

# PICO CARE 450

- Better Performance of PICO CARE compared to Q/SW.
- Ultimate Performance of PICO CARE\_MLA in Treatment



# Better Performance of PICO CARE compared to Q/SW

- Higher peak power
- The less photothermal effect, The more photoacoustic effect

# Pulse Duration

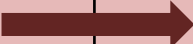
Prefix	Symbol	Numerical Value	Power of 10 Equivalent
Milli	ms	0.001	$10^{-3}$
Micro	$\mu s$	0.000001	$10^{-6}$
Nano	ns	0.000000001	$10^{-9}$
<b>Pico</b>	<b>ps</b>	<b>0.000000000001</b>	<b><math>10^{-12}</math></b>
femto	fs	0.000000000000001	$10^{-15}$
atto	as	0.000000000000000001	$10^{-18}$

- Long pulse duration
- **Photothermal energy**
- **hair removal, vascular lesion treatment**

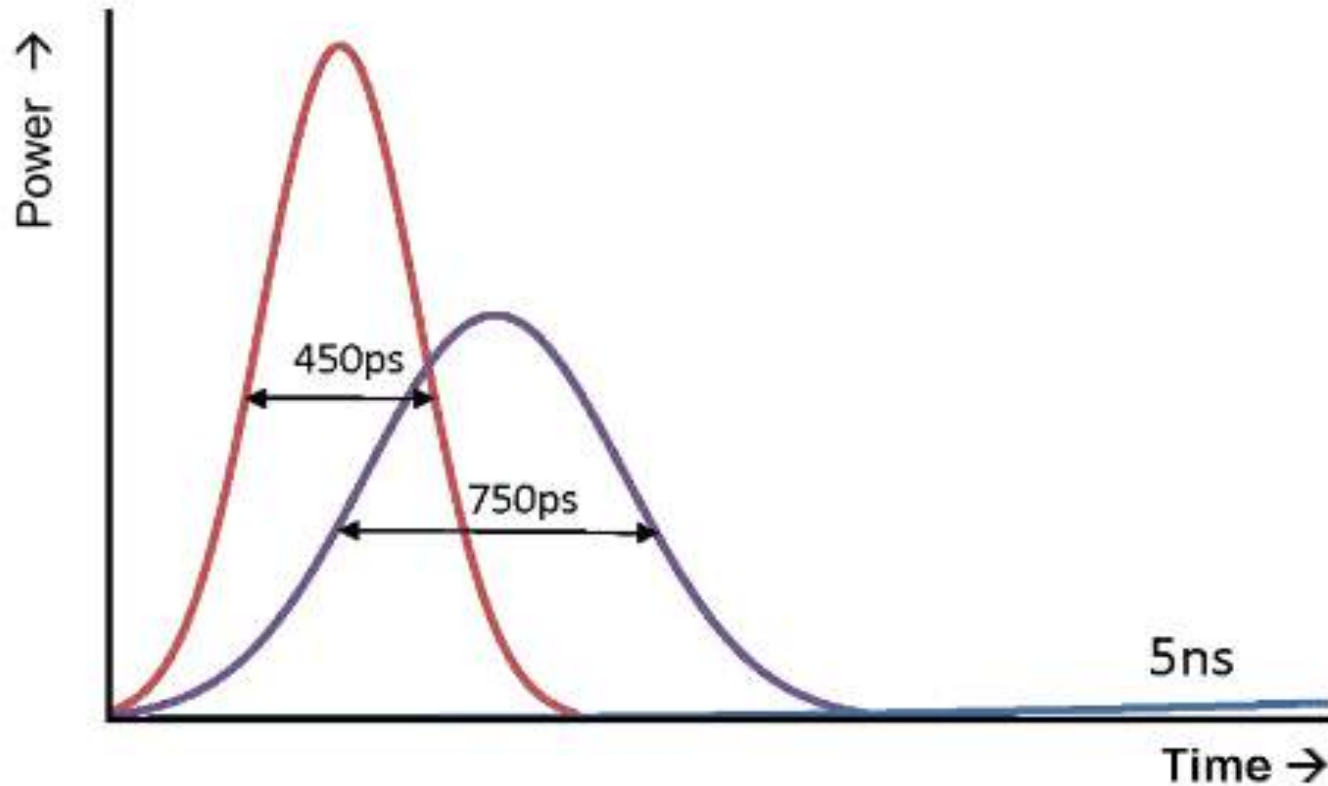
- Short pulse duration
- **Photoacoustic effect**
- **Pigments removal**

# Short pulse duration for pigments treatments

<b>Principle</b>	Short pulse -> peak power ↑ -> a buildup of pressure (= stress) -> fragmentation of pigments particle
<b>Features</b>	<ul style="list-style-type: none"> <li>• The shorter the pulse duration, the higher the peak power.</li> <li>• photoacoustic effect ↑ photothermal effect ↓</li> <li>• Fragmentation of pigments treatments ↑ thermal damage ↓</li> </ul>

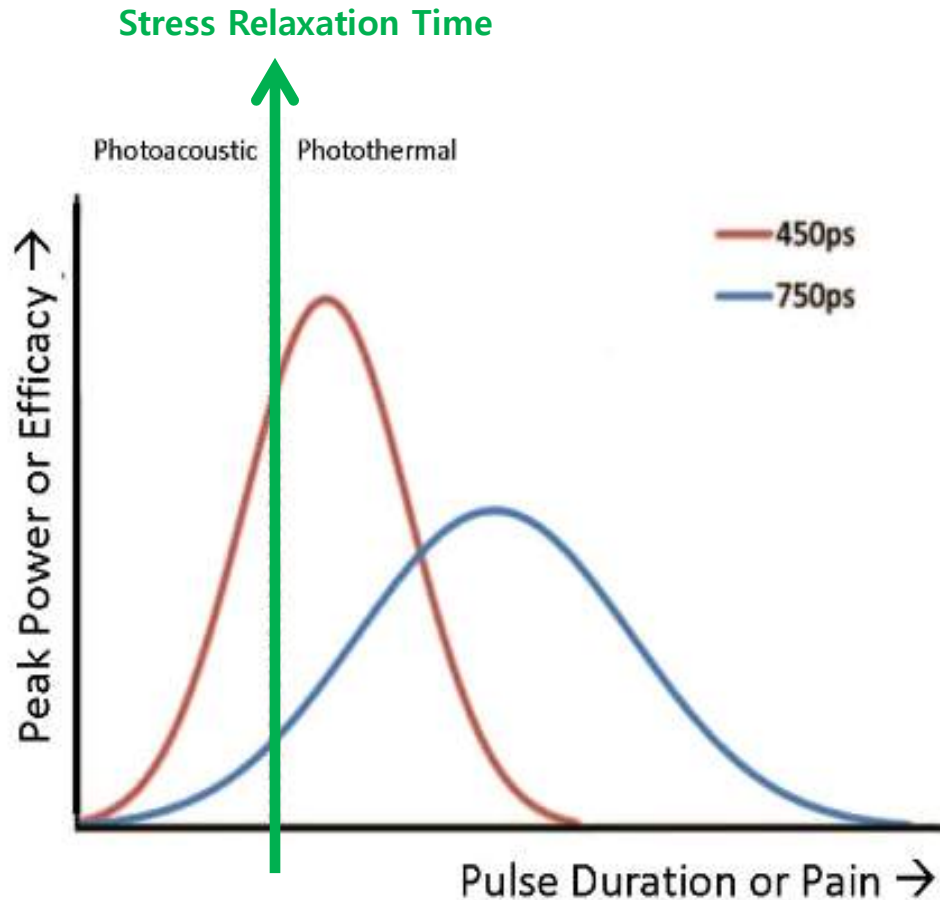
Pulse duration	Nanosecond lasers ( $\frac{1}{10^{-9}}$ )	1000 times shorter 	Picosecond lasers ( $\frac{1}{10^{-12}}$ )
<b>Principle</b>	Photothermal stress (Photoacoustic + photothermal effects)		Photoacoustic stress (Photoacoustic effects)
<b>Description</b>	rapid heating -> expanding the particles -> thermal stress -> fracture of particle		Photoacoustic stress -> fracture of particle
<b>Action</b>	Large pigments		Both large and small pigments
<b>Features</b>	SPTL (Selective photothermolysis)		Various particle size per color is effective to Tattoo treatment
<b>Number of Treatment</b>	↑		↓
<b>Side effect</b>	↑		↓

# Comparison of peak power



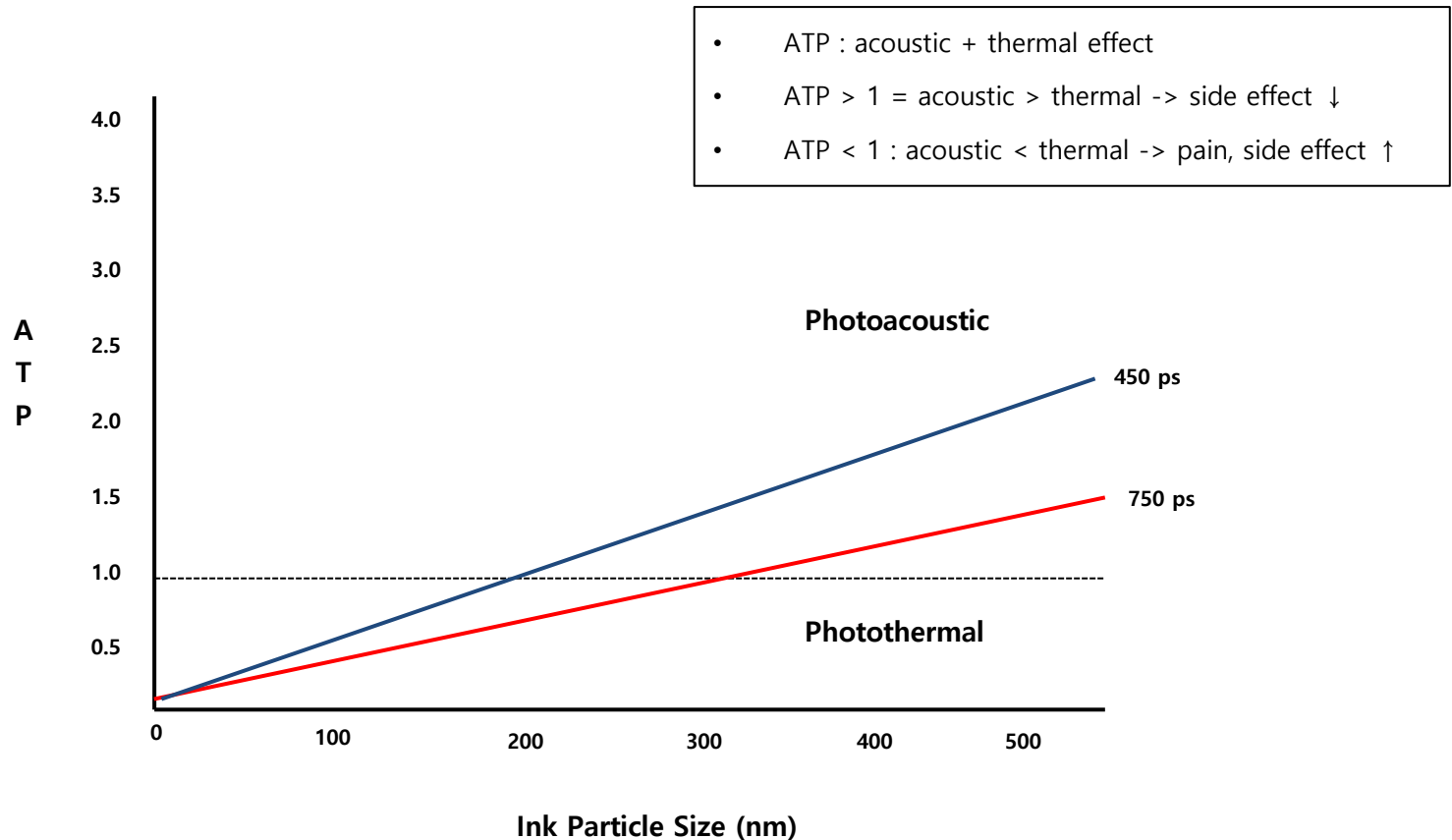
- At the same energy level, the peak power can vary with pulse duration.
- General effect shows the shorter the pulse duration, the higher the peak power.

# SRT (Stress Relaxation Time)



- Prior to SRT, a photothermal effect is followed by the photoacoustic effect.
- 450ps is more effective than that of 750ps in the pigment lesion treatment.

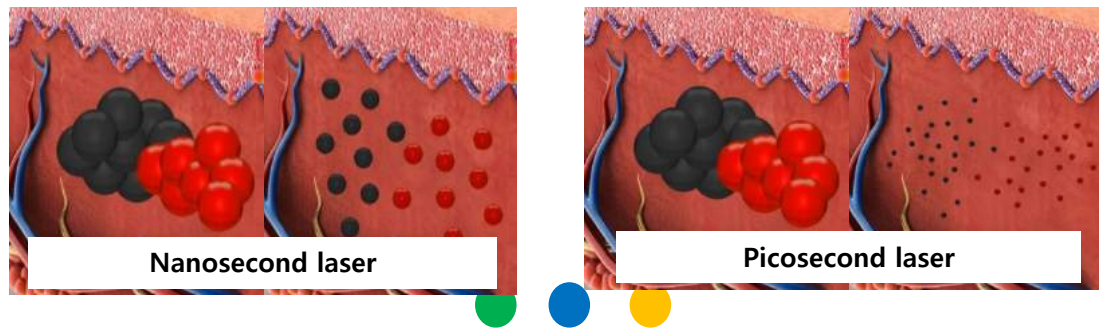
# ATP (Acoustic Thermal Pressure)



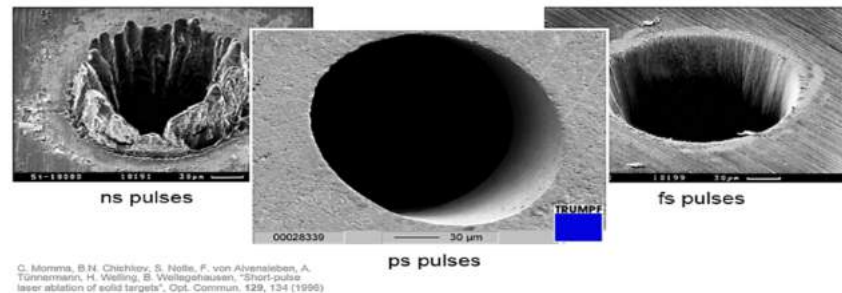
- ATP at 450ps is higher than 750ps at the same pigment particle size
- 450ps is larger than 750ps, breaking effect of small pigment particle is higher and less pain.

# Picosecond laser

- Low energy such as 1/3 or 1/2 used in nanosecond lasers can be effectively treated.
- Nanosecond laser breaks rocky lesions into pebble size, while Picosecond laser does sandy crush.










- It is also effective for Green, Blue, Yellow lesions.
- When the nanosecond laser is irradiated, there is a risk that the temperature is unevenly distributed to the lesion, causing damage to surrounding tissues or rough edges. However, in the case of Picosecond laser, the edges are neatly cut as shown in the pictures below.





# PICO CARE specification

Type	Nd:YAG	
Wavelength	1064nm, 532nm	
Pulse duration	750ps	<b>450ps</b>
Peak power	1064nm : 0.8GW	<b>1064nm : 1.33GW</b>

Main Body	Handpiece		
	S t a n d a r d	 <b>Zoom (2~10mm)</b>	 <b>DOE (5x5~9x9, 6x6mm)</b>
		 <b>Collimation (7mm)</b>	 <b>MLA (3~5mm, 6~10mm)</b>
	O p t i o n	 <b>Filter : 595nm</b>	
		 <b>Filter : 660nm</b>	

# PICO CARE indication

	Therapeutic lesion
Epidermis pigments	age spots, Becker nevus, Café-Au-Lait freckles, lentigines, melasma
Dermis pigments	ABNOM, Ito nevus, Ota nevus, PIH
Tattoos	all colors
Skin rejuvenation	uneven skin color, skin texture resurfacing, fine wrinkles, large pores
Scars	acne scars, chicken pox scars (ice picked, round, box, rolling type)



<ice picked scar>



<round scar>



<box scar>

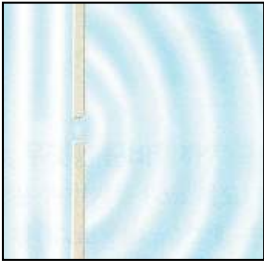
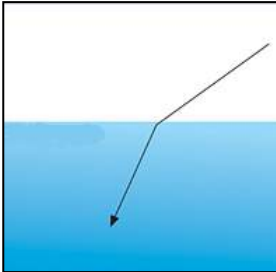
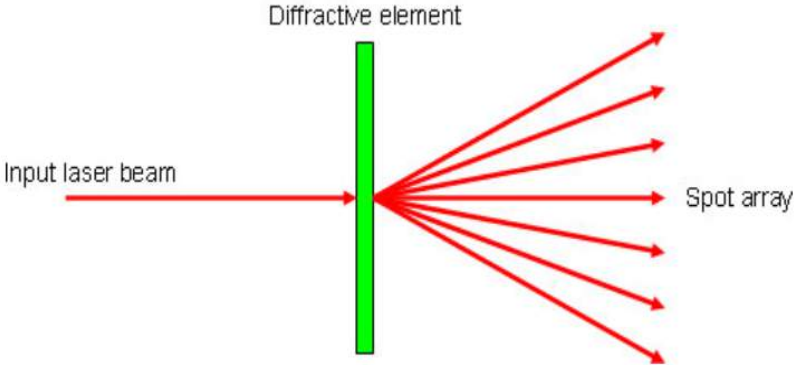
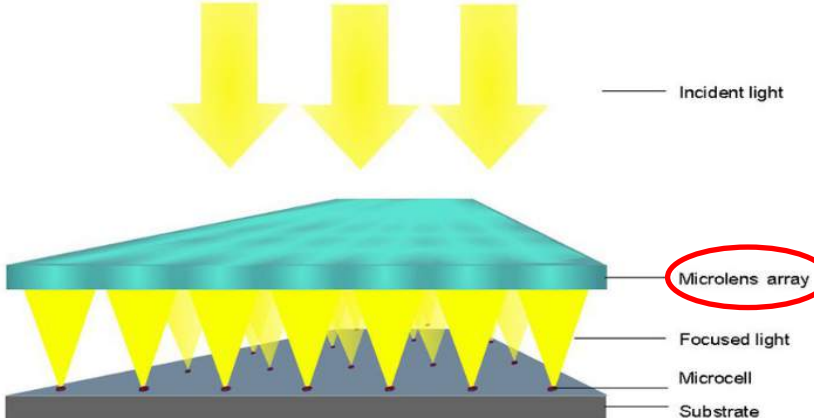


<rolling scar>

# Ultimate Performance of PICO CARE\_MLA in Treatment

- DOE vs MLA
- LIOB (Laser Induced Optical Breakdown)

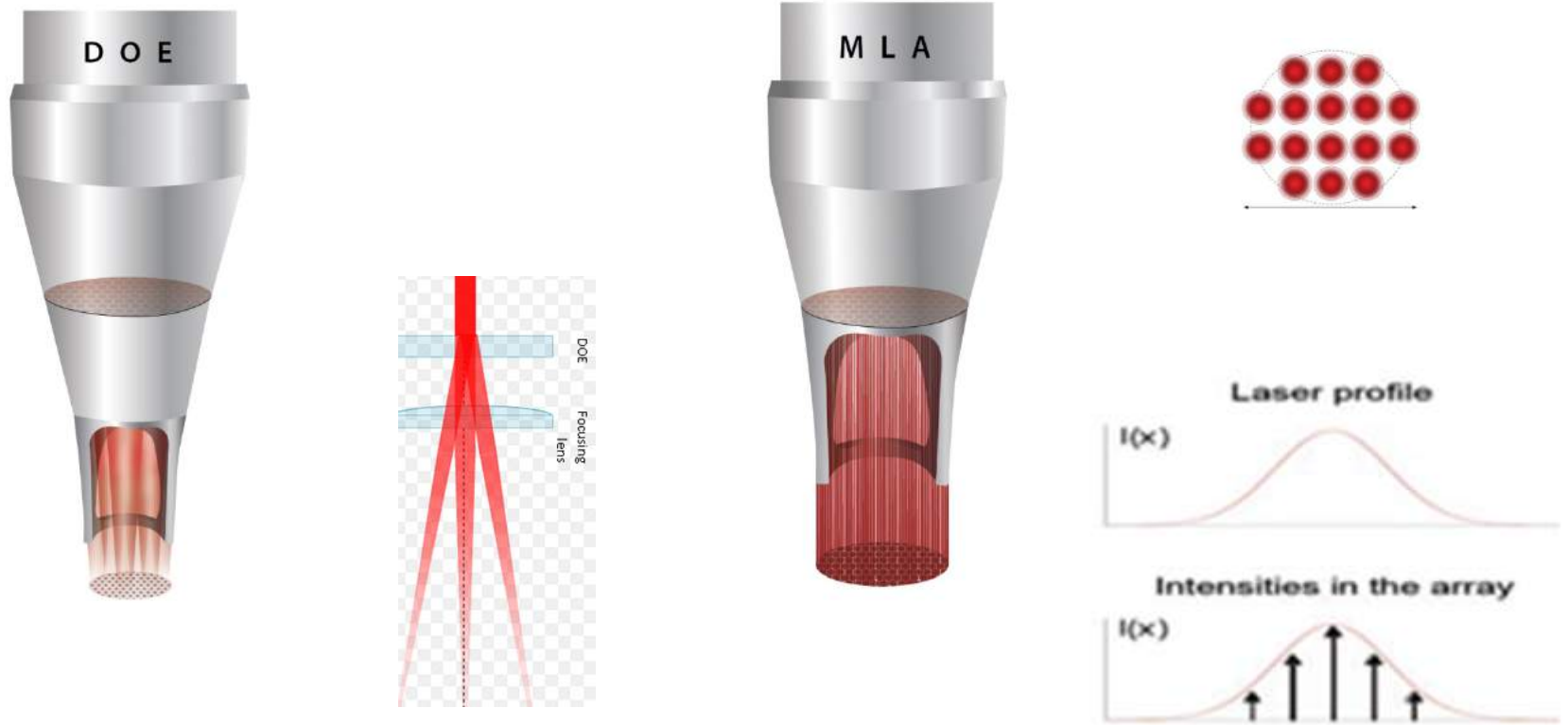
# Lens type : Comparison of DOE and MLA

DOE	ROE
<p align="center"><u>Diffractive</u> Optical Elements</p>	<p align="center"><u>Refractive</u> Optical Elements</p>
<p align="center">Optical properties using diffraction (wave)</p>	<p align="center">Optical properties using refraction</p>
	
	

Due to the diffractive nature of the lens, laser beam can generate multiple beams which evenly divided and irradiated.

After attaching an MLA (Focusing lens), energy can be concentrated in each dot due to the refractive property of the lens,

# H/P : Comparison of DOE and MLA





By the help of uniform irradiated energy, it is easy to use when resurfacing skin, When the energy reached by 20 ~ 30 %, it is concentrated in one place and the incidence of side effects such as PIH can be increased.

It is useful to treat lesions in the sub dermal layer by using energy that is focused on the center of each dot. Also, It is effective to use it for toning because energy is not concentrated too much in one place while moving it.

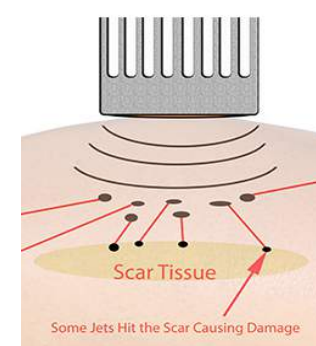
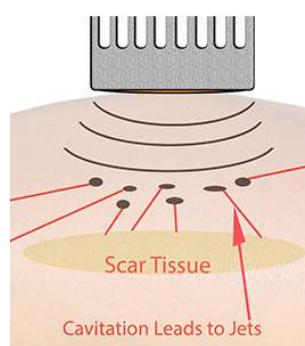
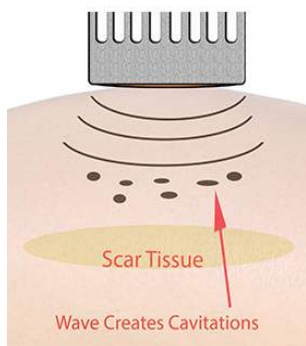
# PICOCARE\_MLA

PICOCARE\_MLA is able to collect energy up to 15 times higher in each dot using a focusing lens. Low energy can increase the therapeutic effect, it can reach to the dermis, which can increase the effectiveness of treatment for dermis.

Handpiece	Parameter	Value
<b>1064nm, 7mm MLA</b> 	Energy	140mJ
	Energy/ Spot	1mJ
	Peak Power	1.3MW
	Spot size	150Um
	Area	0.000176625 cm <sup>2</sup>
	<b>Peak Power Density</b>	<b>7.3 GW/Cm<sup>2</sup></b>
<b>1064nm, 7mm, Zoom</b> 	Energy	140mJ
	Energy/ Spot	140mJ
	Peak Power	187MW
	Spot size	7mm
	Area	0.38465
	<b>Peak Power Density</b>	<b>0.486GW/Cm<sup>2</sup></b>

# LIOB (Laser Induced Optical Breakdown)

Principle	Ultra short pulse duration in picosecond laser + focused intensity of laser by MLA ⇒ LIOB (Laser Induced Optical Breakdown)			
Process	LIOB →	Plasma →	Cavitation →	Effect
	Only effective to dermal layer	Electron, ion, molecule Disassemble and activation	empty space is made in the dermal layer	Increase Collagen, elastin, Mucin
Effect	It delivers Laser-induced damage to deep scars without damaging the epidermis and leads to a healing response. Lower side effects, shorter down-time, couple of treatment times, scar treatment effect ++			



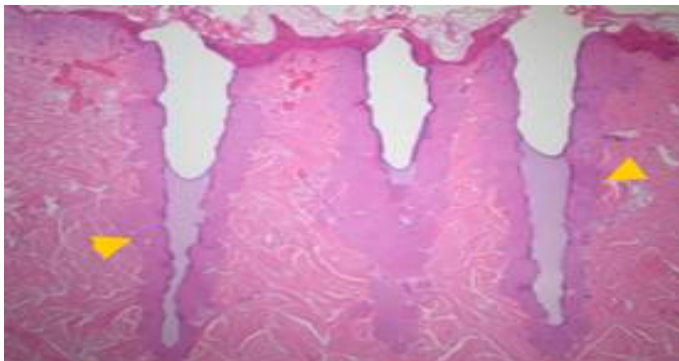
# Traditional Acne Scar Treatment : Fractional Laser

Method	Shaving skin layer		
Pros	It makes flatten the rugged scars and available for the treatment for discoloration	Cons	Energy affects on only epidermis and dermis upper layer (papillary dermis) Long down-time, Skin band can be formed if affected to the sub-dermal layer (dermal dermis). It is possible to form a hypertrophic scar during wound Recovery thermal-damage.
PICO CARE MLA	Adjustable energy can target scar located in epidermis ~ lower layer of dermis Much less pain, Shorter down-time, no side effect No damage to epidermis		

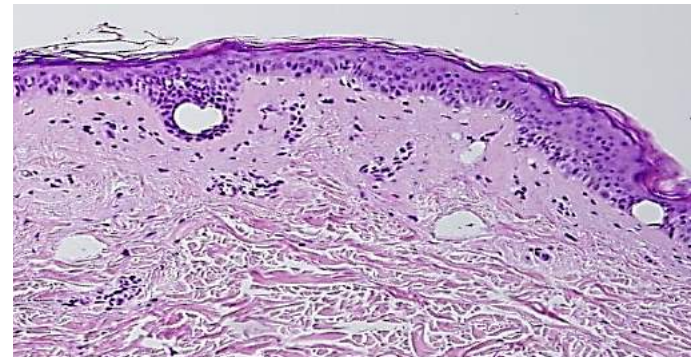


# Comparison of Fractional and MLA

	Fractional Ablative Treatment	Picocare MLA Treatment
<b>Mechanism</b>	Thermal Ablation Residual thermal damage along tissue	LIOB(Laser Induced Optical Breakdown) No residual thermal damage
<b>Operation</b>	Require topical anesthesia cream Procedural time over 1hour	Topical anesthesia Cream as needed Procedural time maximum 1hour
<b>Downtime</b>	Crusting up to 2 weeks after treatment Discomfort pain High chance of side effect such as PIH	Micro-crusting up to 7days after treatment Tolerable pain Less Chance of side effect such as PIH
<b>Result</b>	Good result for Fine wrinkles, large pores, acne scars(shallow), texture with several fractional laser treatments	Good result for Fine wrinkles, large pores, acne scar(Both shallow and Deep), texture with 1 <sup>st</sup> MLA fractional laser treatment



<Fractional>



<MLA>

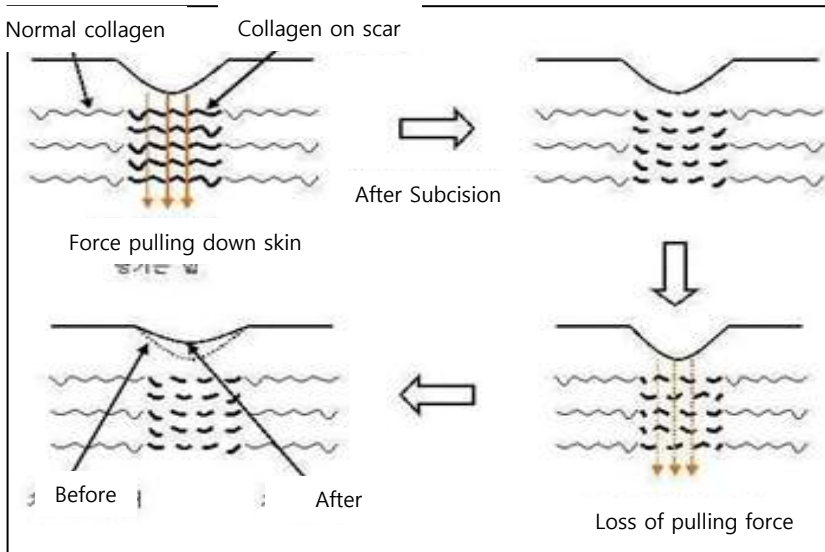
# Traditional Acne Scar Treatment : Subcision

Method	<b>Scar adhesion with 18G injection needle, Exfoliation</b>		
Pros	Round scar effect It is good enough even a small number of treatment	Cons	Pain +++++ Biceps+++ Downtime+++ It is less effective for Ice picked scar, box scar Adverse effects can result in hyperhidrosis ++
PICO	It is effective for round scar, ice picked scar, box scar.		
CARE	Less pain, shorter down-time		
MLA	There are less side-effect such as Hypertrophic formation.		

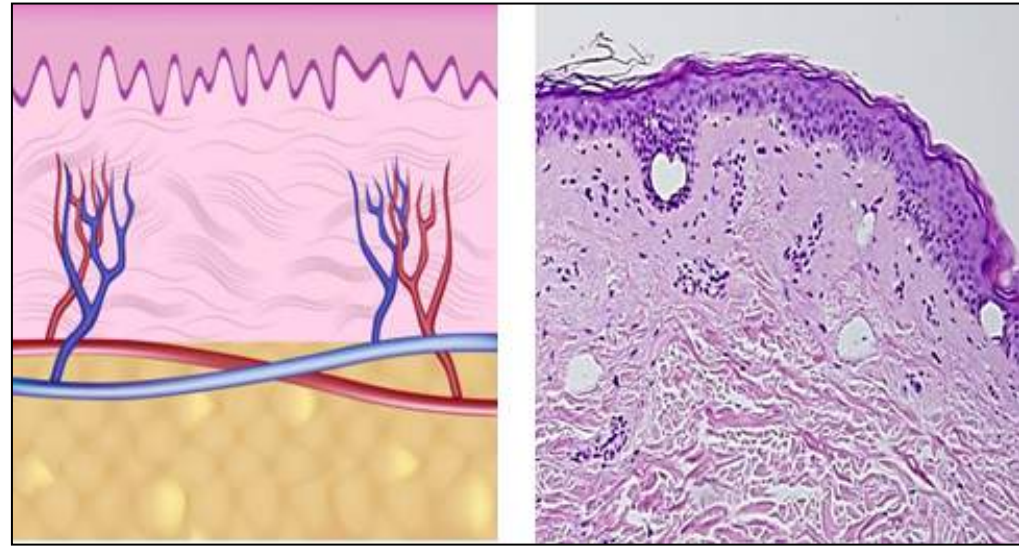


<subcision procedure>

# Comparison of Subcision and MLA



<Subcision>



<MLA>

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Tattoo	1064nm	Tattoo-Body	2.0	3	2	1	-

# Before & After



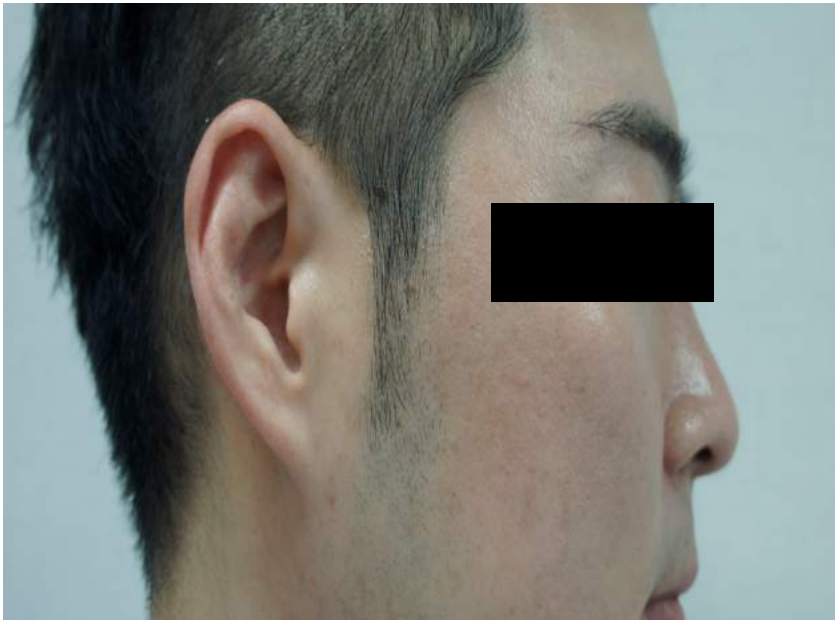
Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Tattoo	1064nm	Tattoo-Body	2.0	3	2	2	8

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Tattoo	1064nm	Tattoo-Body	2.2	3	2	3	6

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Lentiginous	L532nm	Lentiginous	0.2	3	2	2	6

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Lentigines	1064nm	Lentigines (Dark Brown)	0.4	4	2	1	-



# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Pigmentation	1064nm	Toning-Melasma	0.8	10	10	6	2

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Rosacea Lentigines Melasma	1064nm	Toning- Melasma	0.8	10	10	6	1-2

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
PIH	1064nm	Toning-PIH	0.5-0.6	8	10	8	2-3

# Before & After



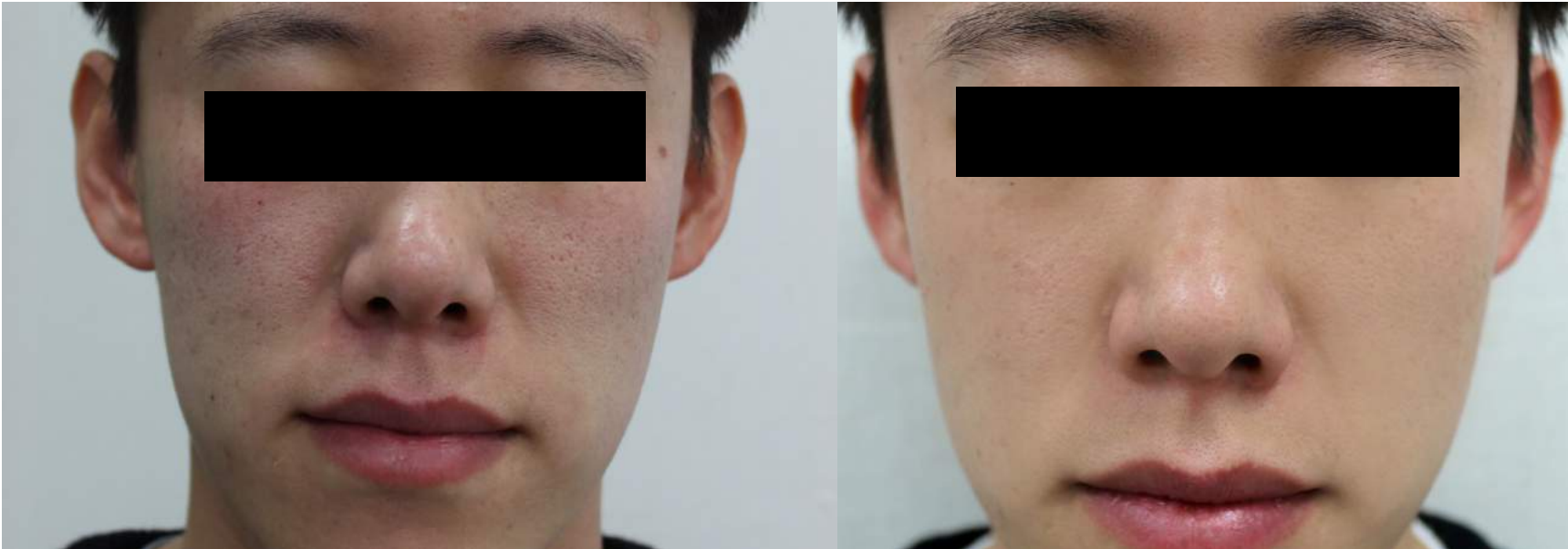
Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Acne Scar	1064nm	MLA Acne Scar (Deep)	3.0	4	2	1	-

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
SCAR	1064nm	MLA-Deep Scar	3.0	3	1	1	-
Rejuvenation	1064nm	MLA-Toning	0.2	10	10	1	-
Rejuvenation	L532nm	MLA-Toning	0.1	7	2	1	

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
Large Pores Acne Scar	1064nm	MLA Skin Rejuvenation	3.0	4	2	3	4

# Before & After



Lesion	Wavelength	Mode	Fluence (J/cm <sup>2</sup> )	Spot Size (mm)	Frequency (Hz)	Tx Time	Interval (week)
ABNOM/ Lentigines	1064nm	Pico Toning- Melasma	0.8	10	10	7	1-2
	1064nm	Q/S Toning	2.5	7	10		

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# THANK YOU

