KOSDAQ
LISTED COMPANY

PICOHI™ 300

300ps

300 Picosecond laser: PICOHI
Physician's Clinical Guide

HIRONIC

Real 300 Picosecond Pulse Duration

Even with long-term use, the pulse duration value maintains a uniform pulse width

High Peak Power

Powerful pigment treatment using strong energy with maximum power of 1.67 GW

Generate LIOB even at low energy, and makes Rejuvenation and Scar treatment easier

Less Photo-thermal Effect

300ps short Pulse Duration enables safe tattoo removal and pigmentation treatment with very little thermal effect

Multiple Hand-Piece for Rejuvenation

ZMLA which can adjust the spot size, VMLA which can adjust the depth, 532nm DOE & 1,064nm DOE are optimized for rejuvenation

Advanced Treatment Information System

Optimal treatment parameters can be derived through patient treatment history management

300 Picosecond laser: PICOHI

Physician's Clinical Guide

Contents:

DISCLAIMER (**Additional explanation**)

▶ The treatment guide proposed in this Physician's Clinical Guide booklet is based on a number of clinical studies and academic papers and various examples. Parameters according to the purpose of the treatment presented should be adjusted and applied according to the actual individual cases, and the manufacturer is not responsible for problems caused by improper use or excessive treatment of the laser.

▶ Before using the laser equipment, the operator must check the user manual and be familiar with the correct operation and operation method of the equipment before proceeding with the procedure.

▶The laser treatment protocol includes patient history and lesion diagnosis during pre-treatment consultation, laser treatment process, frequency, expected treatment results, possible side effects, patient notification before and after treatment, appropriate treatment according to the purpose of treatment, medication prescription, and follow-up visit appointments overall.

▶The indications and parameters introduced in this booklet can be updated through a number of clinical cases and treatment experiences, so the operator should refer to the latest knowledge of clinical application.

300 Picosecond laser: PICOHI

This clinical protocol includes guidelines, parameters and several clinical cases using 300 Pico-second Nd:YAG LASER. This information was prepared based on the opinions of medical staff with abundant clinical experience, and it is recommended to use it as a reference during the treatment. It is necessary to have basic understanding and education about lasers and accumulation of practical experience in order to reconsider proficiency related to equipment operation.

This booklet presents basic parameters according to the purpose of treatment, which may vary in sensitivity, pain, and response to laser treatments depending on the skin type, age, skin thickness, constitution of individual patients etc. It is necessary to set appropriate parameters according to the characteristics and areas of individual lesions. In areas with white or light skin types and with thicker skin layers up to the bone, side effects such as pigmentation or scarring are less likely to occur even when relatively high parameters are applied.

To maximize treatment results and minimize side effects, it is important to identify factors before treatment that may negatively affect the post-treatment process of individual patients. After treatment, proper cooling and supply of moisture to the treatment area can help to reduce side

effects and downtime; for treatment with high parameters, consideration of air cooler or ice pack cooling before and during treatment can also reduce side effects and discomfort.

Chapter I. Overview

1. Characteristics of Laser

The term "L.A.S.E.R" originally stands for "Light Amplification by Stimulated Emission of Radiation" and now refers to both the system and the energy that a laser emits. The direction, frequency, and phase of light generated by stimulated emission, that is, photon, completely consistent with that of the incident photon that caused stimulated emission. Therefore, lasers have excellent directivity, light condensation, and coherence, and have very high brightness.

Laser beam has three characteristics (monochromatic, coherence, and collimation) that are different from general natural light or lamps, and because of these characteristics, it is widely used for medical and industrial purposes.

Monochromatic

The laser beam has a single wavelength compared to the normal beam, and it does not spread as it progresses. The laser beam is monochromatic with only one wavelength and is a continuous light with an even phase. This spectrum of light is irradiated to the spectroscopic prism, and a thin Line spectrum appears on the screen, and the laser beam is monochromatic light with matching phases, which is called coherent light. When the laser beam is focused with a lens, it can be condensed in a very small area (enough to measure the wavelength of light as a unit). This monochromaticity allows the laser beam to selectively absorb · reflect · transmit of the material. Therefore, in order to treat pigmented lesions, it is necessary to select a laser that absorbs well to obtain a good treatment effect.

Coherence

Coherence refers to the degree to which the phases of waves are aligned in time or space, which is the most important property in applications using the interference of light. Temporal coherence is a characteristic mainly used to cause interference, and by using this characteristic, a measurement device such as OCT (Optical Coherence Tomography) can be implemented, enabling precise measurement of skin tissue.

Collimation

The laser beam is amplified only if it travels in a direction parallel to the optical axis determined by the mirrors on both sides of the resonator (total reflection mirror and partial reflection mirror). Therefore, unlike the thermal radiation light source that proceeds in all directions, the laser output has a linearity that goes straight in one direction. Due to this straightness, the laser beam can be used as an accurate align tool above all else, and by using a reflector, it is possible to irradiate the laser beam exactly to the desired point.

2. Clinical Application of Lasers

When Laser light is irradiated to the skin, it goes through the following four optical processes.

① **Absorption:** When the laser interacts with other materials in the form of light energy, the form of thermal energy changes. The laser mainly utilizes the form of light energy that is converted into thermal energy by interacting with chromophores. It is possible to treat pigments, hair removal, blood vessels, and rejuvenation by using the absorption of melanin, hemoglobin, and water, which are chromophores that absorb lasers.

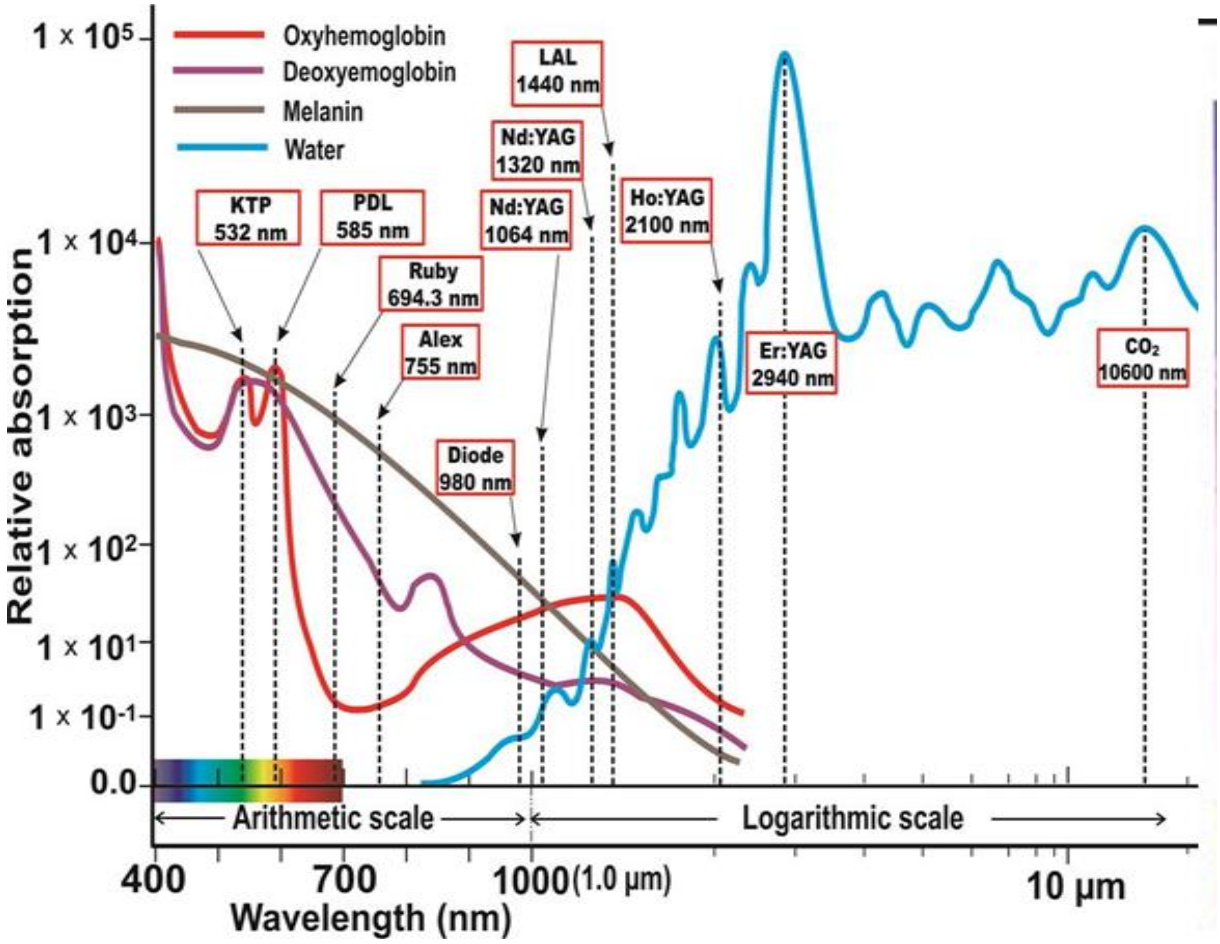
② **Scattering:** It refers to the fact that light collides with molecules, atoms, or particles smaller than the wavelength of light to change the direction of motion and scatter, and the skin tissue has a large scattering effect on light. Therefore, the laser light is restricted from going deep into the skin, which limits the depth of penetration. The penetration depth varies according to the wavelength characteristics of the light, so it is necessary to use a laser wavelength suitable for the depth of the lesion to be treated.

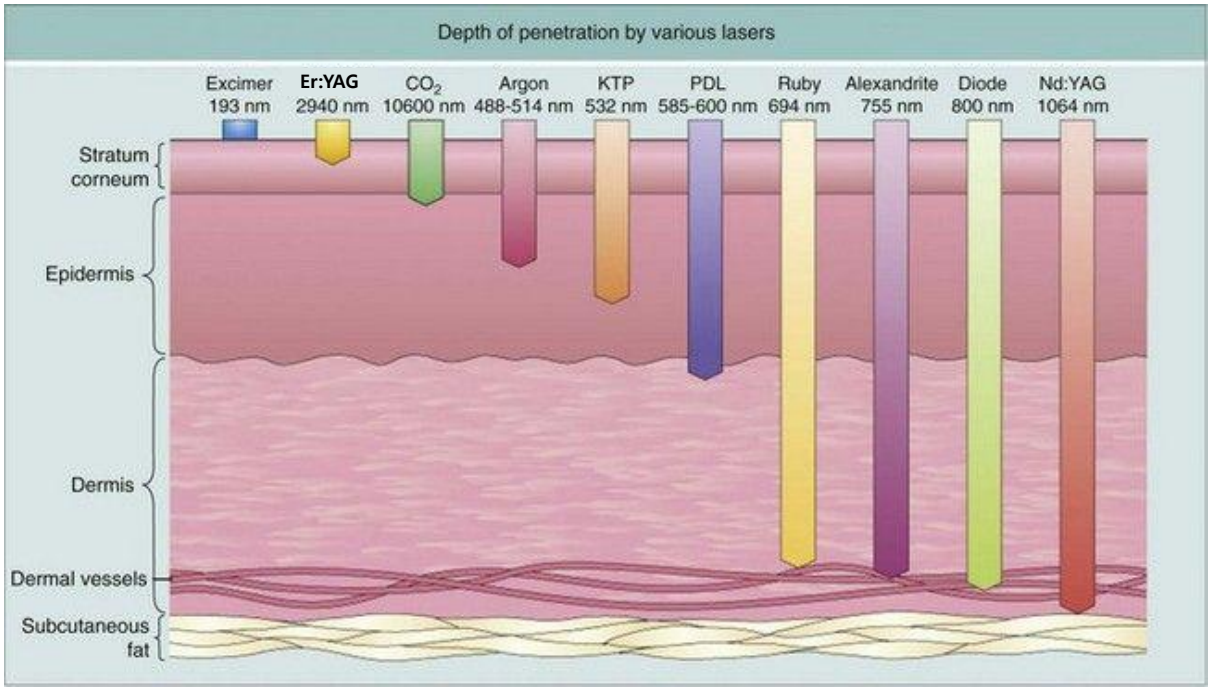
③ **Transmission:** It is an important part of the selective treatment of the desired area. For example, if a wavelength with high absorption of melanin on the skin surface is used, the desired energy may not reach the dermis layer. Substances have their own absorption spectrum, and if it is accurately identified, it is possible to selectively treat the desired area without damaging other tissues.

④ **Reflection:** Since there is no interaction with the laser light, and the effect is insignificant, the laser light has no effect on the human body when reflected.

In 1983, Anderson et al, introduced a method for selectively treating pigmented lesions or vascular lesions using lasers without damaging other normal tissues. In addition, he presented the hypothesis that if the laser wavelength, pulse width, and energy are properly combined and used, the lesion can be selectively and completely treated. This theory became the 'Selective Photothermolysis' theory as we know it today, and it became a guideline for the subsequent development of medical lasers. In order to treat a lesion with a laser, a physical phenomenon in which laser light is absorbed by various types of chromophores in soft tissue must be accompanied. What is important here is the type and characteristics of chromophores that cause absorption in the skin tissue.

When the chromophore absorbs laser light, chromophore converts the laser light energy into a photo-thermal effect or photo-chemical effect. However, since there is no effect if light is reflected or transmitted from the chromophore, the maximum therapeutic effect can be obtained when the wavelength of the laser exactly matches the absorption characteristic of the chromophore.





There are three main types of chromophores in the skin, and most of the effects shown by lasers are thermal reactions, which is called the photo-thermal effect.

① **Melanosome:** It is located in melanocytes that synthesize melanin pigment, and is an egg-shaped pigment granule particle containing melanin. All pigmented lesions in the skin are expressed by these melanosomes. In order to selectively destroy melanosomes without causing thermal damage to the surrounding tissues, it is necessary to know the thermal properties, and the thermal relaxation time, TRT, indicates this characteristic.

The definition of thermal relaxation time is the time it takes for the temperature of the chromophore heated by the laser to drop by about 50% and is proportional to the size of the chromophore. Therefore, if the laser irradiation time is shorter than this time, it does not cause thermal damage to the surrounding tissue, allowing selective treatment.

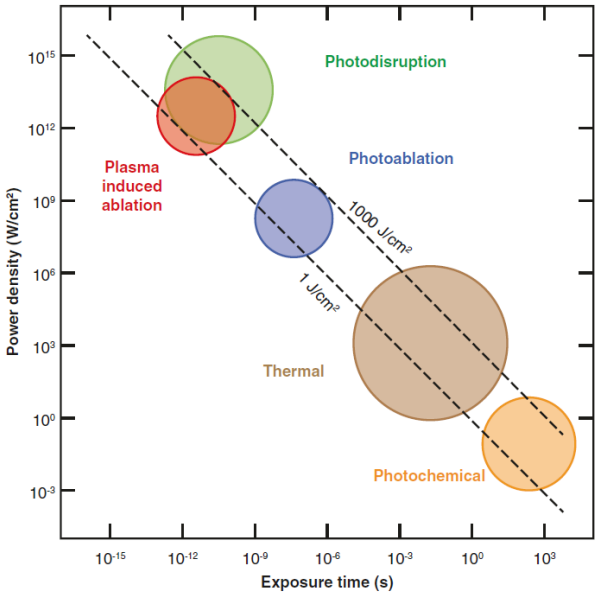
In order to treat skin pigmentation, it is necessary to know not only the thermal properties of chromophores, but also the absorption characteristics and the location of chromophores, so that an accurate and selective treatment can be performed. The thermal characteristics have a deep relationship with the pulse width of the laser to be used, the absorption characteristics have a deep relationship with the laser wavelength, and the location of the chromophore is deeply related to the penetration depth of the laser.

② **Hemoglobin:** It is a pigmentosa in the treatment of vascular lesions. The TRT of a vessel is proportional to the diameter of the vessel, and if the diameter of the vessel is between 10 and 100 μm, the TRT is approximately 1 and 10 ms. Therefore, when treating small vessel (~10μm) lesions, shorten the pulse width of the laser to 0.4~1.5ms.

Laser, which treats vascular lesions, requires high energy and long pulse widths, unlike Laser, which is used to treat pigmented lesions, because most treatments are aimed at coagulating or contracting blood vessels by applying heat. That is, the pulse width and output energy of the laser must be variable according to the diameter of the vessel lesion. When treating vascular lesions using high energy, the temperature of the epithelial layer rises rapidly, so the epithelial layer should be sufficiently cooled to protect it from heat damage.

③ **Water:** Treatment using water absorption is largely divided into two ways, one is a method of increasing the temperature to 120 degrees or more and using it to remove tissues (removal of dots, salted fish, etc.). Another is to stimulate collagen regeneration by raising the tissue temperature in the range of 50 to 60 degrees (wrinkle, elasticity, lifting, pore shrinkage, etc.)

④ The principle of incision and removal of soft tissue is not selective treatment such as the treatment of vascular lesions or pigmented lesions mentioned above, but uses the property that laser light is strongly absorbed in water. It utilizes the evaporation phenomenon of soft tissue by rapid thermal expansion on the soft tissue surface. Even in this case, the pulse width of the laser must be shorter than the TRT of the soft tissue to avoid thermal damage to the tissue other than the treated area.



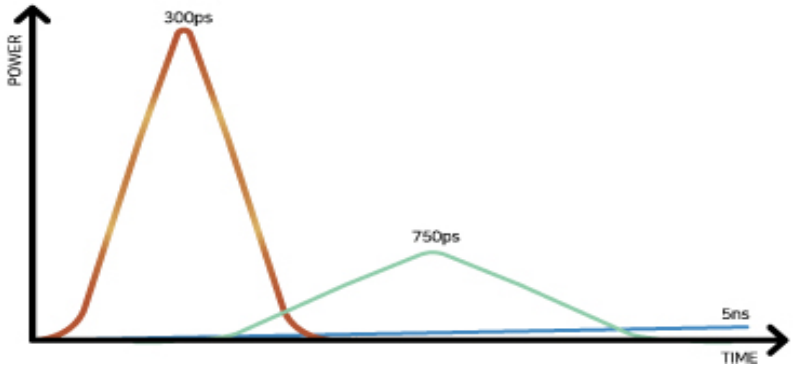
<Tissue responses by relations between laser power density and exposure time>

Various responses occur in the tissues by laser power density and exposure time even if the equal fluence of laser irradiates.

Power Density	Exposure Time	Tissue Reaction	Contents
Low ↓ High	High ↑ Low	Photochemical	Chemical response by using light energy
		Photothermal	Utilizing heat to the target place following thermal energy conversion of light energy if when laser irradiates tissues e.g. incision and tissue degeneration by heat etc.
		Photoablation	Molecular bonding and melting of tissue without thermal damage to break down the tissue.
		Photodisruption	Laser that irradiated in highly short period with high power derives rupture of tissues by generating plasma to the target place.

Among the above classifications, Photodisruption is also known as Photomechanical, and short exposure time and high power density are essential for LIOB generation through Plasma induced ablation. The laser irradiated at high speed forms plasma, and the acoustic shock wave of the plasma affects the tissue and induces rupture.

Clinical difference between Pico-Second and Nano-Second



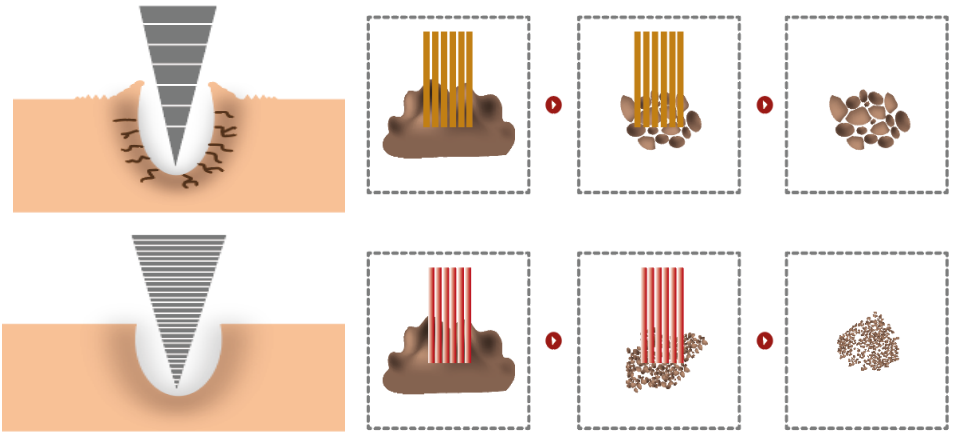
Peak Power = Energy / Pulse Duration

Ex) Q-Fit(Q-Switched Laser) = 1,800mJ/5,000ps = 0.36GW

PICOHI(Pico-second Laser) = 500mJ/300ps = 1.67GW

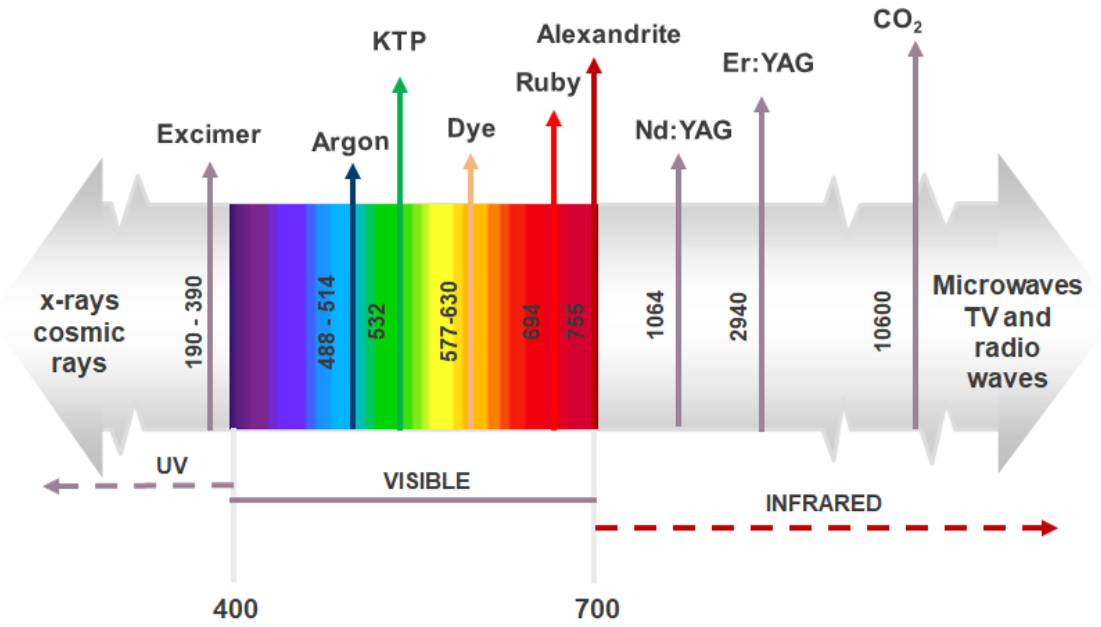
PICOSECOND	Pico-second is 1,000 times shorter than Nano-seconds	$10^{-9} \rightarrow 10^{-12}$
PICOSECOND Laser Pulse Duration	Pico-second laser is 17 times shorter than Q-Switched laser	5ns(5,000ps) → 300ps
Laser reaction in the skin	Photomechanical Effect > Photothermal Effect	TRT → SRT

Q/Switched Laser	**Picosecond Laser**
Shock Waves (photomechanical effect)	**More Shock Waves**
Collateral Damage (photothermal effect)	**Less Collateral Damage**



Excellent decomposition of pigment is possible with minimal damage to surrounding tissues and excellent photolysis effect.

3. Types of Laser



Laser types are classified into solid, liquid, gas, and semiconductor lasers according to the medium that generates the laser, and the wavelength of the laser is determined by the medium.

Lasers used for pigmented lesions

Treatment of pigmented lesions is primarily aimed at destroying pigments other than natural or normal skin color. One is due to melanin inside the skin and the other is due to Dye injected externally. Since the pulse width of the laser must be shorter than the TRT of the chromophore, a Q-Switching type laser must be used for this purpose.

① **Q-Switched Ruby Laser(694nm):** The pulse width of the laser is about 20-40ns, and the absorption of melanin is high, so it has the advantage of light pigment treatment. It has the disadvantage that the laser does not oscillate with high repetition, and it is difficult to treat pigmented lesions in the dermis layer because the penetration depth is not deep.

② **Q-Switched Alexandrite Laser(755nm):** Pulse width is about 50-100ns. Deeper penetration than ruby laser, but shallower than Nd: YAG. It also has less absorption for melanin than ruby laser and higher than Nd: YAG. Energy output is stabilized at a high temperature of

50 to 70 degrees, making it difficult to manufacture and manage devices.

③ **Q-Switched Nd: YAG Laser(1,064·532nm):** Pulse width is about 5-12ns. At 1,064nm wavelength, the penetration depth is the deepest among the lasers used for medical purposes, so it is used to treat pigmented lesions deep in the dermis such as Ota nevus. At the wavelength of 532nm, the penetration depth is shallow, so pigmented lesions in the outer cortex can be treated. For the treatment of pigmented lesions in the dermis and epidermis caused by melanin, the ND: YAG laser capable of oscillating two wavelengths is used the most and has the best therapeutic effect. Compared to ruby or alexandrite laser, the absorption of melanin is low, so there are cases in which the response to the treatment of cloudy lesions is weak.

In order to remove externally injected pigments such as tattoos, two things must be checked before treatment. The first is the color of the pigment, and the second is the position and depth of the pigment.

In addition, since the injected pigments are generally composed of very small grains, the TRT is very short (less than 10^{-6}seconds), so only the laser oscillated by Q-Switching does not damage the normal tissue around the pigment and selectively selects only the pigment. It can be destroyed.

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Laser	Color	Depth
Ruby(694nm)	Blue, Black	Upper dermis
Alexandrite(755nm)	Green, Blue, Black	Upper dermis
Nd:YAG(532nm)	Red, Orange	epidermis
Nd:YAG(1,064nm)	All Colors	Deep dermis

Lasers used for vascular lesions

Since the vascular TRT is long, lasers that treat vascular lesions generally use Long-Pulse Lasers with a pulse width of 1 ms or more, which has high energy density. Since the temperature of the epithelial layer rises rapidly during treatment, it must be sufficiently cooled with cooling water to protect it from thermal damage.

① **Copper Vapor Laser(578.2nm)**: Pulse width is about 2ns. The high repetition rate, 6~12kHz, 578nm wavelength is also absorbed by melanin in the epidermis and dermis layer, so

pigmentation occurs well after treatment and is particularly severe in patients with dark skin.

② **KTP Laser(532nm)**: Q-Switched Nd: YAG A wavelength of 1,064 nm is generated by incident on a nonlinear crystal called Potassium Titanium Oxide Phosphate ($KTiOPO_4$, KTP). The wavelength of 532nm is close to the highest absorption wavelength of Oxyhemoglobin (542nm), so it is effective in treating vascular lesions. However, in order to increase the length due to the short penetration depth, a method of continuously generating a Q-Switched Pulse Train for several tens of ms is used.

③ **Pulsed Dye Laser(585~595nm)**: Dye Laser is a tunable wavelength range from 563nm to 625nm. Therefore, it is possible to maximize the therapeutic effect while converting the wavelength from 577nm to 595nm, which is the third maximum absorption wavelength of oxyhemoglobin.

④ **Long-pulsed Nd: YAG Laser(1,064nm)**: It is a laser that can vary from 0.3ms to about 300ms and is most widely used in the treatment of telangiectasia (telangiectasia) caused by vasodilation and vascular lesions with a diameter of less than 4mm. The advantages of long-pulsed Nd: YAG laser over short-wavelength lasers are that the absorption of melanin is low and the penetration depth is deep. If the pulse width is moderately long during treatment, heat can be uniformly and slowly applied to the blood vessels, so blood vessels can be coagulated while avoiding rupture of blood vessels or purpura or pigmentation after laser treatment.

Lasers used for resurfacing

This method is used to treat scars, fine lines, acne, warts, spots, etc. that appear on the surface of the skin. Since about 70% of the epidermal component is water, a laser that absorbs water well is used.

① **Er: YAG Laser(2,940nm):** It is a laser with the highest absorption of water, and can remove the epidermal layer of the skin with great precision and has a penetration depth of several ㎛. In order to increase the thermal effect, the long-pulse method that oscillates with a pulse width of 1 ms or more and the general method of 300 μs are used.

② **CO_2 Laser(10,600nm):** The 10,600nm wavelength has a high water absorption and a very strong thermal effect, so it has the effect of contracting or tightening the collagen in the dermis layer. The disadvantage is that the penetration depth is deeper than Er: YAG, so pigmentation can easily occur after the procedure.

Lasers used for Hair Removal

It is a method to prevent hair growth by thermally destroying the melanin pigment in the hair root. The TRT varies depending on the thickness of the hair, but the TRT is generally long and a Long-pulse laser is used for hair removal.

① **Diode Laser(800~810nm):** Long-pulse operation can be obtained by turning on & off the current applied to the semiconductor laser, and it is easy to proceed with hair removal while protecting the skin by cooling the contact surface.

② **Long-pulsed Nd: YAG Laser(1,064nm):** The absorption of melanin pigment is somewhat lower than that of diodes or alexandrite, but it has the advantage of deep penetration. It has advantages for dark skinned and Asians.

③ **Long-pulsed Alexandrite Laser(755nm):** The absorption of melanin pigment is higher than that of diodes or Nd: YAG, and the large spot size and high repetition rate make it easy to remove hair in a wide area.

4. Clinical Consideration of Laser Treatment

The most important thing in treatment is the patient's skin type. Laser treatment is a treatment using light, and absorption of light is very important, and skin color that is the target and background of treatment is very important. When the background is bright and the lesions are clearly distinguished, treatment is easy. In the opposite case, the difficulty of treatment may increase or it may be impossible to proceed.

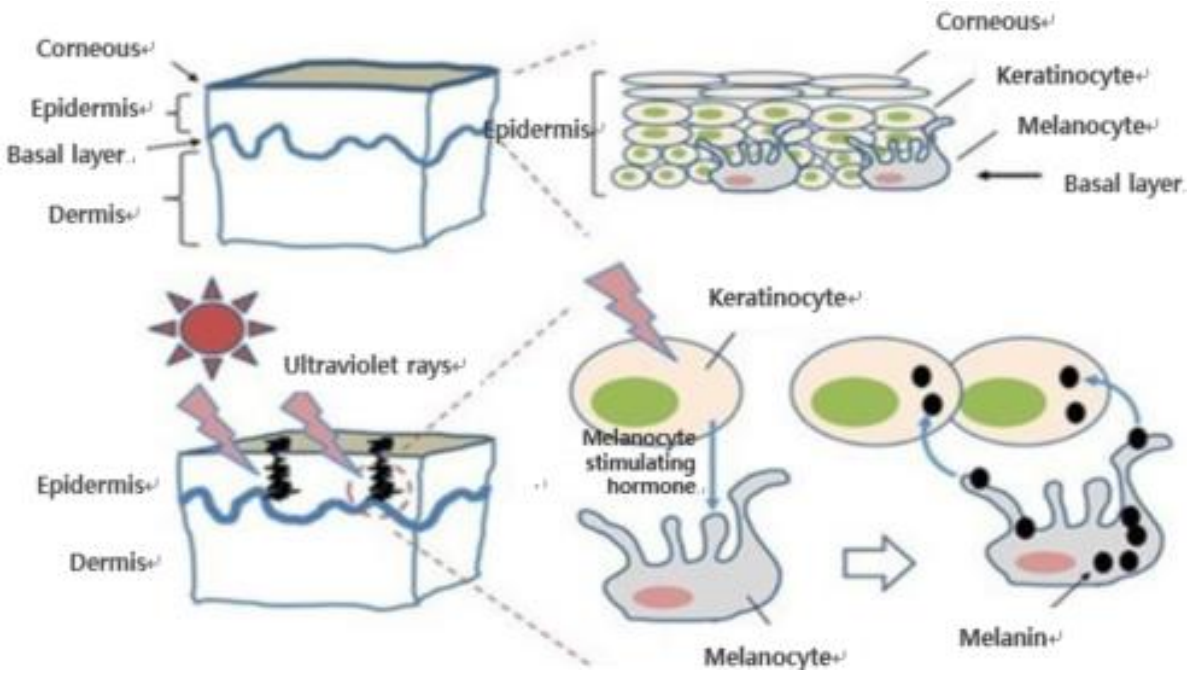
Skin types are classified into 6 types from Ⅰ to Ⅵ according to the method devised by Fitzpatrick. (Check the questionnaire for Fitzpatrick's skin type classification) It is important to classify a patient's skin type according to these criteria and apply it to treatment.

Fitzpatrick Skin Type

Type	Characteristics	Sunburn	Pigmentation
I	White skin, blue eyes, freckles, Unexposed skin color: white	Usually burns	Never
II	White skin, red hair or blonde hair blue, light brown or brown eyes	Usually burns	Little
III	Ordinary Caucasian	Sometimes mild burn	Gradual
IV	White or light brown skin, dark brown hair, dark eyes (Mediterranean, Mongolian, Asian, Latin American),	Rarely burns	Always
V	Brown-skinned race Unexposed skin color: brown	Very rarely burns	severe extensive
VI	Black Unexposed skin color: black	Never burns	dark pigmentation

※ Skin Disease Atlas 3rd Edition

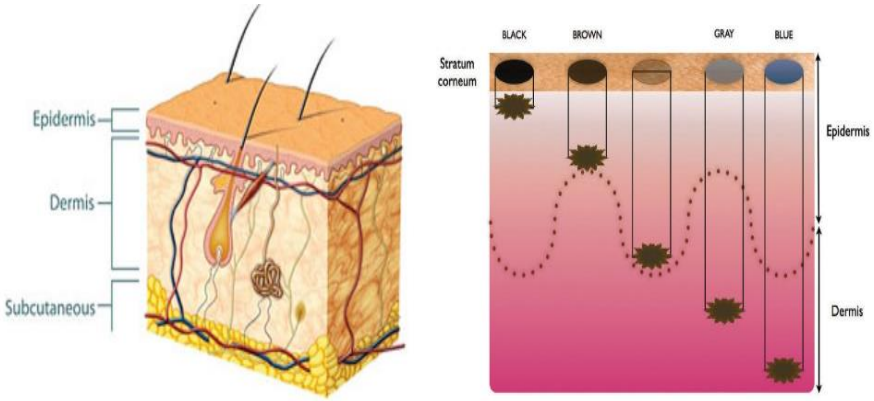
Causes of the occurrence of pigmentation



< Pigmented lesion formation process>

Ultraviolet rays and daily life stimulation → Cerebral transmission → Sympathetic nerve stimulation → Melano blast generation stimulation → Melanocyte generation → Melanosom formation → Keratinocyte melanin absorption (granular layer) → Stratum corneum transmission → Keratin exfoliation

Location of the treatment lesion



< The color difference of the pigment according to the depth of the skin >

epidermal pigment (80-120㎛): Black, close to brown Ex) freckles, blemishes, age spots

dermal pigment (300㎛-2㎜): Close to grayish blue Ex) Freckles, Abnom (nevi), PIH

The thickness of the area to be treated (thickness from the epidermis to the bone)

In thick areas such as cheeks, the thickness from the skin to the bone is thick, and the volume through which thermal energy can be diffused is large, enabling high energy use. Conversely, in areas with a thin thickness up to the bone, such as the forehead, the diffusion volume of thermal energy is limited, so it is safe to use a low energy value. Even with the same forehead, if the patient's BMI index is high, a higher energy value can be used because the forehead area is wider. However, for patients with a low BMI index, it is recommended to use a lower energy value than the standard because the forehead area may have a narrower volume.

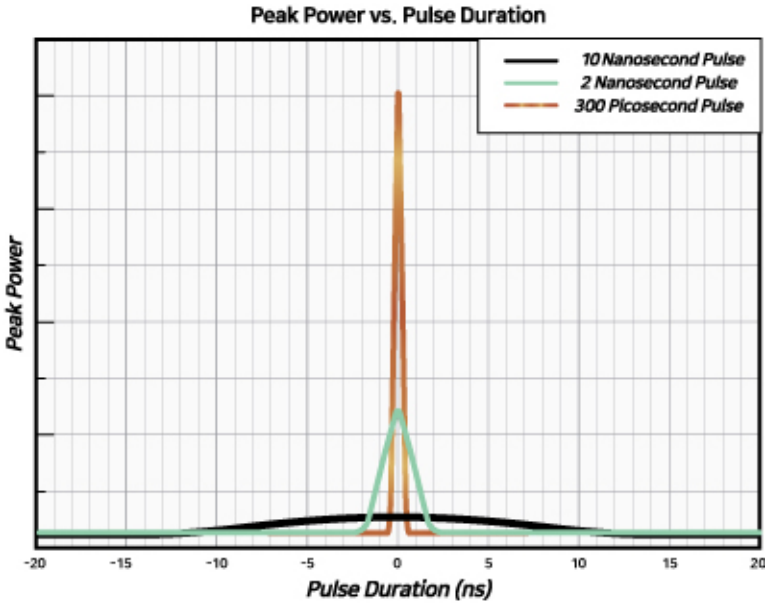
Understanding depth penetration according to spot size

Even when irradiated with the same energy intensity at the same wavelength, if the spot size is large, the scattering and reflection area is wide and the energy is transmitted to a deep position. When the spot size is small, the area of scattering and reflection is small, and energy is transmitted to a shallow position.

Chapter Ⅱ. 300 PICO-second LASER

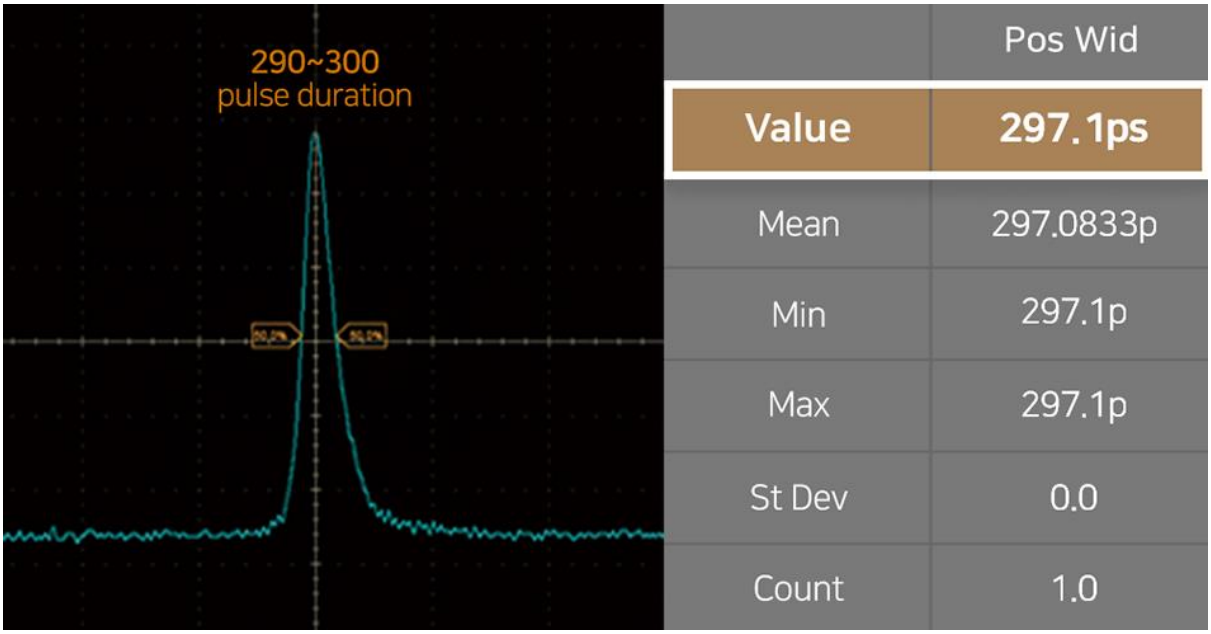
1. Introduction of equipment

The Q-Switched Nd:YAG laser has proven its excellent effect clinically through numerous cases and is an essential equipment for skin care because of its high clinical usability. Based on the theory of selective photothermolysis, light energy is converted into thermal energy to destroy and remove the target. It can be used for traditional epidermal and dermal pigmented lesions, removal of various tattoos, and various other indications. However, if the photothermal action is too strong, heat damage is caused, and in some cases, side effects such as hypopigmentation and hyperpigmentation may occur due to inflammation of the surrounding tissues and damage or destruction of cells including pigment targets during the treatment process. Since then, the Picosecond laser, developed as a next-generation product, treats pigment diseases with a more advanced technology, providing a treatment experience that is different from existing products and optimal results. Picosecond is a time unit that means 10^{-12} or 1/1,000,000,000,000 seconds, one trillionth of a second, and is a laser with a pulse duration of 300 picosecond.



Real 300 Picosecond Pulse Duration

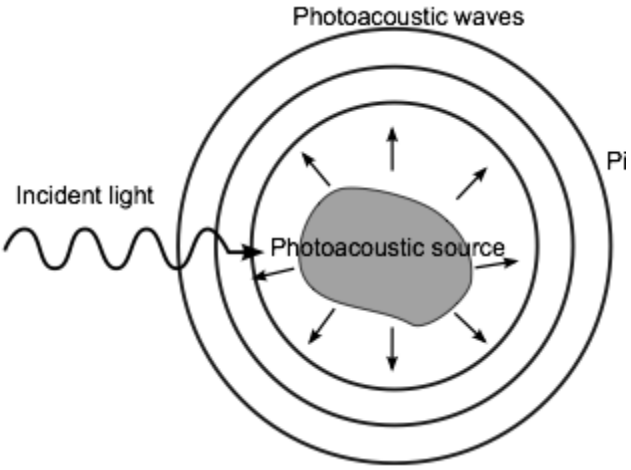
Because implementing a stable and uniform Real 300 Picosecond requires significant technology, maintaining a stable Pulse Duration has been a hot topic for Picosecond Laser manufacturers. For this reason, the most important part of selecting the Picosecond Laser equipment is to check the stability of the Pulse Duration. The 300 Pico-second LASER has sophisticated beam quality, maintains a uniform pulse width for long-term use, allowing you to experience the effect of the "Real" 300 Pico-second, and is a device that can be used continuously for a long time without replacement of lens consumables.

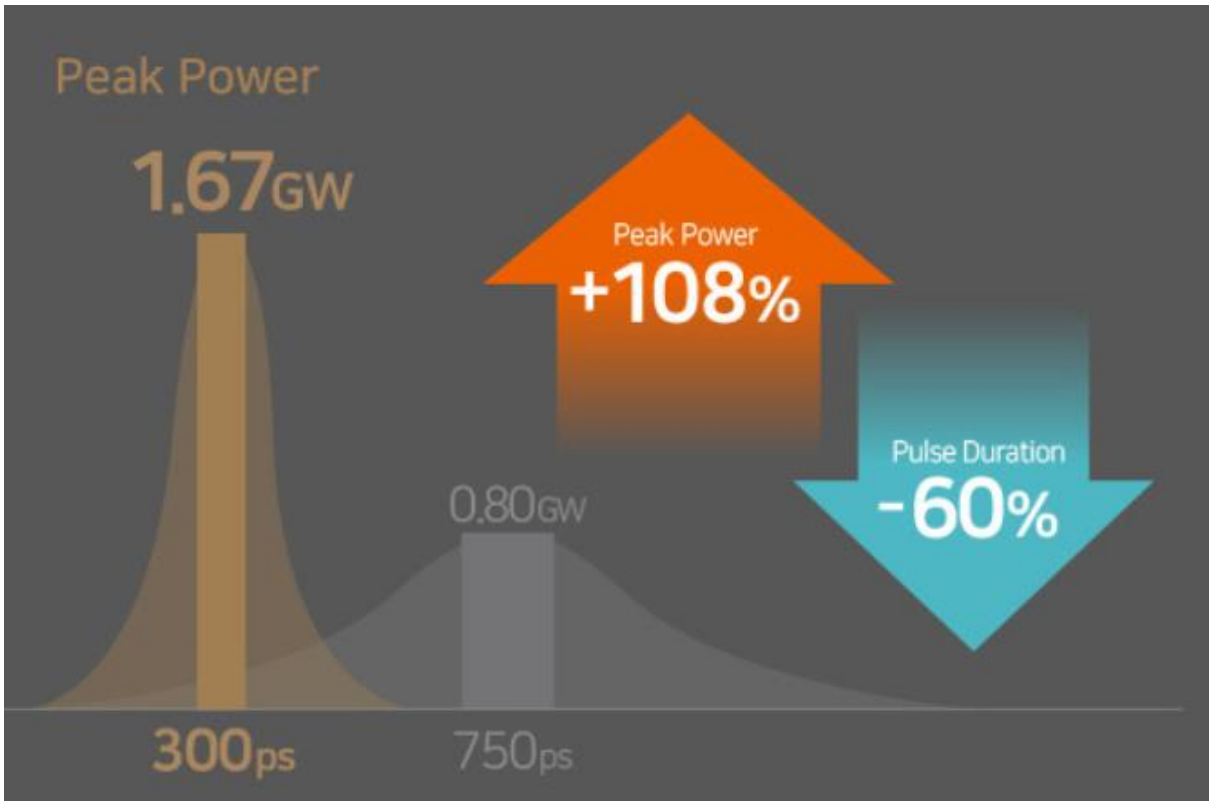


High Peak Power

Due to the nature of the laser, the shorter the pulse duration at the same energy value, the higher the power. Compared to conventional Nanosecond Laser, Picosecond Laser can form Giga Watts' high peak power, which makes it easier to create Laser Induced Optical Breakdown (LIOB) in the dermis, making it an effective device for rejuvenation. In addition, when high peak power laser is irradiated to melanin, it is absorbed inside the cell, resulting in rapid expansion as the temperature rises rapidly, which leads to photoacoustic waves. This wave breaks down the boundaries of cell tissue and acts as pressure, crushing the pigment into fine sizes. Compared to Nanosecond Laser, which is mainly due to Photo-thermal Effect, Photo-Mechanical Effect is the main principle of action in the Picosecond Laser. Photodisruption, a concept similar to plasma-induced ablation, refers to tissue collapse due to plasma formation, which is a common phenomenon in Picosecond, a short pulse duration. The Real 300 Picosecond LASER, with a 300 ps short duration and a peak power of 1.67 GW Max energy of 500 mJ, is even more explosive. In addition, the shorter the pulse duration, the smaller the cavitation size, which has the advantage of reducing side effects to surrounding tissues.

Effect	Reaction
Photo acoustic effect	Shock wave, Cavitation, Jet formation
Photo disruption	Plasma, Shock wave, Cavitation, Jet formation, **Plasma shielding effect** (Protecting surrounding tissue by absorbing laser photons after plasma formation and preventing emission to external tissue)





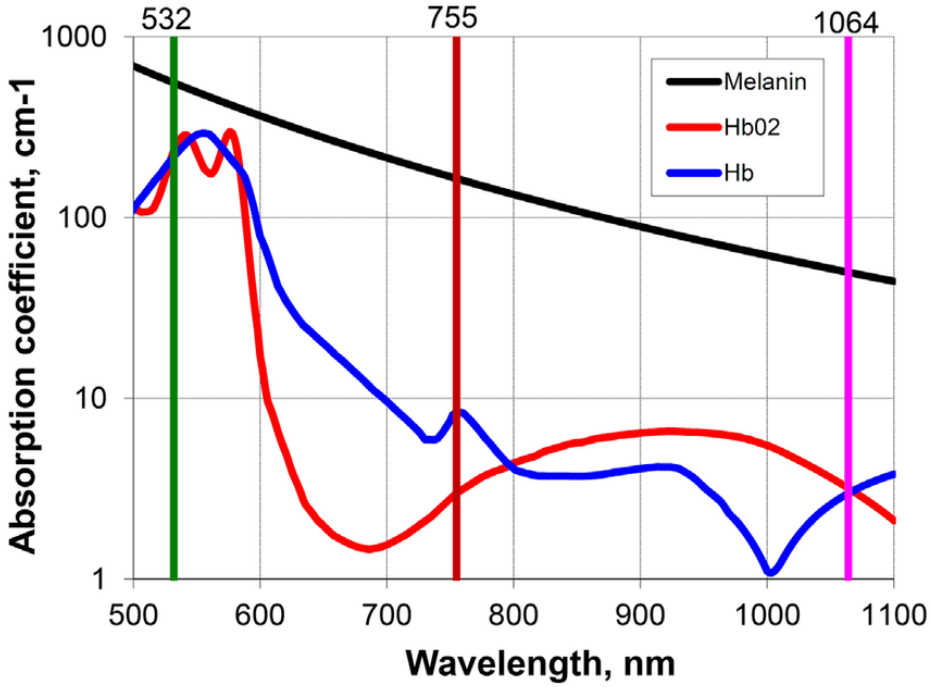
Less Photo-thermal Effect

The photo-thermal effect of the existing laser is the effect of thermal damage proportional to the temperature and exposure time of the tissue, and to prevent this, the laser treatment method was selected according to the Thermal Relaxation Time (TRT), the time when the temperature of the tissue raised by the laser reaches 50% or less of the initial temperature. However, Picosecond Laser is able to implement a photo-acoustic effect that allows pigment to be treated by mechanical shocks due to shock waves, rather than heat-induced Melanosome destruction, which explains the

concept of pigmentation with a shorter pulse duration and a shorter peak power energy impact Or, because it is shorter than TRT of tattoo ink, it can be expected to have a better effect than 450 and 750 picosecond equipment as well as nanosecond laser. The pigments irradiated with 300 picosecond lasers are crushed to a smaller size than conventional treatments, making it easier to absorb or drain in the body, allowing for safer and improved effects.

Multiple Hand-Piece for Rejuvenation

The 300 Picosecond Laser uses two wavelength bands, 532 nm and 1,064 nm, which are highly Melanin selectable. For 532 nm with higher Melanin selectivity of the two wavelengths, the shorter wavelength but higher selectivity is mainly used to remove epidermal pigments, and 1,064 nm has a slightly lower Melanin selectivity than 532 nm, but it can penetrate deeper skin tissue, so it is used separately to remove deep dermis such as otamovans or tattoos.



It has been confirmed that it is a device that is expected to have a great pigment treatment effect and also has an excellent effect on skin's Rejuvenation. In particular, Post-Inflammatory Hyperpigmentation (PIH) after intractable stains and inflammation has been confirmed to improve during adaptation with a technique called Pico-Toning, and it is easy to cause LASER Induced Optical Breakdown (LIOB) even with low energy, which is known to improve skin wrinkles and pores. Less Photo-Thermal Effect, a 300 picosecond fast, is mild compared to other treatments, and the 300 picosecond laser has the advantage of little downtime for patients who are worried about post-treatment symptoms, such as bruises or mucosal bleeding.

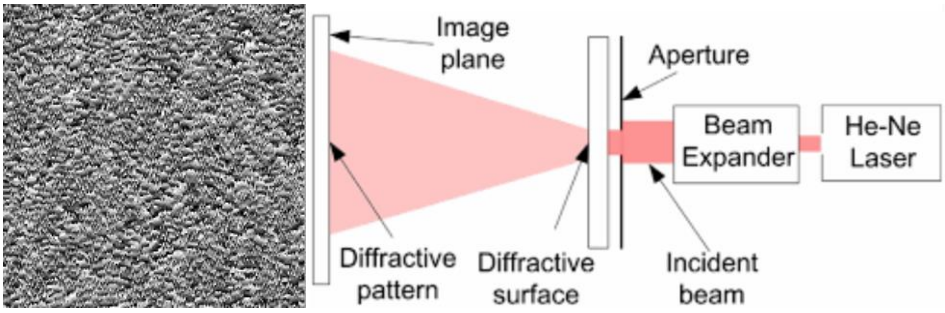
<Clear Zoom Handpiece>

It has a variety of handpieces depending on the purpose of treatment, and the Clear ZOOM handpiece has the advantage of selecting the wavelength of 1,064nm and 532nm according to the indication, and adjusting the spot size according to the size of the lesion. It is largely divided into the following.

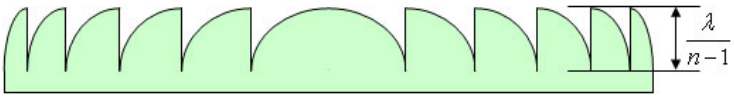
적응증	532nm	1,064nm
Pigment	Epidermal pigment: blemishes, surpluses	Epidermal pigment: otamovan, ectomorphic follicle
Tattoo	Reddish color	Blackish color

<Clear Colli. Handpiece>

Clear Colli. Handpiece refers to the beam of the column and can irradiate a certain energy regardless of distance, so it is a handpiece that is used in the treatment comfortably for wide indications ranging from spots to toning. It uses a wavelength of 1,064 nm and allows energy to be transferred to the dermal layer, and it is commonly used because it does not need to be in close contact with the skin during the procedure, which is fast and emphasizes ease of use.



< Patterns and Operation of DOE Laser Investigation>

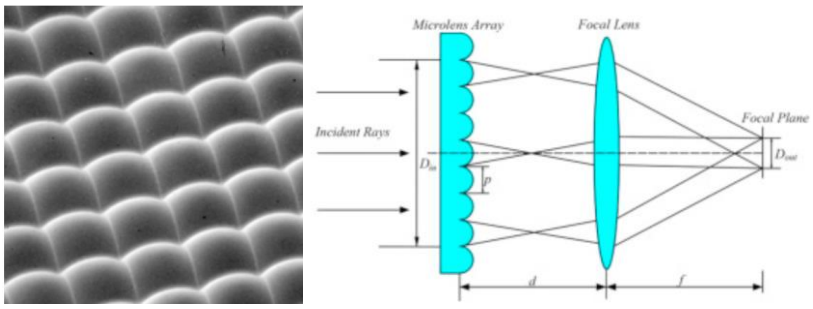


< DOE Lens Sectional View>

<1,064nm Multi Handpiece>

<532nm Multi Handpiece>

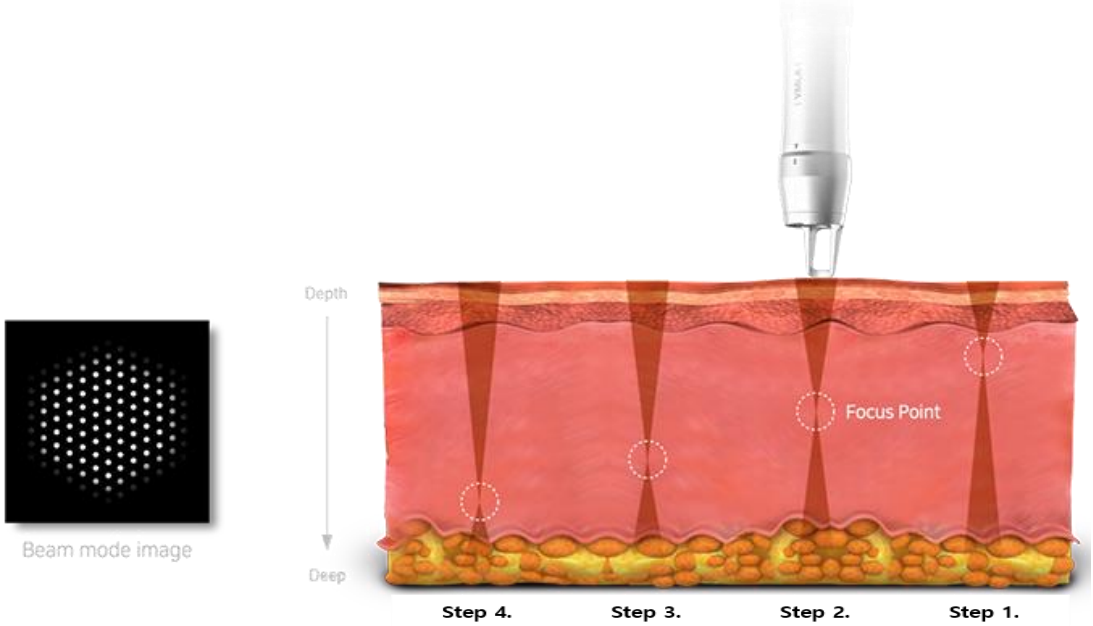
The Multi Handpiece, a differential Optical Element (DOE) handpiece, is designed to divide one laser beam into a predetermined number of segments, focusing on the exact energy and position of each beam. The DOE lens is designed to create a precisely angled surface using geometric calculations to create diffraction of light so that the beam gathers at the desired position. Due to the complexity of manufacturing, the price increases, and for the quality of the beam, the peripheral energy is discarded due to masking, resulting in energy loss. It is set up so that energy that is lost against the energy irradiation value but sufficiently effective in the treatment area can be investigated. There is one DOE handpiece each at 532nm and 1064nm.



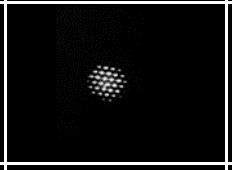
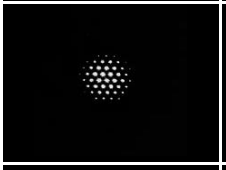
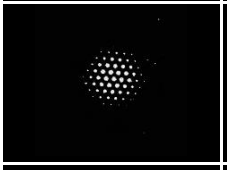
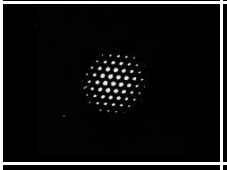
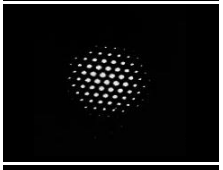
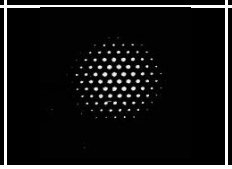
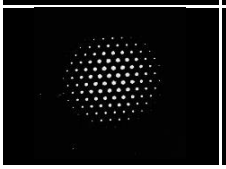
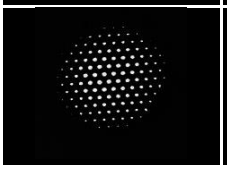
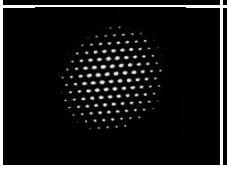
<Patterns and Operation of MLA Laser Investigation>

<Deep Renew Handpiece> **<Renew Handpiece>**

The Micro Lens Array (MLA) type handpiece combines multiple focusing lenses and gathers energy around each micro-beam, which has the advantage of high energy transfer. The lens is simple to manufacture, so it is relatively small and light, and the cost of manufacturing is economical, and it can be investigated with various penetration depths and spot sizes. It has a spot-size adjustable Renew Handpiece (ZMLA) and a penetrating depth-adjustable Deep Renew Handpiece (VMLA) to provide the patient with the appropriate treatment depending on the required indication.



< Adjusting the Depth of the Deep Renew Handpiece >

Beam Size	4	5	6	7	8
Laser Pattern					
Beam Size	9	10	11	12	-
Laser Pattern					-

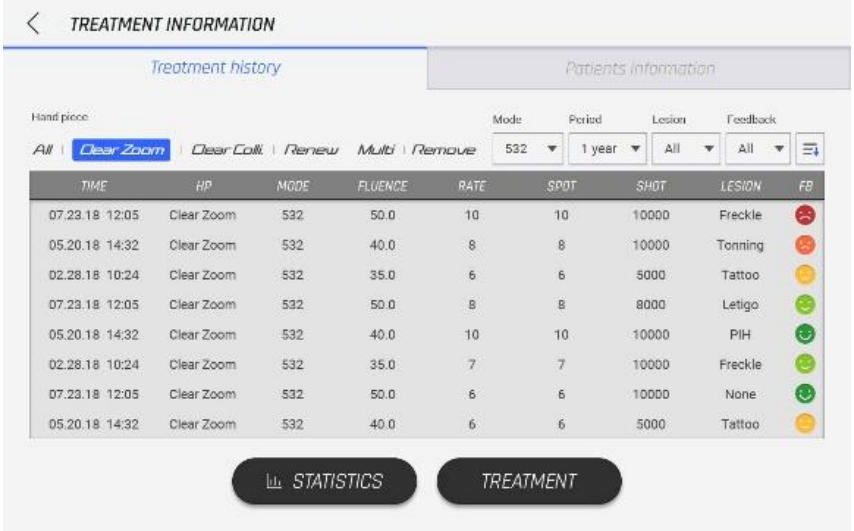
<Change of the Spot Size of Renew Handpiece>

Advanced Treatment Information System

The Real 300 Picosecond Laser incorporates a number of advanced technologies and recommends optimal maintenance of equipment to achieve targeted therapeutic effects. A remote management system for maintenance of equipment includes notification of lamp or consumable replacement cycles, self-checking of equipment abnormalities, prevention of faults, and remote assistance to equipment.

In addition, it is an innovative product that can derive optimal treatment parameters by allowing patient satisfaction to be entered along with tracking management of continuous use parameter values for patients treated due to a program that enables smooth history of treatment.

<Patient satisfaction survey for the procedure>

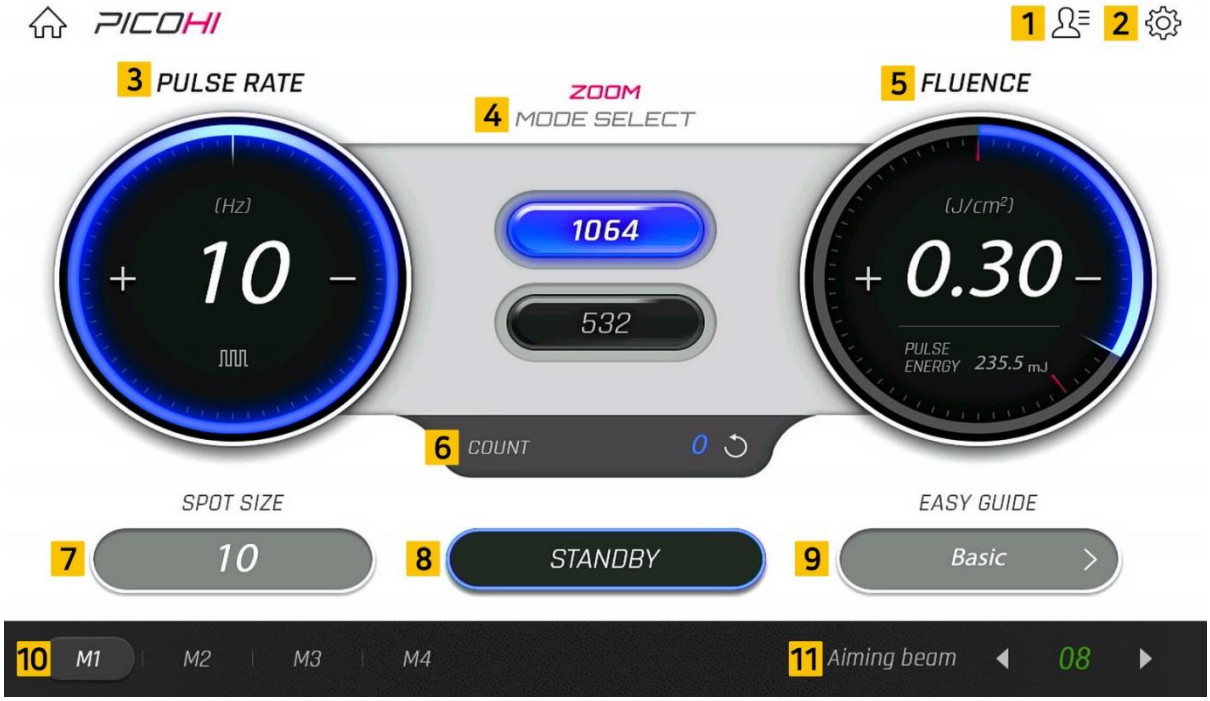


<Patient treatment history management>

<Management of treatment history by handpiece>

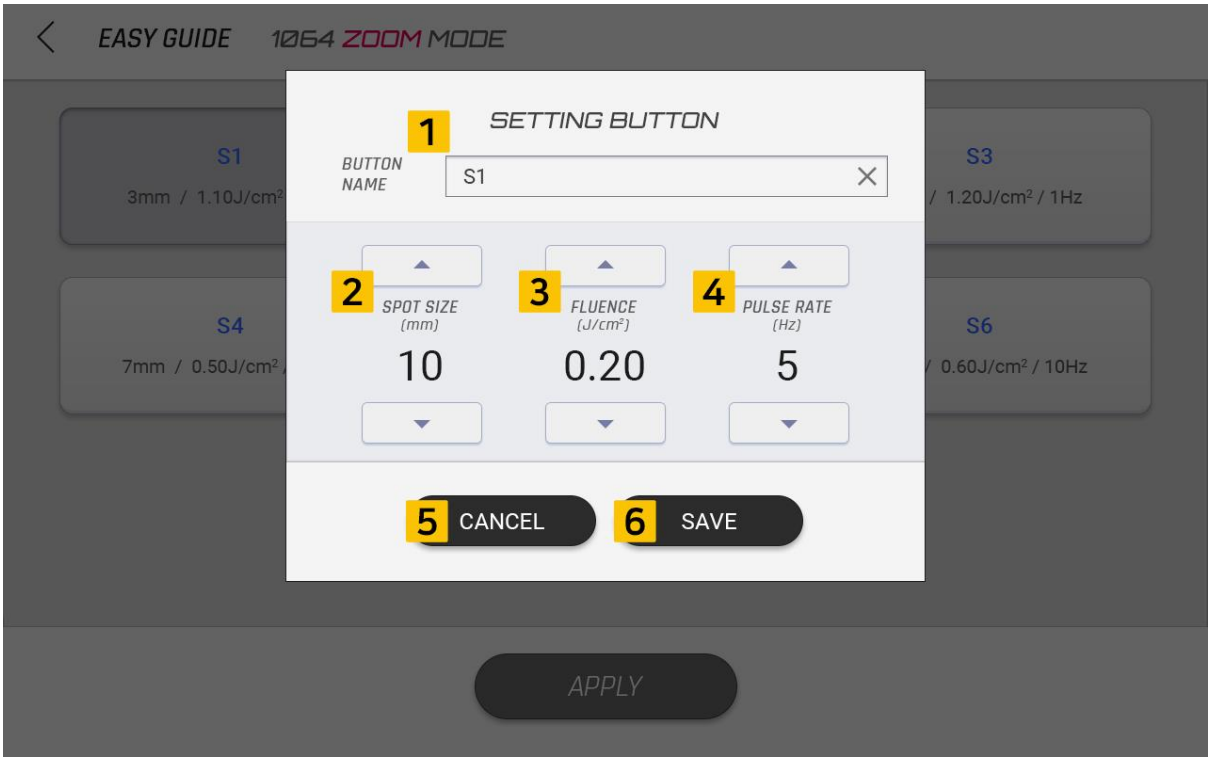
2. Operating Guidelines

The GUI of the 300 Pico-second LASER promotes operator convenience by providing an intuitive GUI for each handpiece.



1. Display patient information: switch to patient information selection screen
2. Settings indication: Possible settings for convenience, such as volume control
3. PULSE RATE:
   1) Adjustable laser beam irradiation speed, selectable number of laser beams irradiated per second
   2) It can set the pulse rate you want by using '+' and '-'
   3) Single, 1, 2, 5, 10Hz can be selected, considering the operator's skill level and operation time
4. MODE SELECT: Wavelength can be selected using "532" or "1064" button
5. FLUENCE: Controls the amount of energy per unit area, the higher the response, the stronger the reaction, and adjusts according to the selected spot size and h/p used
   It can set the pulse rate you want by using '+' and '-'
6. COUNT: Number of laser shots emitted since device is turned on, resettable via ↺ button
7. SPOT SIZE: The meaning of the diameter of the beam emitted through the handpiece and the SPOT SIZE adjusted in the handpiece can be checked with the naked eye.
   If it is not the same as the adjusted SPOT SIZE of the handpiece, it does not work.
8. STAND BY / READY: In the procedure preparation state, when the STAND BY button is clicked, it is converted to the READY button, and energy can be irradiated by stepping on the foot switch (automatically switched to STAND BY if not operated within 30 seconds after READY)

9. EASY GUIDE: Provides a laser treatment guide screen using the corresponding wavelength



Available to use 6 pre-set parameters according to treatment goals

specific parameters can be stored according to the operator's preference

① Rename storage parameters

② Adjust Spot Size

③ Fluence control

④ Pulse Rate Adjustment

① Cancellation

② Save

10. Settings save button: Can save operator's settings between M1~M4 (press and hold for 3 seconds)
11. AIMING BEAM: Brightness of AIMING BEAM can be adjusted between 0 and 10

2. Handpiece Introduction Summary

Handpiece	Wave Length(nm)	Pulse Duration(ps)	Spot Sizes(mm)	Indication
Clear Zoom	1,064	300	2~10	Dermal pigmented lesions black tattoo
	532	275	1.5~7.5	Epidermal pigmented lesions Red. yellow tattoo
Clear Colli.	1,064	300	10	Stable and effective toning treatment Improving freckles and tone
Deep Renew (VMLA)	1,064	300	13	Possible to target appropriate skin layer target through various depth adjustments Skin Rejuvenation
	532	275	13	
Renew (ZMLA)	1,064	300	4~12	Efficient skin rejuvenation through various spot size adjustments
	532	275	4~12	
Multi (DOE)	1,064	300	7X7	Rejuvenation Synergy Effect in connection with MLA handpiece Texture improvement through mild treatment
	532	275	7X7	
	1,064	300	10X10	
	532	275	10X10	

Chapter Ⅲ. Clinical application

1. PICO-Toning

Principles of Pico Toning

Toning is a method of treating several times with low energy. Picotoning is a method of treating several times using a very short pulse width called Picosecond, and refers to a pigment treatment technique using a wavelength of 1,064 nm and low energy. By repeating the process of crushing pigment particles smaller than before by maximizing the Photo-acoustic Effect, the size of the pigment can be pulverized to a size that is easy to absorb or discharge from the body, resulting in high satisfaction.

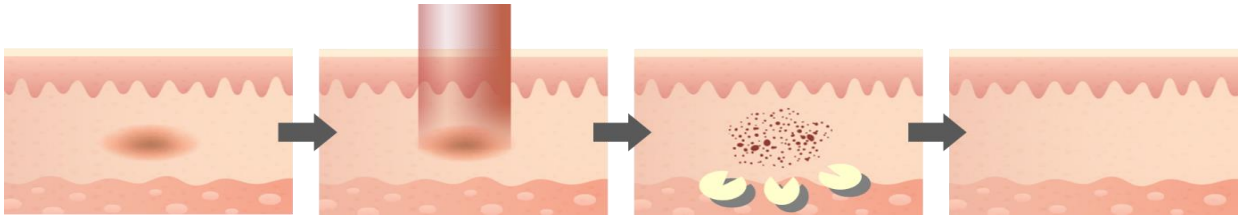
Indication of picotoning

It is an effective procedure for spots, pigmentation, improvement of irregular skin tone, and post-inflammatory pigmentation (PIH). It is important not only to selectively destroy the melanin pigment in the deep layer of the skin, but also to be careful not to affect other skin tissues.

Advantages of Pico Toning with 300 ps

Picotoning minimizes side effects such as pigmentation or low pigmentation and maximizes treatment effect through photo-physical application rather than photo-thermal application. A shorter pulse width minimizes the photothermal effect, increases the photolysis effect, has a high peak power, and reliably investigates the output of high energy as well as low energy, which can effectively treat stains and refractory pigments without side effects. In addition, there is low concern about the possibility of PIH due to Melanin cell stimulation due to the photo-thermal effect of conventional LASER procedures, and heat diffusion to surrounding tissues is minimized, reducing pain and concern about hypochromic and hyperpigmentation due to inflammatory reactions.

Picotoning is 1,064 nm Clear Coli. This procedure helps improve overall tone and pigment by investigating low density energy several times through H/P. The concept of SRT, which selectively removes only Melanosome without destruction of Melanin, has the advantage of requiring few separate periods for recovery and of being effective in smearing and intractable pigments. Another reason for preference is that 300 picosecond picotoning can be treated less frequently compared to conventional LASER toning due to its short and strong Peak Power.



Pigmentation | Laser Irradiation | Pigmentation Fragmented & Macrophages activated | Pigmentation removed

Indications and procedure guide

Laser Toning & Full Face, PIH(Post Inflammatory Hyperpigmentation)

Indication	Hand Piece	Wavelength (nm)	Spot Size (㎜)	Fluence (J/㎠)	Pulse Rate (Hz)	Pass	Sessions	Interval (Week)	End Point
Melasma	Clear Colli.	1,064	10	0.20~0.24	5~10	1~2	4~5	2	Erythema
Toning(Mild)	Clear Colli.	1,064	10	0.30~	10	2~3	4~5	1~2	
Toning	Clear Zoom	1,064	10	0.30~	10	2~3	4~5	1~2	
PIH	Clear Zoom	1,064	7	0.70~	10	Stacking (2~3sec)	3~	1~2	Erythema Darkening
	Multi	532	7X7	0.04~	5~10	3~4	3~	1~2	

Preparations before treatment

1. The patient's pain during the toning procedure is only a slight tingling, so it is recommended not to apply anesthetic cream. The reason is that capillaries may contract through ointment anesthesia, making it difficult to see the exact response during the procedure.

2. Prepare appropriate handpieces according to the purpose.

- Clear Coli. : No need for detailed energy control or handpiece contact with the skin

  For use in toning procedures

  For Melasma, low energy & repetitive procedures require safe treatment

- Clear Zoom: Dense pigmented, partially intensive toning used when required

- Clear Zoom.: When PIH treatment is performed through intensive stacking procedures for pigmented areas

- Multi: Partial use in epidermal pigments and for pale pigment form PIH treatment throughout the skin

Precautions during treatment

1. In the case of skin type Ⅲ~Ⅳ, the basic parameter setting is set to 1,064nm, 10mm, 0.3J, and 10Hz, and for spots with weak energy and thin skin (eye area, cheekbones, etc.), lower energy (0.20J-0.24J), and lower pass count.

3. In the case of frequency, it is recommended to proceed to 10Hz for partial treatment except for

freckles, and 5Hz for areas with freckles.

3. Colli during the procedure. Keep the distance between the tip of the handpiece and the skin 3~5cm to investigate the laser.

4. Avoid high energy (Fluence) and excessive pass irradiation as it can cause low pigmentation, PIH, and discoloration, and it is safe to set it according to the skin type within the parameters suggested. Fluence is controlled by the color of individual spots of the patient and by skin reactions immediately after irradiation. In general, the darker the color, the higher the energy absorption, and the faster the skin response, so lower the fluence. It is recommended that the commonly used fluence value start with a value lower than the recommended parameter criteria, and avoid excessive fluence.

Endpoints and skin reactions immediately after treatment

1. Toning: When selecting the parameters to investigate 2 to 3 passes and 1,000 to 1,500 shots throughout the face, no response immediately after the procedure or light erythema occurs after 3 to 5 minutes after the procedure. If the skin is thin or sensitive, the erythema appears immediately after the procedure, and it tends to be red like a slight rash. There are three types of freckles: epidermal, dermal, and mixed, and epidermal freckles are observed immediately after irradiation, but dermal and mixed skin reactions tend to appear late during treatment, so wait for a while (about 1-2 minutes) and minor changes.

2. PIH: An aggressive approach is required using a higher fluence than a typical spot treatment. Depending on the shape of the lesion, the procedure is performed by selecting the appropriate handpiece, and immediately after the procedure, erythema and temporary pigmentation may occur, but it is recommended to gradually improve as the treatment progresses and change the energy according to the lesion color.

Post-treatment care

1. Immediately after the procedure, apply cooling/calming to the area where the ice pack or mask pack and patch have been treated.

2. In the case of erythema that occurs immediately after treatment, it disappears within 2 hours.

3. Do not use Retinol or AHA-containing functional cosmetics for 2 days after treatment, and

recommend hypoallergenic cosmetics for skin moisturization.

4. Immediately after the procedure, care is required, such as sunblock, moisturizer, and sunblock (SPF+30) Make sure to use protective measures for light blocking during outdoor activities within 30 days of treatment.

5. After treatment, be careful not to engage in activities that rapidly raise blood flow or body temperature until the initial treatment is performed (about a week). (Drinking, exercising sauna, etc.)

6. In case of blisters on the treatment area, contact the hospital immediately.

7. For toning treatment, maintenance treatment is recommended every 1 to 2 months even after the end of regular treatment due to improved spots.

※ These parameters were developed based on clinical experience with picosecond lasers, and can be updated as more experience is accumulated. Use these parameters for reference only, and determine the treatment program based on the overall consideration of each lesion and clinical experience.

Pico Toning Package (Collimated HP 1064nm / Zoom 7mm): 1 to 2 weeks apart

Basic Package	Pico Toning + Regeneration Management / Whitening Management 10 times Pico Toning + Vitamin Ion Toning 5 times Picotoning + Hydrogen Toning + Long Pulse 5 times Pico Toning 10 times + Whitening 10 times
Whitening Package (**Pico Toning** 2 times + CO_2 2 times + LP 1 time + Q-ND 2 times + 4 whitening treatments)	Week 1: **Pico Toning** + Sedation Management Week 2: Q-Nd:yag Laser Toning + Whitening Management Week 3: CO_2 (Remove dots or blemishes) Week 4: Sedation management + Whitening Week 5: **Pico Toning** + LED + Reproduction Management Week 6: Long-pulse+Calming Management Week 7: Whitening Management Week 8: CO_2 (Remove dots or blemishes) Week 9: Q-Nd:yag Laser Toning + Whitening Management
Pico Triple Package	Week 1: **Pico Toning** +LDM +LED

(**pico toning**+luby toning+Q-Nd:yag toning)	Week 2: Q-Nd:yag toning + oxygen fill + sedation management Week 3: Q-Nd:yag toning + reproduction management Week 4: **Pico Toning** + LED + reproduction management Week 5: Ruby Toning + Sedation Week 6: Whitening and sedation management Week 7: **Pico Toning** + PHA Water Tox + Sedation Management Week 8: Q-Nd:yag toning+reproduction management
Pico Toning Package 5 Weeks (**pico toning**+Long pulse)	Week 1: **Pico Toning** +LDM +LED Week 2: Long Pulse 755/1064+Oxygen Fill + Reproduction Management Week 3: **Pico Toning** + LED + Reproduction Management Week 4: Long Pulse 755/1064 + Whitening Management Week 5: **Pico Toning** + PHA Water Tox
Pico Toning Package 5 Weeks (**pico toning**+Q-ND)	Week 1: **Pico Toning** + Reproduction Management Week 2: Laser Toning + Reproduction Management Week 3: **Pico Toning** + LED + Reproduction Management Week 4: Laser Toning + Whitening Management Week 5: **Pico Toning** + Sedation Management
Pico Toning Package 7 Weeks (pico toning+Long Pulse+Needle RF)	Week 1: Long Pulsed 1064 + reproduction management Week 2: Scarlet + Baby Injection + reproduction management Week 3: Lizuran 2cc+LDM Week 4: **Pico Toning** + Whitening Week 5: Long Pulse 755 + Ample Management (reproduction ample) Week 6: Scarlet + PDRN + Cryo Week 7: **Pico Toning** + Whitening

Clinical picture

▶Melasma

Melasma is an acquired brown hyperpigmentation that occurs on the face and is common in women and is characterized by being bilateral and symmetrical. Exposure to sunlight, pregnancy, and use of oral contraceptives are associated with the occurrence of melasma, and it can be classified into three histological types: epidermal, dermal, or a mixture of epidermis and dermis. The epidermal type responds well to treatment, and in epidermal melasma, melanocytes are increased in the basal layer of the epidermis. In dermal melasma, melanophage containing melanin was observed around blood vessels in the dermal layer. Maintenance treatment is recommended every 1 to 3 months after the end of the entire treatment course.

▶PIH(Post-Inflammatory Hyperpigmentation)

PIH (Post-Inflammatory Hyperpigmentation) is a common complication of inflammatory skin disease, infection, allergy, physical damage, drug reaction, rash, trauma, atopy, or laser treatment that damages the skin. The darker the skin color, the more easily it occurs, and depending on the cause, the pigment may be deposited in the dermis or epidermis. Fluence is set a little more aggressive than melasma treatment, and endpoints moderate erythema are observed. It is recommended to repeat the number of treatments until the PIH is removed, and when the PIH improves, the result is permanent, so there is no need for maintenance treatment.

2. Pigmented Lesions

Principle of epidermal pigmentation generation

The epidermis is the outermost layer of the skin, and when discoloration occurs in the epidermis, lesions appear brown or black due to melanin or pigment attracted from the outside. The onset of these epidermal lesions is divided into congenital or postnatal and acquired cases. Genetic factors affect when it occurs at the time of shipment or release, and in the case of acquired epidermal pigmentation, light damage, aftereffects associated with the aging process, resistant aging, and photo-aging skin.

Melanin cells, which are highly associated with pigment deposition, are located in the base layer at the bottom of the five-layer epidermis, which prevents damage to epidermal cells when exposed to ultraviolet light. For example, excessive exposure to light energy causes inflammatory damage in Basement Membrane cells, and increases melanin in the epidermis to make the skin look darker.

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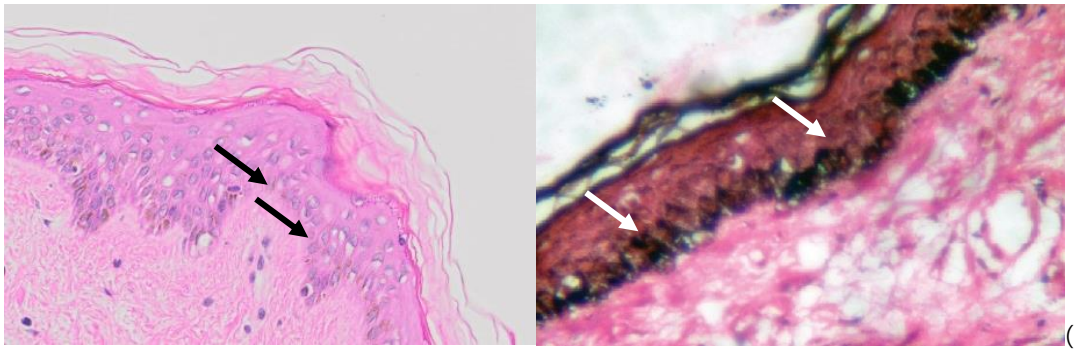


<Normal epidermis and epidermis where pigmentation occurred>

Indications of Epidermal Pigmentation Treatment

In other epidermal pigmentation lesions, innate or acquired factors stimulate abnormal melanin production from melanocytes. These include Freckles, Lentigines, Seborrheic Keratosis (boredom = black mushroom, a.k.a SK), and Nevus Spilus (hemisprontal rebellion).

Benefits of Epidermal Pigmentation Treatment with 300 ps

In Fitzpatrick skin type III or higher, which belongs to the Asian skin type, PIH easily occurs due to inflammatory damage to the base layer and the epidermal-epithelial boundary when treating epidermal pigmentation, and the difficulty of treatment is high. For this reason, setting an appropriate energy value for the lesion and investigating it is the most important point in the treatment of epidermal pigmentation treatment. For the 300 Picosecond Laser, you can set the Clear Zoom Handpiece to a 532nm wavelength for fine-grained treatment. If optimized parameters are applied based on clinician's judgment of the condition of the lesion, the effect may be further enhanced and the side effects may be further reduced.

Indication and Treatment Guide

Epidermal Pigmentation

Indication	Hand Piece	Wavelength (nm)	Spot Size (㎜)	Fluence (J/㎠)	Pulse Rate (Hz)	Pass	Sessions	Interval (Week)	End Point
Freckles Lentigines Seborrheic Keratosis	Clear Zoom	532	3	0.20~	1~2	1	1~3	4~6	Mild Whitening
			4	0.18~	1~2	1	1~3	4~6	
Nevus Spilus	Clear Zoom	532	3	0.35~0.40	1	1	5~	4~6	Mild Whitening Darkening Erythema
			4	0.20~0.25	1	1	5~	4~6	
	Multi	532	7X7	0.04~0.06	5~10	2~3	5~	3~4	

Preparations before treatment

1. Anesthetic ointment is determined by clinical judgment based on the patient's skin condition. Anesthetic ointment is applied to the treatment area if the skin is weak or thin, or if the patient is sensitive to pain, although not normally performed. Wait 20 to 30 minutes after application and carefully remove anesthetic ointment to prevent foreign substances from leaving. If foreign substances remain, the laser may be hit by foreign substances, causing damage to the lens or poor treatment.

2. Prepare appropriate handpieces according to the purpose.

- Clear Zoom: If you select a spot that fits the lesion size and proceed with the procedure at 1 pass
- Multi: Use for mild treatment due to the wide range of pigments or risk of pigmentation

3. Check the pigment change immediately after one test shot is irradiated to the pigmented area of the lesion. It is recommended to select a Fluence value to the extent of mild whitening, and if it is too clear, adjust the appropriate parameters according to the clinician's judgment, such as lowering the Fluence or increasing the Fluence when the reaction is difficult.

4. For pigmentation treatment, select spot size according to the size of the pigmented lesion. For black mushrooms, do not select a spot size (greater than 7mm) that is too large for the parameter. Even with the same fluence value, larger spot size can affect surrounding tissues and cause PIH.

Precautions during treatment

1. Investigate the entire lesion area, taking care not to duplicate the laser in the same lesion area during the procedure. The time of completion of one procedure is when 1 pass is applied to the entire lesion area.

2. Depending on individual skin tendency, PIH can easily occur after laser treatment or high energy setting can cause side effects such as hypochromic deposition, so it is recommended to see the treatment pattern 3-4 times a month rather than a single treatment.

3. The 532 nm wavelength band with a very high melanin absorption rate is likely to cause PIH even with a small difference when applying the procedure, so care should be taken when using it early when you are not familiar with the equipment.

4. If only the Spot Size increases in the same Fluence, the energy penetration depth increases gradually.

5. As the treatment progresses, the chromatin of the pigment decreases, increasing the Fluence gradually.

6. Side effects can be avoided by having sufficient treatment intervals during combination procedures with other lasers. Even different types of equipment can accumulate between heat transferred to the skin and affect skin recovery and treatment effects. For example, in parallel with the IPL procedure, it is recommended to treat after a certain period of time, such as at least 2 months if you treated the Picosecond Laser first, and 1 month if you treated the IPL first.

Endpoints and skin reactions immediately after treatment

The degree to which faint whitening is observed is more mild than when treated with Nanosecond Laser as an endpoint of treatment. Conversely, it is recommended to lower the Fluence value if whitening is observed immediately after the procedure, or if there is damage to the epidermis. If the Fluence value is low, only erythema is observed in the lesion area and there may be no pigmentation. In such cases, it is recommended that the Fluence value be raised to a higher level, but avoid repeated surveys of the same area as increasing the possibility of PIH. For Freckles and Rentigines, it is recommended to perform delicate procedures at the clinician's discretion with Mild Whitening with erythema or Seborrheic Keratosis with a slightly darker white than the previous lesion. Depending on the size of the lesion, attention should also be paid to the occurrence of PIH due to adjacent irradiation between the laser application sites during the procedure.

In the case of Nevus Spilus, for internal points in the pigment class, use the Zoom handpiece to view the very weak timing of whitening as an endpoint, and adjust the Fluence value according to the degree of whitening. Use a DOE handpiece to treat the pigmentation, and immediately after the treatment, assume that the treatment area has erythema and darkening.

Post-treatment care

1. Immediately after the procedure, apply cooling/calming to the area where the ice pack or mask pack and patch have been treated. After that, we apply antibiotic cream/pollution (local steroid hydroquinone). Apply antibiotic cream/pollution continuously twice a day until the scab drops.

2. After the epidermal lesion procedure, use a wet band, etc. (dressing material), etc. to prevent infection and irritation from the outside, for 2 to 3 days until a scab occurs.

3. Do not use Retinol or AHA-containing functional cosmetics for 2 days after treatment, and recommend hypoallergenic cosmetics for skin moisturization.

4. The color of the lesion where whitening appeared during the procedure changes to red, resulting in minor edema. Typically, scabs occur after 3 to 5 days, which naturally fall out within a week, resulting in temporary hypochromic symptoms in the treatment area. It recovers to its normal skin color after a period of about a month. In this process, the patient may think that the pigment in the treatment area has become thicker, so detailed information on the changes after the procedure is required in advance.

5. PIH may be suspected if the color of the treatment area is darker than the surrounding area even after 3 weeks of treatment. If PIH occurs, a treatment period of about 6 months is expected, and when PIH is confirmed one month after the pigment treatment, toning treatment is performed.

6. Immediately after the procedure, care is required, such as sunblock, moisturizer, and sunscreen (SPF+30). Make sure to use protective measures for light blocking during outdoor activities within 30 days of treatment.

7. After treatment, be careful not to rapidly raise blood flow or body temperature until the initial treatment is performed (about a week). (Drinking, exercising sauna, etc.)

8. In case of blisters on the treatment area, contact the hospital immediately.

※ The disease-specific parameters presented above are based on clinician experience using the Picosecond Laser and may be updated continuously in the future. The data is recommended for reference, and for each disease, it is recommended to proceed according to the optimal program through individual lesions, patient characteristics, and clinical judgment.

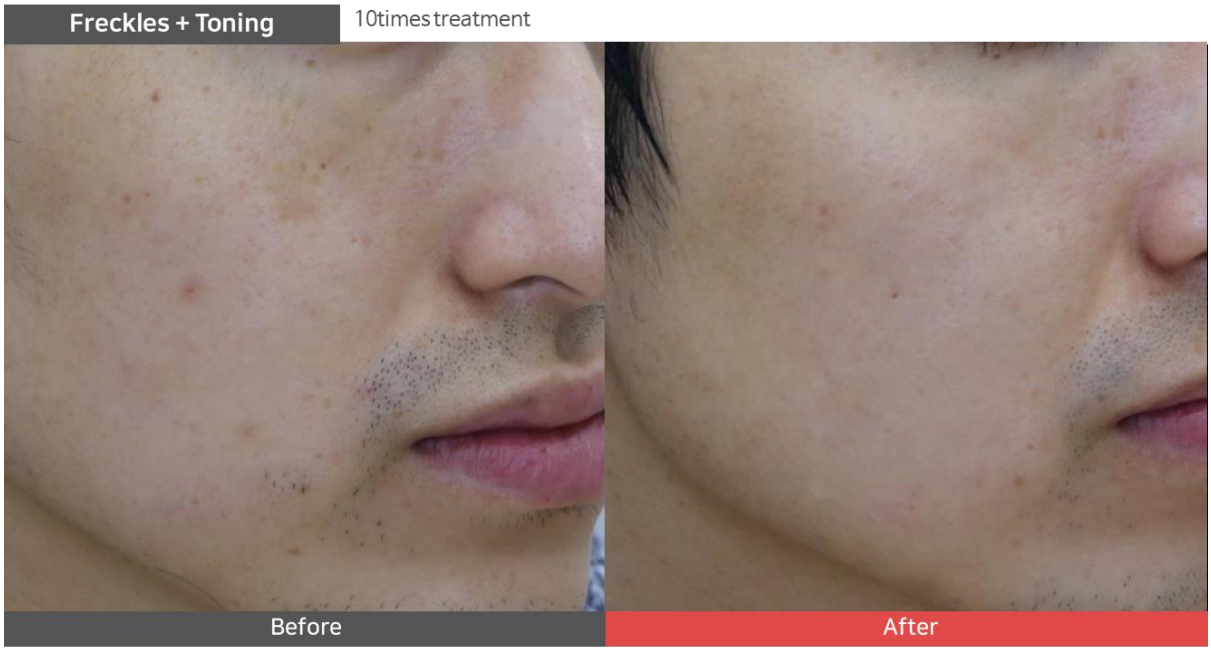
Pico Lesions Treatment Package (Zoom HP): 3 to 4 weeks apart

Basic package	Treatment of Pico lesions (wavelength selection based on lesions) Treatment of Pico Lesions + Pico Toning Pico lesion treatment + IPL (wavelength selection depending on lesion) Treatment of Pico lesions + removal of spots Er:yag+ Q-Ndyag+Pico lesion treatment Pico lesion treatment + Pico toning 9 times + whitening care 9 times

Clinical picture

532nm

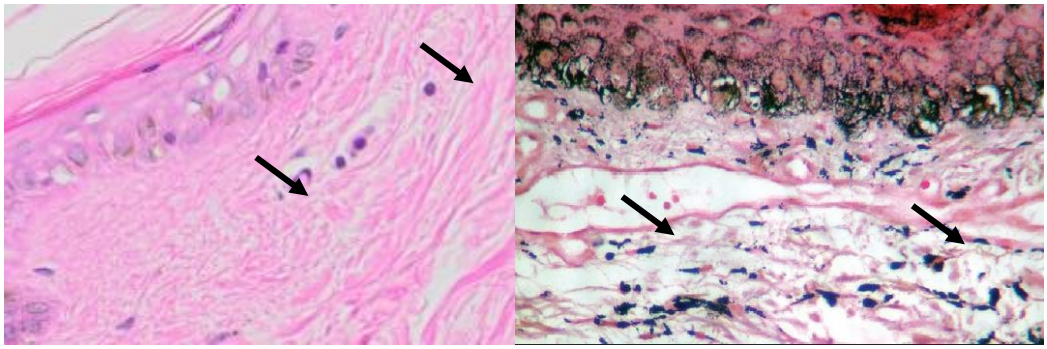
- Lentigine / Freckles



Principle of the occurrence of dermal pigmentation

The dermis consists of two layers and is located under the epidermis. The dermis also plays a major role in hydration, along with nourishing the epidermis and the role of the body's thermostatic system. The epidermis and dermis interact organically to regulate the body process, and this interaction occurs actively in the Dermal-Epidermal Junction, and the main place that plays this role is the Basement Membrane. The base layer, the lowest layer of the epidermis, is connected by Basement Membrane and Anchoring Filaments, and the upper layer of the dermis, the papilla layer, is connected by Anchoring Collagen Fibrils. As such, the Basement Membrane is located between the epidermis and the dermis and plays a very important role in maintaining cell function through the supply of oxygen, nutrients and essential compounds between the two layers of skin and releasing externally generated waste into lymph and blood.

The cause of dermal pigmentation is caused by abnormal proliferation of melanin cells in the dermis. Most of these occur naturally, but they are sometimes acquired. The resulting dermal pigmentation is also transferred by the D-E Junction described above, which negatively affects the connective tissue of the Extracellular Matrix (ECM), which also affects the connections of Collagen, Elastin, etc.



<Normal dermis and dermis where pigmentation occurred>

Indication of the treatment of dermal pigmentation

It is mainly used in the treatment of pigmentation located in the dermis, such as Ota's Nevus (Ota-Movan), Acquired Bilal Nevus of Ota-like Macule (Acquired Bilateral Ota-Movan, ABNOM). It is typically blue and easily diagnosed, but some are brown, so care should be taken to distinguish clinicians.

Advantages of treating dermal pigmentation with 300 ps

For the treatment of dermal pigment lesions, treatment is performed using Zoom handpieces that can transmit all 1,064 nm wavelengths that can sufficiently transmit energy to melanin cells in the dermis, and it is known to repeat treatment several times. As for appropriate treatment, opinions are divided on the clinical usefulness of low-power and low-power repetitive treatment, but low-power treatment is suggested to reduce the risk of PIH. It tends to take a long time to observe significant improvement as the destroyed Melanocyte is metabolized into the dermis after treatment.

Indication and Treatment Guide

Dermal Pigmentation

Indication	Hand Piece	Wavelength (nm)	Spot Size (㎜)	Fluence (J/㎠)	Pulse Rate (Hz)	Pass	Sessions	Interval (Week)	End Point
ABNOM Ota's Nevus	Clear Zoom	1,064	4	1.20~	1	1	3~	4~6	Whitening
			7	0.70~	5~10	Stacking (2~3sec)	3~	2~4	Erythema Darkening

Preparations before treatment

1. Apply anesthetic ointment to the treatment area prior to treatment. Wait 20 to 30 minutes after application and carefully remove anesthetic ointment to prevent foreign substances from leaving. If foreign substances remain, the laser may be hit by foreign substances, causing damage to the lens or poor treatment.

2. Determine the appropriate spot size according to the purpose.

• 4mm spot: Select the energy with a low PIH risk or a whitening reaction when treated strongly

• 7mm spot: Use when there is a risk of pigmentation or when treated weakly/ Select the energy that has a darkening reaction

3. Check the pigment change immediately after one test shot is irradiated to the pigmented area of the lesion. The expected endpoint varies depending on the spot size. For 4 mm, it is recommended that you select the Fluence value for whitening, and for 7 mm, select the degree to which Erythema and Darkening are verified. Conversely, if no skin reaction is observed immediately after irradiation, raise the Pulse Rate gradually by 5 to 10 Hz, and if no skin reaction is observed at 10 Hz, gradually increase the Fluence until the endpoint is observed. Be careful not to investigate

the same area during the adjustment process. Immediately after treatment, the area becomes thicker as an end point, and if there is damage to the epidermis or bleeding, the fluence is lowered.

4. If the same Fluence is used, the penetration depth of the laser increases as the spot size increases, so check the appropriate settings according to the patient's lesion before proceeding with the procedure.

Precautions during treatment

1. Investigate the entire lesion area, taking care not to duplicate the laser in the same lesion area during the procedure. The time of completion of one procedure is when 1 pass is applied to the entire lesion area.

2. In most cases, repeated treatment is required for intradermal pigmented lesions. As the procedure progresses, the color of the lesion will gradually fade, which is an observed phenomenon as shallow distributed pigments are removed, requiring increased fluence to remove pigments deep in the dermis.

3. If fluence is increased, the spot size should be reduced to minimize the risk of PIH. However, if the spot size is small, it may affect the depth of penetration, so it is not recommended to set the spot size to 3mm or less when treating intracutaneous pigmented lesions.

4. Treat dermal lesions with a wavelength of 1,064 nm. If accompanied by epidermal lesions, it is recommended to remove the pigment in the dermis at 1,064 nm first, and then remove the epidermal distribution pigment at 532 nm. However, treatment of both wavelengths on the same lesion should be avoided, and patient satisfaction can be expected to increase during the procedure.

Endpoints and skin reactions immediately after treatment

If treatment is performed at a low number of treatments using high power, the appropriate endpoint is to observe the whitening response at the treatment site. As energy is irradiated to the dermal layer, some mucosal bleeding may occur. In the case of repeated treatment at low power, the treatment site is assumed to have erythema and darkening immediately after treatment.

Post-treatment care

1. Immediately after the procedure, apply cooling/calming to the area where the ice pack or mask pack and patch have been treated. After that, we apply antibiotic cream/pollution (local steroid hydroquinone). Apply antibiotic cream/pollution continuously twice a day until the scab drops.

2. If bleeding is observed in a large and wide area, such as Ota's Nevus treatment, Vaseline dressing or Bio Skin dressing should be applied for about a week, and it is recommended to replace it once a week.

3. Steroid ointment and antihistamines can be prescribed for 1 to 2 days to prevent minor skin problems after treatment such as folliculitis.

4. Do not use Retinol or AHA-containing functional cosmetics for 2 days after treatment, and recommend hypoallergenic cosmetics for skin moisturization.

5. The color of the lesion changes to red during the procedure, resulting in minor edema. Typically, a scab occurs after three to five days, which naturally falls out within a week. In this process, the patient may think that the pigment in the treatment area has become thicker, so detailed information on the changes after the procedure is required in advance.

6. PIH may be suspected if the color of the treatment area has become darker than the surrounding area even after 3 weeks of treatment. If PIH occurs, a treatment period of about 6 months is expected, and when PIH is confirmed one month after the pigment treatment, toning treatment is performed.

7. Immediately after the procedure, care is required, such as sunblock, moisturizer, and sunscreen (SPF+30). Make sure to use protective measures for light blocking during outdoor activities within 30 days of treatment.

8. After treatment, be careful not to rapidly raise blood flow or body temperature until the initial treatment is performed (about a week).(Drinking, exercising sauna, etc.)

9. In case of blisters on the treatment area, contact the hospital immediately.

※ The disease-specific parameters presented above are based on clinician experience using the Picosecond Laser and may be updated continuously in the future. The data is recommended for reference, and for each disease, it is recommended to proceed according to the optimal program through individual lesions, patient characteristics, and clinical judgment.

Pico Lesions Treatment Package (Zoom HP): 3 to 4 weeks apart

Basic package	Treatment of Pico lesions (wavelength selection based on lesions) Treatment of Pico Lesions + Pico Toning Pico lesion treatment + IPL (wavelength selection depending on lesion) Treatment of Pico lesions + removal of spots Er:yag+ Q-Ndyag+Pico lesion treatment Pico lesion treatment + Pico toning 9 times + whitening care 9 times

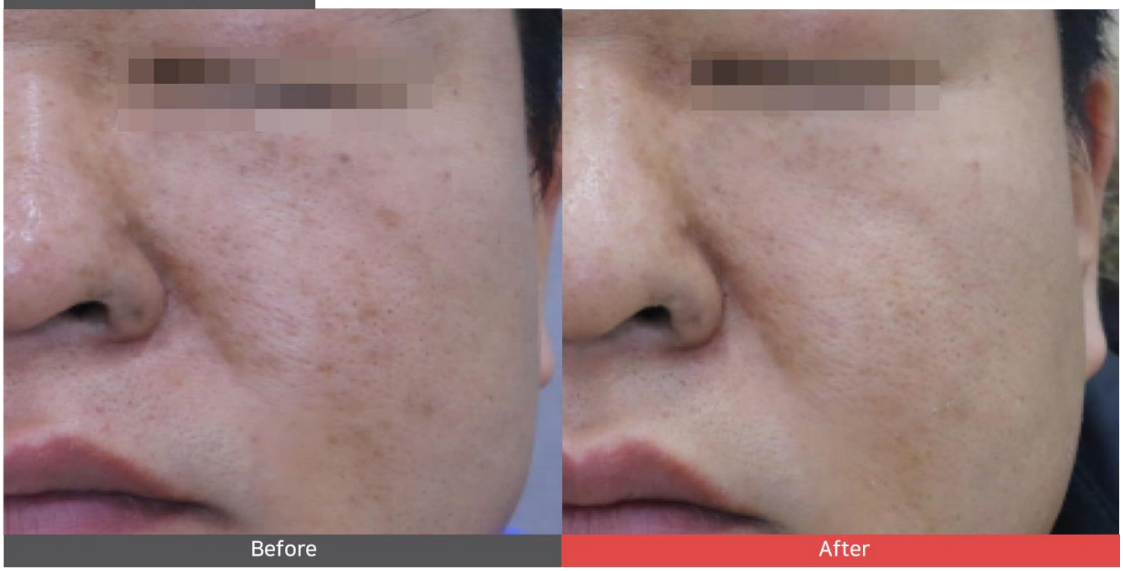
※ The disease-specific parameters presented above are based on clinician experience using the Picosecond Laser and may be updated continuously in the future. The data is recommended for reference, and for each disease, it is recommended to proceed according to the optimal program through individual lesions, patient characteristics, and clinical judgment.

Clinical picture

1064nm

• ABNOM (Acquired Bilateral Nevus of Ota-like Macule)

ABNOM 1time treatment



3. Tattoo Removal

Principles of tattoo removal procedures

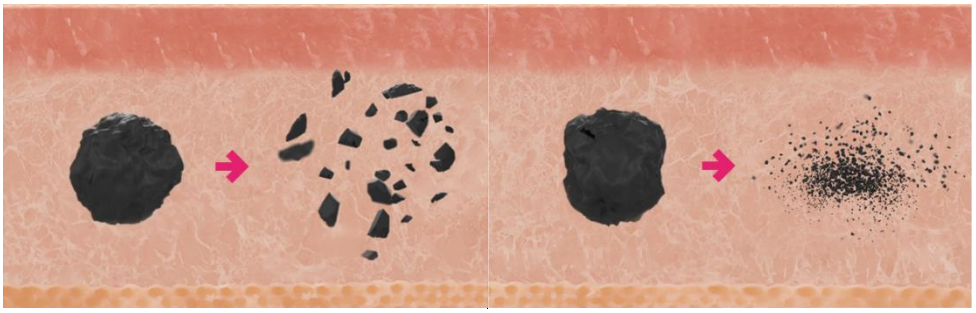
Tattoo removal procedures differ in the establishment of treatment methods depending on who the operator is. Tattooed by a professional tattooist injects ink into a specific depth of the dermis using a special electric needle device, but amateur tattoos use various pigments such as soot outside of ink and various non-standardized tools to observe the location and distribution of pigments. During the tattoo procedure, the injected pigment is quickly discharged due to the human body's inflammatory reaction, and the remaining tattoo pigments are classified as foreign substances in the body. When foreign substances enter the body of a living organism, a removal reaction is induced by macrophages, which swallow small particles and then excrete them through the lymphatic system and liver to remove foreign substances from the body. However, most of the tattoo pigment particles are often large enough for macrophages to swallow, so they are kept in fibrous collagen capsules and cannot be excreted. The principle of tattoo removal procedures is to destroy the encapsulated pigment in the dermis and crush it into a size suitable for macrophages to swallow and discharge.

Indication of tattoo removal procedures procedure

You can use it to remove dark colors such as black and blue, eye-line tattoos, eye-brow tattoos, or to see improved results when removing bright colors in red or orange.

Benefits of tattoo removal with 300 ps

The concept of tattooing, which is difficult to remove once engraved, has also changed as medical laser technology has developed. Laser's pigmentation has become a hot topic among people hoping to get rid of their tattoos. However, in the case of the existing Nanosecond Q-Switched LASER, pain was inevitably involved in the tattoo removal process in the dermis, and damage to surrounding tissues caused by examining high energy values for tattoo removal was inevitable.



<Nanosecond(10^{-9} second)> <Picosecond(10^{-12} second)>

With the continuous development of laser technology, the development of the Picosecond Laser equipment enables safe procedures to minimize damage to surrounding tissues by pulse duration shorter than the TRT of the existing Nanosecond Laser. The Picosecond equipment allows pigment to be crushed to a smaller size than the existing Nanosecond equipment, enabling faster and more effective tattoo removal, while also providing effective advantages such as reducing the number of treatments and reducing pain. In addition, side effects such as reduced pain during the procedure, changes in skin resolution at the treatment site, hypochromatosis, and burn scars were greatly reduced.

300 Pico-Second Laser is important to maintain a constant Pulse Duration, which results in high development difficulty. When selecting the Pico-Second Laser, ensuring that the product maintains a constant pulse duration is the first step in proper tattoo removal treatment.

Kirby-Desai Scale

Kirby-Desai Scale is a 2009 dermatologist Dr. Dermatologist based on the specificity of the aforementioned tattoo procedure to determine the number of laser procedures required for tattoo removal. It is part of a call developed by William Kirby and Dr. Teias Desai. These consultations have the advantage of reducing uncertainty about removing laser tattoos from the patient and ensuring reliability in the progress of the procedure.

The Kirby-Desai Scale, consisting of a total of six parameters, consists of the type of skin (Fitzpatrick Skin Type), the amount of ink, the presence or absence of tattoo layering, the degree of tissue change in scar and skin surface, and the color used, and each item can be quantified through consultation with the patient.

The following table shows Kirby-Desai Scale.

Kirby-Desai Tattoo Removal Scale

SKIN TYPE

I
Always Burns & Never Tans
☐ 1 point

II
Burns Easily & Tans Minimally
☐ 2 points

III
Sometimes Burns & Slowly Tans
☐ 3 points

IV
Burns Minimally & Usually Tans
☐ 4 points

V
Rarely Burns & Tans Well
☐ 5 points

VI
Never Burns & Always Tans
☐ 6 points

LOCATION


Head/Neck/Face
☐ 1 point


Upper Trunk/Shoulder
☐ 2 points


Lower Trunk/Upper Leg
☐ 3 points


Lower Arm/Leg
☐ 4 points


Wrist/Hand/Ankle/Foot
☐ 5 points

AMOUNT OF INK


Amateur
☐ 1 point


Minimal
☐ 2 points


Moderate
☐ 3 points


Significant
☐ 4 points

LAYERING

No
☐ 0 points


Yes
☐ 2 points

SCARRING & TISSUE CHANGES

No Scar
☐ 0 points


Minimal Scarring
☐ 1 point


Moderate Scarring
☐ 3 points


Significant Scarring
☐ 5 points

☐ Note :
Pre-existing scar tissue will remain after treatment

COLORS


Black Only
☐ 1 point


Mostly Black w/Some Red
☐ 2 points

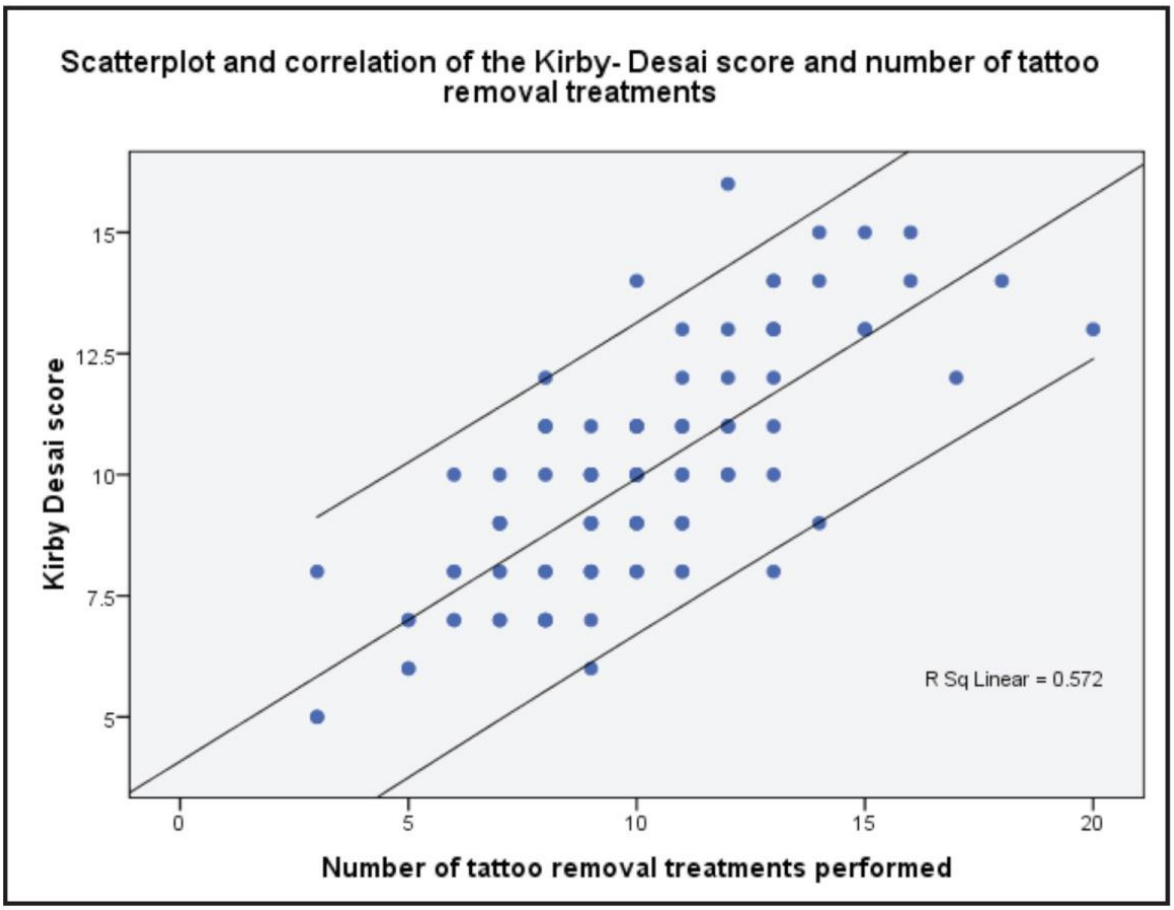

Mostly Black & Red w/ Other Colors
☐ 3 points


Multiple Colors
☐ 4 points

☐ Note :
Some colors such as blue, green, aqua, purple, pink, orange, brown and yellow may never go away.

☐ Note :
White, pink and peach color may turn after treatment

Estimated Number of Treatments Required to Achieve Goal:



After calculating the total score, a treatment plan should be established to account for the appropriate number of tattoo removal procedures based on the table above. For example, if you have a total score of 10 Kirby-Desai, it is recommended that you establish a treatment plan between 5 and 13 times according to the clinician's judgment, although the appropriate number of tattoo removal procedures is 10 times.

If too much energy is used during tattoo removal procedures, the above adverse reactions may occur in skin lesions. Accordingly, it is important for clinicians to judge the spot size and energy value for the lesion.

This process is highly recommended because clinicians can provide more efficient treatment by accurately identifying the patient's condition and establishing a treatment plan through Kirby-Desai Scale before tattoo removal.

Indications and Treatment Guide

Tattoo Removal

Indication	Hand Piece	Wavelength (nm)	Spot Size (㎜)	Fluence (J/㎠)	Pulse Rate (Hz)	Pass	Sessions	Interval (Week)	End Point
Black Blue Eye Brow	Clear Zoom	1,064	3	1.10~	1~5	1	5~	6~8	Whitening
			4	1.00~	1~5	1	5~	6~8	
			5	0.80~	1~5	1	5~	6~8	
Red Orange		532	4	0.15~	1~5	1	5~	6~8	
			5	0.12~	1~5	1	5~	6~8	

Preparations before treatment

1. Use local anesthetic to minimize pain before the procedure. However, if the tattoo area is wide, there is a possibility that a shock may occur due to excessive use of local anesthetics, so it is necessary to limit the area of one-time treatment. Wait 30 to 60 minutes after application and carefully remove anesthetic ointment to prevent foreign substances from leaving. If foreign substances remain, the laser may be hit by foreign substances, causing damage to the lens or poor treatment.

2. In the tattoo removal procedure, select a wavelength according to the color of the tattoo and conduct a test shot using a wide spot (4mm or more).

- 1,064 nm: Black, blue, beauty tattoos (eyes, eyebrows, etc.) When removing dark colored tattoos
- 532 nm: When removing light colored tattoos, such as red or orange,

3. Check the pigment change immediately after one test shot is irradiated to the pigmented area of the lesion. The expected endpoint varies depending on the spot size. For 4 mm, it is recommended that you select the Fluence value for whitening, and for 7 mm, select the degree to which Erythema and Darkening are verified. Conversely, if no skin reaction is observed immediately after irradiation, raise the pulse rate gradually by 1 to 5 Hz, and if no skin reaction is observed at 5 Hz, gradually increase the Fluence until the endpoint is observed. Be careful not to investigate the same area during the adjustment process. Immediately after treatment, the area becomes thicker as an end point, and if there is damage to the epidermis or bleeding, the fluence is lowered.

4. It is recommended that a test shot be performed before the tattoo procedure. After testing 3 to 4 shots in small areas, you should observe the skin reaction and set the appropriate parameters through the clinician's judgment. If some brown or red tattoos (such as lip tattoos) contain iron oxide in the ink, the area may turn black during laser treatment. In such cases, the removal of pigments is more difficult and the number of treatments may increase, so care must be taken.

5. In general, the area around the eyes is an area related to the optic nerve, and the skin is thin, requiring sophisticated treatment with low energy. For eye protection, it is recommended to insert Eye Shield 30 to 60 seconds after administration of eye drops.

Precautions during treatment

1. Cooling in the middle of the procedure minimizes patient pain and reduces skin soothing and side effects.

2. Investigate the entire lesion area, taking care not to duplicate the laser in the same lesion area during the procedure. The time of completion of one procedure is when 1 pass is applied to the entire lesion area.

3. The procedure starts with a wide spot and gradually changes to a small spot.

4. When treating an area with a large area, perform a 1 Pass treatment so that it overlaps by 20% with a 4mm spot size.

5. The moisture content around the eyes is high, so the removal may be a little slower than the eyebrow area.

6. In most cases, repeated treatment is required for intracutaneous pigmented lesions. As the procedure progresses, the color of the lesion will gradually fade, which is an observed phenomenon as shallow distributed pigments are removed, requiring increased fluence to remove pigments deep in the dermis.

7. If fluence is increased, the spot size should be reduced to minimize the risk of PIH. However, if the spot size is small, it may affect the depth of penetration, so it is not recommended to set the spot size to 3mm or less when treating intracutaneous pigmented lesions.

8. If the same Fluence is used, the penetration depth of the laser increases as the spot size increases, so check the appropriate settings according to the patient's lesion before proceeding with the procedure.

9. Most beauty tattoos have pigments in the epidermis layer, so they can easily disappear even after one or two treatments, but if you irradiate them too strongly, reactions can occur unless you don't have eyebrows.

10. Pigments that remain minute after all tattoo removal sessions have ended may naturally disappear after 3 to 4 weeks depending on the action in the human body. There is no need to increase the Fluence or consider additional procedures.

11. When removing eyebrow tattoos, it is recommended to shave in advance because the remaining eyebrows in the area are affected by the pigment, but we recommend that you explain and decide the change through consultation with the patient. If you proceed without shaving your eyebrows, you will be notified in advance that the color of your eyebrows may turn white. If the patient's eyebrow type is as white as fluffy, it may proceed without shaving.

Endpoints and skin reactions immediately after treatment

The point at which whitening occurs in the tattoo area immediately after the laser procedure is Endpoint. It is recommended to use low fluence during the initial procedure (about 2 to 3 times) to treat at mild whitening level without pinpoint bleeding. However, if whitening does not occur, the fluence may increase, resulting in a slight Pinpoint Bleeding. When changing the Fluence, be careful not to be irradiated over the area and reduce Fluence if there is excessive Pinpoint Bleeding.

Post-treatment care

1. Immediately after the procedure, apply cooling/calming to the area where the ice pack or mask pack and patch have been treated. After that, we apply antibiotic cream/pollution (local steroid hydroquinone). Apply antibiotic cream/pollution continuously twice a day until the scab drops.

2. Vaseline dressing or Bio Skin dressing should be applied for about a week to prevent infection in the treatment area and to protect and promote regeneration of the area until a scab occurs, and it is recommended to replace it once a week.

3. There is a high possibility of bruising or swelling when removing tattoos around the eyes and lips (Eyeliner, Lip Liner), so it is helpful to wash your face with cold water and calm down with an ice pack.

4. One week of teramycin eye ointment prescription is provided for patients with Eyeliner tattoo treatment.

5. Do not use Retinol or AHA-containing functional cosmetics for 2 days after treatment, and recommend hypoallergenic cosmetics for skin protection.

6. Immediately after the procedure, care is required, such as sunblock, moisturizer, and sunscreen (SPF+30). Make sure to use protective measures for light blocking during outdoor activities within 30 days of treatment.

7. After treatment, be careful not to rapidly raise blood flow or body temperature until the initial treatment is performed (about a week).(Drinking, exercising sauna, etc.)

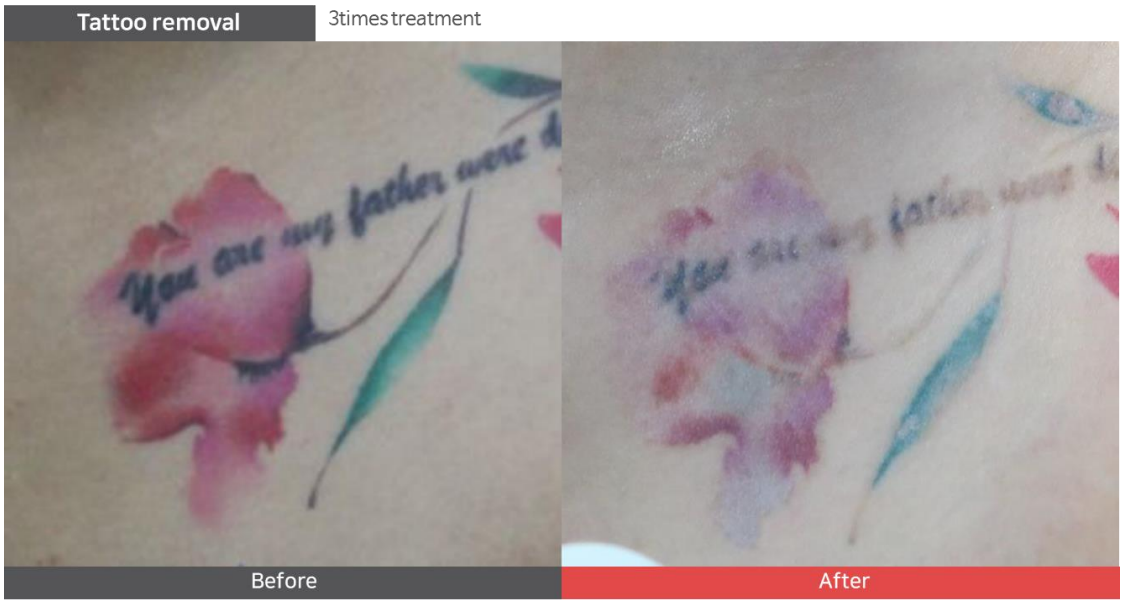
8. In case of blisters on the treatment area, contact the hospital immediately.

※ The disease-specific parameters presented above are based on clinician experience using the Picosecond Laser and may be updated continuously in the future. The data is recommended for reference, and for each disease, it is recommended to proceed according to the optimal program through individual lesions, patient characteristics, and clinical judgment.

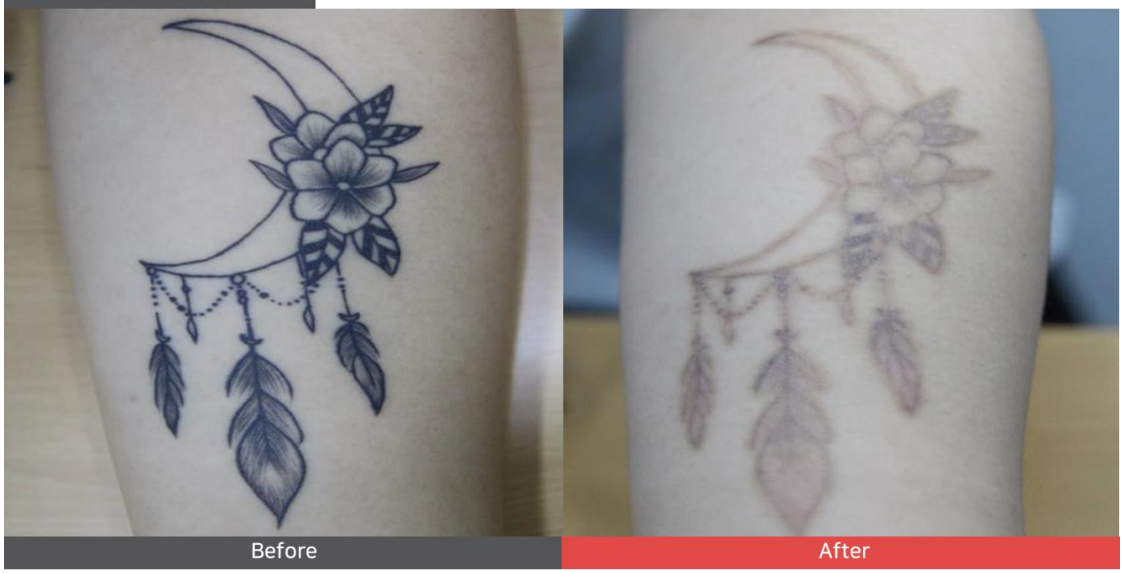
Clinical picture

1064nm

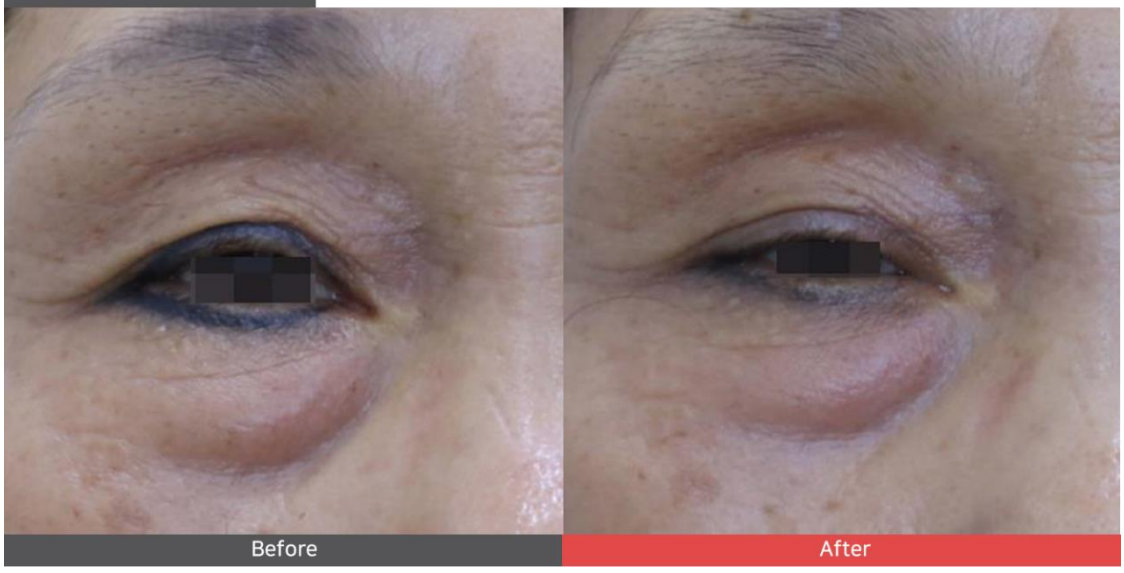
- Black tattoos
- Colored tattoos
- Cosmetic tattoos



Tattoo removal 3times treatment



Tattoo removal 1time treatment



4. Skin Rejuvenation

Principles of Rejuvenation Treatment

In the past, Rejuvenation procedures were performed by applying heat through laser to the dermal layer to induce skin regeneration procedures and treatments through them However, in this process, side effects such as burns and substances may occur due to excessive photo-thermal effects. Due to the continuous development of laser technology, the recent rejuvenation treatment using laser is developing in a direction that minimizes side effects and increases the effectiveness.

Indication of Rejuvenation procedure

You can expect a good effect on patients who wish to improve their skin quality, such as improving their overall skin tone and texture.

Benefits of Rejuvenation with 300 ps

Rejuvenation with 300 Pico-second Laser is recommended as the most effective laser rejuvenation procedure because it enables good LIOB formation due to short pulse duration and high peak power, and minimizes damage to surrounding tissues.

Rejuvenation through LIOB generation using two handpieces

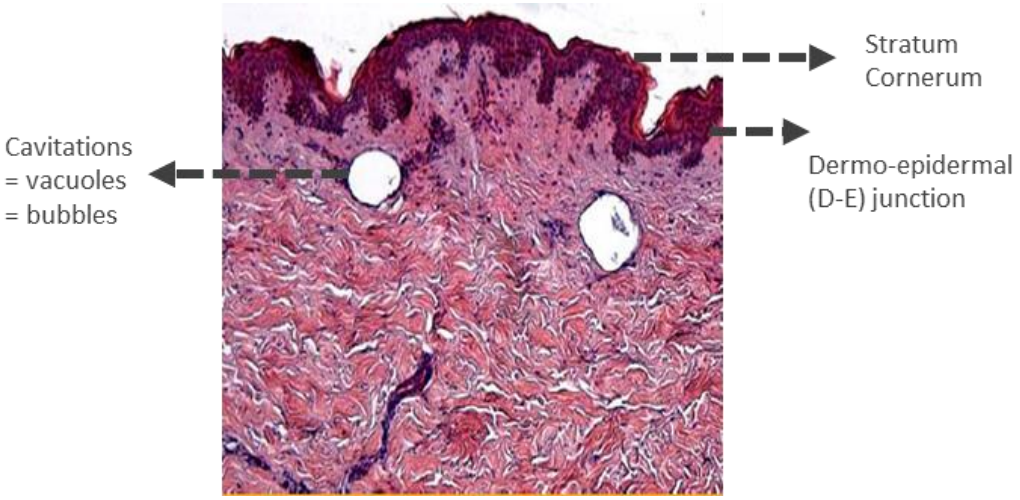
Due to the nature of the laser, the shorter the pulse duration at the same energy value, the higher the power. As a result, plasma is formed in the epidermis and dermis layers irradiated to the laser, resulting from explosive vaporization and physical impact energy, and the cavity created by this is called Laser Induced Optical Breakdown (LIOB). Following the occurrence of LIOB, the body promotes collagen and elastin production in the area due to the general wound healing process, which leads to overall skin improvement. In addition, wounds in the basal layer promote the secretion of wound factors and various synthetic components, leading to dermal remodeling.

Compared to conventional Nanosecond Laser, Picosecond Laser can form Giga Watts' high peak power, which makes it easier to create Laser Induced Optical Breakdown (LIOB) in the dermis, making it an effective device for rejuvenation. The Real 300 Picosecond LASER, with a 300 ps short duration and a peak power of 1.67 GW Max energy of 500 mJ, is even more explosive. In addition, the shorter the pulse duration, the smaller the cavitation size, which has the advantage of reducing side effects

to surrounding tissues.

The DOE handpiece, Multi Handpiece, is designed to divide one laser beam into a predetermined number of segments, focusing on the exact energy and position of each beam. It is set up so that energy that is lost against the energy irradiation value but sufficiently effective in the treatment area can be investigated.

The MLA handpiece is a combination of several focusing lenses, and energy is gathered around each micro-beam, which has the advantage of high energy transfer power. It has the advantage of being able to investigate with a variety of penetration depths and spot sizes, and has two handpieces: a spot-size adjustable Renew Handpiece and a penetration-adjustable Deep Renew Handpiece, which can provide the treatment suitable for patients with the necessary indications.



Skin Rejuvenation(Short Downtime)

Indication and Treatment Guide

Indication	Hand Piece	Wavelength (nm)	Spot Size (㎜)	Fluence (J/㎠)	Pulse Rate (Hz)	Pass	Sessions	Interval (Week)	End Point
Skin Rejuvenation	Multi	1,064	7X7	0.05~0.10	5~10	3~4	5~	1~2	Erythema Mild Petechia
	Deep Renew	1,064	13	0.03~0.08	5~10	3~4	5~	2~3	

Preparations before treatment

1. Anesthetic ointment is determined by clinical judgment based on the patient's skin condition. Anesthetic ointment is applied to the treatment area if the skin is weak or thin, or if the patient is sensitive to pain, although not normally performed. Wait for 15 to 20 minutes after application, then carefully remove the anesthetic ointment to prevent foreign substances from leaving. If foreign

substances remain, the laser may be hit by foreign substances, causing damage to the lens or poor treatment.

2. Determine the appropriate handpiece according to the purpose.

• Multi: When toning and skin texture/pore are treated at once

• Deep Renew: When treating skin texture/pore without downtime

3. The clinician is aware of the possibility of aggressive reactions in the irradiation area with loud noises as the concentrated energy is transferred to the skin during the Multi Handpiece procedure and recommended to explain this to the patient.

Precautions during treatment

1. If you shoot from a float, it may damage the surface without being irradiated to the Depth that fits the indication. During the procedure, make sure that the end of the handpiece is vertically aligned with the skin surface.

2. Since the Pulse Rate requires a tip on the skin, it can start at 5Hz, which is not moving fast, and then increase to 10Hz after handling is familiar.

3. When using the Multi handpiece, set the total face to 1,500-2,000 shots, and when using the Deep Renew handpiece, set the Depth to three stages and investigate 1,500-2,000 shots.

Endpoints and skin reactions immediately after treatment

· Endpoint calculates the occurrence of erythema and edema across the area during treatment. Fluence is recommended to be adjusted at a level where there is no mucosal bleeding.

·Redness and swelling of the treatment area during Mild Treatment are common temporary symptoms. Cooling of the area improves quickly. In the event of point bleeding, it naturally disappears within 2 to 3 days.

Post-treatment care

1. Immediately after the procedure, apply cooling/calming to the area where the ice pack or mask pack and patch have been treated.

2. Steroid ointment and antihistamines can be prescribed for 1 to 2 days to prevent minor skin problems after treatment such as folliculitis.

3. Do not use Retinol or AHA-containing functional cosmetics for 2 days after treatment, and recommend hypoallergenic cosmetics for skin moisturization.

4. Immediately after the procedure, care is required, such as sunblock, moisturizer, and sunblock (SPF+30) Make sure to use protective measures for light blocking during outdoor activities within 30 days of treatment.

5. After treatment, be careful not to engage in activities that rapidly raise blood flow or body temperature until the initial treatment is performed (about a week).(Drinking, exercising sauna, etc.)

6. In case of blisters on the treatment area, contact the hospital immediately.

※ The disease-specific parameters presented above are based on clinician experience using the Picosecond Laser and may be updated continuously in the future. The data is recommended for reference, and for each disease, it is recommended to proceed according to the optimal program through individual lesions, patient characteristics, and clinical judgment.

Pico High Premium Package: Wedding Care Package

(Scent Management – Using Collocated HP)

Basic Package	Pico toning + RF + HIFU **Pico toning** +RF +Needle RF +hydrolifting + Filler +Botox **Pico premium** + Extrusion + sedation management + ampoule management
Pico Premium Package (Advanced)	Week 1: Contour injection + FCR coral filling Week 2: **DOE 532** + Sedation Management Week 3: **Pico toning** + Whitening Week 4: **Pico toning** + Contour injection + Chin Botox Week 5: Genesis Toning + PHA Moisture Tox Week 6: **Pico Praxel** +PDRN + Cryo Week 7: EGF Ampoule Management

Pico Premium Package (Professional)	**Week 1: Pico Pigment Removal** **Week 2: DOE 532+ Pico toning + Sedation Management** **Week 3: Vitamin Care** **Week 4: RF** Week 5: Hifu (There is a difference in the number of shots by part) Week 6: Glow Collagen Booster Week 7: **Pico Fraxel**+Calming Management

Clinical picture

• Skin rejuvenation

5. Skin Renewal

Principles of pore expansion and scarring

Due to aging, excessive exposure to ultraviolet rays, and daily skin problems such as acne, wrinkles and scarring on the skin have a great influence on appearance. Many scientists and clinicians have always conducted various studies on human needs to maintain or restore young, clean skin, which continues to lead to professional technological advances in cosmetics and beauty treatments.

Scars occur during the body's wound healing process and are caused by collagen formation problems, the scale of immature collagen, and sometimes reduced blood supply to the wound. The types of scars are hypertrophic (the area protrudes upward) and atrophic (downward, like a crater), and these scars fade over time but may remain permanently on the skin, which is directly related to people's quality of life.

Indication of pore dilatation and scar treatment

By applying to enlarged pores and scars on the skin surface caused by a number of causes, you can expect improved results with the skin wound regeneration process.

Advantages of pore dilatation and scar treatment using 300 ps

Skin Renewal treatment with 300 Pico-second Laser is effective in solving scarring and pore problems, showing clinical usefulness to skin regeneration, and also improving pigmentation and healing effects after scar treatment. This can be explained below.

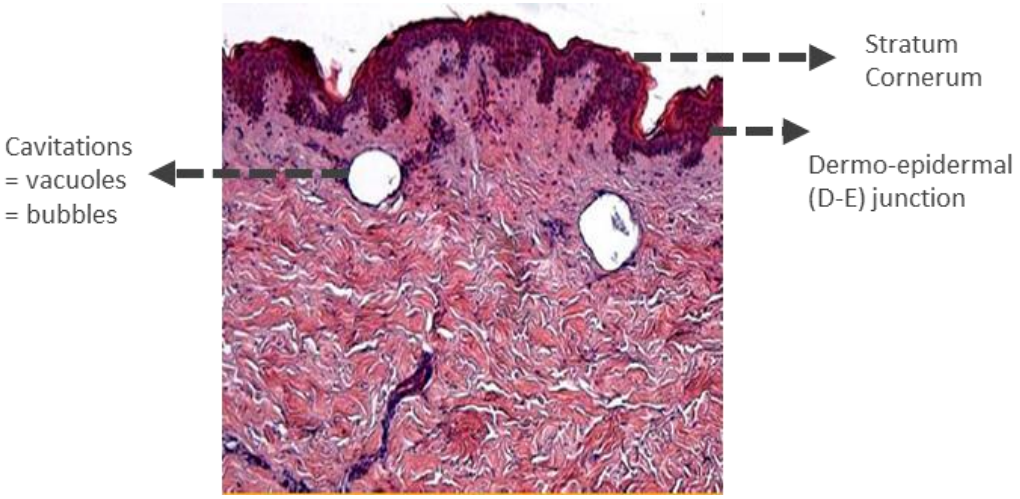
LIOB Concepts and Treatment Principles

Due to the nature of the laser, the shorter the pulse duration at the same energy value, the higher the power. As a result, plasma is formed in the epidermis and dermis layers irradiated to the laser, resulting from explosive vaporization and physical impact energy, and the cavity created by this is called Laser Induced Optical Breakdown (LIOB). Following the occurrence of LIOB, the body promotes collagen and elastin production in the area due to the general wound healing process, which leads to overall skin improvement. In addition, wounds in the basal layer promote the secretion of wound factors and various synthetic components, leading to dermal remodeling.

Compared to conventional Nanosecond Laser, Picosecond Laser can form Giga Watts' high peak power, which makes it easier to create Laser Induced Optical Breakdown (LIOB) in the dermis, making it an effective device for rejuvenation. The Real 300 Picosecond LASER, with a 300 ps short duration and a peak power of 1.67 GW Max energy of 500 mJ, is even more explosive. In addition, the shorter

the pulse duration, the smaller the cavitation size, which has the advantage of reducing side effects to surrounding tissues.

The MLA handpiece is a combination of several focusing lenses, and energy is gathered around each micro-beam, which has the advantage of high energy transfer power. It has the advantage of being able to investigate with a variety of penetration depths and spot sizes, and has two handpieces: a spot-size adjustable Renew Handpiece and a penetration-adjustable Deep Renew Handpiece, which can provide the treatment suitable for patients with the necessary indications.



Indication and Treatment Guide

Acne Scar(Full Face) / Acne & Scratched Scar(Normal & Mild)

Indication	Hand Piece	Wavelength (nm)	Spot Size (㎜)	Fluence (J/㎠)	Pulse Rate (Hz)	Pass	Sessions	Interval (Week)	End Point
Acne Scar (Full Face)	Deep Renew	1,064	13	0.10~0.20	5~10	3	3	4~6	Petechia +Edema
	Renew	1,064	10	0.12~	5~10	3~4	3	3~4	
	Multi	1,064	7X7	0.08~0.20	5~10	1~2	3	2~4	
Partial Acne & Scratched Scar(Normal)	Renew	1,064	4	0.80~	2	Stacking (3~4sec)	3	4~6	
			5	0.50~	5~10	3~4	3	4~6	
Partial Acne & Scratched Scar(Mild)			4	0.20~0.50	2	Stacking (3~4sec)	3	4~6	Erythema Mild Petechia Edema
			5	0.13~0.30	5~10	3~4	3	4~6	

Preparations before treatment

1. Apply anesthetic ointment to the treatment area prior to treatment. Wait 40 to 60 minutes after application and carefully remove anesthetic ointment to prevent foreign substances from leaving. If

foreign substances remain, the laser may be hit by foreign substances, causing damage to the lens or poor treatment.

2. Determine the appropriate handpiece and spot size according to the purpose.

• Deep Renew: When treating areas with wide pores / acne marks

Depth For steps 1 to 4, start with step 4 and step 1 per step

500 to 750 shots, 2,000 to 3,000 shots in total

• Renew: For treatment of areas smaller than 13mm

• Multi: For uneven skin surface treatment over scars

Precautions during treatment

1. If you shoot from a space, the penetration depth may not be accurate, so make sure that the end of the handpiece is vertically placed close to the skin surface during the procedure.

2. In the case of pore scars during MLA procedures, select a spot size that is one step larger than the actual lesion size. You need to be in close contact with the skin to maximize the effectiveness of the procedure by accurately investigating the laser on the depth that fits the indication.

3. Since the Pulse Rate needs to be treated with a tip on the skin, it can be started at 5Hz, which is not moving fast, and then raised to 10Hz after handling is familiar.

4. The clinician may consider performing 1 to 2 pass additional procedures for the Large Pore area rather than the contents presented in the parameter.

5. Before partial scar treatment, the scar and surrounding area can be investigated widely with deep renewal handpiece treatment parameters to further maximize the clinical effect after surrounding.

6. When treating partial scars, stack the scar area 2-3 times and observe the endpoint reaction.

Endpoints and skin reactions immediately after treatment

· Bleeding may occur depending on the number of stacking shots. Petechia will disappear within 3 to 5 days.

· Endpoints calculate the occurrence of edema across the treatment area during normal scar removal.

Depending on the investigation of energy values, bleeding may occur. In the event of point bleeding, it naturally disappears within 2 to 3 days.

·Redness and swelling of the treatment area during Mild Treatment are common temporary symptoms. Cooling of the area improves quickly.

Post-treatment care

1. Immediately after the procedure, apply cooling/calming to the area where the ice pack or mask pack and patch have been treated.

2. Steroid ointment and antihistamines can be prescribed for 1 to 2 days to prevent minor skin problems after treatment such as folliculitis.

3. Do not use Retinol or AHA-containing functional cosmetics for 2 days after treatment, and recommend hypoallergenic cosmetics for skin moisturization.

4. Immediately after the procedure, care is required, such as sunblock, moisturizer, and sunblock (SPF+30) Make sure to use protective measures for light blocking during outdoor activities within 30 days of treatment.

5. After treatment, be careful not to engage in activities that rapidly raise blood flow or body temperature until the initial treatment is performed (about a week).(Drinking, exercising sauna, etc.)

6. In case of blisters on the treatment area, contact the hospital immediately.

※ The disease-specific parameters presented above are based on clinician experience using the Picosecond Laser and may be updated continuously in the future. The data is recommended for reference, and for each disease, it is recommended to proceed according to the optimal program through individual lesions, patient characteristics, and clinical judgment.

Pico Fraxel Package (Fractional HP-MLA): Select handpiece depending on treatment area /

Adjust scars, pores according to progress, maintain 4 weeks' interval

Basic package	Pico pores, scars + soothing and regeneration management (including regeneration factors) Pico pores, scar + 1927 laser + Sedation and regeneration management (including regeneration factors)
Pico Fraxel Package (pico fraxel + pico toning + Needle RF)	Week 1: **Pico Toning** +LDM +LED Week 2: Laser Toning + Whitening Management Week 3: Long Pulse 755/1064 + Whitening Management Week 4: **Pico Fraxel** + Regeneration Management Week 5: LDM Playback Management Week 6: **Pico Toning** + Whitening Week 7: Needle RF + Replay Management Week 8: LDM Playback Management Week 9: Laser Toning + Whitening Management Week 10: **Pico Toning** + Whitening Week 11: Long Pulse 755/1064+LED Week 12: **Pico Fraxel** + Regeneration Management Week 13: LDM Playback Management Week 14: Laser toning + ampoule management Week 15: **Pico Toning** + Whitening Management
Pico Fraxel Package	(Choice two) Pico Fraxel + **Needle RF + [Er:YAG/CO2]** +Er.:GLASS Pick 2

Clinical picture

- Enlarged pores
- Scars

Acne Scar 14times treatment

Large pores 5times treatment

Large pores & Acne scar 5times treatment

Chapter VI. Q&A

✓ **What is Picosecond?**

➔ 10^{-12} = billionth second

➔ Picosecond Laser: Equipment developed to minimize skin damage by irradiating high energy in a very short time, 1,000 times faster than a billionth of a second, a Nanosecond Laser used primarily in conventional laser equipment

✓ **What's the differences between DOE and VMLA principles?**

DOE (Diffractive Optic Element)

➔ Formation of fractional beams in the form of beam splitting through units

➔ Delicate and accurate energy by creating a uniform energy distribution

VMLA (Variable Micro Lens Array)

➔ The principle that collagen is synthesized by creating a small micro space under the skin without damaging the upper layer of the skin

✓ **What is the formula for calculating Peak Power?**

(W) Unit = Power X Time

$$\text{Peak power} = \frac{\text{Energy}}{\text{Pulsewidth}} = \frac{\text{Average power}}{\text{PRR} * \text{pulsewidth}}$$

(See Appendix)

✓ **What are the features of 300 ps laser compared to 700 / 450 ps?**

➔ At 700 ps, it is difficult to apply to patients with skin time 4 or higher due to high melanin absorption, and tissue damage is large and recovery time is prolonged due to excessive energy absorption when tattoos are removed.

➔ At 450 ps, there is a difference in the effect of removing pigments and tattoos, and the Spot Size of Collimation HP is smaller than 300 ps Laser, requiring more handling during

toning procedures.

✓ **What's the effective handpiece for each leisons?**

- By tattoo color: ZOOM HP
- Flakes and pigmentation: COLLIMATION HP, ZOOM HP, DOE HP
- Rejuvenation: VMLA HP, DOE HP

✓ **Comparison of MLA & DOE handpieces, strong point and specific target lesion**

MLA(Scar, Rejuvenation)	Pico Fraxel	DOE(pigmented toning)
Very high	**Energy Efficiency**	Relatively low
Relatively low	**Energy Equivalence**	Very uniform
1) Skin regeneration 2) Rejuvenation 3) Pigmented disease	**Clinical Sequence**	1) Pigmented disease 2) Rejuvenation 3) Skin regeneration

✓ **Let me know Gross Weight & Dimension of 300 Pico-second Laser accurately.**

➔ Gross Weight: 180KG

➔ Dimension: 455(W) X 1040(L) X 975(H) (brochure size)

1550 X 740 X 1290 mm (real size)

✓ **Are there any requirements for 300 Pico-second Laser Distribution?**

➔ Recommended wearing goggles (risk of eye blindness), beware of accessories around the operator's hand or subject.

➔ The treatment room environment is a mirrorless room by the risk of reflection

✓ **What is the difference between picosecond laser and long-pulsed laser treatment?**

➔ Existing Long-Pulsed Laser: Heat is applied to tissues in the skin through laser to promote skin regeneration, damage to surrounding tissues due to excessive heat, and side effects such as burns and blisters on irradiated areas

➔ Picosecond Laser: This minimizes heat irradiation with laser to reduce pain and prevents disruption to daily life after treatment with a short recovery period

✓ **Do you have skin trouble after laser treatment?**

➔ The Picoseond Laser uses a short Pulse Duration compared to the existing laser, but it can cause trouble during pigmentation. However, it disappears within a few days of temporary expression

✓ **How much time do I need for laser treatment?**

➔ Depending on the type of lesion treatment, it may take 5 to 10 minutes for a mild procedure

✓ **Can I drink or smoke?**

➔ Laser treatment is a treatment that heats the skin, and it is recommended to limit drinking and smoking, which may affect body temperature, for about a week after treatment

Chapter Ⅴ. Guidelines Before and After Treatment

1. Pre-treatment Guidelines

Skin care before treatment

Avoid using sun exposure tanning and tanning products at least 4 weeks ago.

Avoid using skin irritating cosmetics (ex-scrub) or other procedures at least two weeks before.

Wash your face

Pre-clean the treatment area so that there are no makeup or cosmetic residue.

Remove accessories such as earring necklaces and watches as the laser beam may be reflected during treatment.

Diagnosis

Proper diagnosis of the patient's disease is carried out using visual, magnifying glass, UV light, and diagnostic equipment.

Counseling

Check the patient's skin type, conditions, past history, laser treatment experience, and presence or absence of clinical contraindications

This is an essential procedure for clinicians to establish accurate treatment protocols with observations of lesions, and is the basis for accurate diagnosis of the disease along with the characteristics of the observed lesions.

After a clinical diagnosis of the lesion, the patient is informed of the diagnosis, possible treatment techniques and principles, treatment response and expected progress, possible side effects, and general precautions for laser treatment.

Discuss with the patient in advance as below.

- General Treatment: Treatment requirements, anesthesia, treatment interval and frequency, treatment cost, etc
- Pigment therapy: duration of lesion, origin of occurrence (preliminary or acquired), response to past treatment, skin response to daylight
- Tattoo removal: Difficulty of the procedure depending on the professionalism of the tattooist, the association between skin type and possible side effects of the tattoo procedure,

the difference between the expected effect and actual treatment of the tattoo treatment, and information on the tattoo procedure (period, type of ink and dye, allergic reaction to pigment, or not)

Check the patient for contraindications of laser treatment.

- a patient with cancer or other malignant diseases
- Patients with diabetes, connective tissue disease, systemic immune system disease, radioactive or chemotherapy treatment
- Patients with allergies to local anesthetics, antibiotics, or other drugs
- a mentally ill person such as alcohol or drug abuse
- photosensitive skin
- Patients who cannot or do not faithfully follow the instructions for post-treatment care
- Patients with unrealistic expectations of laser treatment

Check for laser treatment contraindications for tattoo patients.

- Patients with darker skin than tattoo color, such as darkened skin due to excessive tanning and sunbathing before treatment: treatment with a minimum interval of 3 to 6 months maximum

Picture

Get pre-treatment photos for future progress, comparison and results. Obtain three or more clinical pictures, front, right, and left, including the lesion area.

For future comparisons, set the same camera settings, lighting, background, and treatment area angle as the pre-treatment photography.

Anesthesia

Sometimes anesthetic ointment can be applied to reduce discomfort in the procedure.

After applying anesthetic ointment, wrap it up and proceed for 30 to 60 minutes.

It is a task that is usually performed when using high energy such as tattoo removal and scar treatment.

When used in a large area, excessive application of anesthetic components can cause side effects,

so be careful when using it.

1. Post-treatment Guidelines

· Skin reactions, such as erythema and swelling, are common after treatment. These reactions usually subside after two or three days.

· If the symptoms are severe or persist after 2-3 days, contact the hospital

Blisters, exudates, or bleeding within 24 hours of treatment

Severe pain or pain that lasts 24 hours

· After inflammation, hyperpigmentation (PIH) is a common adverse reaction during laser procedures and occurs three to four weeks after the procedure. This can be suspected if the treatment area becomes darker than the surrounding skin, and for Asians, it is interpreted as the cause of excessive laser treatment. This naturally disappears after 3 to 6 months, and PIH can easily appear in patients with darker skin tones. In case of occurrence, hydroquinone ointment can be used with sunscreen or recovered through toning treatment.

· The decolorization appears during a wavelength band procedure with a high melanin absorption rate, which has a lighter color compared to normal skin around it, and recovers after about 4 weeks.

· Hypertrophic or keloid scarring may occur with only a small number of specific constitution during scar treatment. This is caused by infection when care is neglected after the procedure, and it easily occurs in areas where the fat layer is thin and close to the bone.

· In some patients with sensitive skin, itching caused by laser irritation may appear early in the procedure, but this is recoverable by short-term use of cooling measures or hydrocodone studies for the area.

· Repeated procedures using high parameters for the same area may cause skin changes, but this can be recovered over time. It is more effective when combined with Fractional Laser treatment.

· Tattoo particles located inside the dermis layer or tattoos using various pigments may not be completely removed despite repeated treatment. Or, in the case of ink containing iron oxide, it may turn black by reacting with a laser, which may be difficult to treat or may require multiple repetitive treatments, and may not be fully improved.

· In principle, gauze dressing is recommended after tattoo removal, and it is recommended to visit the hospital 1-2 days after treatment to replace the dressing.

· If dressing is performed after treatment (tattoo removal or MLA HP treatment), be careful not to touch water for 3 to 5 days and change daily.

· Avoid exposure to sunlight immediately after the treatment, and use sunscreen (SPF+30 or higher) for other procedures.

· Apply regenerative cream and moisturizing cream from time to time to maintain moisture on your skin.

· If a scab is generated after pigmented lesions, tattoo treatments, or MLAs, the face will naturally fall out within 5-7 days and the body will fall out within 7-14 days. Do not artificially tear or scratch scabs.

· You can wash your face or make-up the day after the procedure.

For tattoo removal, be careful not to touch the treatment area for 3 to 5 days and avoid makeup.

· Avoid sun exposure, tanning and tanning products for a minimum of 4 weeks.

· The peeling/scrub product is not used for about 1-2 weeks.

· Avoid skin irritating behaviors such as hot baths, saunas, strenuous exercise, and swimming for about 1-2 weeks.

· Smoking and drinking can delay the skin healing process or cause inflammation.

Chapter Ⅶ. Supplement

1. Precautions

General precautions

Familiarize yourself with and understand the manual before operating the Laser equipment, receive and use the relevant professional training, and verify normal operation before use

* The Laser investigation room must have a Laser warning label attached to the entrance

* This Laser Equipment is a Medical Laser Equipment and should only be used for medical purposes.

* Handlers should be familiar with the instructions, take appropriate safety measures and are always aware of possible hazards

* This device must not be arbitrarily dismantled and modified

* Only the manufacturer or authorized person to handle and repair the machine in connection with the repair of the machine

* Be sure to read the safety instructions of professional technicians and manufacturers before using it, and obtain relevant professional training before using it

* Make sure to ground the main body

* Do not use anything other than the supplied accessories

* Do not apply arbitrary or excessive impact to the body

* This device is a Laser Safety Class 4 device, so please be careful when using it

* Avoid using large instantaneous currents such as generators, X-Ray equipment, etc. around the instrument, or in places where electromagnetic exposure is severe.

* Use non-flammable substances for anesthesia, skin preparation, and cleaning and sterilization of the instrument

* Minimize the combustible substances (such as alcohol) in the operating room, and if gauze is required during the procedure, wet it first.

* Always provide a fire extinguisher and water in the treatment room

* The installation and removal of the arm (ARM) must be carried out by an authorized personnel, so contact an authorized personnel

Application precautions

Pay attention to prevent the laser beam from leaving the investigation room during the investigation

* Be careful not to let the laser beam radiate to a glass, mirror, or other light-reflecting material

* All investigators, assistants, investigators, and surgery personnel who are directly exposed to the laser equipment must wear laser defense glasses Laser irradiation directly to the eyes can cause damage to the cornea and lens, leading to blindness. In particular, the 1,064㎚ wavelength is immediately absorbed into the eye retina by non-visible light, resulting in permanent blindness. Symptoms of corneal damage caused by laser are out of focus, blurred vision, and feel like foreign substances have entered the eyes.

* Before using the equipment, make sure that the bending arm handpiece footswitch and other accessories are properly installed on the equipment

* Ensure that all power cords are connected correctly before using the equipment

* If you want to use a device that has not been used for a long time, make sure that the device is functioning properly

* During laser treatment, tissue particles may be discharged according to the process of increasing production, resulting in smoke. It is recommended to install smoke inhalation equipment in the operating room and use the device in a ventilated area.

* Do not disassemble or use the equipment recklessly in the event of a failure, as the engineer from the authorized manufacturer must repair it

* Do not modify or disassemble the machine arbitrarily as it generates a high voltage inside the machine

Laser-only eyeglasses (Examiner)	Defense Glasses (Patient)
	

2. Laser Treatment Consent

Patient Consent

Patient Name		Date of Birth	
Current Medication		Medication Name	
Allergy or Not		Allergy Name	
Disease or Not		Disease Name	
Treatment Experience or Not		Treatment Name	

▶If you have been treated waxing, scrubbing, or fine peeling before the procedure, the procedure is recommended after 7-10 days.

▶If you have a keloid constitution, you must consult a doctor.

Laser treatment is performed for the purpose of wrinkle, pigmented lesion, acne and scar treatment, and skin regeneration, and may require treatment for a certain period of time for the best results depending on the purpose and condition of the lesion. A single procedure does not show the maximum effect, and depending on the severity of the lesion and the condition of the skin, the following symptoms may occur even if the procedure proceeds normally.

Pain	Feeling burned or similar discomfort Similar to the feeling of sunburn, lasting up to 24 hours
Erythema and swelling	Redness or temperature increase of skin immediately after treatment, swelling of treatment area Temporary phenomenon that lasts for a short period of time, cooling pack can relieve symptoms. Depending on the severity, it can be reduced by taking antihistamine allergy medicine.
Blisters and scars	Blistering of treatment area, careless management after treatment, scarring may occur
Hyperpigmentation	It can cause hyperpigmentation of dark colors compared to the surrounding skin color. A temporary phenomenon that lasts for 2 to 6 months, pigment changes occur when exposed to sunlight. Refrain from UV exposure and recommend using sunscreen due to increased possibility.
Simple herpes zoster	If you have a history of simple herpes virus infection, it can recur. It is preventable by taking antiviral drugs prior to treatment and can be prescribed if necessary.

Most laser treatments show significant improvement, but some patients may feel the difference in the degree of improvement due to differences in skin conditions. Proper application of clinician-provided procedures is required to get best results.

Refund is not available for any reason after the procedure is completed, and the same applies to package products and partial use.

I have been familiar with the above consent form prior to the procedure and am aware and agree to the expected outcome of the procedure and how to deal with the procedure.

3. Energy table by handpieces

■ **Output value according to the size of the irradiation area of ZMLA(532mm)**

ZMLA(1064nm)										
Fluence (J/cm2)	Spot Size (mm)	4	5	6	7	8	9	10	11	12
	Output Energy	[mJ]								
0.01			2.0	2.8	3.8	5.0	6.4	7.9	9.5	11.3
0.02		2.5	3.9	5.7	7.7	10.0	12.7	15.7	19.0	22.6
0.03		3.8	5.9	8.5	11.5	15.1	19.1	23.6	28.5	33.9
0.04		5.0	7.9	11.3	15.4	20.1	25.4	31.4	38.0	45.2
0.05		6.3	9.8	14.1	19.2	25.1	31.8	39.3	47.5	56.5
0.06		7.5	11.8	17.0	23.1	30.1	38.2	47.1	57.0	67.8
0.07		8.8	13.7	19.8	26.9	35.2	44.5	55.0	66.5	79.1
0.08		10.0	15.7	22.6	30.8	40.2	50.9	62.8	76.0	90.4
0.09		11.3	17.7	25.4	34.6	45.2	57.2	70.7	85.5	101.7
0.10		12.6	19.6	28.3	38.5	50.2	63.6	78.5	95.0	113.0
0.11		13.8	21.6	31.1	42.3	55.3	69.9	86.4	104.5	124.3
0.12		15.1	23.6	33.9	46.2	60.3	76.3	94.2	114.0	135.6
0.13		16.3	25.5	36.7	50.0	65.3	82.7	102.1	123.5	147.0
0.14		17.6	27.5	39.6	53.9	70.3	89.0	109.9	133.0	158.3
0.15		18.8	29.4	42.4	57.7	75.4	95.4	117.8	142.5	169.6
0.16		20.1	31.4	45.2	61.5	80.4	101.7	125.6	152.0	180.9
0.17		21.4	33.4	48.0	65.4	85.4	108.1	133.5	161.5	192.2
0.18		22.6	35.3	50.9	69.2	90.4	114.5	141.3	171.0	203.5
0.19		23.9	37.3	53.7	73.1	95.5	120.8	149.2	180.5	214.8
0.20		25.1	39.3	56.5	76.9	100.5	127.2	157.0	190.0	226.1
0.30		37.7	58.9	84.8	115.4	150.7	190.8	235.5	285.0	339.1
0.40		50.2	78.5	113.0	153.9	201.0	254.3	314.0	379.9	452.2
0.50		62.8	98.1	141.3	192.3	251.2	317.9	392.5		
0.60		75.4	117.8	169.6	230.8	301.4	381.5	471.0		
0.70		87.9	137.4	197.8	269.3	351.7	445.1			
0.80		100.5	157.0	226.1	307.7	401.9	508.7			
0.90		113.0	176.6	254.3	346.2	452.2				
1.00		125.6	196.3	282.6	384.7	502.4				
1.10		138.2	215.9	310.9	423.1					
1.20		150.7	235.5	339.1	461.6					
1.30		163.3	255.1	367.4	500.0					
1.40		175.8	274.8	395.6						
1.50		188.4	294.4							
1.60		201.0	314.0							
1.70		213.5	333.6							
1.80		226.1	353.3							
1.90		238.6	372.9							
2.00		251.2	392.5							
2.10		263.8	412.1							
2.20		276.3								
2.30		288.9								
2.40		301.4								
2.50		314.0								
2.60		326.6								
2.70		339.1								
2.80		351.7								
2.90		364.2								
3.00		376.8								

■ **VLMA (1064 mm) Output value according to the size of the irradiation area of the handpiece**

VMLA(1064nm)		
Fluence (J/cm2)	Spot Size (mm)	13
	Output Energy	[mJ]
0.01		13.3
0.02		26.5
0.03		39.8
0.04		53.1
0.05		66.3
0.06		79.6
0.07		92.9
0.08		106.1
0.09		119.4
0.10		132.7
0.11		145.9
0.12		159.2
0.13		172.5
0.14		185.7
0.15		199.0
0.16		212.3
0.17		225.5
0.18		238.8
0.19		252.1
0.20		265.3
0.25		331.7
0.30		398.0
0.35		464.3

■ Output value and irradiation depth adjustment according to irradiation area size of VMLA (532mm) handpiece

VMLA(532nm)		
Fluence (J/cm2)	Spot Size (mm)	13
	Output Energy	[mJ]
0.01		13.3
0.02		26.5
0.03		39.8
0.04		53.1
0.05		66.3
0.06		79.6
0.07		92.9
0.08		106.1
0.09		119.4
0.10		132.7
0.11		145.9
0.12		159.2
0.13		172.5
0.14		185.7
0.15		199.0
0.16		212.3
0.17		225.5
0.18		238.8
0.19		252.1

■ Output value of collimated 1064 handpiece according to the size of the irradiation area

Collimation 1064		
Fluence (J/cm2)	Spot Size (mm)	10
	Output Energy	[mJ]
0.01	0	7.9
0.02		15.7
0.03		23.6
0.04		31.4
0.05		39.3
0.06		47.1
0.07		55.0
0.08		62.8
0.09		70.7
0.10		78.5
0.11		86.4
0.12		94.2
0.13		102.1
0.14		109.9
0.15		117.8
0.16		125.6
0.17		133.5
0.18		141.3
0.19		149.2
0.20		157.0
0.22		172.7
0.24		188.4
0.26		204.1
0.28		219.8
0.30		235.5
0.32		251.2
0.34		266.9
0.36		282.6
0.38		298.3
0.40		314.0
0.42		329.7
0.44		345.4
0.46		361.1
0.48		376.8
0.50		392.5
0.52		408.2
0.54		423.9
0.56		439.6
0.58		455.3
0.60		471.0

■ **Output value of DOE 1064 handpiece according to size of irradiation area**

DOE 1064		
Fluence (J/cm2)	Spot Size (mm)	Quadrangle (7, 10)
	Output Energy	[mJ]
0.01		10.0
0.02		20.0
0.03		30.0
0.04		40.0
0.05		50.0
0.06		60.0
0.07		70.0
0.08		80.0
0.09		90.0
0.10		100.0
0.11		110.0
0.12		120.0
0.13		130.0
0.14		140.0
0.15		150.0
0.16		160.0
0.17		170.0
0.18		180.0
0.19		190.0
0.20		200.0
0.25		250.0
0.30		300.0
0.35		350.0
0.40		400.0
0.45		450.0
0.50		500.0

Output value of DOE 532 handpiece according to size of irradiation area

DOE 532		
Fluence (J/cm2)	Spot Size (mm)	Quadrangle (7, 10)
	Output Energy	[mJ]
0.01		10.0
0.02		20.0
0.03		30.0
0.04		40.0
0.05		50.0
0.06		60.0
0.07		70.0
0.08		80.0
0.09		90.0
0.10		100.0
0.11		110.0
0.12		120.0
0.13		130.0
0.14		140.0
0.15		150.0
0.16		160.0
0.17		170.0
0.18		180.0
0.19		190.0
0.20		200.0
0.21		210.0
0.22		220.0
0.23		230.0
0.24		240.0
0.25		250.0

■ **Output value according to the size of the irradiation area of the Zoom (532 nm) handpiece**

Zoom 532										
Fluence (J/cm2)	Spot Size (mm)	1.5	2	3	4	5	6	6.5	7	7.5
	Output Energy	[mJ]								
0.01										4.4
0.02							5.7	6.6	7.7	8.8
0.03						5.9	8.5	9.9	11.5	13.2
0.04					5.0	7.9	11.3	13.3	15.4	17.7
0.05					6.3	9.8	14.1	16.6	19.2	22.1
0.06				4.2	7.5	11.8	17.0	19.9	23.1	26.5
0.07				4.9	8.8	13.7	19.8	23.2	26.9	30.9
0.08				5.7	10.0	15.7	22.6	26.5	30.8	35.3
0.09				6.4	11.3	17.7	25.4	29.8	34.6	39.7
0.10				7.1	12.6	19.6	28.3	33.2	38.5	44.2
0.11				7.8	13.8	21.6	31.1	36.5	42.3	48.6
0.12				8.5	15.1	23.6	33.9	39.8	46.2	53.0
0.13			4.1	9.2	16.3	25.5	36.7	43.1	50.0	57.4
0.14			4.4	9.9	17.6	27.5	39.6	46.4	53.9	61.8
0.15			4.7	10.6	18.8	29.4	42.4	49.7	57.7	66.2
0.16			5.0	11.3	20.1	31.4	45.2	53.1	61.5	70.7
0.17			5.3	12.0	21.4	33.4	48.0	56.4	65.4	75.1
0.18			5.7	12.7	22.6	35.3	50.9	59.7	69.2	79.5
0.19			6.0	13.4	23.9	37.3	53.7	63.0	73.1	83.9
0.20			6.3	14.1	25.1	39.3	56.5	66.3	76.9	88.3
0.25		4.4	7.9	17.7	31.4	49.1	70.7	82.9	96.2	110.4
0.30		5.3	9.4	21.2	37.7	58.9	84.8	99.5	115.4	132.5
0.35		6.2	11.0	24.7	44.0	68.7	98.9	116.1	134.6	154.5
0.40		7.1	12.6	28.3	50.2	78.5	113.0	132.7	153.9	176.6
0.45		7.9	14.1	31.8	56.5	88.3	127.2	149.2	173.1	198.7
0.50		8.8	15.7	35.3	62.8	98.1	141.3	165.8	192.3	220.8
0.55		9.7	17.3	38.9	69.1	107.9	155.4	182.4	211.6	242.9
0.60		10.6	18.8	42.4	75.4	117.8	169.6	199.0	230.8	
0.65		11.5	20.4	45.9	81.6	127.6	183.7	215.6	250.0	
0.70		12.4	22.0	49.5	87.9	137.4	197.8	232.2		
0.75		13.2	23.6	53.0	94.2	147.2	212.0	248.7		
0.80		14.1	25.1	56.5	100.5	157.0	226.1			
0.85		15.0	26.7	60.1	106.8	166.8	240.2			
0.90		15.9	28.3	63.6	113.0	176.6				
0.95		16.8	29.8	67.1	119.3	186.4				
1.00		17.7	31.4	70.7	125.6	196.3				
1.10		19.4	34.5	77.7	138.2	215.9				
1.20		21.2	37.7	84.8	150.7	235.5				
1.30		23.0	40.8	91.8	163.3	255.1				
1.40		24.7	44.0	98.9	175.8					
1.50		26.5	47.1	106.0	188.4					
1.60		28.3	50.2	113.0	201.0					
1.70		30.0	53.4	120.1	213.5					
1.80		31.8	56.5	127.2	226.1					
1.90		33.6	59.7	134.2	238.6					
2.00		35.3	62.8	141.3	251.2					
2.10		37.1	65.9	148.4						
2.20		38.9	69.1	155.4						
2.30		40.6	72.2	162.5						
2.40		42.4	75.4	169.6						
2.50		44.2	78.5	176.6						
2.60		45.9	81.6	183.7						

■ **Output value according to the size of the irradiation area of the Zoom (1064nm) handpiece**

Zoom 1064										
Fluence (J/cm2)	Spot Size (mm)	2	3	4	5	6	7	8	9	10
	Output Energy	[mJ]								
0.02								10.0	12.7	15.7
0.03							11.5	15.1	19.1	23.6
0.04						11.3	15.4	20.1	25.4	31.4
0.05						14.1	19.2	25.1	31.8	39.3
0.06					11.8	17.0	23.1	30.1	38.2	47.1
0.07					13.7	19.8	26.9	35.2	44.5	55.0
0.08				10.0	15.7	22.6	30.8	40.2	50.9	62.8
0.09				11.3	17.7	25.4	34.6	45.2	57.2	70.7
0.10				12.6	19.6	28.3	38.5	50.2	63.6	78.5
0.11				13.8	21.6	31.1	42.3	55.3	69.9	86.4
0.12				15.1	23.6	33.9	46.2	60.3	76.3	94.2
0.13				16.3	25.5	36.7	50.0	65.3	82.7	102.1
0.14				17.6	27.5	39.6	53.9	70.3	89.0	109.9
0.15			10.6	18.8	29.4	42.4	57.7	75.4	95.4	117.8
0.16			11.3	20.1	31.4	45.2	61.5	80.4	101.7	125.6
0.17			12.0	21.4	33.4	48.0	65.4	85.4	108.1	133.5
0.18			12.7	22.6	35.3	50.9	69.2	90.4	114.5	141.3
0.19			13.4	23.9	37.3	53.7	73.1	95.5	120.8	149.2
0.20			14.1	25.1	39.3	56.5	76.9	100.5	127.2	157.0
0.30			21.2	37.7	58.9	84.8	115.4	150.7	190.8	235.5
0.40		12.6	28.3	50.2	78.5	113.0	153.9	201.0	254.3	314.0
0.50		15.7	35.3	62.8	98.1	141.3	192.3	251.2	317.9	392.5
0.60		18.8	42.4	75.4	117.8	169.6	230.8	301.4	381.5	471.0
0.70		22.0	49.5	87.9	137.4	197.8	269.3	351.7	445.1	
0.80		25.1	56.5	100.5	157.0	226.1	307.7	401.9	508.7	
0.90		28.3	63.6	113.0	176.6	254.3	346.2	452.2		
1.00		31.4	70.7	125.6	196.3	282.6	384.7	502.4		
1.10		34.5	77.7	138.2	215.9	310.9	423.1			
1.20		37.7	84.8	150.7	235.5	339.1	461.6			
1.30		40.8	91.8	163.3	255.1	367.4	500.0			
1.40		44.0	98.9	175.8	274.8	395.6				
1.50		47.1	106.0	188.4	294.4	423.9				
1.60		50.2	113.0	201.0	314.0	452.2				
1.70		53.4	120.1	213.5	333.6	480.4				
1.80		56.5	127.2	226.1	353.3	508.7				
1.90		59.7	134.2	238.6	372.9					
2.00		62.8	141.3	251.2	392.5					
2.20		69.1	155.4	276.3	431.8					
2.40		75.4	169.6	301.4	471.0					
2.60		81.6	183.7	326.6						
2.80		87.9	197.8	351.7						
3.00		94.2	212.0	376.8						
3.20		100.5	226.1	401.9						
3.40		106.8	240.2	427.0						
3.60		113.0	254.3	452.2						
3.80		119.3	268.5	477.3						
4.00		125.6	282.6	502.4						
4.20		131.9	296.7							
4.40		138.2	310.9							
4.60		144.4	325.0							
4.80		150.7	339.1							

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This product is a 'medical machine', and please read and use 'Precautions for Use' and 'How to Use'.
PicoHi is an Nd:YAG laser surgical machine, a pigment laser surgical machine.

Purpose of use

1. Nd:YAG Surgical Machine: Laser Surgical Machine that uses Nd:YAG as a medium for the purpose of incision, destruction, and removal of tissue

2. Pigment laser surgical machine: A laser surgical instrument that uses pigments as a medium for the purpose of incision, destruction, and removal of tissues.

Medical Staff Only

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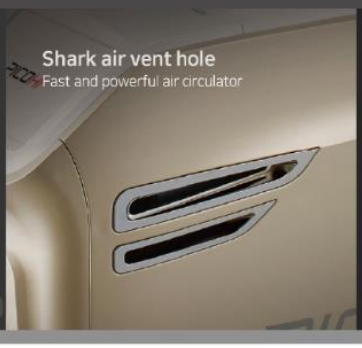
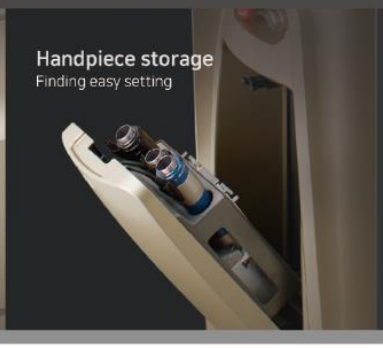
PICOHI Specification

Wavelengths		Nd:YAG 1064nm, 532nm
Pulse Duration		300ps, 275ps
Peak Power		1.67GW, 0.91GW
Pulse Energy[mJ] Max		500mJ, 250mJ
Repetition		1, 2, 5, 10Hz
Handpiece	Clear Zoom Handpiece	1064nm (Spot size : 2 to 10mm)
		532nm (Spot size : 1.5 to 7.5mm)
	Clear Colli. Handpiece	1064nm (Spot size : 10mm)
	Deep Renew Handpiece	1064nm (Beam size : 13mm)
	Renew Handpiece	1064nm (Beam size: 4 to 12mm)
	Multi Handpiece	1064nm (Beam size: 10 x 10mm)
		532nm (Beam size: 10 x 10mm)
Convenience system		RMS System (WIFI)
		Wide LCD 12.1"
		Upper shelf display zone
		Handpiece storage
		Hidden front handle & Back handle
General	Electrical Power	200~240 VAC, 4.4 KVA, 50/60Hz
	Dimensions	455(W) x 1040(L) x 975(H) mm
	Weight	150kg





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