INCREDIBLE DEVICES

PLUTUS™ SUPER ICE

Training Manual

This *Training Manual* provides detailed guidance on safe operation, maintenance and features of the device, ensuring effective use for professional hair removal and skin treatments in clinical settings.

HEALTH CANADA LICENCED

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Dedication

Dedicated to the indomitable lady bosses revolutionizing beauty and leadership each and every day. Your foresight, fortitude, and fervor transform Medspas and Clinical Practices into elevated sanctuaries of confidence and transformation. Your leadership is formidable, your influence enduring, and your success unequivocally well deserved.

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Disclaimer

Legal, Safety & Compliance Information

Important Safety Information

Before operating this device, all users must carefully read and understand the instructions, warnings, and safety guidelines provided in this manual. Failure to follow the recommended procedures may result in equipment malfunction, injury to the operator or client, or ineffective treatment outcomes.

This device must only be used for its intended purpose and within the parameters specified in this documentation. Operators must always follow recommended safety protocols and ensure that appropriate protective measures are in place during device operation.

Protective equipment, including eye protection where applicable, must be used according to the treatment requirements described in this manual.

Operator Responsibility

This device is intended for professional use only. It must be operated by trained and qualified personnel who possess adequate knowledge of aesthetic or medical treatment procedures.

The operator is responsible for ensuring proper training before operating the device, following all safety instructions and treatment protocols, assessing client suitability prior to performing any treatment, maintaining proper hygiene and safety standards during procedures, and operating the device in accordance with local regulatory requirements.

The manufacturer assumes no responsibility for outcomes resulting from improper use, lack of training, or failure to follow the guidelines outlined in this manual.

Contraindications & Precautions

Before performing any treatment, operators must conduct a thorough consultation and assessment to determine whether the treatment is suitable for the client.

Certain medical conditions, medications, or skin sensitivities may contraindicate treatment. Operators must exercise professional judgment and follow accepted clinical standards when determining treatment eligibility.

If any uncertainty exists regarding a client's suitability for treatment, consultation with a qualified medical professional is recommended.

Maintenance Responsibility

Routine inspection and proper maintenance of the device are essential to ensure safe and effective operation.

Users are responsible for maintaining the device according to the maintenance guidelines provided, ensuring the device is used in an appropriate environment, preventing unauthorized modifications or repairs, and ensuring that servicing is performed only by authorized personnel.

Improper maintenance or unauthorized modifications may result in device malfunction and may void warranty coverage.

Documentation & Product Updates

The information contained in this manual is based on the most current product knowledge available at the time of publication. The manufacturer reserves the right to update or revise the device design, specifications, operational procedures, and documentation at any time without prior notice.

Users are responsible for ensuring they are working with the most recent version of the user guide and operational documentation.

Limitation of Liability

The manufacturer shall not be held liable for any direct, indirect, incidental, or consequential damages resulting from improper operation, unauthorized modification, failure to follow instructions, or use of the device outside of its intended purpose.

Use of this device constitutes acceptance of the guidelines and limitations described in this documentation.

Intellectual Property Notice

All content contained in this manual, including text, illustrations, diagrams, and technical information, is protected by intellectual property laws. No portion of this publication may be reproduced, distributed, translated, or transmitted in any form without prior written permission from the manufacturer.

Warranty Disclaimer

Warranty coverage for this device is provided only as outlined in the official warranty documentation supplied with the product.

Warranty may be voided if the device is modified or altered without authorization, serviced

by unauthorized personnel, used outside recommended operational parameters, or damaged due to misuse, negligence, or improper handling.

Consumable components and normal wear and tear are not covered under warranty unless explicitly stated.

General Warnings & Safety Symbols

This device must be used only for its intended purpose and in accordance with the procedures described in this manual. Failure to follow instructions may result in equipment damage, operator injury, or client harm.

Users should read this manual before operating the device, ensure only trained professionals operate the equipment, use appropriate protective equipment when required, avoid modifying the device, disconnect power before cleaning or maintenance, and ensure the device is used in a safe environment.

If the device appears damaged or operates abnormally, discontinue use immediately and contact authorized service personnel.

Safety Symbols

Certain symbols may appear on the device, packaging, or documentation to indicate important safety information.

Common symbols may include warning indicators, electrical hazard signs, instructions to refer to the user manual, protective equipment requirements, temperature limitation symbols, and notices indicating that the device should not be disassembled by unauthorized personnel.

Treatment Contraindications & Precautions

Before performing any procedure using this device, operators must assess whether the treatment is suitable for the client.

Treatments should not be performed or should be performed with caution in individuals with active skin infections, open wounds, severe skin sensitivity, inflammatory skin conditions, recent surgical procedures in the treatment area, known hypersensitivity to light or heat-based treatments, pregnancy without medical approval, or use of medications that increase photosensitivity.

Operators must exercise professional judgment and conduct a proper consultation prior to treatment.

Client Consent & Practitioner Responsibility

Before performing any treatment using this device, the practitioner must ensure that the client has received a full consultation and understands the nature of the procedure.

The practitioner is responsible for explaining the treatment process and expected outcomes, discussing potential risks and aftercare instructions, obtaining informed client consent, maintaining client records and treatment documentation, and selecting appropriate treatment parameters.

The manufacturer is not responsible for treatment outcomes or complications resulting from practitioner error or failure to obtain informed consent.

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Chapter 1 - Introduction

Welcome to the PLUTUS™ Super Ice ❄ System User & Training Manual.

The PLUTUS™ Super Ice ❄ is an advanced professional aesthetic device designed to deliver effective, safe, and consistent treatments through precision engineering and intelligent energy control. This system has been developed to meet the needs of modern clinics and practitioners who demand reliable performance, patient comfort, and predictable clinical outcomes.

This manual has been created as a comprehensive guide to device operation, treatment protocols, safety standards, and best practices. It is intended for trained professionals and authorized users who have received appropriate instruction in aesthetic treatments and device handling.

Within this manual, you will find:

- An overview of the PLUTUS™ Super Ice ❄ system and its core technology
- Safety information, contraindications, and precautionary guidelines
- Detailed setup and operational instructions
- Treatment parameters and protocol guidance
- Maintenance, care, and troubleshooting information

A proper understanding and adherence to the information in this manual will ensure optimal device performance, longevity, and—most importantly—safe and effective treatments for clients.

All users must read this manual thoroughly before operating the PLUTUS™ Super Ice ❄ system. Failure to follow the outlined procedures and safety instructions may result in suboptimal outcomes or risk of injury.

For ongoing success, PLUTUS™ Super Ice ❄ should be used in conjunction with professional training, sound clinical judgment, and applicable local regulations.

Advanced Laser Technology

❄ PLUTUS Super Ice ❄ has Multi-Pulse Technology, which is considered the Gold Standard in modern-day hair removal.

❄ The 800W Power used by the system provides powerful energy to control hair growth forever.

1.1 Indications for Use

PLUTUS™ Super Ice ❄ is designed for permanent hair reduction on all skin types (Fitzpatrick skin types I-VI), including tanned skin. Permanent hair reduction is defined as a long-term, stable reduction in hair regrowth, assessed at 6, 9, and 12 months after completing the treatment regimen.

- Applicable Users: Adults (21 years and older) seeking to remove unwanted hair.
- Applicable Locations: Professional healthcare settings.
- Treatment Method: Single-wavelength laser treatment, non-embedded.

Wavelength: 808nm – The gold standard for safe and effective hair removal on all Fitzpatrick Skin

Types (I–VI), including tanned skin.

Permanent Hair Reduction: Targets melanin in hair follicles, delivering heat to disable regrowth.

Energy Density: 10–140 J/cm² for versatile treatment across different hair and skin types.

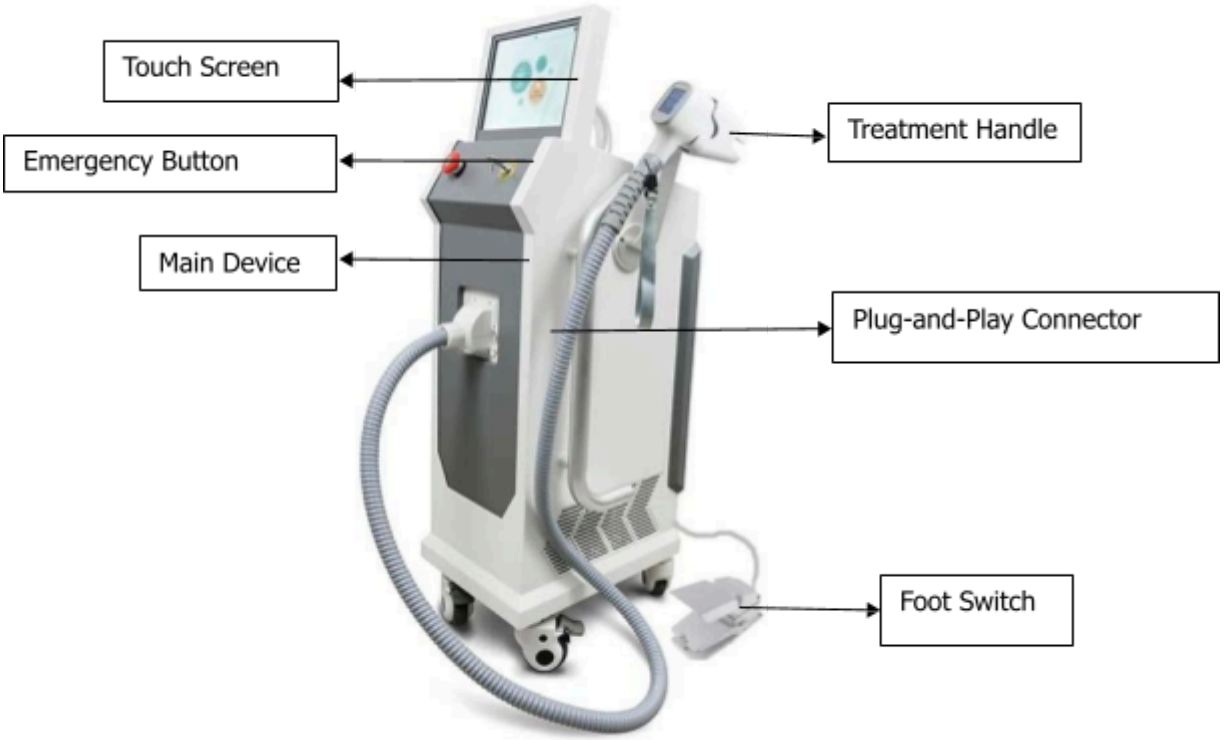
Treatment Time (Head-to-Toe) Full-Body Laser Hair Removal Sessions: 60 minutes.

Laser Power: 800W (8 bars × 100W).

Pulse Frequency: 1 – 10 Hz for fast, continuous treatments.

Pulse Duration: 10 – 300 ms, adjustable for precision and comfort.

1.2 Device Structure and Performance



Main Unit

A device's main unit is all about its appearance. It is the carrier of other components and is composed of a display module, supply module, control module and holders.

Power Module

The power module supplies the entire system, acting as the main source for the equipment's operation.

Control Module

The control module oversees the device's functions, comprising:

- **Key Switch**: Powers on the device and connects it to the power source.
- **Emergency Stop Switch**: Stops the equipment immediately in case of errors or faults, ensuring safety.

Display Module

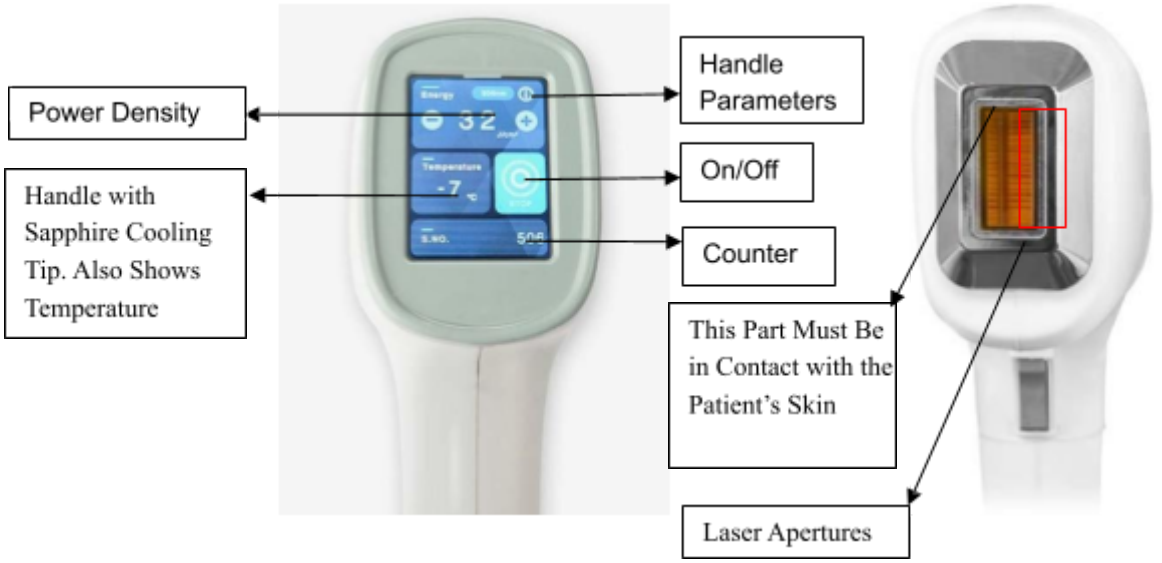
The control screen serves as the interface for human-computer interaction, showing operational settings and system adjustments.

Foot Switch

The foot switch, a linked device, activates the equipment when pressed. When released, it halts the operation.

1.3 Treatment Handle

The treatment handle is the primary component used for treatment, consisting of the pipe and head. The electrical wires and data lines are contained within the pipe. Refer to Picture 1.2 for the treatment handle.



1.4 Hand Trigger vs. Foot Pedal Operation

The **Plutus Super Ice** provides two activation options: **Hand Trigger** and **Foot Pedal**.

- **Important:** The hand trigger and foot pedal **cannot be used simultaneously**. Only one may be active at a time.

Using the Foot Pedal

1. Locate the connection port at the **back, bottom-right corner** of the device.
2. **Screw the foot pedal connection** securely into this port.
3. The device is now ready to be activated via the foot pedal.

Using the Hand Trigger

1. **Unscrew the foot pedal** from the back bottom-right port.
2. Reattach the **false connector** in its place.
3. The device is now ready for hand trigger activation.

1.5 Specifications of the Device

Specification	Parameters
Light Source	Diode Laser
Laser Emitter	16 Bar/800W/50A
Wavelength	808nm±10%
Energy Density	10-120J/cm²
Frequency	1-10Hz
Width of Light	10-300ms/±10%-30%
Light Output Size	1.2cm*2.4cm
Cooling System	Water Cooling, Fan Cooling, and Semiconductor Cooling
Operator Display Screen	10.4" TFT True Colour LCD
Main Unit Service Life	5 Years
Treatment Handle Service Life	20 Million Shots

1.6 Device Accessories

The components of the PLUTUS™ Super Ice❄ Semiconductor Laser Treatment System are listed in Table 1.2.

Name	No.	Name	No.
User Manual	1	Power Line	1
Treatment Handle	1	Foot Switch	1
Cross Screwdriver	1	Funnel	1
Plastic Pipe	1	Therapy Glass	1
Goggle	1	500ml Measuring Glass	1

1.7 Label Description

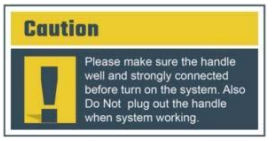
Number	Icon	Name	Function
Figure 1.6.1		Laser Class Label	The Laser Level of this product is "4."
Figure 1.6.2		Handle Connection Label	**Note:** When the product's hand tool is plugged into the host, ensure the connection is reliable.
Figure 1.6.3		Dangerous Label	Be careful not to look directly into the window of the hand tool with your naked eyes.
Figure 1.6.4		"Replace the Filter" Location Label	**Note:** The filter is changed every 6 months.
Figure 1.6.5		QC Passed Label	The product has passed the quality inspection certification.
Figure 1.6.6		Water Injection Label	Insert the white connector port of the water injection funnel into the water injection hole and fill the equipment through the funnel. The water injection process ends when the water level reaches "H" on the water injection pipe or when water overflows.
Figure 1.6.7		Foot Switch Label	Allows you to operate the device with your foot.

Figure 1.6.8		Power Switch Label	There are buttons for turning the device on and off.

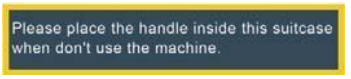
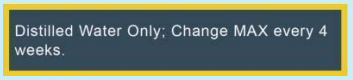
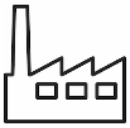
Number	Icon	Name	Function
Figure 1.6.9		Water Injection/Drainage Hole Label	Fill and drain the water tank through the water injection hole/drainage hole.
Figure 1.6.10		AC Outlet Interface Label	The label of the AC input socket.
Figure 1.6.11		Software Updated Position Label	The position where the software of the instrument is updated.
Figure 1.6.12		Storage Location of Handle	The handle should be put in the suitcase when it is not in use.
Figure 1.6.13		Replace the Distilled Water Label	The product should be replaced with distilled water at most every 4 weeks.
Figure 1.6.14		Vent Hole Label	After receiving the product, you need to replace the vent hole cover, which is used to drain the air from the water tank.
Figure 1.6.15		Fuse Label	Requirements for the specifications and parameters of the fuse used by the machine.
Figure 1.6.16		Read the Manual Identification	The requirements for reading the manual carefully before using the machine.

Figure 1.6.17		Production Serial Number Identification	The requirements for machine identification.
Figure 1.6.18		Manufacturing Date Identification	The requirements for the manufacturing time of the machine.

Number	Icon	Name	Function
Figure 1.6.19		Manufacturer Identification	The requirements for the manufacturer's information on the machine.
Figure 1.6.20		Waste Treatment Identification	The requirements for the disposal method of the machine.
Figure 1.6.21		Waste Treatment Identification	The requirements for the disposal method of the machine.
Figure 1.6.22		Electrical Safety Identification	The requirements for the electrical safety of the machine belong to Type B applications.
Figure 1.6.23	**IPX1**	Waterproof Grade Identification	Label proving that the machine is waterproof and the parts are not susceptible to degradation.
Figure 1.6.24		Avoid Exposure - Laser Radiation is Emitted from This Aperture	Description of the laser light outlet and direction.

1.8 Precautions

- Do not use the device with other electrical devices on the same extension board.
- Avoid operating the device during a thunderstorm, as electrical surges can affect functionality and pose a risk.
- Keep the device away from magnetic fields to prevent malfunction.

- Ensure the room voltage matches the required supply voltage. Do not exceed 240V AC.
- Confirm that the voltage in the room is consistent with the equipment's requirements. Do not use alternating current above 240V.
- Do not operate the device in high-temperature or high-humidity areas to prevent electrical shock or faults.
- Verify the equipment is correctly connected to the power supply before use.
- Ensure the circuit and accessories are securely connected before use.
- Avoid using multi-plug sockets.
- Handle the equipment with care after connecting the power.
- Do not shake or collide with the equipment during operation.
- If the cable or connections are damaged, or if the equipment has fallen or been exposed to water, do not use it.
- Do not use the cover board or electrical wires as handles.
- Keep electrical wires and hoses away from heat sources.
- It is recommended to operate the equipment in a dry place, away from outdoor environments.
- Only use accessories provided by the manufacturer.
- Turn off the power supply after use and before cleaning or maintenance.
- Do not clean the device with detergents, solvents, or chemicals.
- Avoid using the equipment while using aerosol products.
- Prevent water from spraying on the equipment.
- If you feel unwell or experience discomfort, do not use the equipment.
- Do not use the equipment if your skin feels irritated or injured.
- Do not use the equipment near sensitive areas like the eyes, mouth, genitals, ears, nose, or nipples.
- Pregnant women should not use this device.
- Consult a doctor before use if you have any health concerns.
- Never use modified or altered equipment.
- Always wear professional goggles or glasses to protect your eyes from direct light flashes.
- The manufacturer may provide a schematic diagram for maintenance upon request.

1.9 Contraindications

- Cancer, precancerous lesions, suspicious moles, or the use of anticancer drugs.
- Pregnancy (Including IVF).
- Use of photosensitive medications.

- Conditions aggravated by 808 nm wavelength light.
- Active infection or a history of herpes simplex in the treatment area.
- Diabetes (Requiring insulin injections).
- Endocrine disorders (As light may induce stimulation).
- History of blood-clotting disorders.
- Use of anticoagulant medications.
- Epilepsy.
- History of keloid scarring.
- Use of oral Accutane (Isotretinoin) within the past 6 months.
- Use of depilatories or other hair removal treatments such as waxing, plucking, or electrolysis
- within the past 6 weeks.

1.10 Warnings

- Individuals with darker skin tones or suntanned skin may be at higher risk for pigmentary changes in the treatment area.
- Sun exposure to the treated area immediately after treatment and for up to one month following can increase the risk of pigmentary changes.
- Avoid approaching areas with high electromagnetic interference, such as RF-shielded rooms housing active HF surgical equipment or MRI systems.
- Do not use the device in locations where the power connection cannot be easily disconnected, ensuring the machine can be turned off safely.
- Avoid using the equipment near or stacked with other devices, as this may cause improper operation. If necessary, ensure both devices are functioning properly.
- Using non-specified or non-manufacturer-provided accessories, transducers, or cables may increase electromagnetic radiation and reduce equipment performance.
- Keep portable RF communication devices (including antenna cables and external antennas) at least 30 cm (12 inches) away from any part of the device, including the cable, to prevent reduced device performance.
- Mutual interference between equipment may pose risks, and the device may cause electromagnetic interference to other equipment.
- Caution: Laser fume/plume may contain viable tissue particulates.
- Do not aim the laser at flammable liquids or materials, as high heat can ignite substances like foam or alcohol.
- Never aim the laser at the operator's or patient's eyes. Both the operator and patient must wear protective goggles (wavelength 800nm-1100nm) during treatment.
- During treatment, ensure the laser tip is securely against the skin and that no light leaks.

- Unauthorized modification of this equipment is prohibited. The company must provide specialized training for maintenance personnel.

Note: This equipment is suitable for industrial areas and hospitals (CISPR 11 Class A). If used in residential environments (requiring CISPR 11 Class B), it may not provide adequate protection for radio-frequency communications. Mitigation measures, such as relocating or redirecting the device, may be necessary.

1.11 Adverse Reactions

- Burns
- Erythema
- Edema
- Pain
- Darkening or lightening of the skin

1.12 Security Measures

When an emergency occurs, press the emergency stop switch (red knob) to turn off the equipment.

1.13 Notice to Users

The operator must thoroughly read the instruction manual before using the equipment. Before treatment, the operator must inform the patient of any potential risks and obtain written consent for the procedure. The success of the treatment largely depends on the operator's experience and understanding of professional knowledge. During the procedure, the operator and the patient must wear protective goggles (wavelength 800nm-1100nm). The manufacturer specially provides these goggles to ensure user safety. Do not use protective eyewear that does not meet the required safety standards.

1.14 Equipment Mechanical and Electrical Safety

The equipment requires a single-phase power supply of 100~230VAC (50/60Hz).

Caution: Using controls, making adjustments, or performing procedures not specified in the manual may result in hazardous radiation exposure.

The equipment is grounded through a three-wire connection, and the ground wire must be appropriately connected. Only authorized personnel are permitted to repair the equipment, as unauthorized repairs will void the warranty.

To prevent misuse by unauthorized personnel, always unplug the key switch when the equipment is not in use.

Note: Avoid using flammable materials such as acetone or alcohol near the equipment. When disinfecting with alcohol-based products, ensure that the alcohol has fully evaporated before operating the device.

Chapter 2 - Installation

2.1 Installation Procedure

Before unpacking the equipment, ensure that the installation environment meets the required conditions. The device should be placed in a clean, dry area, free from etchant gases and excessive dust. Exposure to etchant gases can damage wiring, electronics, and optical components. Dust can also harm filters and internal electronic parts. The installation area's temperature and humidity should fall within the specified range.

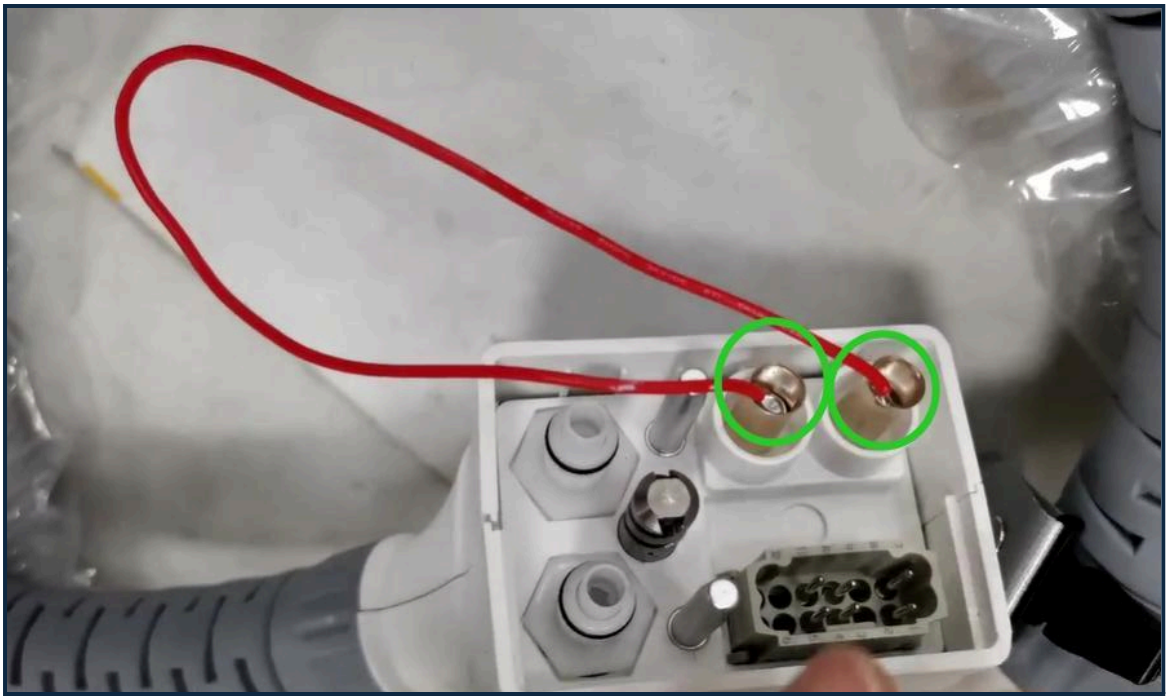
After unpacking, allow the device to rest in a cool, clean, and dry location for at least 12 hours to prevent damage from humidity during long-distance transport. Avoid operating the device in dusty or dirty environments, as this can negatively affect internal electrical components.

Here are the step-by-step instructions on how to install the device:

- Unpack the device and verify all accessories are present and correct.
- Allow the device to acclimate for 24 hours to avoid damage from high humidity during transport.
- Assemble the device components and ensure all connections are secure.
- Connect the power and foot switch, then conduct a water circulation test.
- Fill the water tank with distilled water only.
- Double-check that all parts and accessories are correctly connected.
- Power on the device and test its functions and parameters.
- If all checks are satisfactory, the device is ready for treatment.

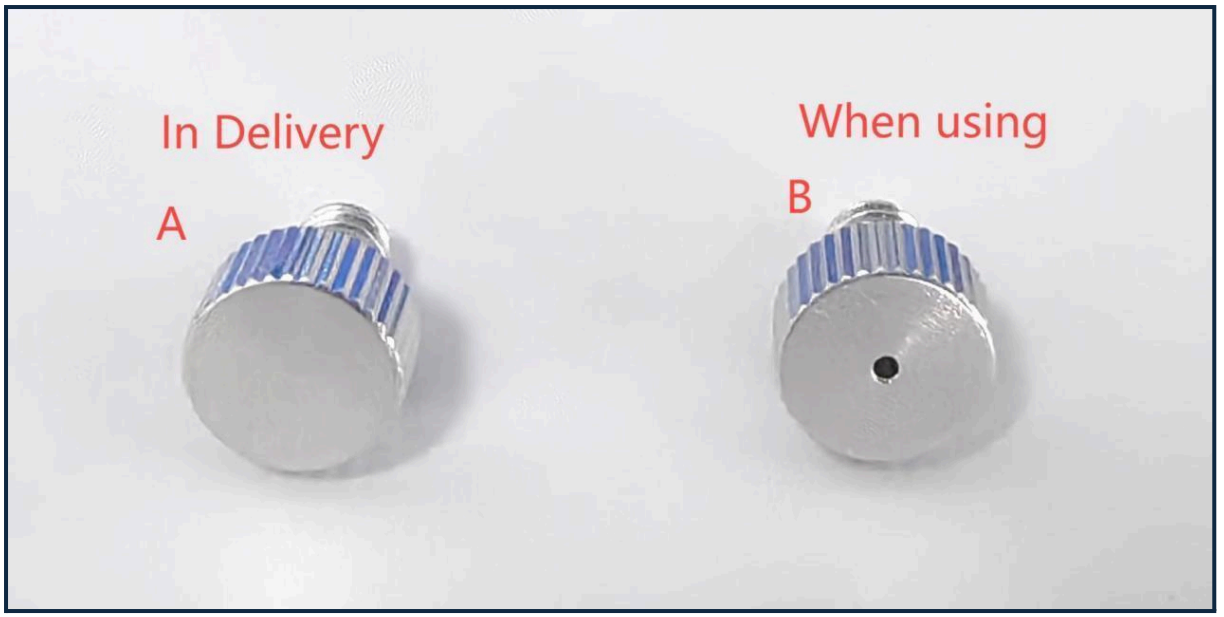
2.2 Installing the Handle

Handle Installation: When installing the device handle, carefully remove the protective cover. This cover is designed to prevent damage from static electricity during transportation, which could otherwise result in the handle losing power or malfunctioning. Ensuring its removal before use is crucial for maintaining the proper functionality of the handle.



Vent Configuration

Switch the vent from A to B. The device should be operated using the B-cap located at the rear of the machine to ensure optimal airflow and performance.

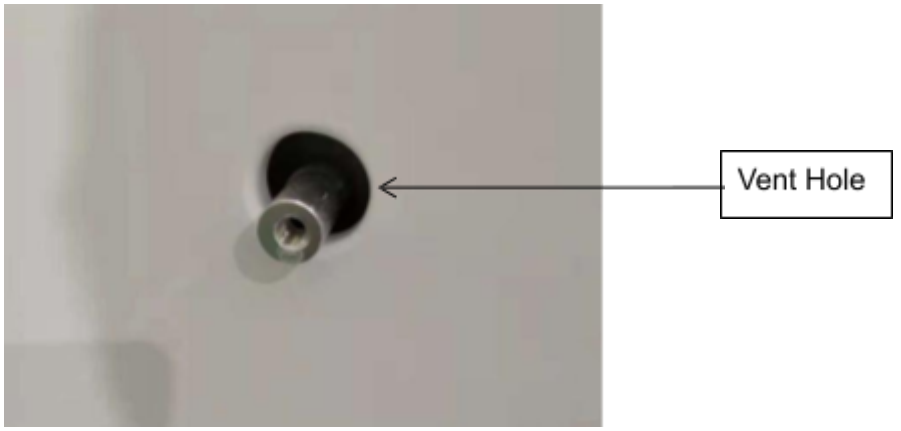


2.3 Installation Requirements & Water Input

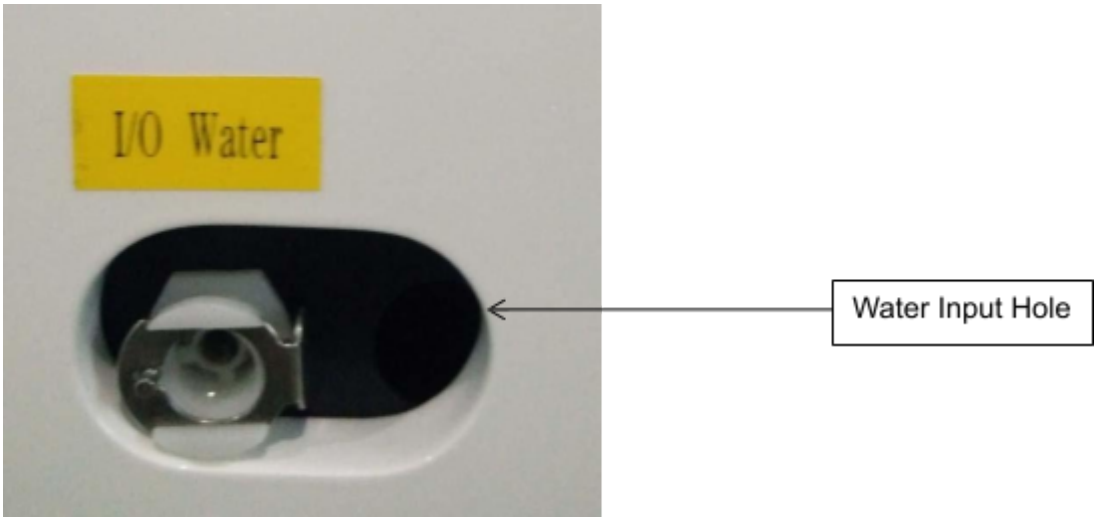
Before operating the machine, ensure the water tank is filled with distilled water. Always check the water level before turning on the machine; it should be at least 90% of the water meter line. If the water level is low, fill the tank with distilled water.

Water Input Instructions

- The room temperature should be between 5°C and 40°C, with humidity below 80%. The therapy room must be clean.
- Ensure the vent hole is open during water input and the treatment handle is installed correctly (Refer to Section 3.2.3). Water input will be unavailable if the handle is not correctly installed.

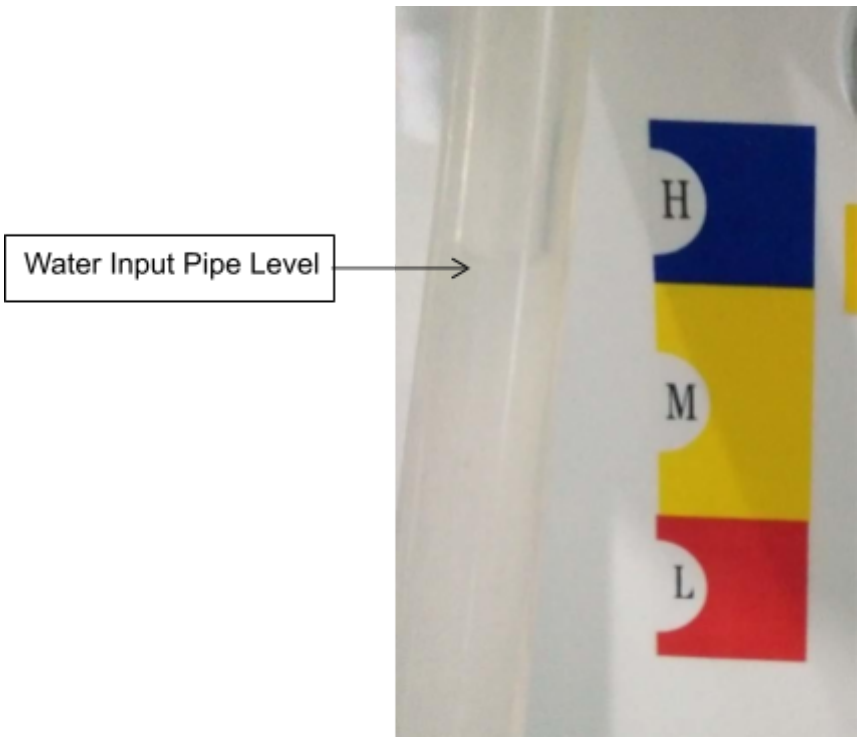


Picture 2.1



Picture 2.2

- Connect the funnel to the plastic pipe, then attach it to the white plug and insert it into the water input hole (see Picture 2.1). Fill the tank by pouring water through the funnel. Once the water level reaches the “H” marker or overflow occurs, the water input process is complete (See Picture 2.2).



Picture 2.3 – Water Input Pipe Level

- After filling the water, press the metal plate to release the water input pipe (See Picture 2.4).

Picture 2.4

Water Circulation Testing

Once the water input and power connections are completed, ensure that the foot switch is connected. Follow the steps below to test the water circulation:

- Before turning on the machine, make sure the emergency button is in the “up” position.
- The circuit breaker, located at the rear of the machine, needs to be switched on to power the unit.
- Turn on the key switch to activate the water circulation system, which will begin functioning automatically.
- Observe the water circulation to confirm everything is working as expected. If there are no water leaks or circulation alarms, allow the machine to run for one minute before turning it off.

2.4 Replacing Distilled Water

As distilled water is used, we recommend changing the water once every month. When replacing the water, remove both the vent cover and the water input hole cover. Drain the old or dirty water completely to ensure proper maintenance.

Installation of the Operation Handle

- When installing the treatment handle, position it below the main device, ensuring that the gas can be expelled properly from the handle. After installation, allow the device to run for about one minute, ensuring that the water circulation is sufficient.
- Refer to Picture 2.5: First, connect the handle connector to the device, starting with the right side, followed by the left. The connection is complete when you hear a “click” sound.

Picture 2.5

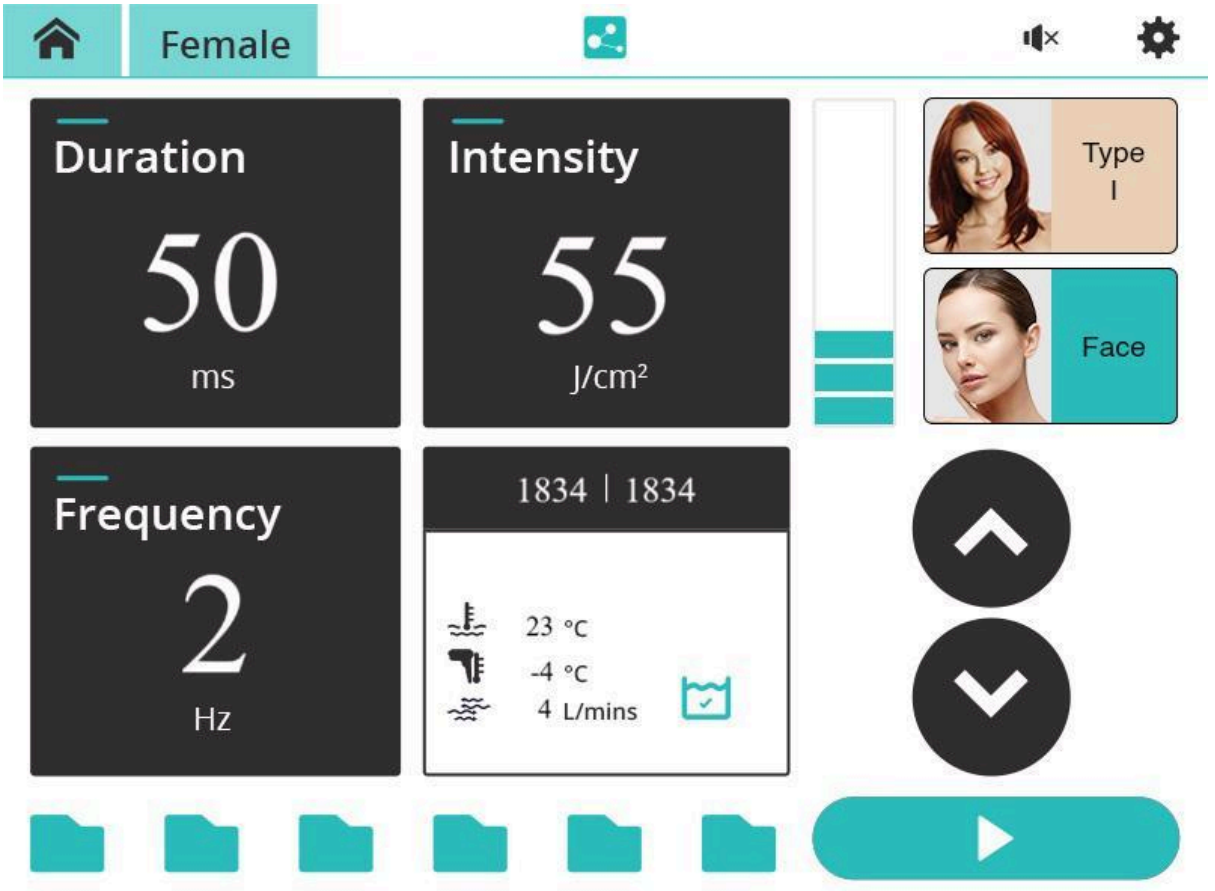
- To remove the handle, press the button up and down, then gently pull the handle out.

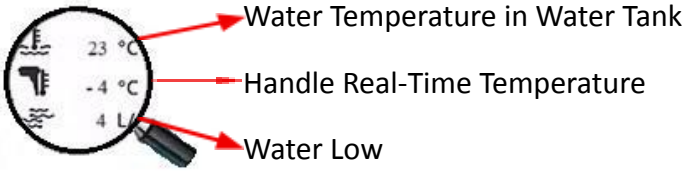
First-Time Setup: If the machine is new and this is the first time filling the water tank, and the water level alarm persists even after the initial water fill, you should add more water to ensure the proper level is reached.

2.5 Handle Instructions

Handle Safety and Protection: To ensure the safety and longevity of the laser handle, always avoid letting the handle fall. When operating the device, securely fasten the handle protective rope around your wrist to prevent the handle from being accidentally dropped.

Monitoring the Alarm System: Always monitor the alarm system of the device to ensure proper operation. Pay close attention to the water temperature, water flow, and water level indicators. If the water level alarm turns red, immediately add water to the system to prevent any operational disruptions or damage to the device.





Sensors

Handle Temperature Requirements for Hair Removal

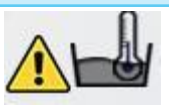
Hair removal treatments should only begin once the temperature of the handle is below -10°C. The handpiece is equipped with three cooling levels for optimal control and comfort. Adjust the cooling settings based on client needs and treatment areas to ensure effective and safe operation.

Proper Handle Positioning During Treatment

During the treatment, the handle head must remain in close contact with the skin. Ensure that the handle is neither tilted nor held away from the skin. Maintaining direct contact ensures maximum treatment efficiency and minimizes any risk of injury or discomfort.

Chapter 3 - Software Instruction

3.1 Working Display

Icon		Name	Function
User Settings Button		System Settings Frame	Allows you to enter the factory setting display.
		Water Temperature Frame	Shows the water tank's current temperature.
		Treatment Handle & Temperature Frame	Shows the treatment handle temperature.
		Water Flow Frame	Shows the current water flow status.
		Water Level Frame	Red Colour: Shows water is lacking. Green Colour: Shows normal water level.
		Energy Density Frame	Shows the current energy density.
		Sound Icon	Allows you to adjust the sound.
		Ready Button	Allows you to enter work mode.
		Data Save Frame	Allows you to save data files.
		Water Temperature Alarm Icon	When the water temperature in the tank is higher, you will see the "!" marker.
		Handle Temperature Alarm Icon	When the handle temperature value is too high, the "!" marker will appear.
		Water Flow Alarm	When the water flow frame shows the value is too high, the "!" marker will appear.

3.2 Instruction for Alarming Indicator Icons

Water Level Alarming

When the water level alarm icon turns red and the "!" marker appears, this indicates that the water level is too low.

Solution: Please add water immediately to ensure proper functioning.

Water Tank Temperature Alarming

If the water tank temperature exceeds the set threshold and the "!" marker appears, the system will automatically switch to standby mode. The default alarm temperature for the water tank is set to 38°C, adjustable between 30°C and 45°C.

Solution: Verify whether the water circulation components are functioning correctly and check for any damage or malfunctions. If no issues are found, contact the device manufacturer or distributor for assistance.

Treatment Handle Water Temperature Alarming

When the treatment handle temperature exceeds the set value and the "!" marker appears, the system will automatically switch to standby mode. The default alarm temperature for the treatment handle is set to 30°C, adjustable between 15°C and 35°C.

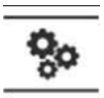
Solution: Discontinue use of the treatment handle and allow it to cool down. After some time, turn the device on again. If the temperature alarm persists, contact the after-sales service or your distributor.

Water Flow Alarming

If the water flow icon indicates a flow rate below "2" and the water drop icon lights up, this signals a water flow alarm. The system will automatically switch to standby mode. The default factory alarm setting for water flow is 2L/min, adjustable between 1L/min and 4L/min.

Solution: Check the water level to ensure there is sufficient water. Confirm that the treatment handle is connected correctly and that there is no water leakage. If no issues are found, contact the device manufacturer or distributor for further assistance.

Chapter 4 - System Setting Interface Instruction

Icon	Name	Function	Remarks
	Language Settings	Language Option	—
	Value Limitation	Max Value & Alarming Value	—
	Alarming Record	Record Alarming	—
	Safe Setting	Safe Setting	—

4.1 Software Operation Explanation

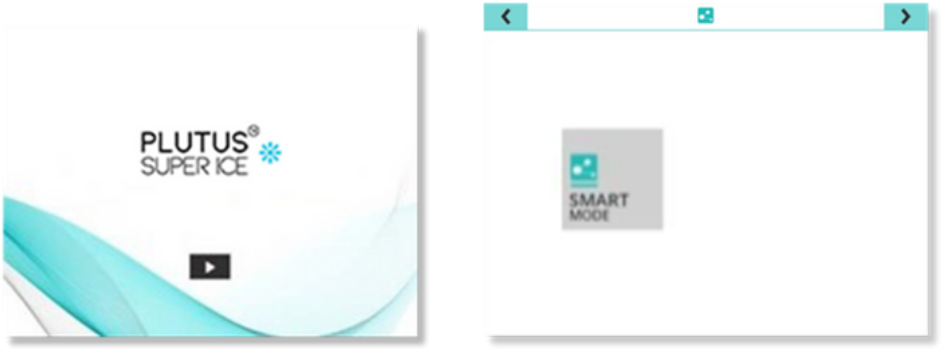
Parameter Setting

To adjust the parameters, touch the value display frame, and a number entry board will appear. The user can input the desired number or value. If a mistake is made, touch the delete button to remove the incorrect input. Press the enter button when the correct information has been entered to confirm the input. To save the current settings, press the save button, which will record the parameters for future use.

Standby/Ready Switch

When the system is in “Standby” mode, pressing the “Ready” button will switch the device to “Ready” status, making it ready for operation. On the other hand, when the system is already in “Ready” status, pressing the “Ready” button will return the device to “Standby” mode. In “Standby” mode, the handle’s indicator light will display a yellow colour, signalling that the system is not in operation. When the system is in “Ready” mode, the handle’s indicator light will change to green, signalling that it is ready to begin the treatment.

4.2 Treatment Parameters



4.3 Hair Removal Smart Mode

Smart Mode

Purpose: Designed for general use across all Fitzpatrick skin types (1–6) and most hair types.

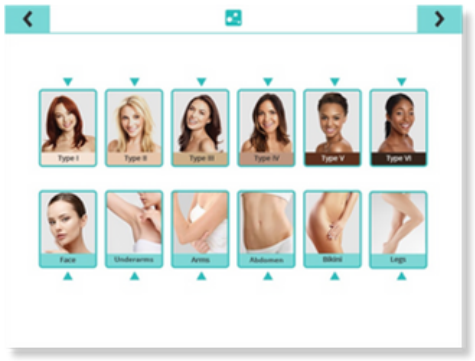
Benefits: Provides precision, efficiency, and safety while being user-friendly.

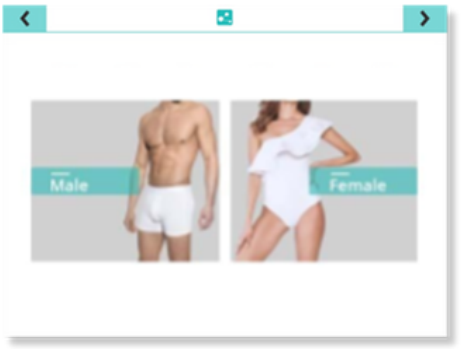
Recommendation: Ideal for most users and beginners

Plutus Super Ice Hair Removal: Smart Mode vs. Expert Mode

4.4 Changing Settings

4.5 Hair Removal (Smart Mode)





In the Top-Right Corner, Click the Settings Cog

Now, follow the set of instructions below to change settings:

- Enter the code: **12345678**.
- On the **left side**, locate and select the **Performance Settings Icon**
- On the right, ensure **SP.limit** displays **0**.
- Click the **Home icon** to return to the main screen—Expert Mode is now active.

4.6 Treatment Settings

Achieving Clinical Endpoints

The desired therapeutic effects are only achieved when the clinical endpoint is reached. For hair removal, this typically means the hair follicles should appear red. The treatment is considered complete only once the clinical endpoint is attained, ensuring effective results.

Energy Settings for Different Skin Types

For individuals with darker skin tones, it is recommended to start with an energy setting of 10 or lower. From there, adjust the energy according to the client's skin response and tolerance. Use lower energy settings with longer duration to minimize the risk of skin irritation while optimizing the treatment's effectiveness.

Note: Please refrain from altering the energy settings. For assistance, contact the highly skilled Therapeutic Systems Engineering Team to have the settings properly configured.

Bikini Area Treatment Settings

For bikini area treatments, regardless of skin colour, set the initial energy level to 10. Adjust the energy according to the client's comfort and skin tolerance. The recommended frequency for treatment in this area is between 1 and 3Hz, with a maximum limit of 3Hz to ensure safe and effective treatment without overloading the skin.

Hair Removal Treatment Cycle

Hair removal treatments should follow a strict 28-day cycle. After a treatment is performed on a specific area, the second treatment for that same area cannot be conducted until 28 days have passed. This cycle ensures that the skin has adequate time to recover and that the hair removal process remains effective.

Powering Down Procedure

To safely power down the system, always turn off the handle before shutting off the machine. Never turn off the machine directly without first powering down the handle. This step prevents potential damage to the device and ensures proper shutdown procedures are followed.

Handle and Treatment Head Installation Check

Before powering on the device, always ensure that the handle is securely attached to the appropriate treatment head. Failure to install the treatment head correctly will trigger an alarm, preventing the device from operating. This precaution ensures both safety and optimal performance of the device during use.

4.8 Treatment Procedure and Device Operation

- Each time the device is powered on, it automatically enters a self-calibration process, detecting and calibrating the output energy. This ensures the system is ready for optimal performance.
- Before starting any treatment, the physician must thoroughly evaluate the patient's medical history to rule out any conditions that may be contraindications for the procedure. Additionally, the treatment area should be carefully inspected. For patients with darker skin tones, it is strongly recommended that the physician perform a patch test before proceeding with the full treatment to ensure safety and effectiveness.

- Before beginning the treatment, the operator should first communicate in detail with the patient, explaining the procedure and addressing any concerns. Afterward, the operator should clean the treatment area with a mild cleanser, followed by performing simple hair shaving or scraping as necessary. A thin layer of gel, approximately 1-2mm thick, should then be applied to the treatment area to facilitate the procedure.
- Once the treatment area is prepared, the operator should turn on the laser system. The treatment parameters should be set based on the patient's individual needs and condition. Once everything is in place, the operator should press the standby/working button to enter the working state.
- In the working state, the temperature of the treatment handle will gradually drop to -10°C, which helps to numb the area and reduce pain during the treatment. It is important to note that no treatment should remain on the same spot for more than 5 seconds, as prolonged exposure may lead to skin damage. The cold temperature creates an ice compress effect that works as an analgesic, making the procedure more comfortable for the patient.
- Throughout the treatment process, the operator must carefully observe the treatment area to ensure the procedure is proceeding as expected. If necessary, the operator should adjust the treatment parameters based on the patient's responses or skin condition.
- The treatment head should not remain in one spot for longer than 1 second. This helps prevent unnecessary skin irritation and ensures that the procedure is safe. Both the operator and patient should always be protected to avoid injuries during treatment.
- Once the treatment is complete, turn off the power switch and remove any remaining cold gel from the treated area. After removing the gel, a cold compress can be applied to the treated area. The cold compress can be used while the system is still in standby mode, which ensures the patient receives the necessary aftercare without causing system interruption.
- The treatment head should then be cleaned using a warm towel and disinfected using a cotton ball soaked in disinfectant to maintain hygiene and prevent contamination.
- Once the cleaning and disinfection are complete, place the treatment head in the designated transport box. At this point, unplug the equipment to conclude the procedure.

4.8 Post-Treatment Attention

- During the treatment, avoid keeping the handle in one spot for too long to prevent skin damage and ensure proper treatment coverage.
- After treatment, the patient should use soft, neutral cleaning products and warm water to cleanse their skin gently.
- It is recommended that the patient apply a moisturizing face mask to replenish moisture lost during the procedure, helping the skin heal and stay hydrated.
- For additional skin protection, the patient should use Vitamin C cream or a neutral moisturizing cream to protect the skin and promote recovery.
- In the first month after treatment, the patient should use a high-SPF 30 sunscreen to protect against sunburn, as exposure to strong sunlight can trigger hyperpigmentation and negatively affect the results.
- Within 24 hours after the treatment, the patient should avoid using hot water for showers, avoid using antiperspirants, and should not swim in pools with high chlorine content.
- After treatment, the patient can wear light makeup, if necessary, but it is advisable to minimize makeup use during the recovery period. If any side effects or infections occur, the patient should contact their beautician or doctor immediately.
- After the treatment, the patient can use the handle to cool down the skin for 5 to 10 minutes. The machine should remain in standby mode during this cooling process to ensure the skin stays comfortable post-treatment.
- The treatment handle should be cleaned with a soft cloth after each use, ensuring the machine is powered off before doing so. This prevents any damage or malfunction caused by excess energy.
- A tingling sensation on the skin during treatment is a normal reaction, as the device works to treat the targeted area.
- After treatment, the skin may develop red spots or slight redness around the hair follicles. This is a normal phenomenon and will disappear after 1-2 days as the skin heals.

Chapter 5 - Fitzpatrick Characteristics

5.1 Fitzpatrick Scale

Fitzpatrick I

Very Fair Skin (Usually Warm Undertones)

Eye Colour Range

- Light blue
- Light green
- Light Gray

Hair Colour Range

- Red
- Strawberry blonde
- Very light blonde

Skin Characteristics

- Extremely fair / porcelain skin
- Always burns, often blisters, peels, seldom/ rarely - never tans
- Freckles common
- Very high sensitivity to UV exposure
- Very low melanin production

Common Ethnic Backgrounds

- Northern European
- Celtic (Irish, Scottish)
- Scandinavian

Fitzpatrick II

Very Fair/Pink Skin / Peaches & Cream
(Usually Warm Undertones)

Eye Colour Range

- Blue
- Green
- Gray
- Light hazel
- Light Brown

Hair Colour Range

- Red
- Strawberry blonde
- Very light blonde
- Blonde Lt – Med
- Light brown
- Blonde Lt – Med

Skin Characteristics

- Always burns, may blister, peels, tans minimally
- Tan fades in 1-2 weeks without sun exposure
- Freckles
- Moderate UV sensitivity
- Low melanin production

Common Ethnic Backgrounds

- Northern Western European
- Baltic, Lithuania, North Germany, Northern France

Fitzpatrick lll

Fair to Medium Beige Skin (Can be warm or cool)

Eye Colour Range

- Blue
- Green
- Med - Dark Hazel
- Almost any eye colour except Black

Hair Colour Range

- Med - Dark blonde
- Chestnut
- Lt - dark brown

Skin Characteristics

- Light beige to olive undertones
- Sometimes burn, sometimes peel, usually
- 1st sun explosion, then can build a tan
- Gradually, can achieve a deep tan
- Few freckles
- Holds tan 3 – 4 weeks without sun exposure
- More even pigmentation

Common Ethnic Backgrounds

- Central European
- Germany, Austria
- Southern Scotland & Ireland
- Eastern European: Poland, Ukraine, Bulgaria

Fitzpatrick lV

Lt- Medium / Olive
Skin usually has cool undertones.
Rare, but may have warm undertones.

Eye Colour Range

Any eye colour, but usually:

- Med – Dk Brown
- Black Brown
- Dk Blue

Hair Colour Range

- Med – Dk Blonde (Can be white-blonde until puberty)
- Auburn
- Black

Skin Characteristics

- Lt – Med Olive or light brown
- Rarely burns, rarely peels.
- Tans easily and deeply (will have pigment response, same day pigment will deepen over 72 hours, without further sun exposure)
- Higher melanin levels
- Can hold residual tan for months
- Seldom freckles
- Increased risk of post-inflammatory hyperpigmentation (PIH)
- Risk for Melasma

Common Ethnic Backgrounds

- Southern Europe – France & Mediterranean
- Mix with dark Ethnicity

Fitzpatrick V

Med - Dark Brown Skin
Usually cool undertones.
Rare, but may have a warm undertone.

Eye Colour Range

Any eye colour, but usually:

- Med - Dark brown
- Black Brown
- Black

Hair Colour Range

- Rare, but may have Lt – med brown. Usually:
- Dark brown
- Black

Skin Characteristics

- Naturally brown skin
- Very rarely burns
- Tans very easily
- High melanin concentration
- High risk for PIH and keloid scarring
- High risk for Melasma

Common Ethnic Backgrounds

- First Nations
- Some Middle Eastern
- Central Asian
- South & Southeast Asian
- Filipino, Thailand
- Indonesian
- East Indian North – Central
- Pakistan

- African American, Afro-Caribbean

Fitzpatrick Vl

Deeply Pigmented Skin. Unusually cool undertones. While rare, it can have warm undertones.

Eye Colour Range

- Rare, but can have any eye colour.
- Dark brown
- Black brown
- Black

HaiColouror Range

Rare, but can have light-coloured hair and dark ginger.

- Black

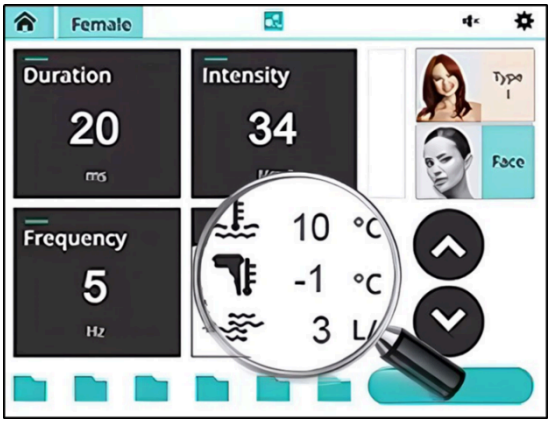
Skin Characteristics

- Deep brown to blue-black
- Never burns
- Very high melanin content
- Strong natural UV protection
- Highest risk for PIH and keloids
- High risk for Melasma

Common Ethnic Backgrounds

- Sub-Saharan African
- Afro-Caribbean
- South Indian
- Sri Lanka

Chapter 6 - Smart Safeguards with User-Friendly Interface



Expert Mode: This mode allows the **operator to adjust parameters** manually to suit the client's needs and skin types for a more customized treatment approach.

Smart Mode: This mode offers **Automated treatment settings** for quick, safe, and efficient procedures. It is ideal for hair removal across different body areas.

❄ **Built-In Monitors** for Optimal Safety and Performance

Prevents cooling interruptions during treatment by monitoring water flow to ensure the cooling system operates smoothly

Prevents overheating and guarantees safe operation by sending out an alert when the temperature rises above the safe limit

Prevents the equipment from overheating by safeguarding the treatment handle from excessive temperatures.

6.1 Wavelength: 808nm

The gold standard for safe and effective hair removal on all **Fitzpatrick Skin Types (I–VI),** including tanned skin.

- **Permanent Hair Reduction:** Targets melanin in hair follicles, delivering heat to disable regrowth.
- **Energy Density:** 10–140 J/cm² for versatile treatment across different hair and skin types.
- **Pulse Frequency:** 1 – 10 Hz for fast, continuous treatments.
- **Pulse Duration:** 10 – 300 ms, adjustable for precision and comfort.

Chapter 7 - Clinical Applications

Suitable Areas	
Face	Back
Arms	Legs
Underarms	Bikini / Brazilian
Chest	Sensitive Zones

7.1 Treatment Protocols

Full Body Hair Removal

- Customizable by body area
- Skin type-specific settings
- Adjustable cooling levels

Sensitive Area Treatment

- Static mode for precise control
- Enhanced patient comfort
- Targeted energy delivery
- Maximum safety protocols

Large Area Treatment

- Super Glide mode for efficiency
- Continuous motion capability
- Rapid treatment delivery
- Maintained efficacy

7.2 Clinical Safety Features

Skin Type Selection and Safety

- Fitzpatrick scale classification selection
- Dynamic treatment parameter adjustment
- Treatment history tracking per skin area

Automated Emergency Shutdown:

- Multiple pulse overlap detection
- Excessive treatment speed
- Impedance abnormalities
- Energy Delivery
- Monitoring
- Real-time pulse
- Shape election
- Energy delivery verification

7.3 Safety Guidelines

Storage Requirements: The machine must be stored in a clean, dust-free environment with humidity levels not exceeding 85%. This ensures the device's longevity and optimal performance by preventing moisture and dust buildup.

Water Usage: Only distilled water with a pH of 7 should be used in the machine. It is essential to replace the water every 15 to 30 days, depending on usage, to maintain proper functioning and hygiene.

Safety Precaution: During treatment, it is strictly forbidden to direct the laser at the eyes. Both the user and the client must wear protective glasses to safeguard their vision from potential harm.

Water Filter Replacement: The water filter should be replaced every 9 to 12 months, depending on the frequency and intensity of machine usage. Regular replacement ensures optimal water flow and prevents clogging.

Preparation Before Treatment: Ensure that the treatment area is thoroughly clean before starting. It is recommended to shave the area at least three days before treatment. Use only colourless, impurity-free cooling gel for the treatment.

Sanitization Before and After Treatment: To maintain hygiene, disinfect the laser handle head before and after each treatment using 75% alcohol. This step is essential to prevent cross-contamination and ensure the safety of each treatment.

Long-Term Storage: If the machine will not be used for more than a week (7 days), it is essential to empty the water to prevent any stagnation or damage.

Routine Maintenance: It is advisable to regularly check and tighten any loose parts, such as the handle holder, armrests, and other components, every 5 to 6 months to maintain machine stability and prevent mechanical issues.

Temperature Considerations: To prevent damage in cold weather, avoid exposing the machine to freezing conditions. Store the machine in an environment with a temperature above 15°C (59°F). In summer, ensure that the indoor temperature does not exceed safe operating levels to protect internal components.

7.4 HR Treatment Guide

This protocol applies to both men and women.

Treatment Intervals by Body Area

Laser hair removal treatments must be scheduled according to the hair growth cycle (anagen phase) and the anatomical area being treated. Proper spacing maximizes follicle targeting and improves treatment outcomes.

Body Area Size	Common Treatment Areas	Recommended Interval
Small Areas	Upper lip, chin, cheeks, sideburns	Every 4–6 weeks
Medium Areas	Underarms, bikini, Brazilian, chest, abdomen, back	Every 6-8 weeks
Large Areas	Legs, arms	Every 8-10 weeks

Recommended Number of Sessions

- 6–9 sessions on average

Additional sessions may be required depending on:

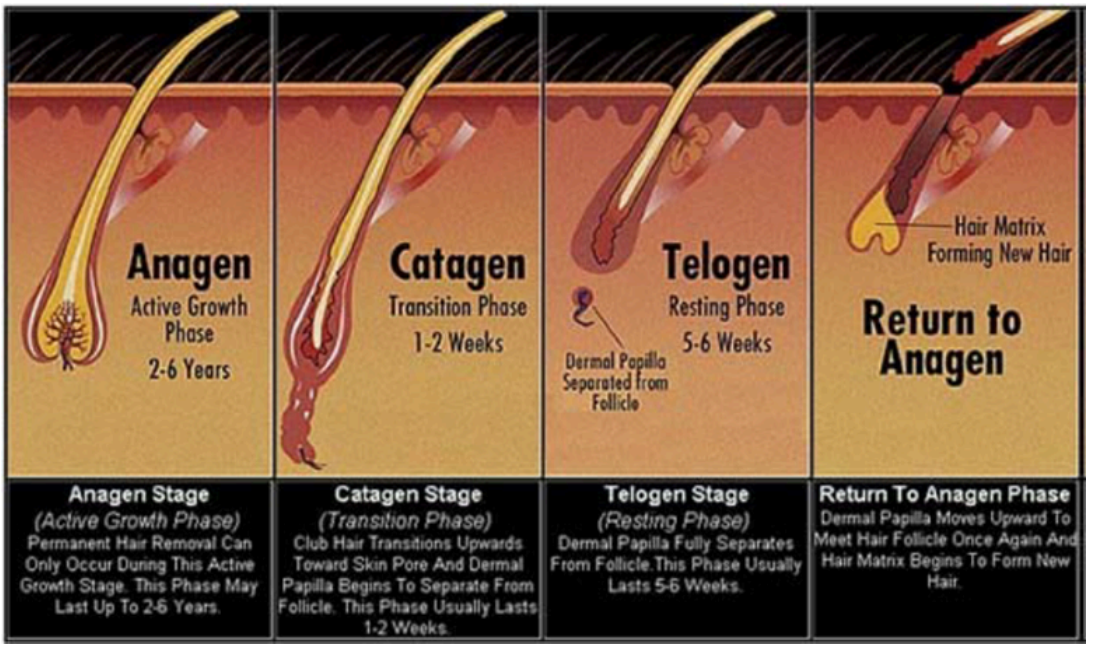
- Hormonal influence
- Hair density and thickness
- Skin type and hair color
- Treatment area

Chapter 8 - Hair Anatomy

8.1 Clinical Training Note

Laser hair removal is only effective on hair in the anagen (active growth) phase.
Treating too frequently may reduce efficacy, as follicles not in the anagen phase will not respond optimally to laser energy.

Proper treatment spacing is essential for safe, effective, and predictable results.



8.2 Permanent Hair Reduction - Treatment Expectations

Permanent hair reduction refers to the long-term decrease in visible hair density and regrowth, achieved by effectively destroying existing hair follicles. At the same time, they are in the anagen (active growth) phase. Athena Super Ice™ treatments are highly effective at disabling active hair follicles; however, the body can still produce new hair follicles over time due to biological factors.

Clinical studies and industry standards indicate an expected outcome of approximately an 80–90% reduction in hair in the active growth phase at the time of treatment. Hair follicles that are successfully treated during anagen are permanently disabled and will not regenerate.

An average of six to eight treatment sessions is recommended to address all hair growth cycles. These sessions are typically spaced over 12 to 18 months, allowing sufficient time for dormant follicles to enter the anagen phase and become treatable.

It is important to understand that permanent hair reduction does not guarantee complete or lifelong hair elimination. Factors such as aging, genetics, hormonal fluctuations, pregnancy, medication use, and underlying hormonal conditions can stimulate the development of new hair follicles after treatment completion.

These newly formed follicles were absent during the initial treatment series and were therefore unaffected.

For this reason, maintenance treatments may be required to manage new hair growth and maintain optimal long-term results. Proper consultation, realistic expectation setting, and adherence to recommended treatment intervals are essential for achieving and sustaining successful outcomes.

8.3 Hair Growth Cycles Explained (Clinically)

Hair grows in three phases:

1. **Anagen (Active Growth Phase)**

    - The only phase that responds effectively to the laser
    - Typically, 10–30% of body hair is in anagen at any given time

2. **Catagen (Transition Phase)**

    - The follicle detaches from the blood supply.
    - Not effectively treatable

3. **Telogen (Resting Phase)**

    - Hair sheds; follicle is dormant
    - Not treatable

Because follicles cycle independently and asynchronously, lasers can only disable anagen follicles during each session.

8.4 How Many Cycles in a Year?

For most body areas (Face, Torso, Bikini, Arms & Legs):

- One full hair cycle can take 4–6 months
- This means 2–3 cycles per year
- Each cycle brings new follicles into anagen

A full body in one year has roughly 6–12 potential anagen cycles, depending on hair location.

However, since only a fraction of follicles are in anagen at any given time, multiple treatments per cycle are required to capture the majority of follicles during their active phase.

Why 8 Treatments Is the Gold Standard

- Each session typically disables 10–20% of active follicles
- Over multiple sessions, this compound
- 6 treatments may be sufficient for some clients, depending on body area, age, health, genetics, etc.
- 8 treatments are the industry standard minimum for consistent, long-term results across body areas
- Treatments are spaced to align with area-specific growth cycles

This is why spacing treatments over 12–18 months produce the most reliable outcomes.

8.5 Clinical Reality (Important for Expectation Setting)

Even after completing a full treatment series:

- An 80–90% reduction of hair present during treatment is expected
- New follicles may develop later due to: Hormonal changes
    - Aging
    - Hormone balance/imbalances, i.e. PCOS, Pregnancy
    - Medications
    - Genetics

This is why permanent hair reduction is best described as long-term management rather than absolute eradication, and why maintenance treatments may be required.

8.6 The Skin

The skin is the body's largest organ. It forms a protective barrier against bacterial invasion, environmental exposure, and physical injury. The skin also helps maintain a stable body temperature and contains sensory nerve endings that respond to heat, cold, touch, pressure, and pain. On average, human skin is approximately 2 mm (0.07 inches) thick.

The skin is composed of three primary layers:

Epidermis – The epidermis is the outermost layer of the skin and serves as a tough protective barrier between the body and the external environment. It contains melanin, the pigment responsible for skin colour and protection against ultraviolet (UV) radiation.

The skin is an ever-changing organ composed of specialized cells and structures that perform multiple vital functions. It protects the body from environmental and biological threats, plays a key role in regulating body temperature, gathers environmental sensory information, and actively participates in the immune response that protects the body from disease.

A clear understanding of these functions begins with knowledge of the skin's three primary layers: the epidermis, dermis, and subcutaneous tissue.

Dermis – The Dermis is located beneath the epidermis. The dermis contains blood vessels, nerve endings, sweat glands, sebaceous (oil) glands, and hair follicles. It provides the skin with structural support, elasticity, and nourishment, and plays a critical role in sensory function and thermoregulation.

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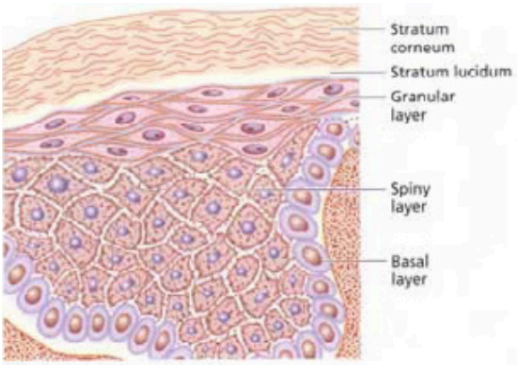
The thickness of the dermis varies by body location, ranging from approximately 0.3 mm on the eyelids to up to 3.0 mm on the back.



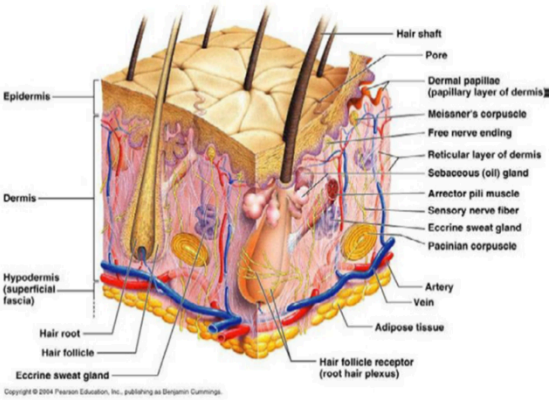
The layers of the epidermis

The dermis is composed of three primary connective tissue elements, which are distributed throughout the layer rather than arranged in distinct strata:

- Collagen – provides strength and structural integrity
- Elastic tissue – allows the skin to stretch and recoil
- Reticular fibres – support and bind the tissue structure

8.7 Layers of the Dermis

The dermis is divided into two layers:



Papillary Layer

The superficial layer is composed of a fine network of collagen fibres. It supports the epidermis and contains capillaries and nerve endings.

Reticular Layer

The deeper and thicker layer is composed of dense collagen fibres arranged parallel to the skin surface. This layer provides tensile strength and resilience to the skin.

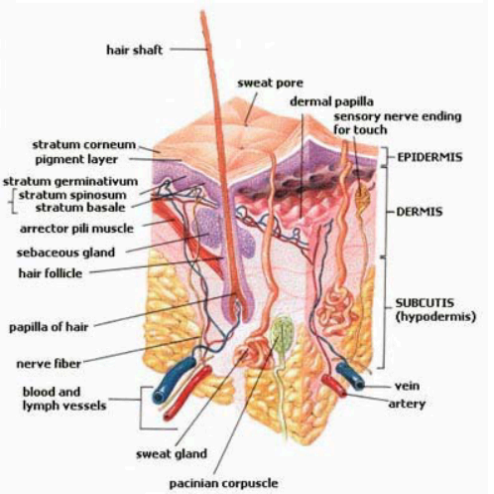
8.8 Specialized Dermal Cells

The dermis contains several specialized structures and cells that support its many functions:

- Hair Follicles – Each follicle is connected to an erector pili muscle, which can raise the hair.
- Sebaceous (Oil) Glands & Apocrine (Scent) Glands – Typically associated with hair follicles.
- Eccrine (Sweat) Glands – Found throughout the dermis but not associated with hair follicles, they regulate body temperature.
- Blood Vessels and Nerves – Supply nutrients and transmit sensations such as pain, itch, and temperature.
- Specialized Nerve Endings – Include Meissner's corpuscles for light touch and Vater-Pacini corpuscles for pressure sensation.

8.9 Hypodermis (Subcutaneous Layer)

The hypodermis, or subcutaneous tissue, consists of fat and connective tissue that houses larger blood vessels and nerves. It plays a critical role in insulating the body and regulating skin and body temperature. The thickness of this layer varies by body area and individual.



The skin is a complex organ with multiple interdependent structures. Dysfunction in any component can result in rashes, abnormal sensations, or other clinical conditions. The field of dermatology is devoted to understanding these structures, diagnosing problems, and managing skin-related conditions.

I can also create a diagram-ready summary with layers, structures, and functions, showing epidermis, dermis, and hypodermis, along with their specialized cells—perfect for training or exam prep.

8.10 Clinical Relevance of Skin Layers in Laser & IPL Treatments

Epidermis: Primary concern for laser safety. Melanin concentration influences energy absorption and risk of epidermal injury. Cooling systems and appropriate wavelength selection protect this layer.

Dermis: Target zone for laser and IPL treatments. Contains hair follicles, blood supply, and chromophores (melanin and oxyhemoglobin) responsible for treatment outcomes.
Subcutaneous Tissue (Hypodermis): Acts as insulation and cushioning. While not directly targeted, tissue thickness can influence treatment depth and parameter selection.

8.11 Student Quick Reference – The Skin

- Largest organ of the body
- Approx. 2 mm thick
- Three layers: Epidermis, Dermis, Subcutaneous tissue
- Laser/IPL treatments aim to affect targets in the dermis while protecting the epidermis
- Proper skin assessment is critical for safety and efficacy

Key Training Reminder

Understanding skin anatomy is essential for safe laser operation, accurate parameter selection, and the management of client expectations. Incorrect assessment increases the risk of burns, pigmentation changes, and suboptimal treatment outcomes.

Chapter 9 - Hair Follicle Anatomy

The mature anagen hair can be divided into vertical (longitudinal) and concentric (horizontal) compartments.

Vertical Divisions

From superficial to deep:

1. Upper Follicle – infundibulum and isthmus
2. Middle Follicle – bulge region
3. Lower Follicle – suprabulbar and bulb areas
    - The upper and middle parts are permanent.
    - The lower follicle regenerates during each hair cycle.

9.1 Concentric Compartments

From outermost to innermost:

Connective tissue sheath\Outer root sheath

- Inner root sheath
- Cuticle
- Hair shaft cortex
- Hair shaft medulla

Infundibulum

- Extends from the epidermis to the sebaceous gland duct.
- It is continuous with the epidermis and can regenerate epidermal cells after injury.
- Lumen contains hair shafts, keratin, and sebum.

Sebaceous Gland

- Produces sebum, a mixture of fat, keratin, and cellular material.
- Peripheral cells divide and move inward, accumulating lipid, then disintegrate to release sebum
- into the hair canal.
- Important for hair shaft outgrowth.

Isthmus

- Extends from the sebaceous gland duct to the arrector pili muscle.
- The outer root sheath contains pale, glycogen-rich cells; no granular layer.
- Arrector Pili Muscle
- Connects to the epidermis; contraction erects hair and creates “goosebumps.” Bulge
- Located at the lower isthmus, it is believed to contain hair-follicle stem cells.
- Supplies cells for the hair matrix during each growth cycle.
- Prominent during telogen (resting phase).

Suprabulbar Region

- Between the isthmus and bulb.
- Layers (outer to inner): dermal sheath, outer root sheath, inner root sheath, hair shaft.
- Inner root sheath layers (Henle’s, Huxley’s, cuticle) fully keratinize here.

Perifollicular Sheath

- Composed of the connective tissue sheath (outer) and the hyaline membrane (inner).
- Envelops epithelial components and supports the follicle.

Outer Root Sheath

- Non-keratinizing layer continuous with epidermis.
- Contains vacuoles, Golgi complexes, endoplasmic reticulum, mitochondria, and glycogen.
- Provides energy for hair growth and structural support.

Inner Root Sheath

- Extends from bulb base to isthmus; produces trichohyalin granules and keratin fibres.

Three layers:

1. Henle’s layer – one cell thick; first to cornify
2. Huxley’s layer – 2–4 cells thick; cornifies above Henle’s layer
3. Inner root sheath cuticle – one cell thick; overlaps hair cuticle to anchor the shaft

9.2 Hair Shaft

- Visible portion above the scalp; composed of dead keratinized cells.

Three layers:

1. Cuticle – protective overlapping layer; controls water content and adds shine
2. Cortex – provides elasticity, strength, curl; contains keratin and melanin
3. Medulla – central hollow core in terminal hairs; may assist in thermal regulation

Hair Follicle Bulb

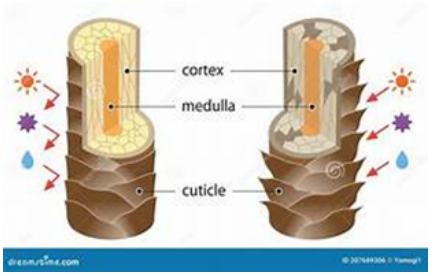
- Deep, bulbous portion surrounding the dermal papilla.
- Contains matrix cells that proliferate rapidly to form the hair cortex.
- Cells differentiate into six cylindrical layers:
- Inner three layers → hair shaft (medulla, cortex, cuticle)
- Outer three layers → inner root sheath lining the follicle

Dermal Papilla

- The dermal papilla, located at the base of the hair follicle, plays a crucial role in hair growth and follicle development. It typically appears as a healthy "pear-shaped" structure and contains a highly active population of cells capable of inducing follicle formation in the epidermis.
- Structurally, the dermal papilla is composed of spindle-shaped fibroblasts, collagen bundles, stroma, nerve fibres, and a single capillary loop. It is continuous with the perifollicular (dermal) sheath, a connective tissue layer that envelops the lower portion of the follicle. This specialized structure directs and regulates hair development and growth throughout the follicle cycle.

9.3 Hair Structure

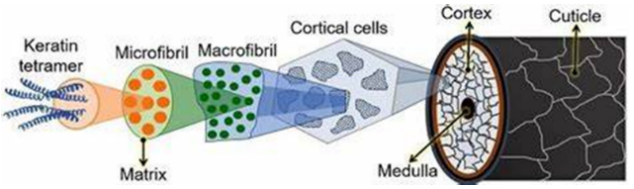
Hairs are elongated, keratinized structures. Keratin is a special protein that is resistant to wear
and tear and is also the main component of nails. Like other proteins in the body, keratin is a large molecule composed of smaller units called amino acids, which are linked together into a chain, like beads on a string.



The diameter of a single hair fibre varies between individuals but typically ranges from 0.05 to 0.09 millimetres.

The epidermis is the outermost layer of the skin. Each hair originates from an indentation in the epidermis. Structurally, hair consists of two main parts:

1. Hair follicle – the part embedded in the skin
2. Hair shaft – the portion that extends above the skin surface



9.4 Types of Hair

Morphologically, three types of hair grow on the human body: vellus hair, terminal hair, and intermediate hair.

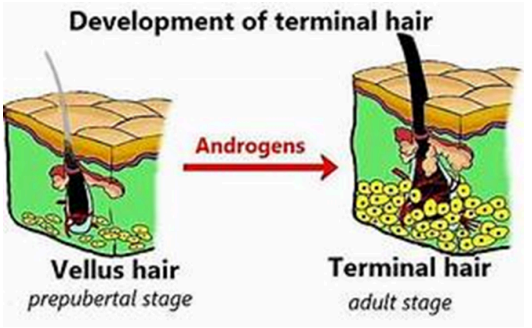
Vellus Hair

Vellus hair consists of short, fine hairs typically measuring 1–2 centimetres in length. These hairs contain little to no pigment and are therefore colourless or very light. Vellus hair follicles do not have associated sebaceous glands, and the hair shaft lacks a medulla and melanin layer.

Vellus hairs are soft, fine, and generally not cosmetically significant.

Terminal Hair

Terminal hair is long, thick, and coarse, growing on the scalp and in various areas of the body. These hairs are produced by hair follicles that have adjacent sebaceous glands. Terminal hairs are darkly pigmented, have a large diameter, and contain a medulla at the innermost part of the hair shaft.



Intermediate Hair

Intermediate hair exhibits characteristics of both vellus and terminal hair. These hairs contain a medulla and have moderate pigmentation, less than that of terminal hair but more than vellus hair. During the balding process, terminal and intermediate hair follicles may progressively miniaturize, leading to the production of vellus hair rather than terminal hair in affected areas.

Hair Shaft Diameter

The diameter of the hair shaft is directly correlated with the depth of the hair follicle during the full anagen stage. While hair size and follicle depth vary across body areas, they are generally consistent within a given area among individuals.

For example, axillary (underarm) hair in adults is typically medium to coarse terminal hair. Similarly, leg hair commonly ranges from medium- to coarse-diameter terminal hair.

The table below illustrates the relationship between hair shaft diameter and hair follicle depth. The depth measurements provided in millimetres are intended as general guidelines only, as individual variations may occur.

Description of Hair Thickness	Description & Depth of the Hair Diameter
Very Fine	Less than 1 mm-very shallow
Fine	1 mm-shallow
Fine to Medium	2-2.5 mm, less shallow to shallow to medium
Medium	3 mm-medium
Medium to Course	4 mm-medium to deep
Course	4-5 mm-deep
Very Course	5-7 mm-deep to very deep

Chapter 10 - Hirsutism

10.1 Causes of Excessive Hair Growth (Hirsutism)

Approximately 7% of women experience excessive hair growth. While a few dark hairs in areas such as around the nipples may be considered normal, hair growth that resembles a male pattern is typically classified as hirsutism.

Excessive hair growth in women can be distressing and emotionally challenging, and may indicate underlying hormonal imbalances that require further evaluation. Elevated levels of androgen hormones stimulate hair follicles to produce thicker, darker, and coarser terminal hairs.

Hirsutism can vary in severity, ranging from a few dark hairs on the chin to more pronounced hair growth, such as a moustache, sideburns, chest, or abdominal hair. In women, excessive hair growth most commonly appears along the midline of the body, including:

10.2 Ferriman–Gallwey Index (Evaluation of Hirsutism)

The Ferriman–Gallwey Index (FGI) was originally developed for anthropological research and is now widely used in clinical practice to evaluate excess male-pattern hair growth in women.

The index assesses hair growth in 11 specific body areas, scoring each area based on the degree of terminal hair growth. The body areas evaluated include:

- Upper lip
- Chin
- Chest
- Upper back
- Lower back
- Upper abdomen
- Lower abdomen
- Upper Arm & Forearm
- Thigh

The Ferriman–Gallwey (F-G) Index classically assesses 9 body areas, but in many clinical and aesthetic training settings, a simplified screening version uses 4 key androgen-sensitive areas.

The 4 Commonly Referenced Areas (Simplified F-G)

These areas are chosen because they are most hormonally responsive and easiest to assess quickly:

1. Upper lip
2. Chin
3. Chest (between the breasts)
4. Lower abdomen (below the navel)

These four zones often give a reliable snapshot of androgen-related hair growth, especially in laser, IPL, and aesthetic consultations.

Important Clinical Clarification

Full Ferriman–Gallwey Index (Original) = 9 areas

Each scored from 0 (no terminal hair) to 4 (severe terminal hair)

The 9 areas are:

- Upper lip
- Chin
- Chest
- Upper abdomen
- Lower abdomen
- Upper arms
- Thighs
- Upper back
- Lower back

Maximum score: 36

Hirsutism typically indicates: ≥8 (varies by ethnicity

Why the 4-area version is used in aesthetics & laser

- Faster consultation
- Less invasive
- Still highlights hormonal vs cosmetic hair
- Helps guide expectations and treatment planning

The Ferriman–Gallwey scoring system is commonly used by physicians to determine the severity of hirsutism:

A modified score of 8 or higher is most commonly used to diagnose hirsutism

Some experts consider a score of 6 or higher sufficient for diagnosis

Based on the total score and supporting clinical findings, hirsutism may be classified as:

- Mild
- Moderate
- Severe

Note: The Ferriman–Gallwey Index is a screening and assessment tool and should be used in conjunction with clinical evaluation and, when appropriate, hormonal testing.

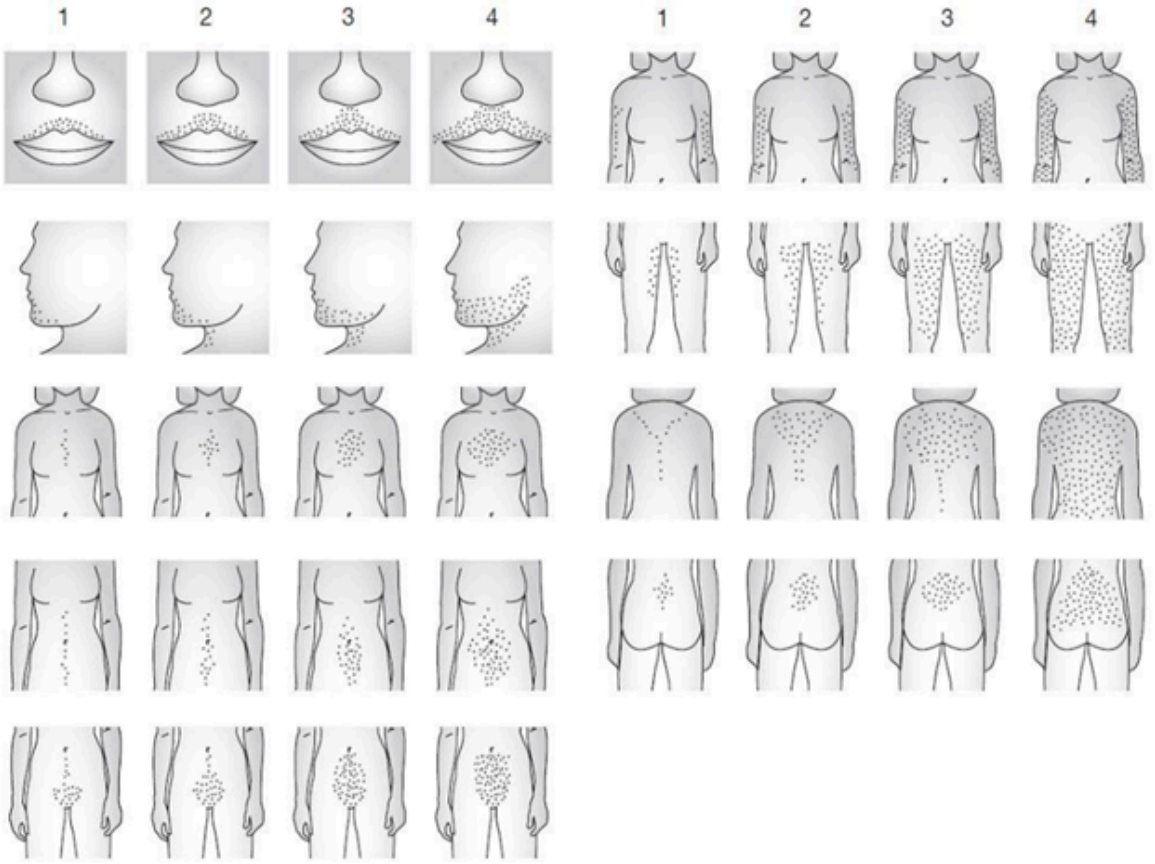


Figure 2 The modified Ferriman–Gallwey scoring system for hirsutism. Each of the nine body areas is rated from 0 (absence of terminal hairs) to 4 (extensive terminal hair growth) and the numbers in each area are added to obtain the total score. A score ≥6–8 generally defines hirsutism. Permission obtained from Humana Press © Azziz R *et al.* (2006) *Androgen Excess Disorders in Women: Polycystic Ovary Syndrome and Other Disorders*, edn 2. Totowa, NJ: Human Press.

10.3 What Cause Excessive Hair Growth

Excessive hair growth should be taken seriously, as it may be associated with variety of underlying factors, including:

- Congenital (Genetic predisposition)
- Hormonal imbalance
- Pregnancy
- Irregular menstrual cycles
- Psychological or emotional stress
- Production of male hormones
- Hyperthecosis
- PCOS
- Puberty
- Metabolic disorders
- Menopause
- Some medications

- Excessive hair growth can be hereditary
- Ovarian/adrenal tumors
- Cushing's syndrome

10.4 Causes of Hirsutism Related to Androgen Excess

Hirsutism in women is most commonly caused by excess androgen production, which stimulates hair follicles to produce terminal-type hair—thicker, darker, and coarser than normal vellus hair.

Hormonal Causes

Menopause: After menopause, the ovaries may ovulate irregularly, leading to lower estrogen levels. Since androgen production continues, the relative hormonal imbalance can lead to increased terminal hair growth.

Ovarian or adrenal tumours: In approximately 2% of cases of hirsutism, the condition is caused by an androgen-producing tumour of the ovary or adrenal gland. When a tumour is responsible, surgical removal is typically required.

10.5 Medication-Induced Hirsutism

Certain medications can lead to excessive hair growth in women, including:

- Acetazolamide
- Cyclosporine
- Danazol
- Diazoxide
- Genoterol
- Anabolic steroids
- Metryrapone
- Testosterone
- Topical

Hexachlorobenzene

- Interferon
- Minoxidil

Oxadiazolopyramide

- Penicillamine

corticosteroids

- Streptomycin
- etradecyl sulphate
- Sodium phenytoin
- PUVA therapy

10.6 Symptoms of Hirsutism

The main symptom of hirsutism is excessive terminal hair growth in women in areas typical of male hair patterns, including:

- Chin and face
- Chest
- Around the nipples
- Abdomen

Women experiencing these symptoms should consult a physician to determine the underlying cause.

10.7 Treatment of Hirsutism

Hirsutism is a symptom, not a disease, and may indicate an underlying medical condition. It is common, and women should not feel embarrassed or uncomfortable about it.

Medical treatments include:

- Hormonal therapy: Birth control pills are commonly prescribed to suppress ovarian androgen production.
- Spironolactone can also be used to block the effects of androgens on hair follicles.

Treatment plans are typically individualized based on the underlying cause and severity of hirsutism.

10.8 Common Reasons for Hair Removal

Medical Reasons

- Hypertrichosis
- Hirsutism
- Pre-operative hair removal, Unwanted facial and/or body hair, Hair in skin grafts and flaps, Ingrown beard hairs
- Transsexual change

10.9 The Different Types of Lasers - Hair Removal

Many types of lasers are used in cosmetic hair removal procedures. Understanding the different types of lasers is essential before undergoing treatment to ensure safe and effective results. Hair removal lasers work based on hair colour, skin tone, and the laser's wavelength.

Ruby Laser

Wavelength: 694 nm

Overview: Ruby lasers were the first lasers developed for hair removal. They are effective in reducing unwanted hair but are limited to patients with very light skin and very dark hair.

Limitations: This laser struggles to distinguish between skin pigment and hair pigment, so only patients with a high contrast between hair and skin can be treated safely.

Current Use: Rarely used today, having been largely replaced by Alexandrite and Nd: YAG lasers.

Alexandrite Laser

Wavelength: 755 nm

Overview: The Alexandrite laser is among the most widely used for hair removal. Its adjustable spot size and fast repetition rate improve both treatment speed and effectiveness.

Ideal Candidates: Patients with lighter skin tones and darker hair.

Notes: While it can sometimes be used for patients with darker skin by reducing energy levels, multiple sessions are often required for optimal hair removal.

Nd: YAG Laser

Wavelength: 1064 nm

Overview: The Nd: YAG laser is versatile and allows safe, effective treatment of patients with darker skin tones.

Advantages: Its longer wavelength penetrates deeper into the skin while minimizing absorption by melanin in the epidermis, reducing the risk of burns in darker skin types.

Diode Laser

Wavelength: 780–1480 nm (varies by device)

Overview: Diode lasers are effective for hair removal and other skin rejuvenation treatments.

Benefits: Suitable for a range of skin tones, providing safe and effective hair reduction when the appropriate settings are used.

IPL (Intense Pulsed Light)

Technology: Unlike true lasers, IPL emits pulsed light at multiple wavelengths simultaneously.

Mechanism: Pulses of light penetrate the skin to different depths, targeting hair follicles without affecting surrounding tissue.

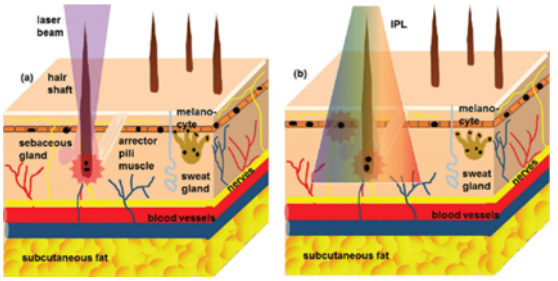
Effectiveness: IPL can provide permanent hair reduction, especially for patients with lighter skin and darker hair, but results may vary depending on hair and skin type.

Note for Practitioners: Choosing the correct laser type and settings based on hair colour, skin tone, and treatment area is critical for achieving safe, effective, and lasting results.

10.10 Coherent and Non-Coherent Light

Non-Coherent Light

Emission of highly random wavelengths, such as those found in thermal light devices or Intense Pulsed Light (IPL) systems. The energy is dispersed and less focused.

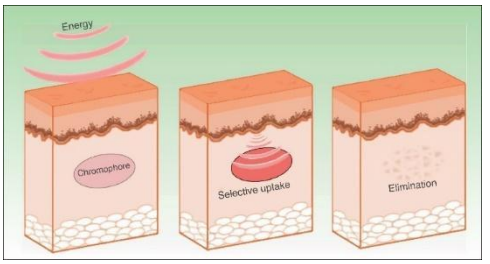


Coherent Light

Light energy is emitted in a resonant, uniform wavelength that does not change, making it highly focused and precise. This is characteristic of true lasers.

Selective Photothermolysis

Selective Photothermolysis is the principle by which light and heat energy are selectively delivered to a target chromophore (such as melanin or hemoglobin) to destroy it, while minimizing damage to surrounding tissues.



Applications in aesthetics:

- Hair removal (melanin in hair follicles)
- Treatment of pigmented lesions
- Treatment of vascular lesions

This principle underpins the safety and effectiveness of modern cosmetic lasers and IPL systems.

10.11 Chromophores

A chromophore is the part of a molecule capable of selectively absorbing light, giving certain compounds their colour. In cosmetic laser technology, the primary chromophores targeted are:

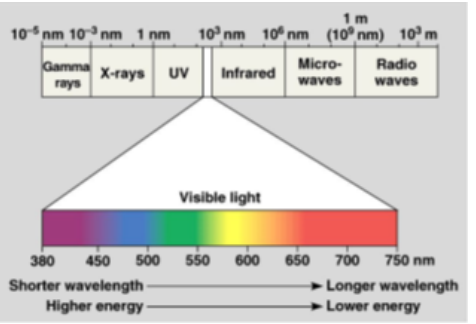
- Melanin: Found in hair follicles and skin
- Hemoglobin: Found in blood vessels

Safety Note: Chromophores are also present in the iris, making laser radiation extremely dangerous to vision. Protective eyewear is mandatory during all laser procedures.

10.12 Wavelength

Wavelength is the distance between two consecutive crests or troughs of a light wave, typically measured in nanometres (nm).

- Shorter wavelengths: Carry more energy
- Longer wavelengths: Carry less energy, but penetrate deeper into the skin



The wavelength of light determines:

The color of the light
Alexandrite 755 nm
The absorption by the target chromophore
Diode 808 nm
The penetration depth beneath the skin is influenced by scattering
Nd:Yag – 1064 nm

Targeting Melanin

- Wavelengths between approximately 700 and 1000 nm are selectively absorbed by melanin.
- Competing chromophores, such as oxyhemoglobin and water, absorb less energy in this range, making it ideal for hair removal.

Color	Wavelength
violet	380–450 nm
blue	450–495 nm
green	495–570 nm
yellow	570–590 nm
orange	590–620 nm
red	620–750 nm

Penetration Depth

- Longer wavelengths experience less scatter, allowing them to penetrate deeper.
- Example: 1064 nm (Nd: YAG) penetrates deeper than 700–800 nm (Alexandrite).
- The interaction of light with tissue can result in absorption, reflection, or transmission, depending on the wavelength and the target chromophore.

10.13 Burn Protocol for Laser Treatments

Although rare, burns can occur during laser treatments due to incorrect settings, skin sensitivity, or improper technique. Immediate and correct action is essential to minimize damage and prevent infection.

Step 1: Immediate Care

Stop the treatment immediately.

- Cool the affected area using a cool compress, chilled gel pack, or running cool water for 10–15 minutes.
- Avoid ice directly on the skin to prevent further tissue damage.

Step 2: Assessment

Examine the burn:

- First-degree burn: Redness, mild swelling, tenderness
- Second-degree burn: Blisters, severe pain, oozing
- Third-degree burn: Charring, severe tissue damage (rare)

Document the burn in the client record.

Step 3: Treatment

First-degree burns:

- Apply soothing aloe vera gel or sterile burn cream
- Cover with a non-adherent sterile dressing if needed
- Advise avoiding sun exposure until healed

Second-degree burns:

- Refer to a medical professional immediately
- Keep the area clean and protected

Third-degree burns:

- Immediate medical emergency – call emergency services

Step 4: Follow-Up

- Monitor for signs of infection (pus, increasing redness, warmth, fever)
- Adjust future laser settings or avoid laser treatment in the area until fully healed.
- Educate the client on proper home care and sun protection.

10.14 Precautions and Screening

Always conduct a detailed client consultation, including:

Medical history

- Medications and supplements
- Recent sun exposure
- Skin conditions or a history of scarring
- Patch testing is recommended for clients with darker skin types, sensitive skin, or uncertain reactions.

Modify laser settings based on:

- Skin type (Fitzpatrick scale)
- Hair color and thickness
- Treatment area

Key Principle: Safety is paramount. When in doubt, delay treatment or obtain medical clearance.

10.15 Burn Protocol

Burn Severity	Signs	Immediate Actions	Follow-Up
1st Degree (Superficial)	Redness, mild swelling, tenderness, no blisters	Stop treatment immediately Cool area with cool compress or running water 10–15 min) Advise sun avoidance, heals within a few days.	Monitor for infection Adjust laser settings for the future
2nd Degree (Partial Thickness)	Redness with blisters or oozing, moderate/severe pain, swelling	Stop treatment immediately and monitor healing Cool the burn Do not pop blisters Cover with a sterile non-adherent dressing to prevent recurrence. Refer to a medical professional.	Document the incident Adjust laser settings for the future
3rd Degree (Full Thickness)	Charring or white leathery skin, severe tissue damage or numbness	Stop treatment immediately Call emergency services Keep the area clean and protected. Prevent further trauma	Do not apply creams or ice High risk of complications Document the incident thoroughly Follow medical advice

Chapter 11 - Electromagnetic Compatibility Requirements for the Equipment

11.1 Guidance and Manufacturer's Declaration -Electromagnetic Emissions and Immunity

Guidance & Manufacturer's Declaration - Electromagnetic Emissions	
*PLUTUS™ Super Ice❄ is intended for use in the electromagnetic environment specified below. The customer or the user of the [Code SI] should ensure that it is used in such an environment.	
Emissions Test	**Compliance Level**
RF Emissions CISPR 11	Group 1
RF Emissions CISPR 11	Class A
Harmonic Emissions IEC 61000-3-2	Not Applicable
Voltage Fluctuations / Flicker Emissions IEC 61000-3-3	Not Applicable

Guidance & Manufacturer's Declaration - Electromagnetic Emissions

Guidance and Manufacturer's Declaration - Electromagnetic Immunity		
*The [Code SI] is intended for use in the electromagnetic environment specified below. The customer or the user of the [Code SI] should ensure that it is used in such an environment.		
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**
Electrostatic Discharge (ESD) IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air
Electrical Fast Transient/Burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV signal input/output	±2 kV for power supply lines Not Applicable
Surge **IEC 61000-4-5**	±1 kV differential mode ±2 kV common mode	±1 kV differential mode Not Applicable
Voltage Dips, Short Interruptions and Voltage Variations on Power Supply Input Lines **IEC 61000-4-11**	0 % UT; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°. 0 % UT; 1 cycle and 70 % UT; 25/30 cycles; Single phase: at 0°. 0 % UT; 250/300 cycle	0 % UT; 0,5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°. 0 % UT; 1 cycle and 70 % UT; 25/30 cycles; Single phase: at 0°. 0 % UT; 250/300 cycle
Power Frequency (50/60Hz) Magnetic Field **IEC 61000-4-8**	30 A/m 50Hz/60Hz	30 A/m 50Hz/60Hz

Guidance & Manufacturer's Declaration - Electromagnetic Immunity

Note: UT refers to the AC mains voltage measured before applying the test level.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity		
*The [Code SI] is intended for use in the electromagnetic environment specified below. The customer or the user of the [Code SI] should ensure that it is used in such an environment.		
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**
Conducted RF IEC61000-4-6	3 V 0,15 MHz – 80 MHz 6 V in ISM bands between 0,15 MHz and 80 MHz	3 V 0,15 MHz – 80 MHz 6 V in ISM bands between 0,15 MHz and 80 MHz
Radiated RF IEC61000-4-3	3 V/m 80 MHz – 2,7 GHz	3 V/m 80 MHz – 2,7 GHz

Guidance & Manufacturer's Declaration - Electromagnetic Immunity

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

- Field strengths from fixed transmitters, such as base stations for radio cellular/cordless) Telephones, land mobile radios, amateur radio, AM and FM radio broadcasts, and TV broadcasts cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the [Code SI] is used exceeds the applicable RF compliance level above, the [Code SI] should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the [Code SI].
- Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Guidance and Manufacturer's Declaration - Electromagnetic Immunity

*The [Code SI] is intended for use in the electromagnetic environment specified below. The customer or the user of the [Code SI] should ensure that it is used in such an environment.

	Test Frequency (MHz)	Band a) (MHz)	Service a)	Modulation b)	Modulation b) (W)	Distance (m)	Immunity Test (V/m)
Radiated RF IEC61000- 4-3 (Test Specification for Enclosure Port Immunity to RF Wireless Communication Equipment)	385	380 – 390	TETRA 400	Pulse modulation b) 18 Hz	1,8	0,3	27
	450	380 – 390	GMRS 460, FRS 460	FM c) ± 5 kHz deviation 1 kHz sine	2	0,3	28
	710 745 780	704 – 787	LTE Band 13, 17	Pulse modulation b) 217 Hz	0,2	0,3	9
	810 870 930	800 – 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation b) 18 Hz	2	0,3	28
	1720 1845	1 700 – 1 990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation b) 217 Hz	2	0,3	28

	1970						
	2450	2 400 – 2 570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation b) 217 Hz	2	0,3	28
	5240	5 100 – 5 800	WLAN 802.11 a/n	Pulse modulation b) 217 Hz	0,2	0,3	9
	5240						
	5785						

Guidance & Manufacturer's Declaration - Electromagnetic Immunity

Note: If necessary to achieve the Immunity Test Level, the distance between the transmitting antenna and the Me Equipment or Me System may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4- 3.

For some services, only the uplink frequencies are included. The carrier shall be modulated using a 50 % duty cycle square wave signal. As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because, while it does not represent actual modulation, it would be the worst case.

The Manufacturer should consider reducing the minimum separation distance, based on Risk Management. Using higher Immunity Test Levels that are appropriate for the reduced minimum separation distance. Minimum separation distances for higher Immunity Test Levels shall be calculated using the following equation:

$E=6\sqrt{P}-d$

Where P is the maximum power in W, d is the minimum separation distance in m, and E is the Immunity Test Level in V/m.

Chapter 12 - Specification

This chapter details the most critical technical parameters and treatment systems of categories.

Specification	Data
Electrical Connections Data	
Electrical Voltage	100~230VAC 16A
Electrical Frequency	50/60Hz
Against Electric Shock Protection Type	Type I
Against Electric Shock Protection Level	B
Harmful Water Invade Type	Normal

Electrical Connections Data

Specification	Data
Weather Condition (During the Operation)	
Temperature Around	+15℃ to +30℃
Relative Humidity	30% to 80%
Atmospheric Pressure	86.0 Kpa to 106.0 Kpa

Weather Condition (During the Operation)

Specification	Data
Weather Condition (During the Transportation and Storage)	
Temperature Around	-20°C – +60°C;
Relative Humidity	≤ 93 % non-condensing
Atmospheric Pressure	86.0 Kpa – 106.0 Kpa

Weather Condition (During the Transportation and Storage)

Specification	Data
Dimension and Weight	
Device Length/Packing Length	430mm
Device Width/Packing Width	500mm
Device Height/Packing Height	1030mm
Gross Weight/Net Weight	Approx. 65Kg

Dimension and Weight

Chapter 13 - How to Return the Device to the Factory for Repair

If the equipment fails to operate normally and you are unable to resolve the issue through basic maintenance, please get in touch with our after-sales service department for assistance. Our staff will provide a schematic diagram for maintenance upon request. If it is necessary to return the device for repair, please follow the instructions below:

13.1 Important Instructions

- **Delivery Confirmation:** Once the equipment is shipped, please immediately inform us of the safe delivery. To ensure timely repair, contact us at the same number for an appointment.
- **Contact After-Sales Service Center:** For routine maintenance or repairs, contact us at the same number for an appointment. A technician will come to your clinic to fix and service the device.
- **Inquiry for Unsatisfactory Service:** If the service provided does not meet your satisfaction, please request the name of the staff member or BDM who assisted you when contacting the after-sales service center.

Chapter 14 - Clinical Reports & Laser Settings

14.1 Treatment Incident Report

Clinic Information

Field	Details
Clinic Name	_____
Technician Name	_____
Date of Incident	____ / ____ / _____
Time of Incident	____: ____

Client Information

Field	Details
Full Name	_____
Date of Birth	____ / ____ / _____
Contact Number	_____
Treatment Area	_____
Treatment Type	_____

Incident Details

Field	Details

Type of Incident

☐ Burn ☐ Adverse Reaction

☐ Equipment Malfunction ☐ Other: _____

Description of Incident_____

Burn Severity (if applicable)

☐ First-Degree ☐ Second-Degree ☐ Third-Degree

Immediate Actions Taken

Step	**Action Taken**
1.	_____
2.	_____
3.	_____

Cooling / First Aid Applied_____

Medical Referral (if applicable) ☐ Yes ☐ No

Facility / Doctor Referred To_____

Equipment Details

Field	**Details**
Device / Model	_____
Settings Used	_____
Safety Equipment in Use	☐ Yes ☐ No
Device Malfunction Observed	☐ Yes ☐ No

Client Outcome

Field	**Details**
Immediate Response	_____
Follow-Up Instructions Provided	_____
Date / Time of Follow-Up Contact	____ / ____ / _____

Technician / Witness Statements

Name / Signature _____ Date_____

Technician _____ ___ / _____ / _____

Witness _____ __ / _____ / _____

Management Review

Field	**Details**
Reviewed By	_____
Position	_____
Date of Review	____ / ____ / _____

Management Review

Field **Details**

Reviewed By _____

Position _____

Date of Review ____ / ____ / _____

Corrective Actions / Recommendations: _____

Instructions:

- Fill out all sections immediately after an incident.
- Keep completed reports in client files and submit for management review.
- Use this report to track trends and improve safety protocols.

14.2 Contraindications for Laser Treatment

Before performing any laser or IPL procedure, it is essential to conduct a thorough client consultation, including a review of medical history, medications, and current skin condition. Contraindications are conditions or circumstances that increase the risk of adverse reactions or complications.

Contraindications are classified as absolute (treatment must not be performed) or relative (treatment may be performed with caution, modified settings, or medical clearance).

Absolute Contraindications

Laser treatment must not be performed under the following conditions:

- Pregnancy, Breastfeeding, and Nursing Mothers
- Laser energy has not been adequately studied during pregnancy or breastfeeding.
- Hormonal fluctuations may alter hair growth patterns, making results unpredictable.

Active Infections or Open Wounds

- Includes bacterial, viral, or fungal infections in the treatment area.

Examples:

- Herpes simplex
- Syphilis
- Impetigo
- Cellulitis
- Open wounds or ulcers

Risk: Laser treatment may worsen the infection and delay healing.

Herpes simplex: Clients must be on oral antiviral medication for at least 12 hours before treatment, with no active lesions present.

Cancer

- Skin Cancer or Pre-Cancerous Lesions

Includes melanoma, basal cell carcinoma, squamous cell carcinoma, actinic keratosis, or suspicious lesions.

Cancer must be in remission for at least 5 years before laser treatment is considered.

Risk: Laser energy may aggravate lesions or delay diagnosis.

Diabetes

- Type l

Risk: Diabetes and Laser / IPL Treatment Risk

Clients with diabetes, particularly Type 1 diabetes and Type ll diabetes on medication, have a compromised wound-healing response due to impaired circulation, altered immune function, and reduced tissue repair capacity. Laser and IPL treatments are considered controlled thermal injuries to the skin, designed to damage target structures, such as hair follicles, selectively.

In individuals with diabetes, this controlled injury may result in:

- Delayed wound healing
- Increased risk of infection
- Prolonged inflammation
- Higher likelihood of blistering or skin breakdown
- Post-inflammatory hyperpigmentation or scarring
- Photobiological Considerations (Mitochondrial Stimulation)

Laser and IPL devices emit light energy (photons) that is absorbed by targeted chromophores within the tissue. In addition to melanin and hemoglobin, cellular components such as the mitochondria may absorb photon energy. This absorption can stimulate mitochondrial activity and cellular metabolism.

Because laser and light-based technologies can stimulate cellular function, treatment is contraindicated in active malignancy or suspected cancer. Stimulating cellular activity in abnormal or diseased tissue may pose an increased risk and is outside the scope of cosmetic laser treatment.

For this reason, clients with a history of cancer must be in confirmed remission for a minimum of five (5) years. Laser or IPL treatments must never be performed over known, suspected, or untreated malignant lesions.

This precaution aligns with the fundamental safety principle of laser therapy: do not stimulate unhealthy or abnormal tissue.

Photosensitive Conditions

- Includes lupus, porphyria, and xeroderma pigmentosum.

Risk: Severe burns, pigment changes, or disease flare-ups.

Photosensitizing Medications

Examples include:

- Tetracycline antibiotics
- Isotretinoin (Accutane) within the past 6–12 months
- Chemotherapy agents (often in the treatment of RA)
- Certain diuretics
- Some antidepressants

Risk: High risk of burns, blistering, and post-inflammatory hyperpigmentation (PIH).

Recent Sunburn, Active Tanning, Spray tan or Self Tanners

- Increased epidermal melanin raises the risk of burns and PIH.
- Treatment must be delayed until the skin has fully healed and the tan has faded.

Bleeding Disorders

- History of bleeding disorders, including hemophilia.

Risk: Bruising, prolonged bleeding, delayed healing.

Relative Contraindications

Pre diabetic or borderline diabetes (insulin resistance), Type II diabetics considered controlled and NOT on medication, require a doctor's note and MUST sign an additional waiver indicating they know and understand the risks with laser and IPL treatments -taking full responsibility. Treatment may be performed only when their blood sugar is well controlled, the skin is intact, and there is no evidence of impaired healing, neuropathy, or vascular compromise in the treatment area.

Confirm diabetic status during consultation.

- Assess skin integrity and healing history.
- Use conservative settings and perform patch testing when appropriate

Decline treatment if healing capacity is compromised

Minors

- Boys under 18 years of age
- Girls under 16 years of age

Laser treatment may be performed with caution, modified parameters, or medical clearance:

- Autoimmune Disorders

Conditions such as:

- Multiple sclerosis (MS) – must be in remission for at least 2 years and not on immunosuppressive medication
- Rheumatoid arthritis
- Scleroderma

Risk: Altered healing response or disease flare.

Epilepsy (Photosensitive)

- Light flashes may trigger seizures.

Thorough pre-treatment screening is required.

- Active Inflammatory Skin Conditions

Example:

- Psoriasis (active)
- Eczema (active)
- Dermatitis
- Fragile or compromised skin

Risk: Increased inflammation, burns, or prolonged healing.

Vitiligo (bilateral or regional disorder)

Risk: of depigmentation or worsening of affected areas.

History of Keloid or Hypertrophic Scarring

- Increased risk of abnormal scar formation.
- Lower energy settings or alternative hair removal methods may be recommended

Anticoagulant or Immunosuppressive Therapy

Examples:

- Warfarin
- Corticosteroids
- Biologic medications

Risk: Bruising, delayed healing, infection.

Tattoos in the Treatment Area

- Laser energy may target tattoo pigment, causing burns or pigment alteration.
- Treatment of tattoos should be avoided unless specialized protocols are used.

13.3 Precautions and Screening

A comprehensive consultation must include:

- Complete medical history
- Current medications and supplements
- Recent sun exposure
- Skin conditions and history of scarring

Patch Testing

Patch testing is strongly recommended for:

- Darker Fitzpatrick skin types
- Sensitive skin
- Clients with uncertain skin responses
- Treatment Modifications
- Laser settings must be adjusted based on:
- Fitzpatrick skin type
- Hair colour and thickness
- Treatment area

Key Safety Principle

Client safety is paramount.

When uncertainty exists, delay treatment, perform a patch test, or obtain medical clearance before proceeding.

Chapter 15 - Maintenance

15.1 Cleaning of the Main Unit

To clean the main device, use a soft, damp cloth to wipe the surface gently. Avoid allowing any liquid to enter the device, as this could cause damage.

15.2 Cleaning, Disinfection, and Replacement of the Treatment Handle

After each treatment, it is essential to clean and disinfect the light output area of the treatment handle. During the procedure, pigment granules may splash onto the crystal, potentially reducing laser output energy.

15.3 Cleaning and Disinfection

It is recommended to clean and disinfect the handle's light output area both before and after use with each patient.

- Use a sterile, soft cloth soaked in 10 mL of 75% medical ethanol to wipe the treatment handle.
- After cleaning and disinfecting, visually inspect the treatment head to confirm it is clean, and allow approximately one minute for it to dry.
- If the treatment head is not visibly clean after the first cleaning and disinfection, repeat the cleaning process until it is satisfactory.

15.4 Replacement of the Treatment Handle

Each treatment handle has a finite service life, typically lasting up to 20 million shots. Once this limit is reached, the handle must be replaced. Contact your dealer or the manufacturer to purchase a replacement.

15.5 Waste Disposal of the Equipment

The disposal of waste materials from the equipment should be carried out in accordance with local environmental protection regulations, ensuring all waste is treated in an environmentally safe manner.

15.6 Handling of System Failures

Failures Phenomenon	Solution
Screen without a Display	Check the electric wire.
	Check circuit breakers and fuses. The fuse specification is 250V/20A. Open the fuse box and replace the fuse.
	Please check the power supply switch.
	Kindly contact the distributor or device producer.
No Reaction of the Handle Switch Button, and No Reaction by Key	Please check whether the power supply switch behind the device is on. If it is on and the trouble persists, please contact the distributor or device manufacturer.
System Can Not Be Initialized	Check the power supplier.
	Please get in touch with the distributor or device producer.
The Energy Output is Lower, or There is No Laser Output	The voltage is too low, so the handle doesn't work normally.
	Please check for any dirt or debris on the laser-reflective mirror. If yes, please clean it.
	The inner handle is destroyed. Please replace it with a new treatment handle.
	Disassemble the treatment handle to check whether the head reflective mirror is damaged.
	If the treatment handle is too hot, turn off the machine, let it cool for about 30 minutes, then use it again.
	Please check whether the water is leaking.
The Treatment Handle Dropped Out of the Handle Holder	Check if the handle is destroyed. If so, please replace it with a new one.
	The device was not turned on at the right time, resulting in a delay.

During the Treatment, You Press the Handle Button, and There Is a "Zizi" Noise	The treatment room temperature is too low. Please raise the room temperature.
	Please check if the current is passing through the wire to the device.
	The treatment room humidity is too high. Please lower the room humidity.
The Cooling System Temperature is Too Low	Turn the device off for a few minutes, then turn it back on. If the cooling system is still low, please contact the distributor or the device producer.
The Treatment Handle Output Energy is Too Low	Check for any dirt or debris on the reflective mirror. If yes, please clean it.
	If the handle is hot, please turn off the machine for 30 minutes.
	Please check whether the head of the reflective mirror is in good condition. If there is any damage, contact your distributor or device producer.
The Treatment Handle Output Energy is Too Low	The life of the treatment head has come to an end. Contact your distributor or device producer for a new handle.
Laser Emitter is Broken	Please get in touch with your distributor or device producer.

Chapter 16 - Laser & IPL Treatment Consent Form

15.1 Contraindication Risk Acknowledgement, Informed Consent & Liability Waiver (Canada)

Clinic Name: _____ Client Name: _____

Clinic Address: _____ Date of Birth: _____

Date: _____

1. PURPOSE OF THIS DOCUMENT

This document is intended to confirm that the undersigned client has been fully informed of the known and potential risks associated with laser and/or IPL treatments when relative contraindications are present, and that the client voluntarily elects to proceed with treatment despite those risks.

This waiver is used in accordance with Canadian professional practice standards for non-surgical cosmetic laser and light-based procedures.

2. DISCLOSURE OF RELATIVE CONTRAINDICATION(S)

The client acknowledges that they have disclosed, or have been advised that they may have, one or more of the following conditions that may increase the risk of complications from laser or IPL treatment (check all that apply):

☐ Type 2 Diabetes (diet or medication controlled)

☐ History of delayed wound healing

☐ Circulatory or vascular compromise

☐ Autoimmune condition in remission

☐ History of abnormal scarring

☐ Other (specify): _____

The client confirms that they do not have Type 1 diabetes, uncontrolled diabetes, active ulcers, active infection, or any absolute contraindication that would prohibit treatment.

3. EXPLANATION OF RISKS

The client understands and acknowledges that:

- Laser and IPL treatments create a controlled thermal injury to the skin.
- Certain medical conditions, including Type 2 diabetes, may impair circulation, immune response, and wound healing.
- These factors may increase the risk of delayed healing, infection, blistering, pigmentation changes, scarring, or other adverse reactions.
- Individual response to treatment cannot be predicted or guaranteed.

The client confirms that these risks have been clearly explained, all questions have been answered, and no guarantees or assurances of outcome have been made.

4. VOLUNTARY ASSUMPTION OF RISK

The client knowingly, voluntarily, and expressly assumes all risks associated with proceeding with laser or IPL treatment despite a relative contraindication.
The client confirms that they: - Are proceeding of their own free will - Understand that elective cosmetic treatment is not medically necessary - Have had sufficient opportunity to decline or postpone treatment.

5. RELEASE AND LIMITATION OF LIABILITY

To the fullest extent permitted by Canadian law, the client hereby releases, waives, and discharges the clinic, its owners, directors, officers, employees, contractors, students, and service providers from any claims, demands, damages, or causes of action arising from or related to:

- Known or disclosed relative contraindications
- Delayed healing or adverse skin reactions
- Complications arising despite appropriate screening, technique, and adherence to professional standards

This waiver does not apply to acts of gross negligence or willful misconduct.

6. MEDICAL CARE AND FOLLOW-UP

The client understands that if an adverse reaction occurs, they may be advised to seek medical attention from a qualified healthcare provider other than the cosmetic laser practitioner.

7. CONFIRMATION OF TRUTHFUL DISCLOSURE

The client confirms that all medical history and health information provided is true, complete, and accurate to the best of their knowledge. The client understands that failure to disclose relevant medical information may increase risk.

8. GOVERNING LAW

This agreement shall be governed by and interpreted in accordance with the laws of the Province/Territory of _____ and the laws of Canada applicable therein.

9. ACKNOWLEDGEMENT AND SIGNATURES

I have read and fully understand this document. I have had the opportunity to ask questions and receive satisfactory answers. I voluntarily consent to proceed with laser/IPL treatment under the conditions outlined above.

Client Name: _____ Practitioner Name: _____

Client Signature: _____ Practitioner Signature: _____

Date: _____ Date: _____

This document is intended for use in professional cosmetic laser and IPL settings and does not replace medical advice or physician clearance when required.

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