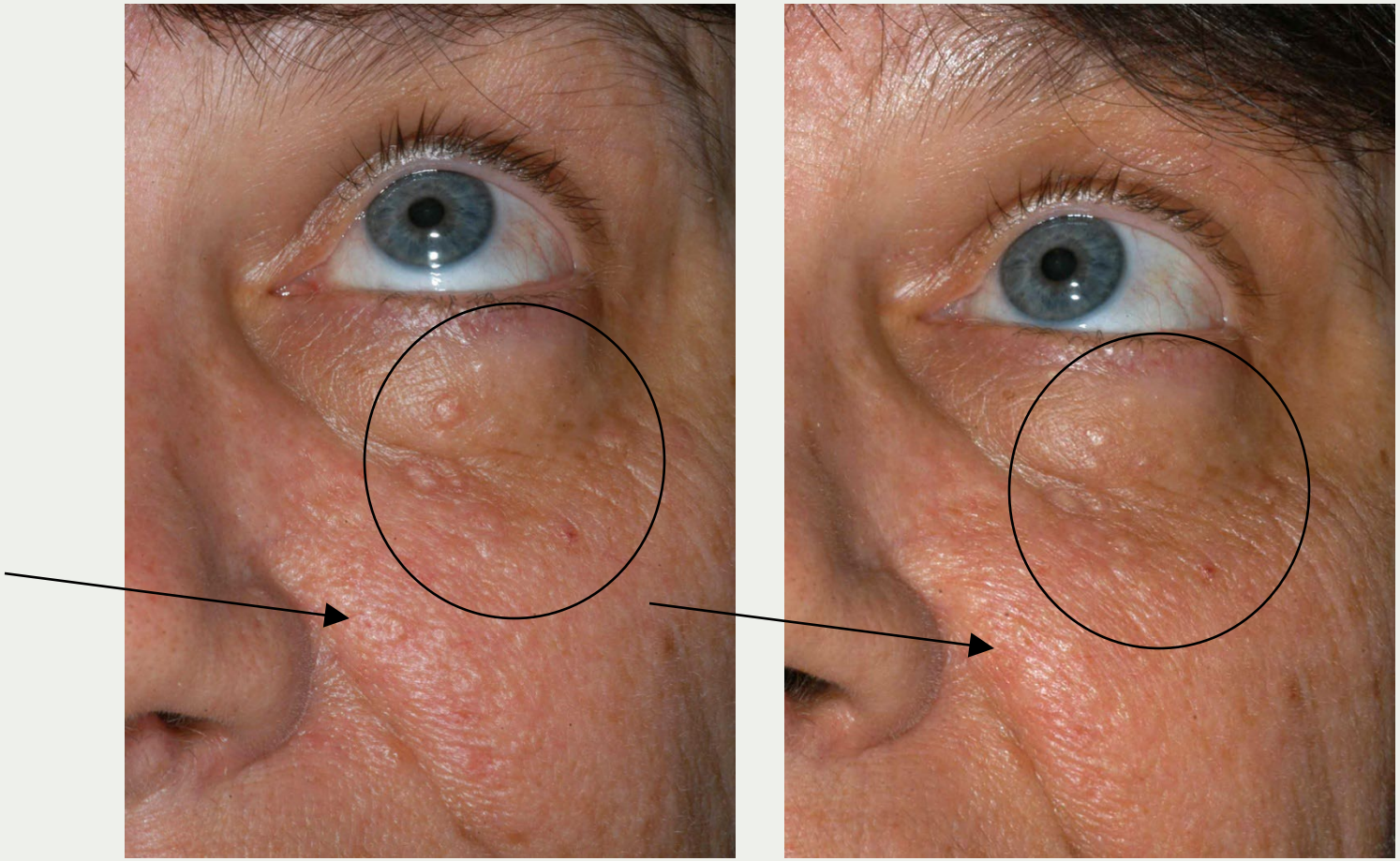
Pre Q-Switched Alex
tx – 3mm, 5 J/cm^2

Post tx

DPNs tx'd with 532 nm, ms domain

Multiple Sebaceous Hyperplasia

Treated with Fractional CO_2

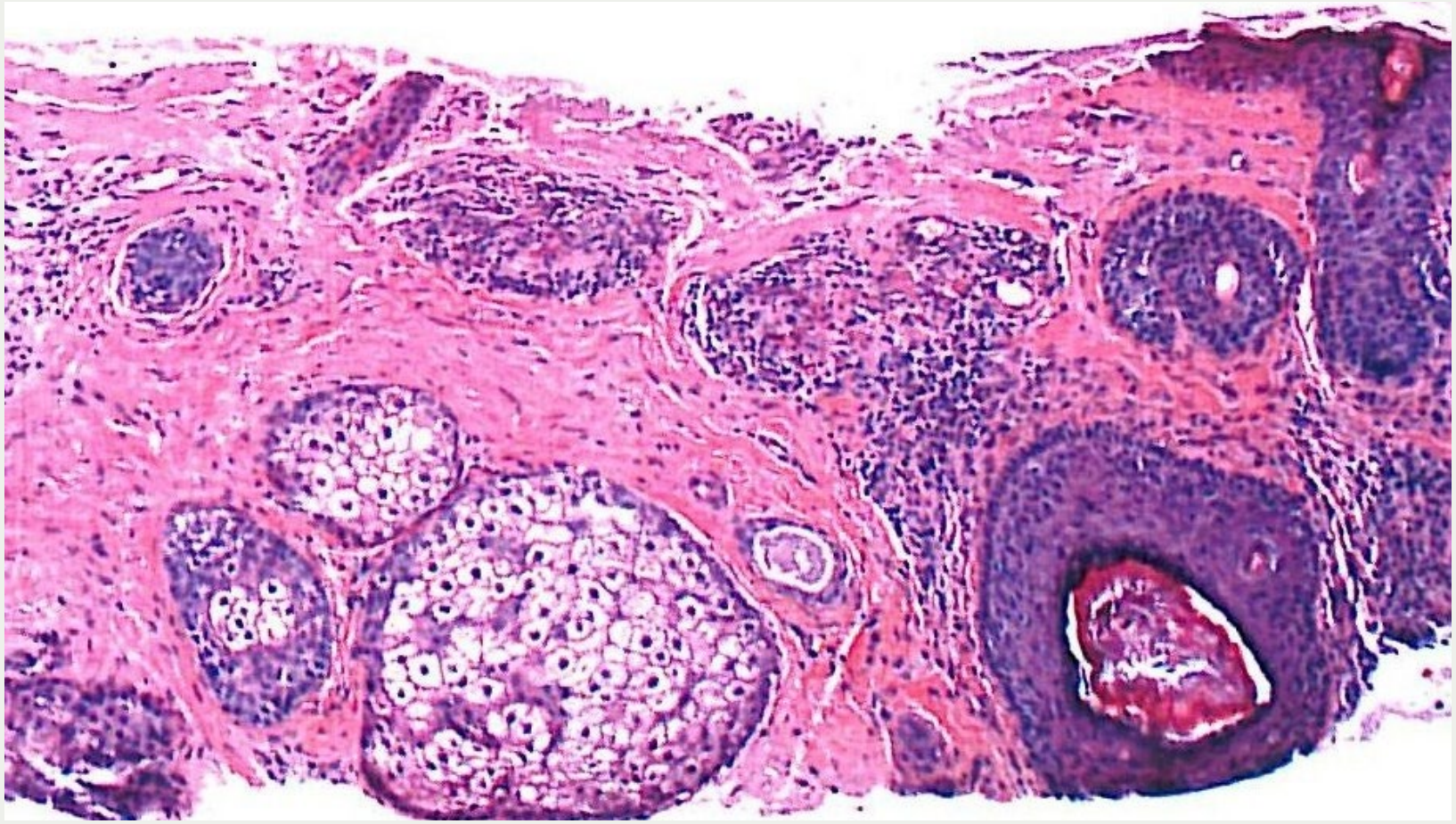


Pre

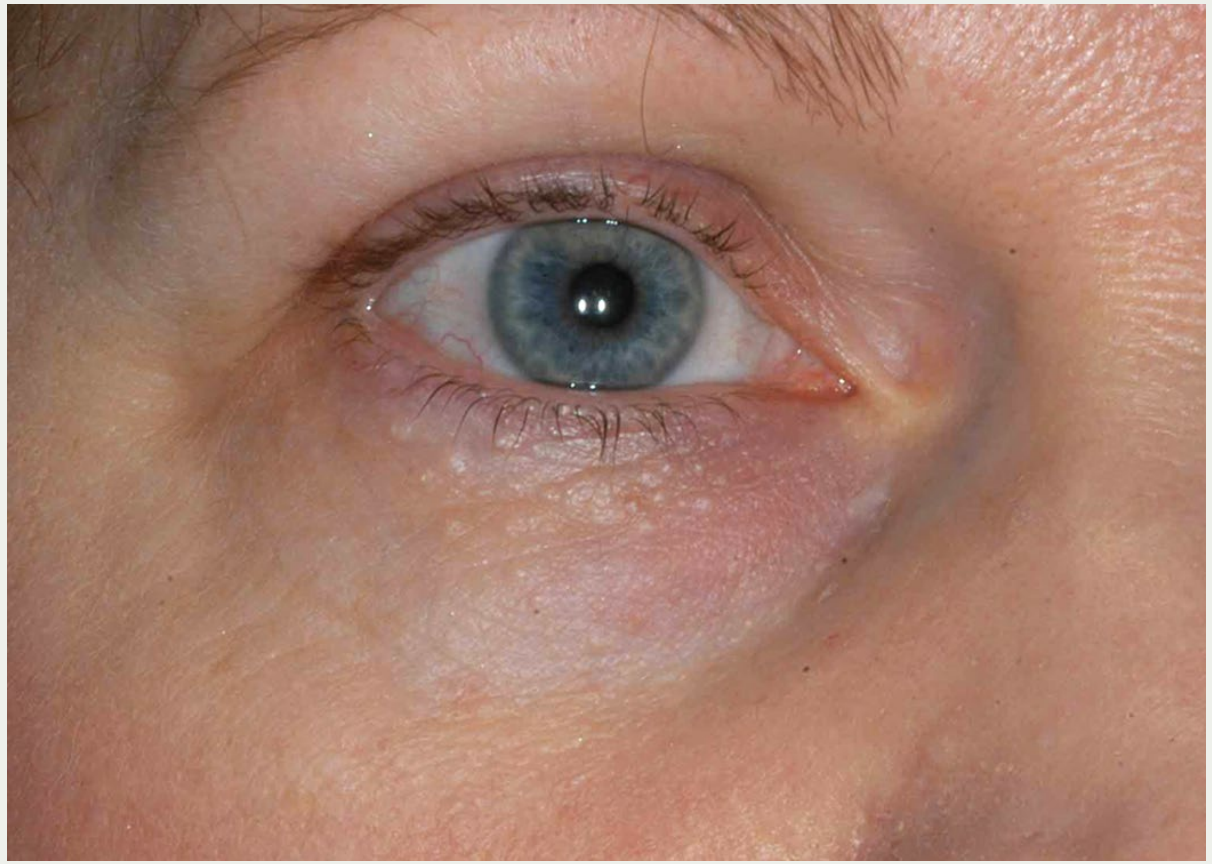
3 mo post single tx

Ruptured Lobules of Sebaceous Hyperplasia with granulomatous inflammation + foamy histiocytes

(consistent with ingestion of degenerating sebocytes)



Syringoma

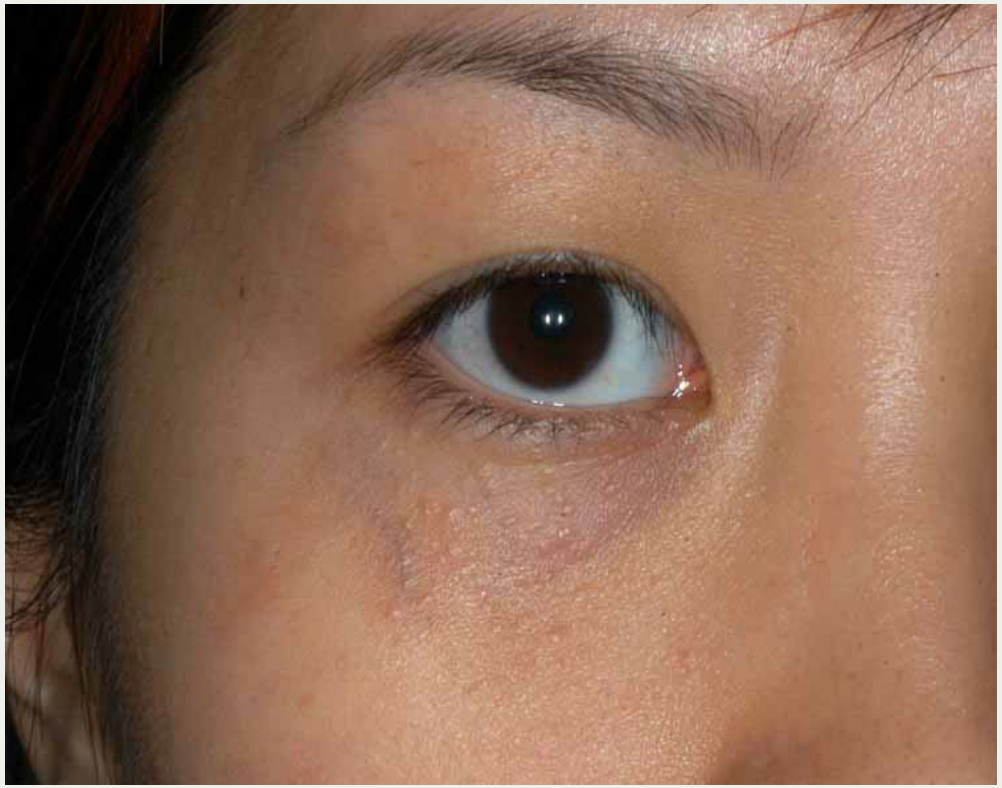


Pre

6 weeks post

Syringoma

Pre

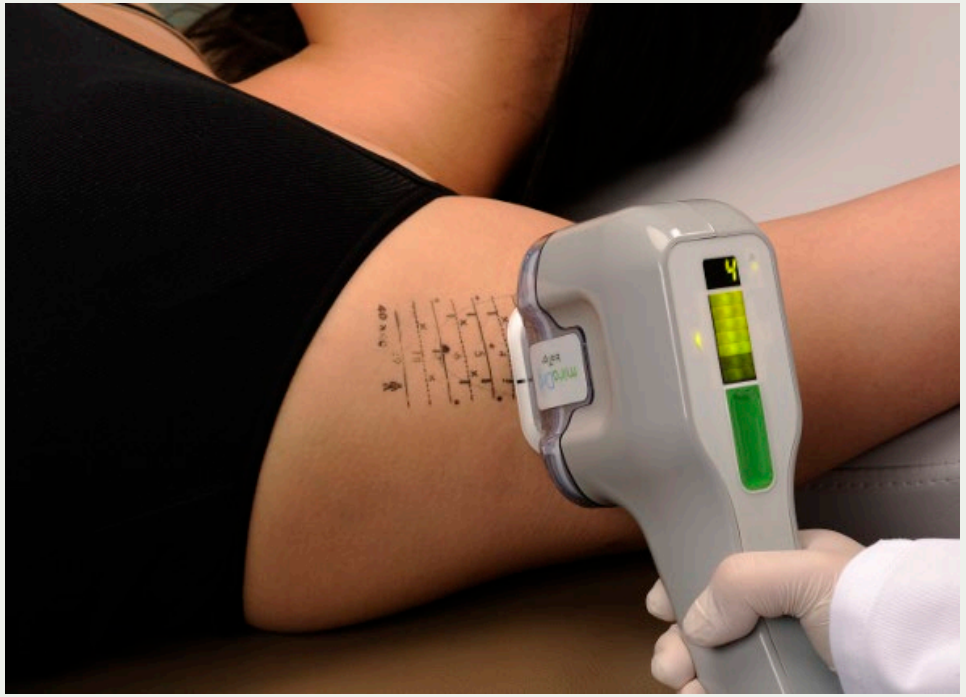


6 wks post-Non-ablative fractional

Microwave Device for Hyperhidrosis

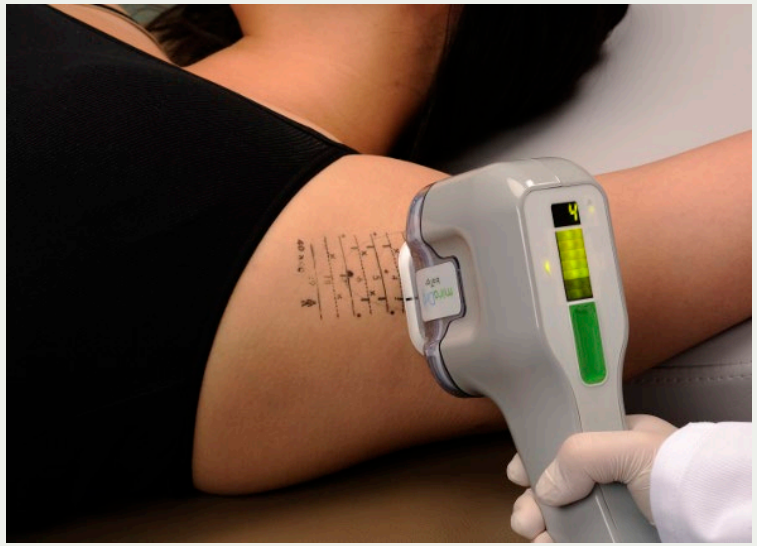
(and Cosmetic Sweating)

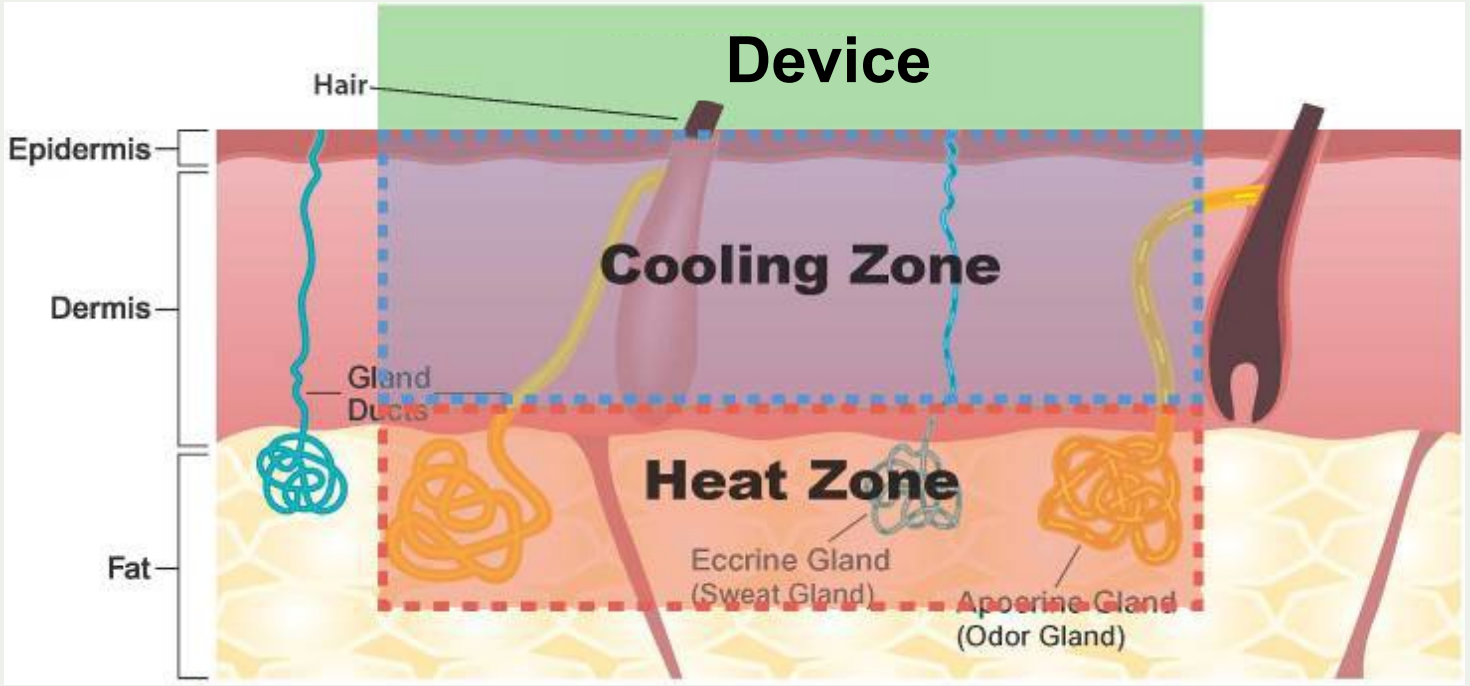
- ✓ Safely and dramatically reduces underarm sweat
- ✓ Lasting efficacy
- ✓ High patient satisfaction
- ✓ Non-invasive (no surgical incisions or cuts)
- ✓ Strong safety profile
- ✓ Secondary beneficial effects:
  - Decreased hair
  - Odor reduction



- Requires about 60-75 minutes per procedure
- 1-2 (rarely 3) procedures spaced 3 months apart required for best results

Controlled Thermolysis Caused by Precisely Delivered Microwave Energy



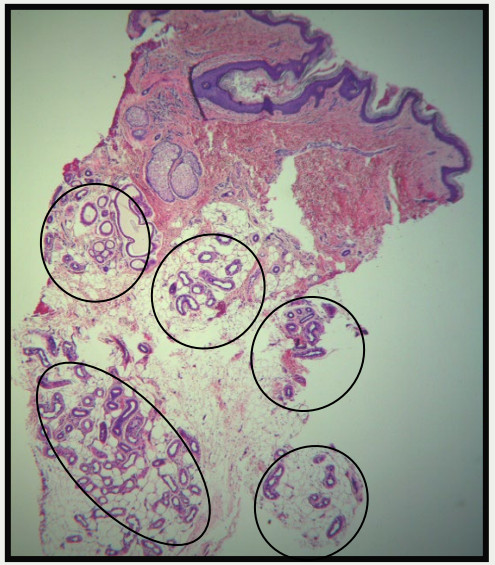


Cellular thermolysis at ~60º C

- Hydro-ceramic cooling keeps Heat Zone at level of sweat glands
- Cooling protects epidermis and upper dermis, while deeper tissue not affected
- Since sweat glands do not regenerate, results are permanent

Human Histology Illustrates Gland Destruction and Removal

Normal sweat glands

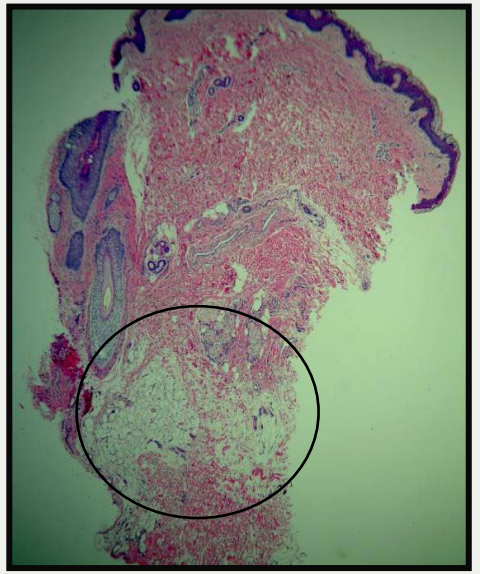


Baseline

Sweat gland cells devoid of nuclei – complete cellular necrosis

10 Days Post Tx Sample

No sweat glands



180 Days Post Tx Sample

"The ontogenisis of sweat glands is only at the embryonic period, so no new sweat glands are regenerated after birth"[1]

Photos courtesy of Nobuharu Kushikata, Tokyo, Japan

1. Li H, Gang Z, et al. J Cutan Pathol 2009; 36:318-324

3 Year Starch-Iodine Test on Same Patient
Demonstrates Dramatic and Lasting Results

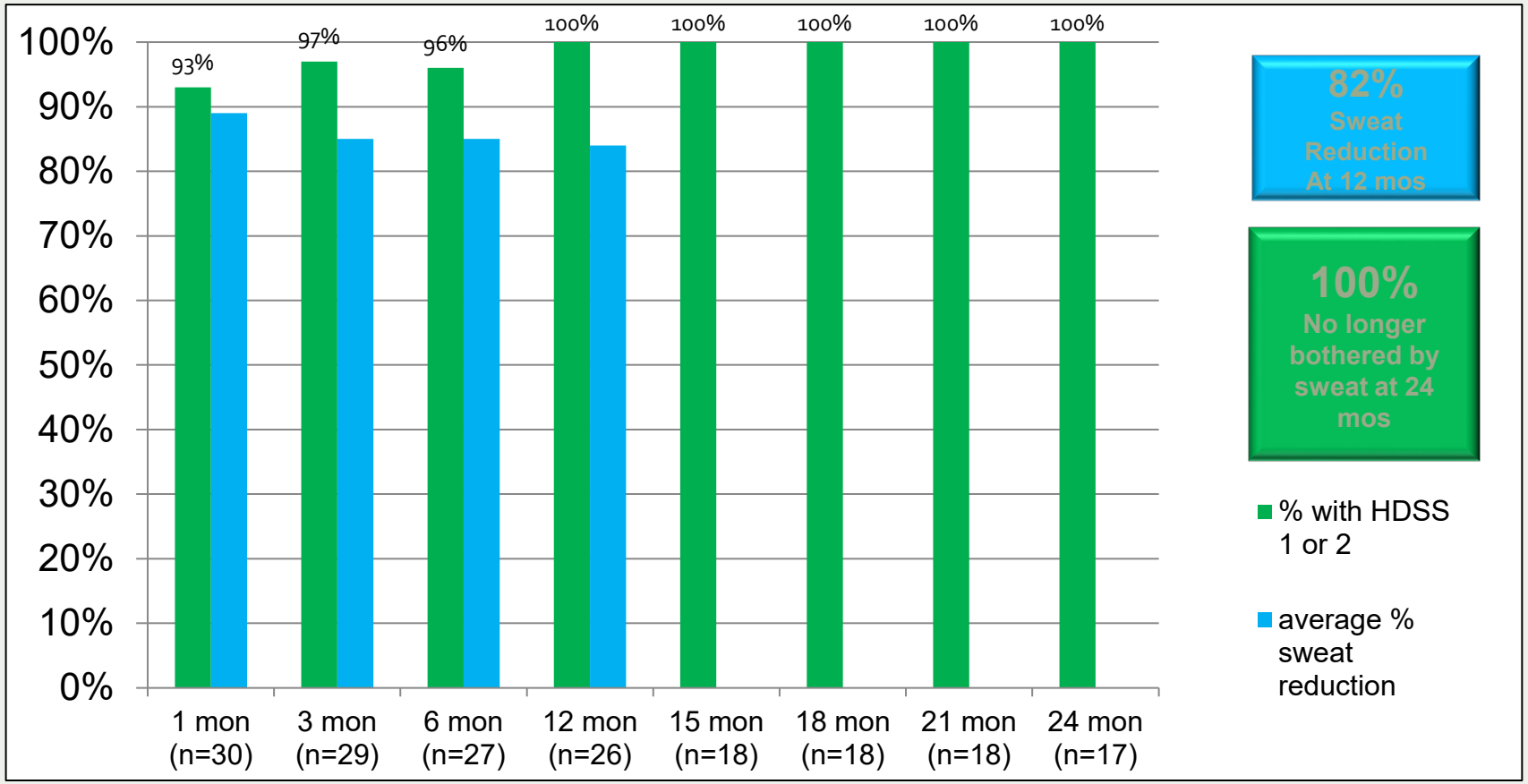
Dark areas show where the patient is still sweating.
The patient is not sweating in the treated area.

Feasibility Study Patient; photos courtesy of Larry Fan, MD

Long-Term Results

HDSS Improvement and Gravimetric Sweat Reduction

HDSS, Average Sweat Reduction



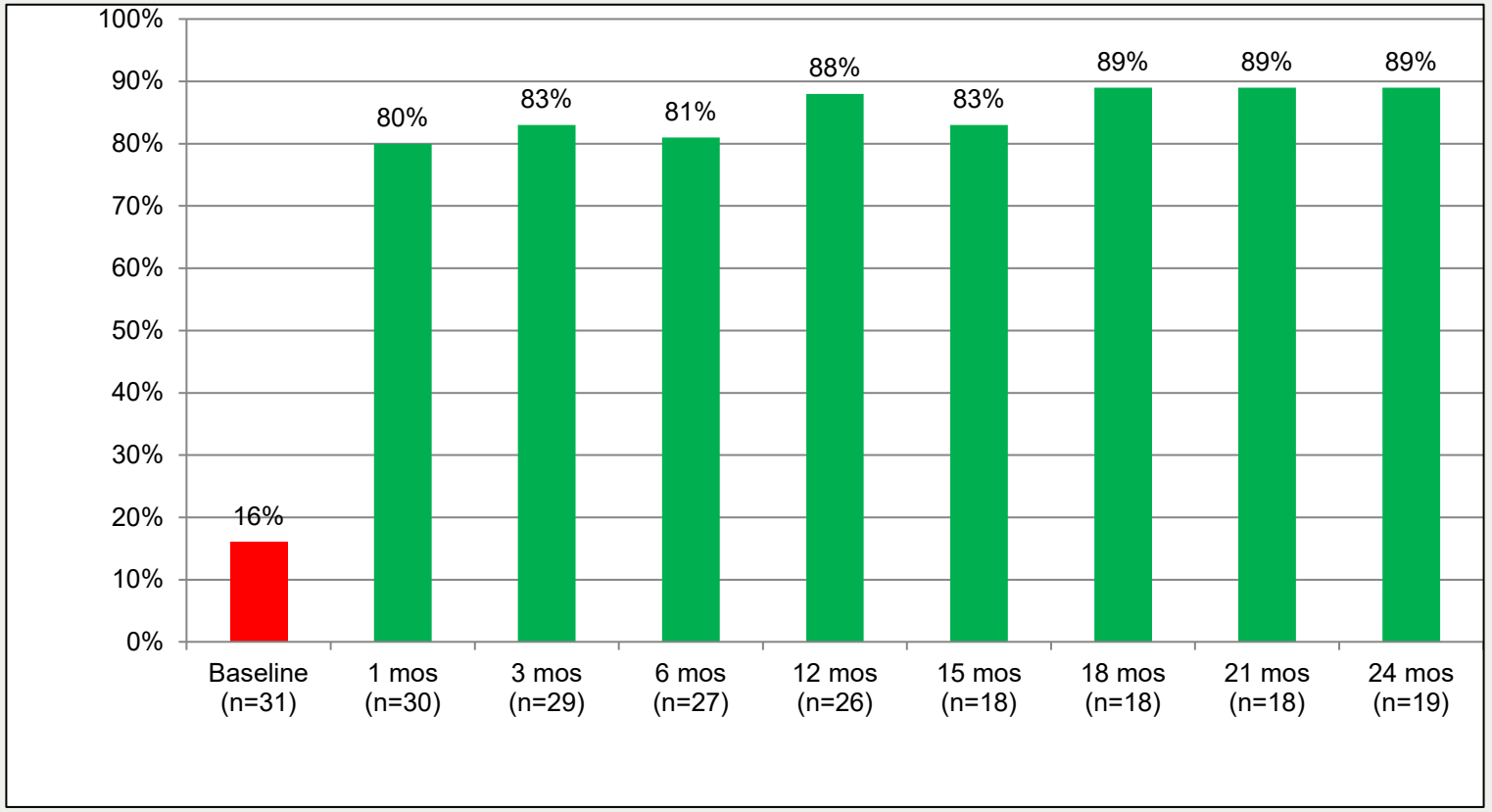
1. Gravimetric % sweat reduction only obtained at in-office visits through 12 months

Lupin M, Hong HC-H, O'Shaughnessy KF. Long-term Efficacy and Quality of Life Assessment for Treatment of Axillary Hyperhidrosis With a Microwave Device. Dermatol Surg 2014; 40: 805-807.

Long-Term Results

Odor Reduction

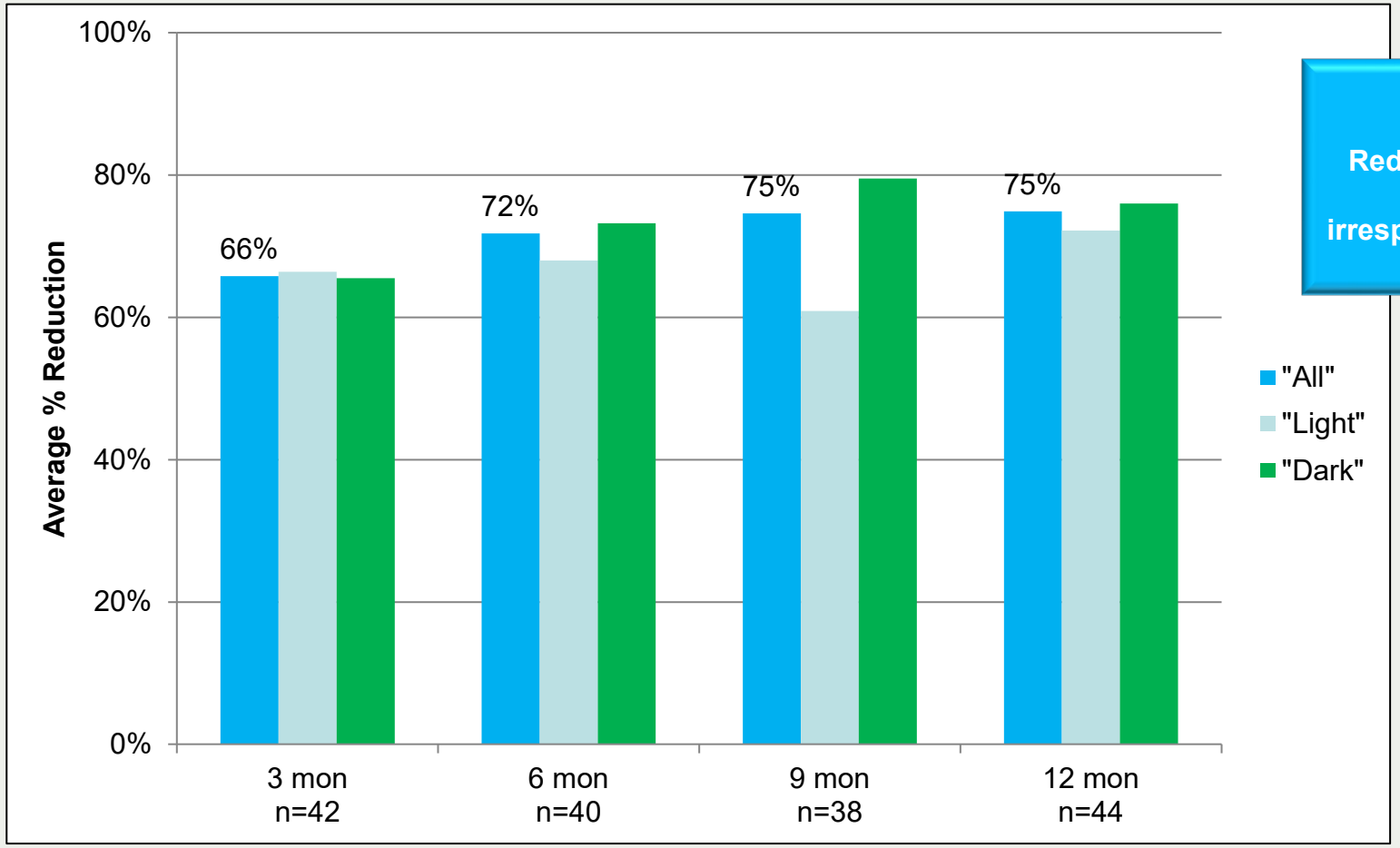
% of subjects without problematic odor



89%
Patients without Problematic odor at 2 years

Lupin M, Hong HC-H, O'Shaughnessy KF. Long-term Efficacy and Quality of Life Assessment for Treatment of Axillary Hyperhidrosis With a Microwave Device. Dermatol Surg 2014; 40: 805-807.

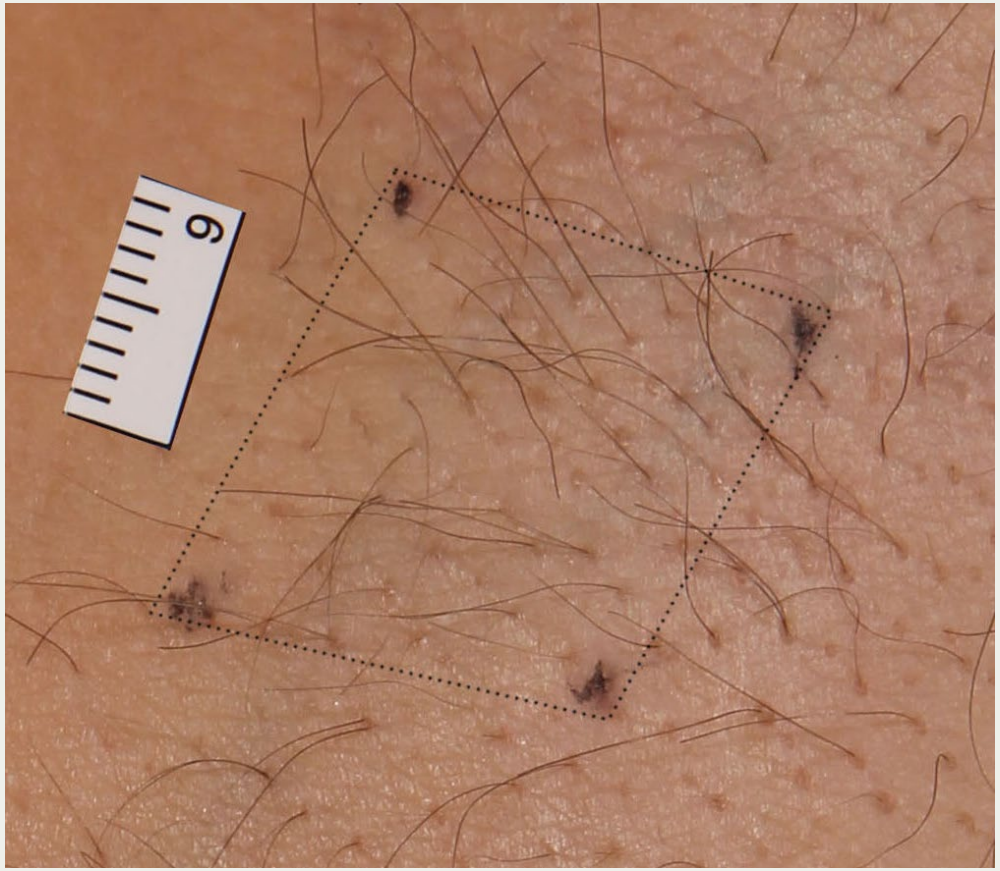
Hair Reduction Study Results



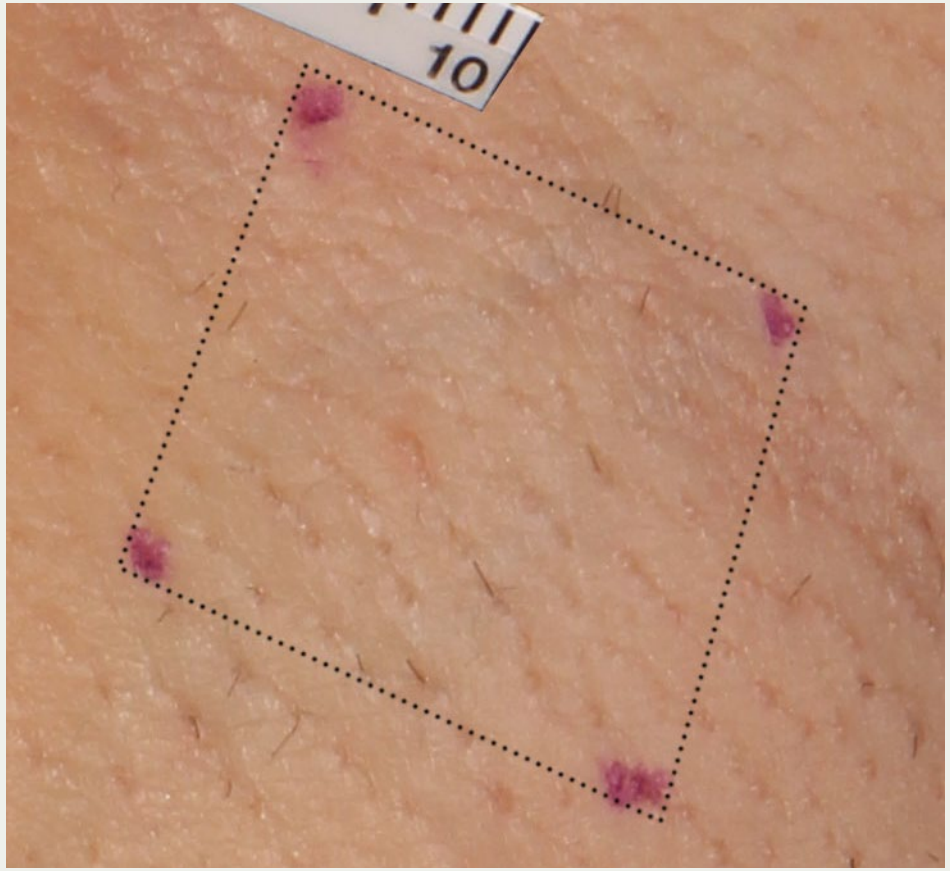
75%
Reduction at 12 months irrespective of hair color

Zelickson B, Brauer J, et al. Presented at the 2015 ASLMS Annual Meeting, April 22-26, Kissimmee, FL, Abstract #60.

Microwave Device Results – Light Hair



Baseline



12-month follow-up; 84% reduction

Microwave Device - Hair Reduction All Skin and Hair Colors

- includes white hair -

Before

1 year after treatment

Microwave Device - Hair Reduction All Skin and Hair Colors

- includes white hair -

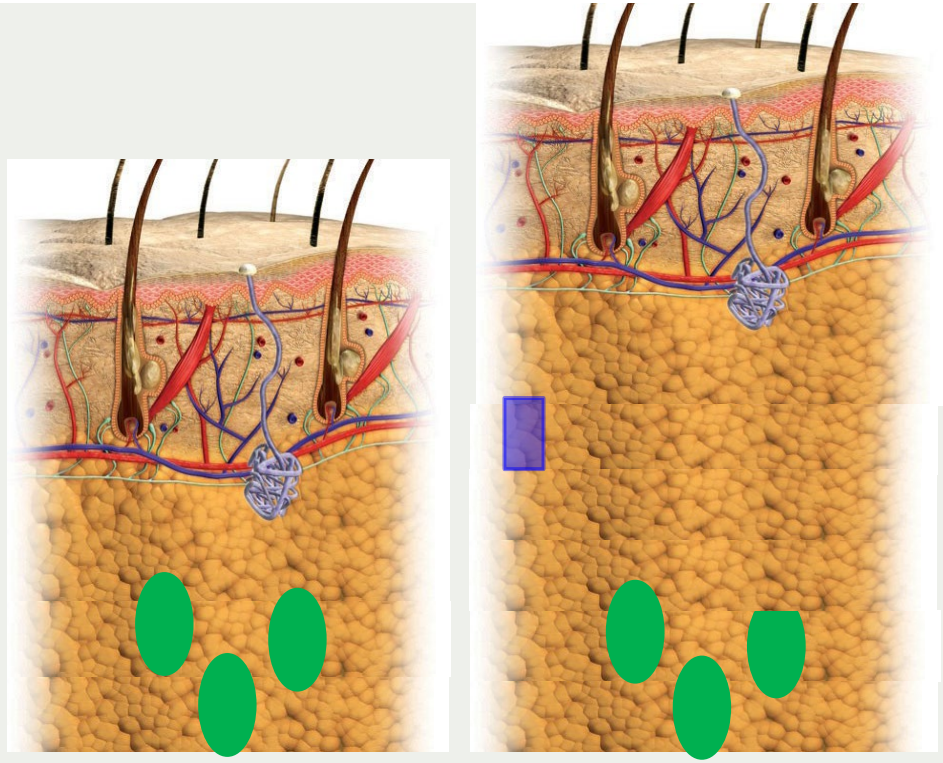
Before

1 year after treatment

High Volume Anesthesia (HVA): Create Space Between Skin and Nerves

Use high volume fluid to create separation distance between skin and the nerves

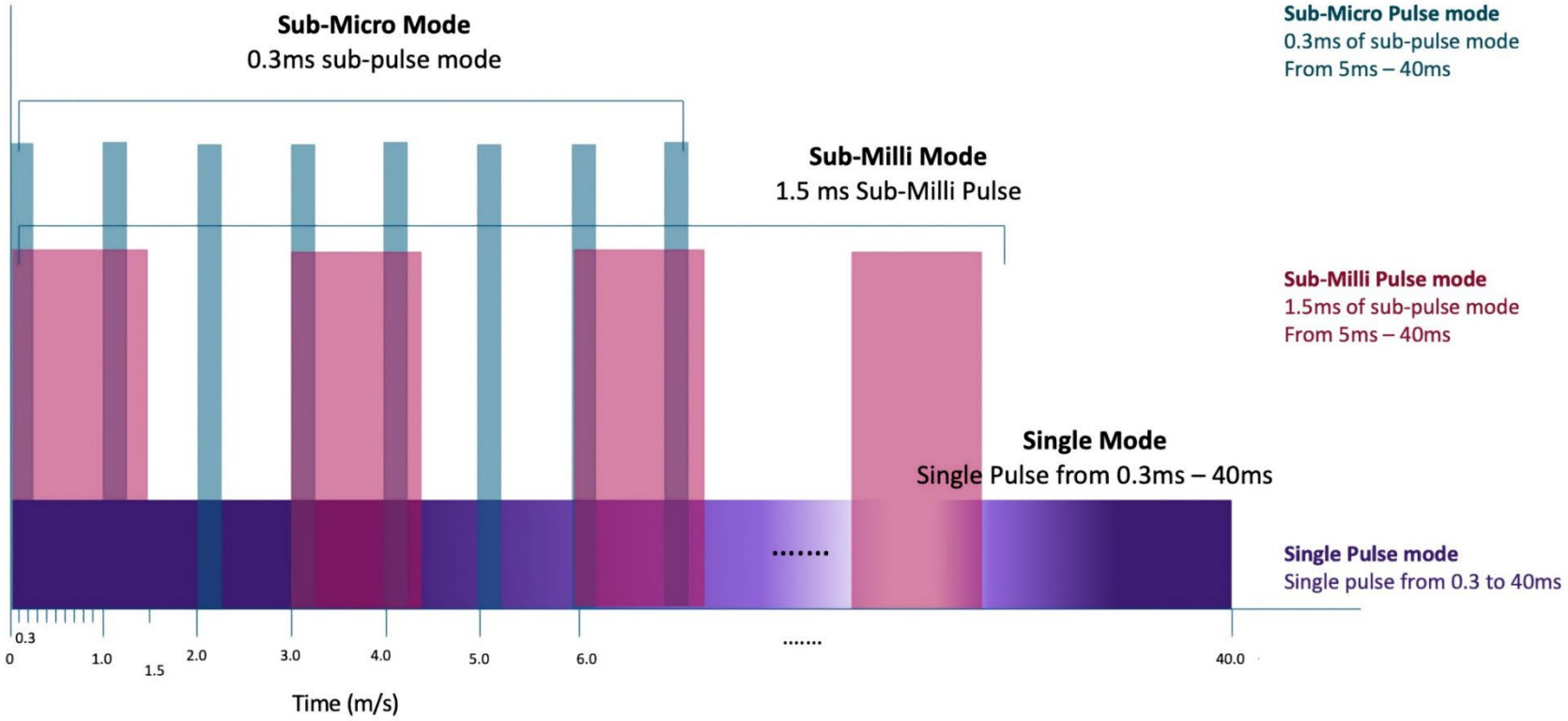
- Increase margin of safety
- Improve patient comfort during anesthesia delivery
- Potential to improve efficacy with safer use of higher energy



Microwave Device Tumescent Anesthesia Delivery

- Decrease the treatment time
- Decrease side effects
- Higher patient satisfaction
- Achieve comparable or better outcomes with 1 treatment
- Cost benefit for the patient

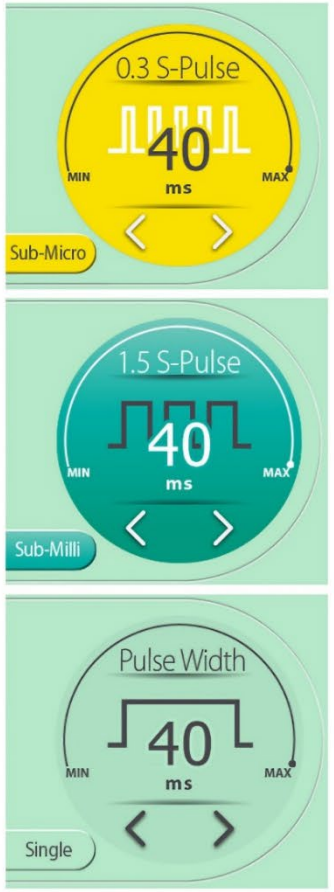
A novel 532/1064nm laser device developed with new pulse sequences and cryogen spray cooling (ICD : Intelligent Cooling Device) to better target vascular & pigment lesions.



Sub-Micro Pulse mode
0.3ms of sub-pulse mode
From 5ms – 40ms

Sub-Milli Pulse mode
1.5ms of sub-pulse mode
From 5ms – 40ms

Single Pulse mode
Single pulse from 0.3 to 40ms



Post radiation scarring and fine vessels

INSERT PIC

Before

Immediately After

3 Months After 1 Treatment

Courtesy of:
Suzanne Kilmer MD, FAAD

LASER & SKIN

Poikiloderma

1064nm in addition to 532nm

Settings: 14mm, 10ms (Sub-Micro), 4.0 J/cm2, ICD 20/20/0

pre

2-mos post 2nd tx

LASER & SKIN

PWS & Pigmented lesions

Courtesy of: Suzanne Kilmer, MD

Courtesy of: Omar Ibrahimi, MD

Courtesy of: Omar Ibrahimi, MD

Courtesy of: Ann Hern, MD