High Power CO2 Fractional Laser System

True 30W CO2 Fractional Laser is

FRAXIS

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1. Back ground of Fractional Technology

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1 st Generation		2nd Generation		3rd Generation *(FRAXIS)*
ER:GLASS		ER:YAG / ND:YAG		CO2(RF)
	ER:GLASS(1540)	ER:YAG(2940)	ND:YAG(1064)	CO2(DC)(10600)
WATER	Low	Very High	Very Low	High
Efficacy	Effective for collagen remodeling, but not good for resurfacing	With high absorption, strongly stimulate the surface of the skin and low collagen remodeling	Low resurfacing result due to low water absorption and Low collagen remodeling with high melanin absorption	Good resurfacing and collagen remodeling
Spot Size	Small and Sharpe, only for thermal damage effect	Big (Not able to penetrate into deep skin due to big size)	Big (Big dot size)	Ideal Spot size(100 ㎛)

2. Why CO_2 Fractional ?

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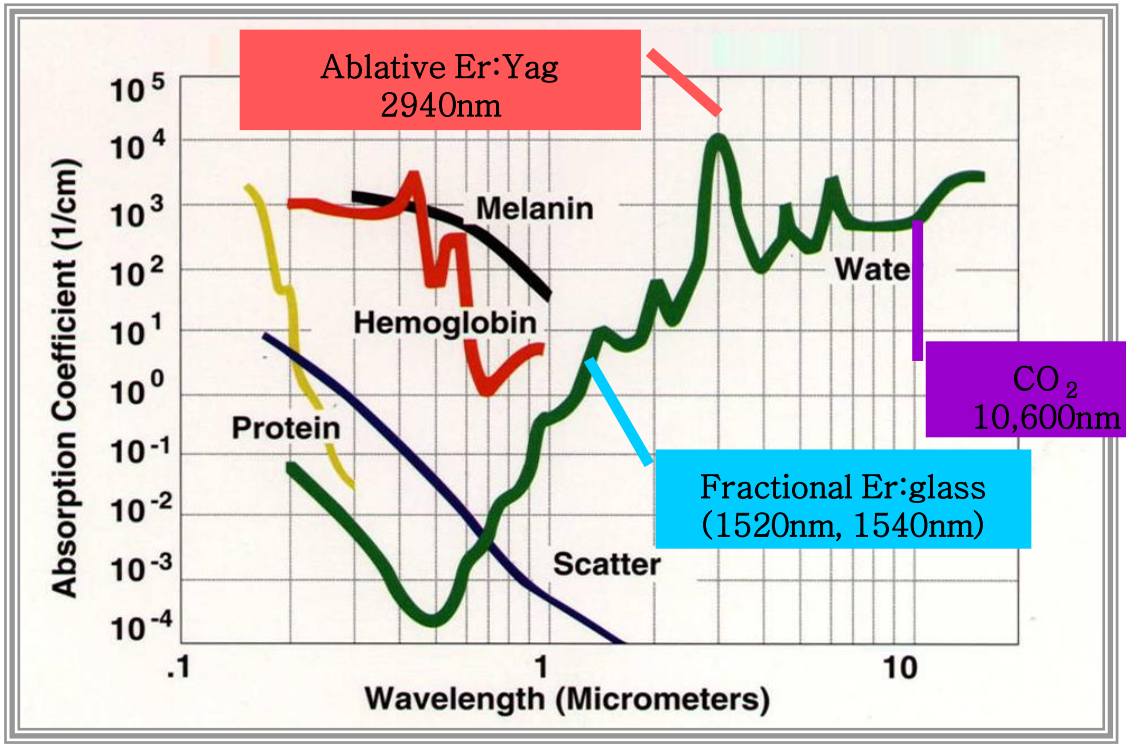
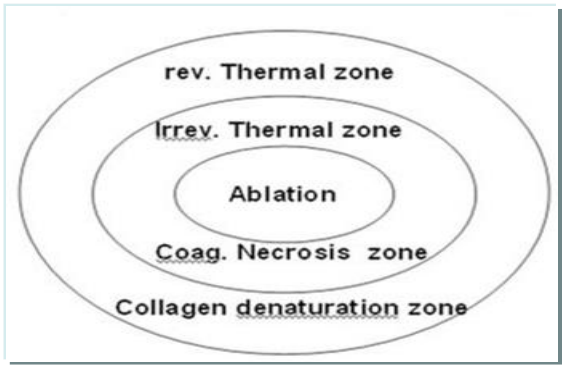
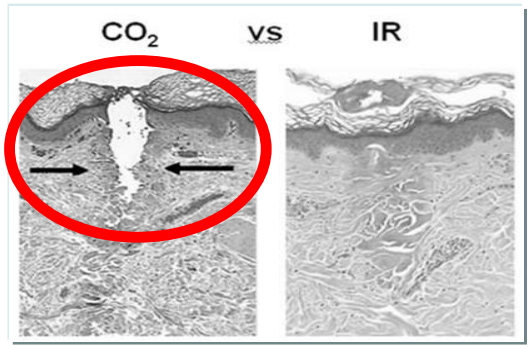


Erbium (2940nm) : Superficial ablative, less collagen remodeling

CO_2 : Strong epidermal ablation with good rejuvenation !!

Near-infrared wavelengths (from 1,064nm-1,600nm) : Less effective for scar revision and fine wrinkles





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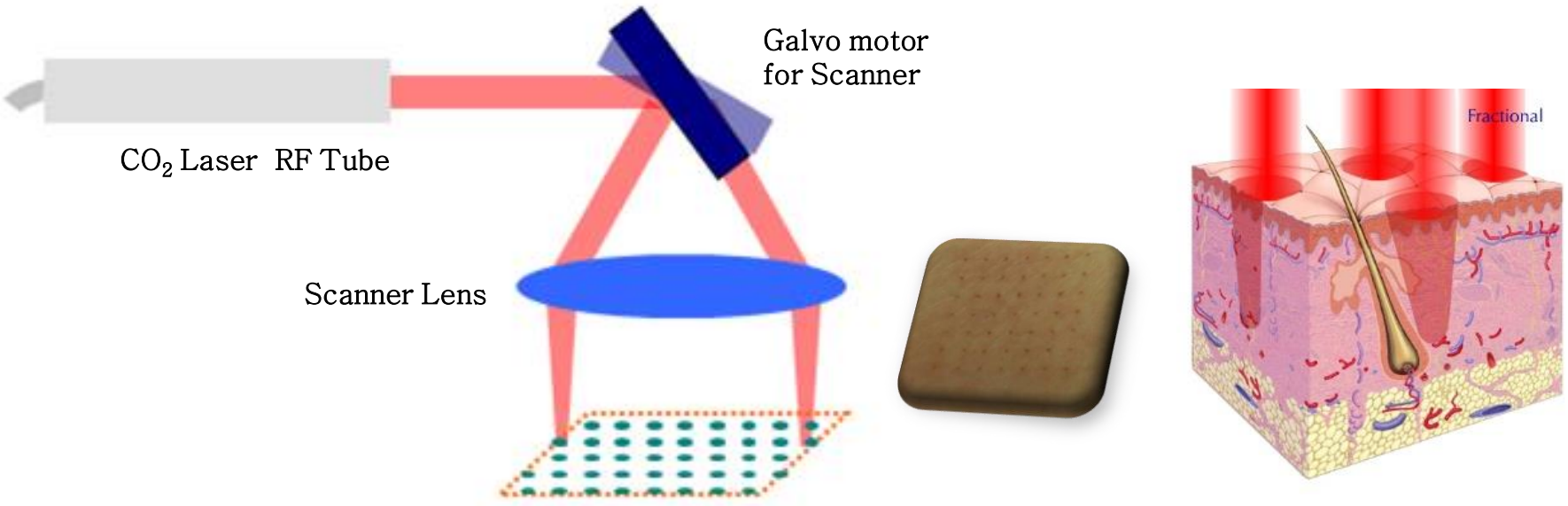
3. Principle of Fractional Laser

FRAXIS



❖ Fractional Photothermolysis is treatment for partial skin,
so if epidermis or superior derma gets damaged, surrounding non-damaged tissue makes possible to recover the damaged tissue with quickly and easily.

❖ So even if Fractional Photothermolysis treatment delivers higher power energy, it can be safer for dermis and epidermis, than existing NIR(Near Infrared Ray) treatment.

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4. CO2 Laser vs Er : YAG

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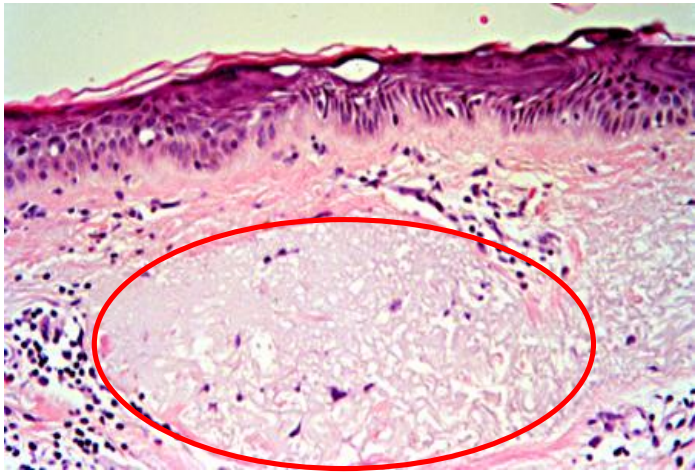
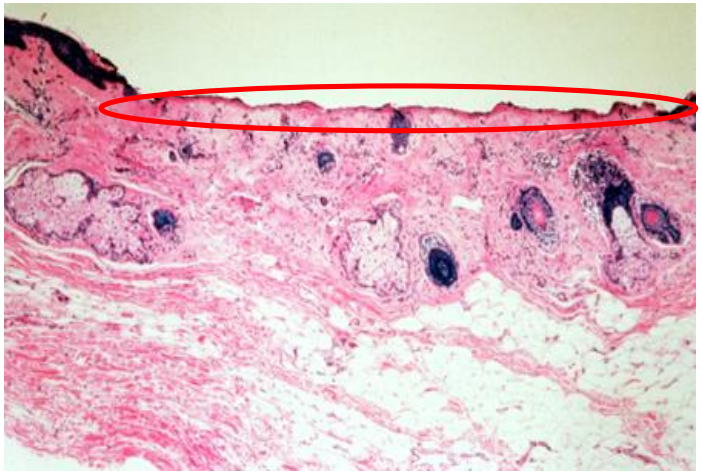


VS



CO_2

Provides ablation and heat which promotes collagen restructuring and growth of new collagen

Ablative Er:YAG

Ablates with minimal heat

Therefore, very little collagen promotion unless MULTIPLE passes are used to ablate down to the dermal layer

5. Comparison CO2 Laser vs

FRAXIS

- "…(compared to Er:YAG) more long-term wound contraction and fibroplasias per micrometer depth of injury is achieved with the carbon dioxide laser."
  - Ross E, McKinlay J, Anderson R. Why Does Carbon Dioxide Laser Resurfacing Work. Arch Dermatol. 1999: 135:444-454

- "It is now apparent that clinical improvement following equivalen t depth dermal laser wounding with the Erbium:YAG laser is less than that observed following carbon dioxide laser skin resurfacin g."
  - Kauvar A. Laser Skin Resurfacing: Perspectives at the Millennium. Dermatol Surg. 2000;26:2:174-17 7

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6. FRAXIS

FRAXIS

- CO2 Micro focusing conventional Laser Scanner Fractional Laser
- 10.6um wavelength Laser (high water absorption)
- More high power is adapted 30W Tube (Made in USA)
- More high beam quality is adapted RF Metal Tube
- FRAXIS releases micro-sized Laser beams punched into the skin,
  which gives strong dry ablation & mild thermal damage,
  that gives good results for scars, wrinkle, rejuvenation, large pore
- Multiple Laser Beam hole is delivered to dermis
- It helps to resurfacing & Remodeling collagen

Application : Tightening, Wrinkle, Rejuvenation, Large pore & Scar Care

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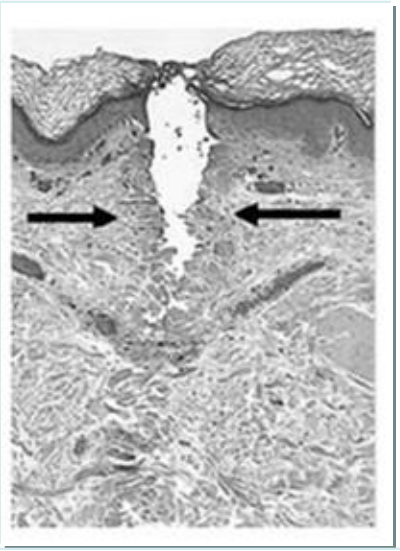
7. How does it work?

FRAXIS

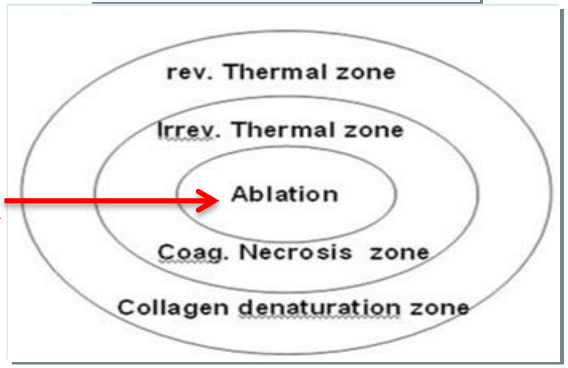
1. Heat in the dermis

- Heat promotes collagen stimulation
- But, Ablative Er:YAG does NOT provide enough heat for collagen regeneration



2. Ablation

- Immediate shrinkage of tissue
- Effective on dyschromia(skin tone)100㎛



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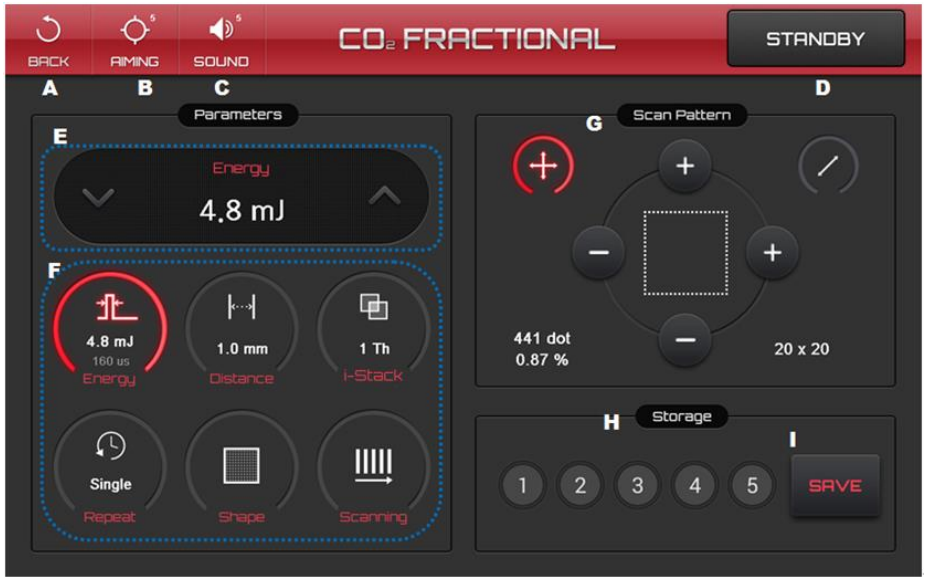
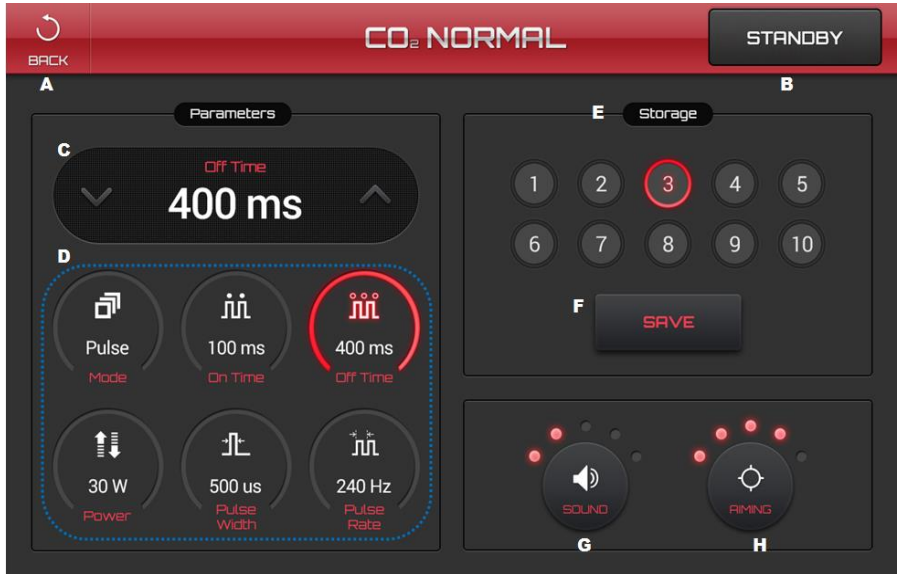
8. UI & Specification

FRAXIS





★ **Energy : Pulse duration / 1 Pixel,**
100us~ 5000us

★ **Repeat : During steps on the foot switch,**
time interval between Area & Next Area.
single, 0.2s, 0.5s, 0.7s, 1.0s, 1.5s, 2.0s

★ **i-Stack : how many shot is radiated per one fixel.**
1th ~10th

★ **Distance : Pixel distance**
0.1~2.0mm

★ **Aiming Beam Brightness: 1 ~ 10 level**

CW Mode

★ **Laser Power : 0.5 ~ 30 Watts(0.5step)**

Pulse & Single Pulse Mode

★ **Laser Power : 0.5 ~ 30 Watts(0.5step)**

★ **On time : 10ms ~ 100ms (10ms step)**
100ms ~ 500ms (20ms step)
500ms ~ 1000ms (100ms step)

★ **Off time : 10ms ~ 100ms (10ms step)**
(only Pulse Mode) 100ms ~ 500ms (20ms step)
500ms ~ 1000ms (100ms step)

Ultra Mode

Width : 20us ~ 200us (10us step)
200us ~ 500us (20us step)
500us ~ 5,000us (100us step)
Pulse Rate : 1Hz ~ 20Hz (1Hz step)
20Hz ~ 1,000Hz (2Hz step)

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9. FRAXIS Scan & Surgical Mode

FRAXIS

Fractional

● With 30 watt high power RF tube, uniform and stable laser beam with 100 ~ 120㎛ spot size reduces thermal damage and any unpredictable side effect for maximum treatment effect

Surgical

● Smart surgical Hand pc with multiple spot sizes enable physicians to easily treat superficial lesions (Seborrheic Keratosis, lentigines…) or more accurate treatment on wart.

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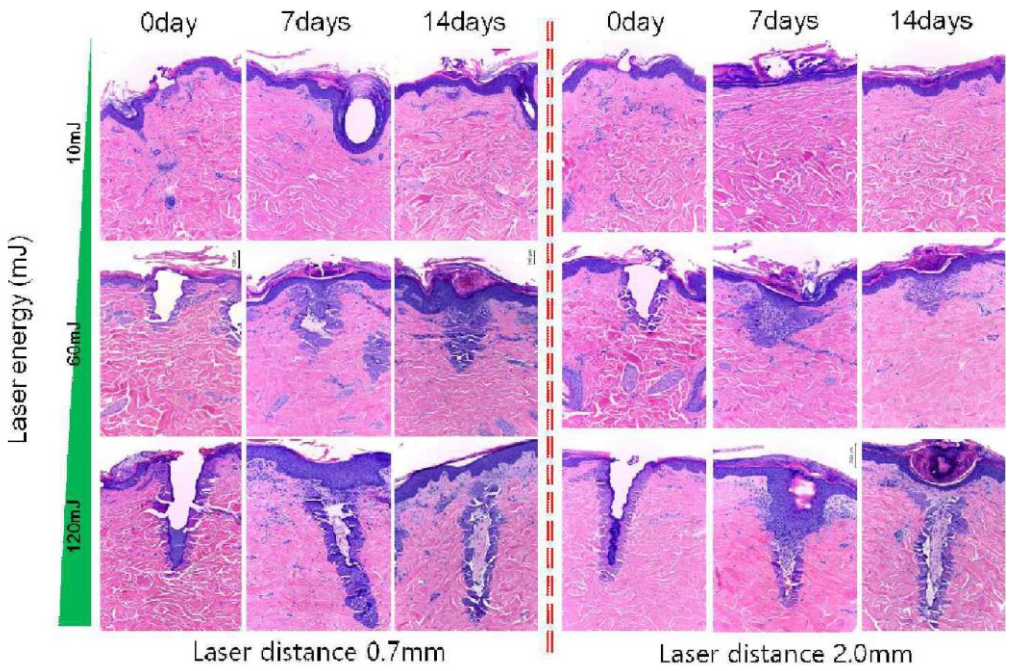
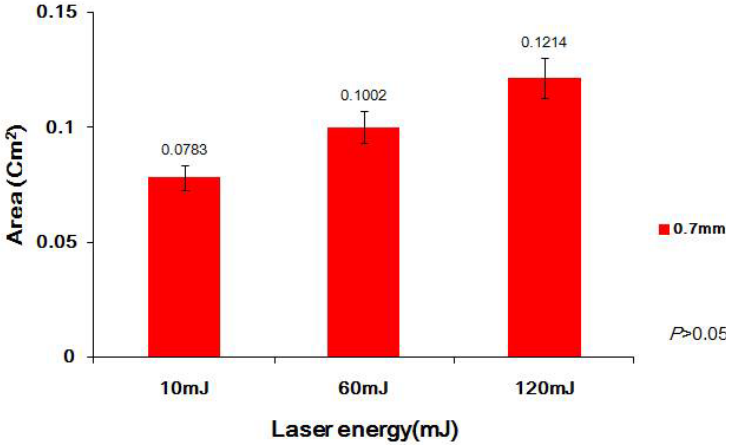
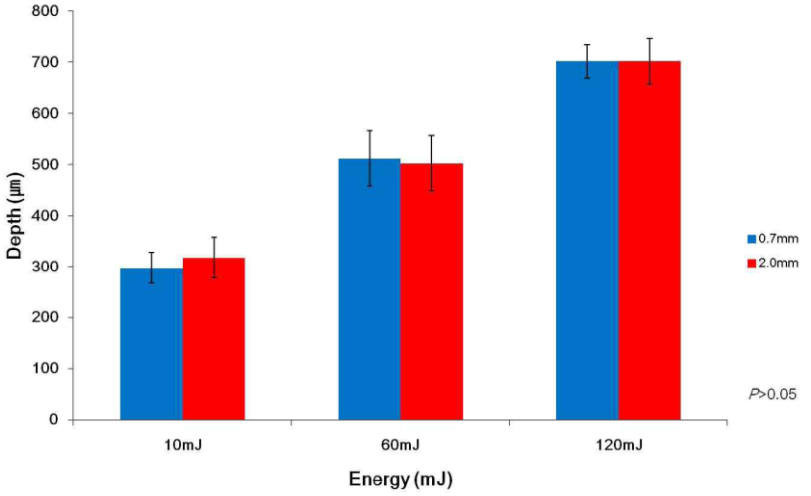
Fractional Mode Penetration Depth

FRAXIS

Spot size
Low energy << High energy







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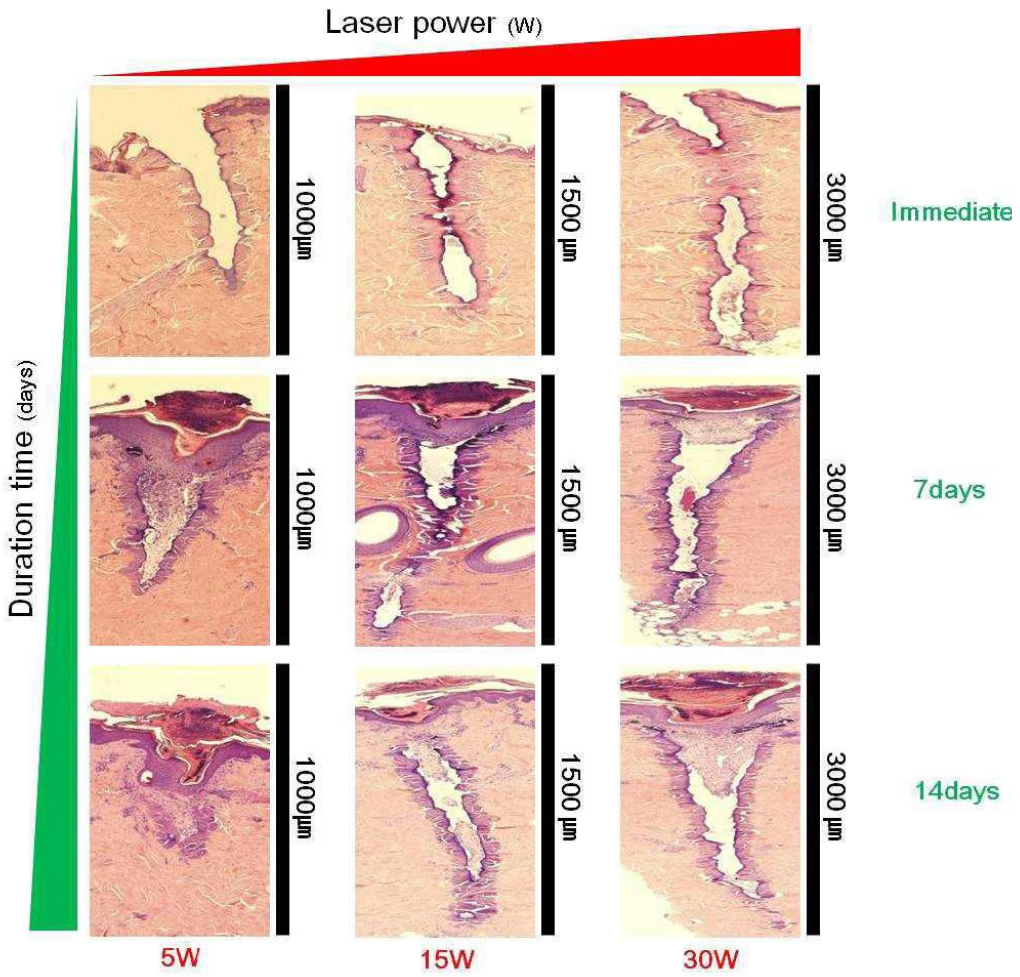
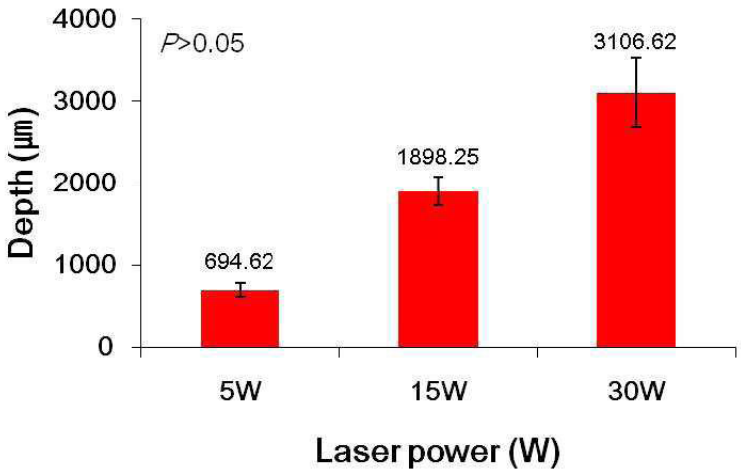
Surgical Mode Penetration Depth



Penetration Depth
Fractional Mode << Surgical Mode



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10. FRAXIS Scan & Shape Mode

FRAXIS

Various Shape and scanning modes

Shape	Scan
CIRCLE, ELLIPSE, SQUARE, RECTANGULAR, TRIANGLE, HALF CIRCLE	Convergence, Sequence, Diagonal, Even/odd, Random / Scatter, Sequence, Diagonal, Even/odd

Fractional

- **Shape** : more than **6** types / **Scan Mode** : **9** types
- Available to provide customized treatment
- Minimizing thermal damage and side effect
- Maximizing treatment effect

Adjustable hand piece size

0.2 mm
0.3 mm
0.5 mm
0.7 mm
0.9 mm
1.1 mm
1.3 mm

Normal

- Adjustable spot size : 7 spot sizes
- 4 types of surgical mode :
  CW, Pulse single, Pulse, Ultra pulse
- Easy to select spot size and pulse mode

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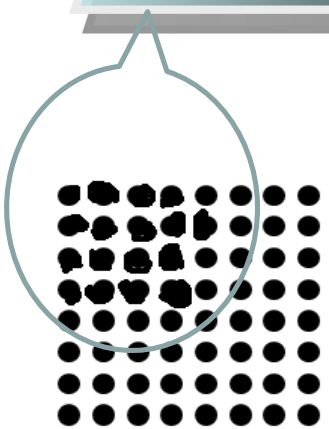
11. Best Beam Quality

FRAXIS

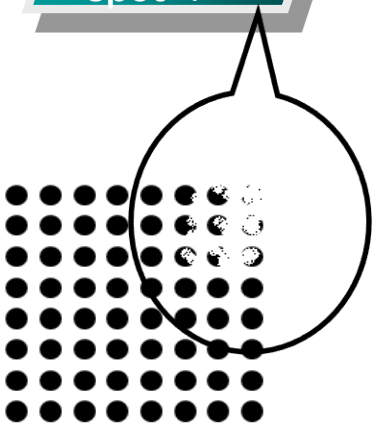
1st consideration

Are each sizes of laser beam uniform ?



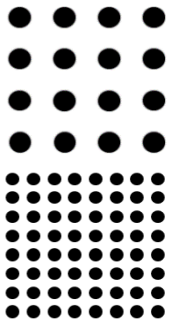
2nd Consideration

Are each laser beams spread uniformly and equally on all over spot ?



3rd Consideration

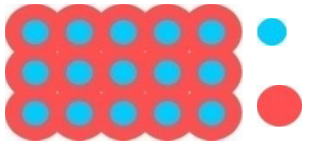
Is each spot size small enough ?



High risk of thermal damage on overlapped area !!

4th Consideration

Does it have various scanning mode to reduce the thermal damage ?



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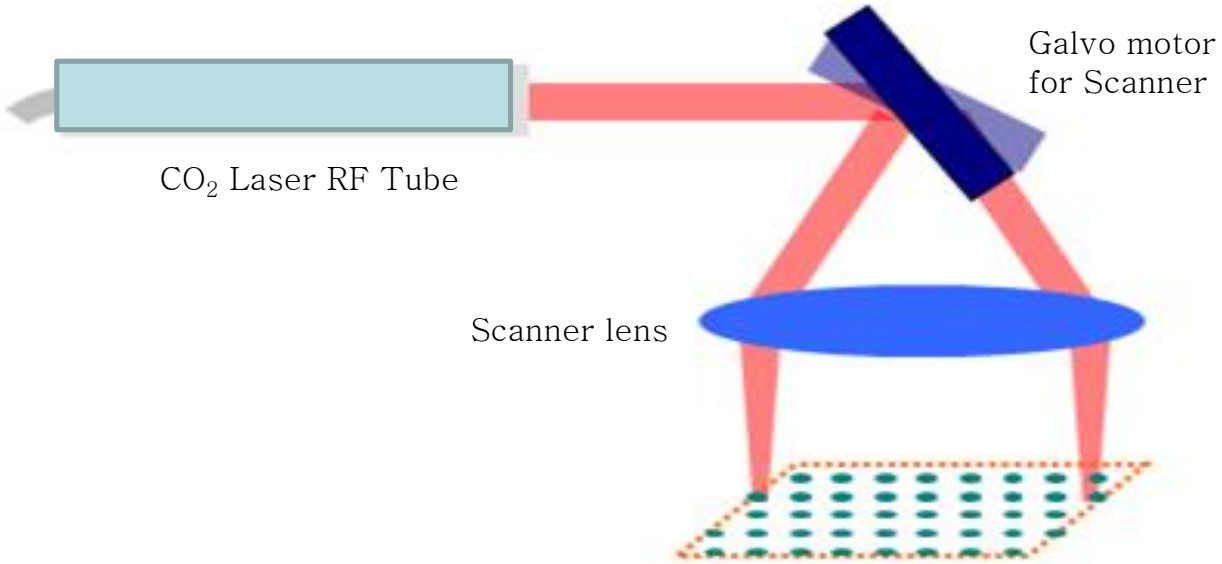
12. The best quality of Fractional

FRAXIS



Beam quality depend on **Tube, Scanner lens and Galvo motor for scanner**

★ Aiming Beam : 1 ~ 10 (1)

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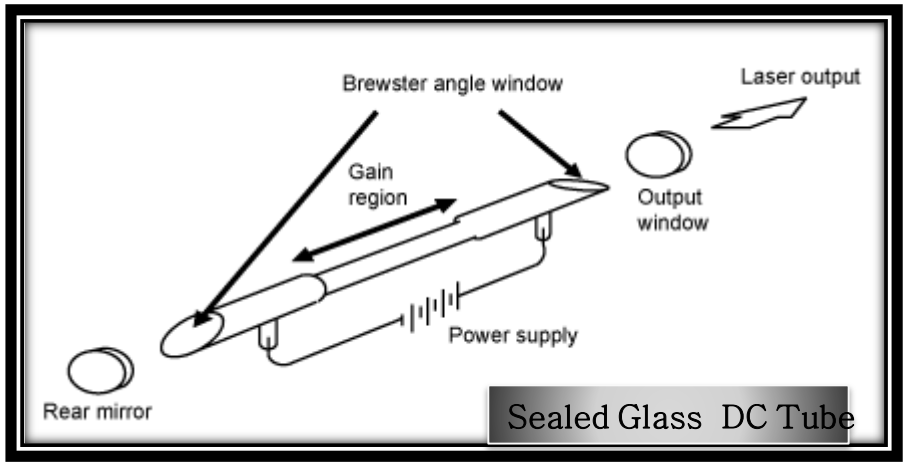
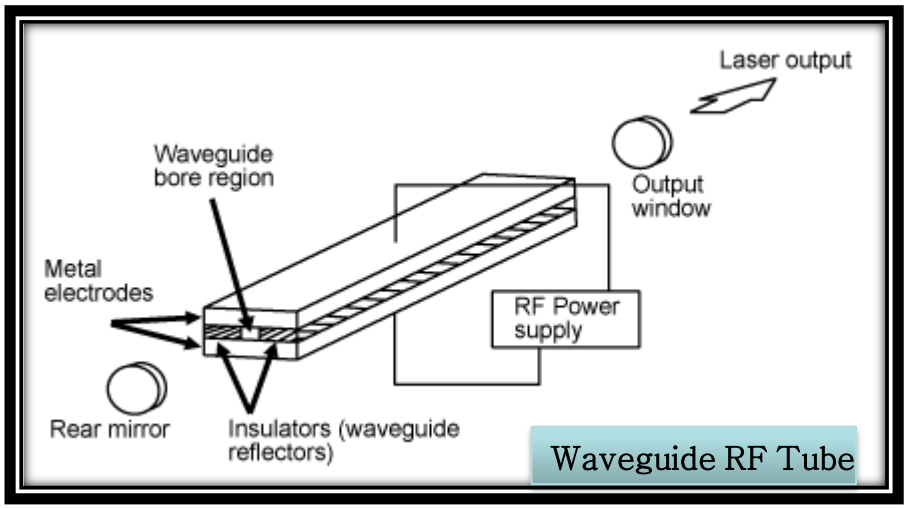
13. CO2 Laser Tube

FRAXIS



❖ Advantage
1) Simple manufacturing process
2) Low cost !!

❖ Disadvantage
1) Unstable laser power
2) CO_2 mixture gases corrode electrode
3) CO_2 mixture gases are dwindling naturally
☞ Regular replacement is necessary !!



❖ Advantage
1) A high and stable laser power by high pressed waveguide RF and fast pumping
2) Permanent life cycle by metal sealed off
3) Compact size

❖Disadvantage
1) High cost

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FRAXIS *adapted RF Metal Tube.*

14. Comparison of Dot Size

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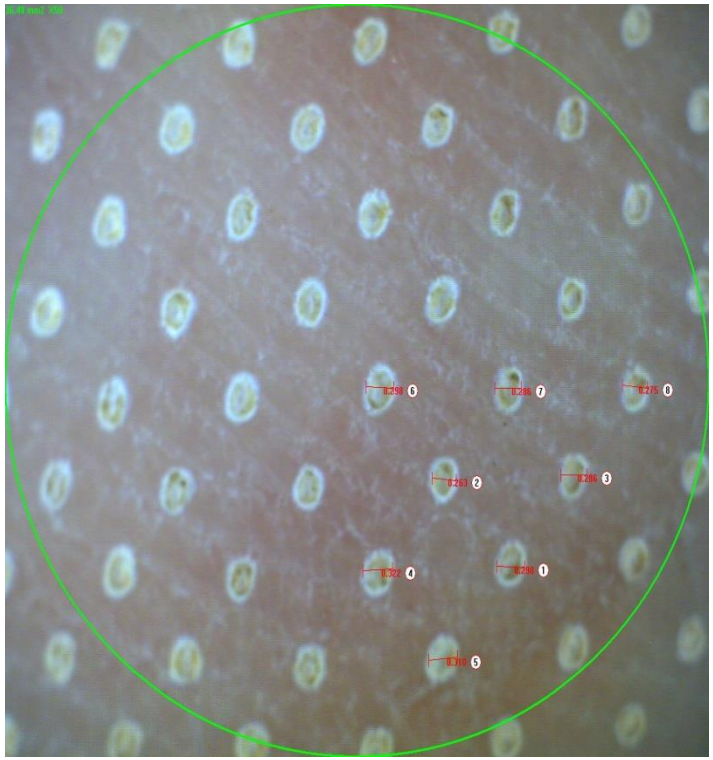
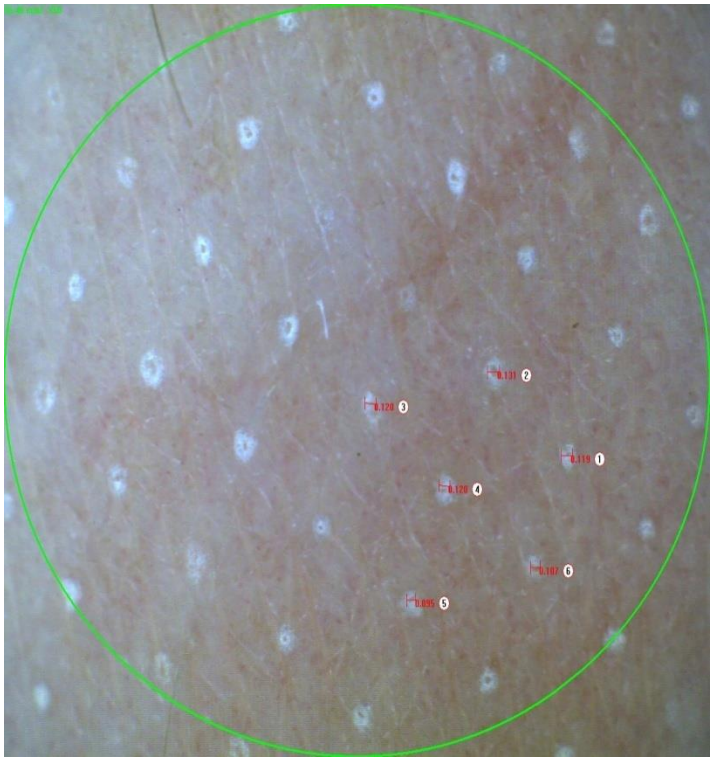
Conventional CO_2 Fractional



-High risk of PIH
-Delayed down time

FRAXIS CO_2 Fractional Laser



- Minimal invasiveness, less pain
- Reduced down time
- Ideal Spot size (100㎛)

15. Beam Quality Test

Shooting Fraxis system on the acrylic panel by high speed camera

Fraxis is more stable by RF tube, Scanner, Micro Lens

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16. The Advantage of FRAXIS

FRAXIS

- High Power Laser (Real 30w)
- Uniform and stable power/ High beam quality
- Fast Scanning – shorter operation time
- Possible to accurate operation
- By replacement of hand piece, can use normal conventional CO2 laser function.
- Minimize thermal damage → Maximize treatment effect
- Easy to operate with Wide Touch screen(10.4inch) & User interface

True Co2 Fractional Laser is FRAXIS

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17. Specification

FRAXIS

Laser Type	RF CO2 LASER, ALL Metal Sealed Type
Laser Power	Normal Mode, CW/Pulse/Ultra: 0.5 ~ 30W
Fractional Pulse Energy	3.5mJ – 175mJ
Laser Mode	Fractional / Normal (10600nm)
Pulse Duration	100 - 5,000us
Repetition	0.2-2.0sec / Single
Overlap (Degree)	1 – 10th
Distance	0.1 – 2.0mm
Treatment Area	1 x 1 – 20 x 20mm
Pixel (dot) Quantity	Up to 40,401
Pixel Size	≥100 micron
Cooling	Air Cooling
Optical Guide	Articulated Arm
Aiming Beam	Semiconductor Diode laser/ Max 5mW/ 650mm
Optional Accessory	Normal(Surgical) Hand-piece, F50/F100 Spot Size, 0.3mm/0.5mm

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18. Clinical Data

FRAXIS

❖ **Acne treatment** (Female : 24 years, 3 sessions)

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18. Clinical Data

FRAXIS

❖ **Pore & Tightening**(Male : 42 years, 2 sessions)

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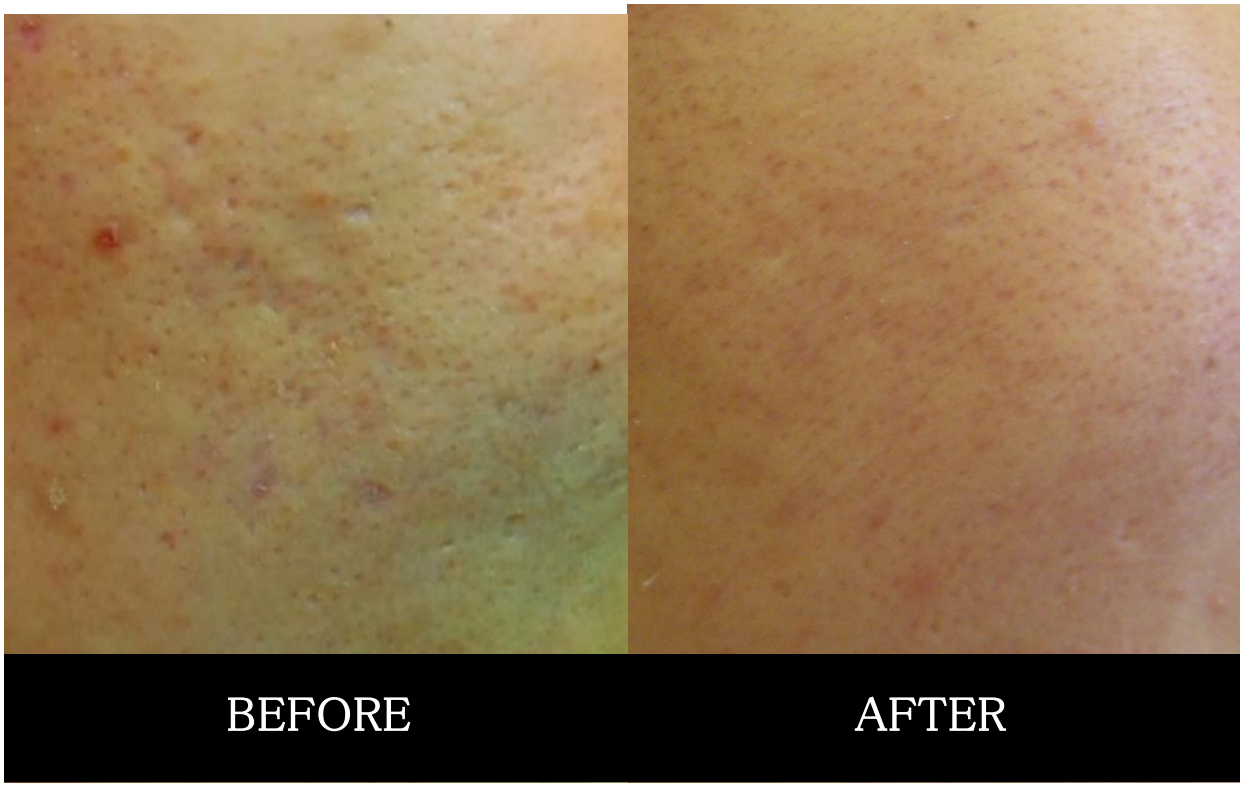
18. Clinical Data

FRAXIS

❖ Acne Scar treatment (Female : 33 years, 2 sessions)



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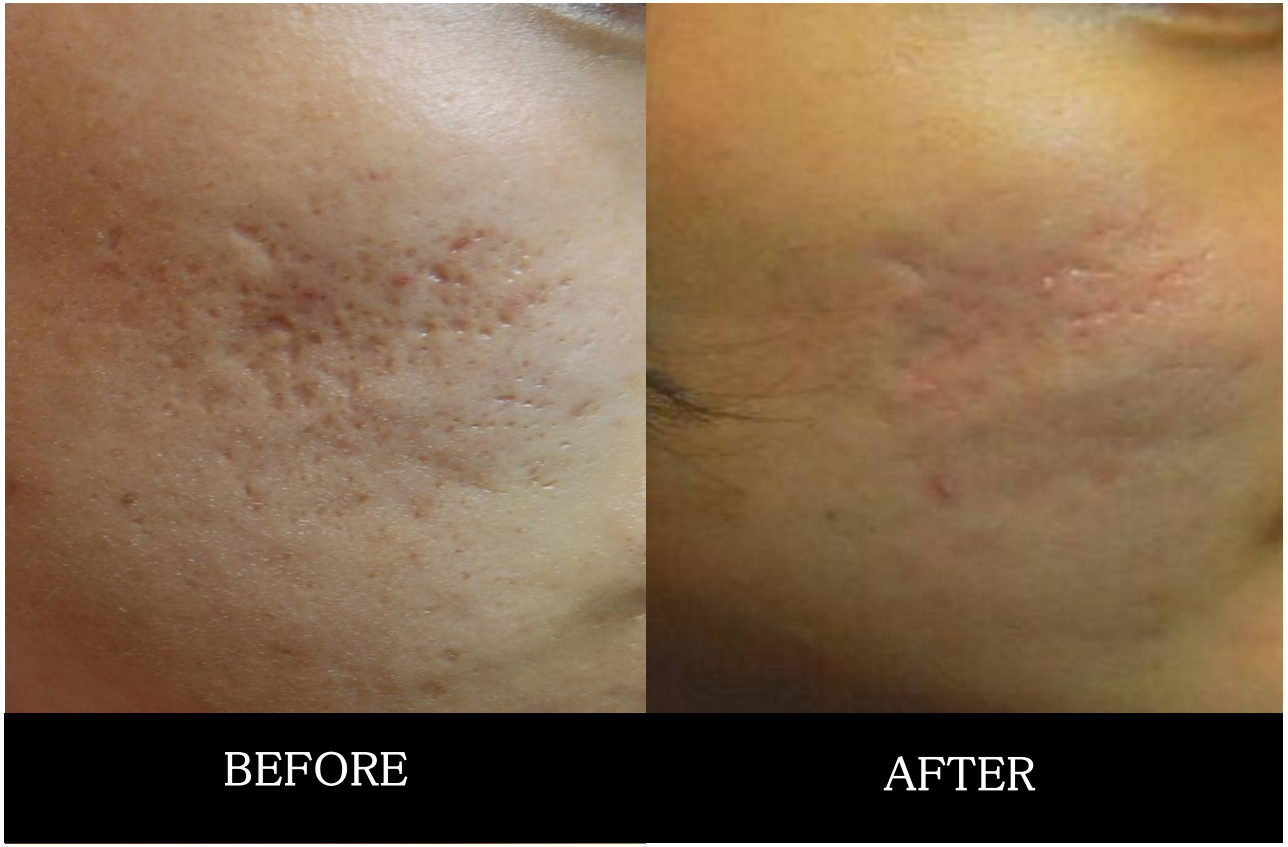
18. Clinical Data

FRAXIS

❖ Acne Scar treatment (Female : 27 years, 3 sessions)



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FRAXIS

Thank you

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