INCREDIBLE DEVICES

ATHENA™ SUPER ICE

Training Manual

MULTI-WAVELENGTH TECHNOLOGY FOR LASER HAIR REMOVAL

The **ATHENA Super Ice Laser Hair Removal Training Manual** provides in-depth instructions on essential techniques, safety guidelines, device configuration, and treatment protocols to ensure effective, safe results for both practitioners and clients.

HEALTH CANADA LICENCED

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Dedication

Dedicated to the bold visionaries and trailblazing pioneers who transformed aspiration into accomplishment within the aesthetic industry. With courage & unwavering resolve, you have built flourishing Medspas and Clinical Practices rooted in excellence. Your entrepreneurial spirit is formidable, & your success a powerful testament to resilience, ambition, and extraordinary purpose.

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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.

Table of Contents

Chapter 1 - Device Overview & Technology

1.1 Introduction

The **Athena SUPER ICE™** Laser System represents a breakthrough in aesthetic laser technology, combining proprietary Triple Pulse Technology™. As a **Health Canada-licensed** medical device, it meets the highest safety and efficacy standards in the aesthetic industry. The system's unique **SUPER ICE™ Cooling Technology** and versatile treatment modes deliver superior results across all skin types and hair colours.

Athena SUPER ICE™ – How it works

The advanced system integrates multiple wavelengths to safely and effectively treat a wide range of skin tones, hair types, and treatment areas.
By combining the proprietary **Triple Pulse Technology** - the **gold-standard 808 nm wavelength**, with the deeper-penetrating **1064 nm wavelength**, and optionally the **755 nm wavelength**, the system can simultaneously emit different energy outputs. This multi-wavelength capability allows the practitioner to customize treatments based on an individual's skin tone, hair colour, hair thickness, and follicle depth.

During treatment, laser energy is selectively absorbed by melanin within the hair shaft and follicle. The heat generated (*Photothermolysis*) disrupts its blood supply, destroys the hair follicle and inhibits future hair growth. **Advanced wavelength** blending and energy modulation significantly reduce discomfort while improving treatment outcomes.

This mixed-wavelength design is suitable for all **Fitzpatrick skin types I–VI**, and a wide range of hair colours, while minimizing the risk of burns, hypopigmentation, and other short-term adverse effects. The result is enhanced safety, improved comfort, and superior hair removal efficacy.

1.2 Diode Laser Safety

- The laser converts electrical energy into light energy and directs it to the targeted treatment area.
- The emergency shutdown button immediately shuts down the device!
- A password on the service screen prevents unauthorized changes to the system's basic operating parameters.
- The system includes a secure remote inter-lock connector for connecting the external inter-lock on the entrance door of the treatment room. The external remote inter-lock is continuously connected to the foot switch, ensuring that when installed, the system is disabled and operation is prohibited if the entrance gate is opened.
- The system includes status indicators: a yellow emission indicator light on the front panel of the device and a buzzer. When the system is ready to trigger a pulse, the yellow transmit indicator light flashes and the buzzer sounds a warning.
- Laser pre-ignition is only initiated when the operator switches to ready mode and presses the foot switch (minimal risk).

- Laser emission is only enabled when the foot switch and remote interlock are both pressed simultaneously.
- Once the system is turned on, water is circulated throughout the system to keep it cool.
- Water flow and temperature should be monitored to eliminate the risk of module overheating. The laser handle will stop firing if, for any reason, water stops flowing or if the water temperature is 40ºC (104ºF) or above.
- The system is equipped with a foot switch for easy use as well as a safety measure.

Treatment Room

The treatment room should not include any reflective objects such as mirrors and glass objects and windows. This equipment should only be used by necessary personnel who are properly trained in the safe operation of ATHENA SUPER ICE devices.

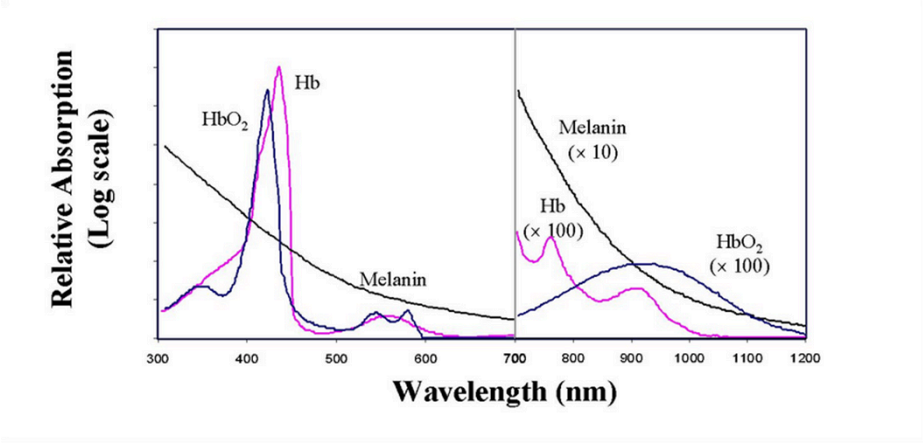
Please ensure that all treatment room personnel are familiar with the ATHENA SUPER ICE device controls and are able to appropriately disable the system immediately if necessary.

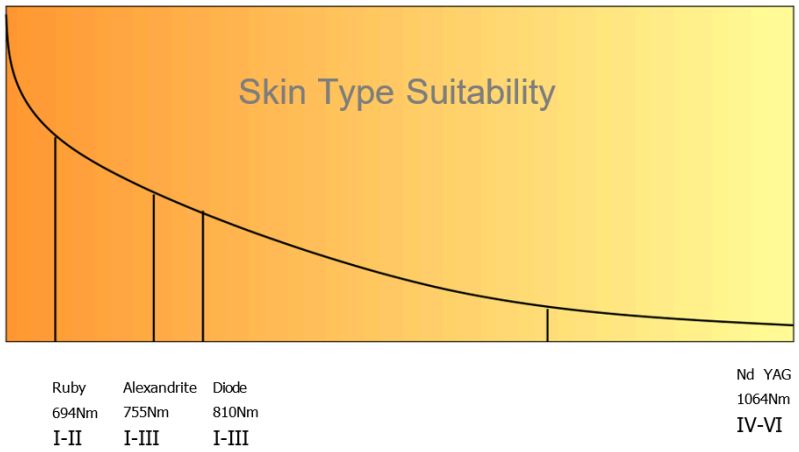
1.3 Multi-Wavelength Architecture

Simultaneous delivery of three optimal wavelengths:

755nm: (Alexandrite) Light skin and fine hair
808nm: **(Classic Diode)** Medium skin tones
1064nm: **(Nd:YAG)** Darker skin types

Wavelength Selection





1.4 Laser Wavelength Breakdown

755 nm – Ideal for lighter and finer hair, highest melanin absorption
Effective for a wide range of hair types and colours. Particularly beneficial for light-colored and fine hair, commonly used for lighter skin types –

Fitzpatrick I - III

808 nm – Fast and Versatile Treatment
The classic and most widely used wavelength in laser hair removal
Deep penetration to effectively target the hair follicle
High average power, large spot size, and high repetition rate. Allows faster treatment times and consistent results. Best suited for **medium-dark hair** and **light-medium skin tones –**

Fitzpatrick I - IV

1064 nm – Best for Darker Skin Types
Safest wavelength for darker skin tones – **Fitzpatrick IV - VI**
Deep penetration to target hair follicles while protecting the integrity of the skin
Reduced risk of burns and post-inflammatory hyperpigmentation (PIH)

Safe for All Skin Types

Lighter skin types respond best to the **755 nm** wavelength, while darker skin types are more safely and effectively treated with the **1064 nm** wavelength. The 808 nm diode wavelength is highly effective for moderate skin tones, offering versatility across a broad range of patients.

Accurate Targeting of Multiple Hair Follicle Depths

Hair follicle depth varies by treatment area, typically ranging from **2 to 7 mm** beneath the skin's surface. Some follicles are superficial (e.g., upper lip), while others are deeper (e.g., bikini area). Utilizing multiple laser wavelengths allows precise targeting of follicles at varying depths, resulting in more optimal and consistent treatment outcomes.

Effective for Different Hair Colours

Light-colored and fine hair requires wavelengths with higher melanin absorption, such as **755 nm**, for effective treatment. Darker, thicker hair responds more effectively to **808 nm** and **1064 nm** wavelengths, ensuring comprehensive treatment across a wide range of hair colours and textures.

1.5 Technical Specifications

Laser Sources

Primary DIODE Laser (808 nm):
Operating temperature: **20-25°C**
Secondary Alexandrite and ND:Yag crystal (755nm / 1064 nm):
Operating temperature: **15-20°C**

Bulb Specifications

Flash lamp type: Xenon ceramic chamber
Rated lifetime: **150 million shots**
Energy per flash: **200J maximum**
Pulse duration capability: **0.2-300ms**
Bulb cooling: Closed-loop deionized water system

1.6 General Precautions and Warnings

To ensure safe use of ATHENA SUPER ICE, the following precautions and warnings must be observed.

Precautions

Device operators and the supervisors should read this manual in its entirety before attempting to operate the ATHENA SUPER ICE.

The handpiece light exit must be kept clean at all times. The system weighs approximately 90 kilograms and injury may occur if care is not taken when moving the system. The system is stable and designed to be moved, but should always be moved slowly and carefully.

Warnings

Only INCREDIBLE's authorized personnel can repair ATHENA SUPER ICE device. This includes making internal adjustments to power supplies, cooling systems, optics, handpieces, and more.

Verify that the ATHENA SUPER ICE is connected to the appropriate voltage.

Operators can only perform maintenance when the system is shut down and disconnected from the power supply. Performing maintenance procedures while the system is powered can be hazardous to the operator and/or destructive to the system.

- Always turn off the system when not in use.
- Never leave the system in ready mode unattended.
- Never allow untrained personnel to operate the system.
- Never press the footswitch unless the handle is safely aimed at the specific intended target treatment area.
- The system should always be powered OFF during maintenance.

1.7 Warnings Related To Laser Exposure

Direct and Reflective Eye Exposure Hazards

All personnel (patients and medical staff) in the operating room during treatment must wear protective and anti-laser goggles recommended by INCREDIBLE LASER to protect their eyes.

It is a best practice to instruct patients to close their eyes during treatment, even if wearing goggles.

If the patient cannot wear goggles, fit the patient with opaque goggles that completely block light from reaching the eyes.

If the area to be treated is close to the eye (such as the eyelid), protect the eye with a corneal shield.

1.8 Warnings!

Radiation from ATHENA SUPER ICE can cause serious eye damage or blindness. Do not treat eyebrows, eyelashes, or other areas within the bony area around the eyes. For maximum safety, patients must wear authorized goggles during all treatments.

When operating a laser system, Never look directly into the laser light or handle or apparatus on the far side of the handle, even if you are wearing laser safety glasses. Never aim the laser beam anywhere other than the intended treatment area. Stray laser light and its reflections are always a potential hazard and can cause serious irreversible eye damage.

Eye safety precautions: Clearly identify treatment rooms by prominently posting approved Warning and Safety signs, outside the treatment door and inside the Treatment room.

Cover all windows with dark filament to ensure that the laser beam does not escape the treatment room. Restrict access to treatment rooms while equipment is in use. Only personnel trained to operate the equipment should have access. Make sure the foot switch is clean and working properly. Place the footswitch where it cannot be confused or mistaken.

Do Not transmit laser output through an optical instrument designed for long distance (such as a telescope)

Safety Glasses

Radiation from ATHENA SUPER ICE is harmful to the human eye. All personnel must use 810 Provides adequate protection against nano-radiation (OD>5) goggles. Additional goggles can be ordered from your INCREDIBLE LASER representative. Nominal eye hazard distance NOHD: 19m (assuming irradiation duration 0.2 s).

Explosion and Fire Hazard

The absorption of light energy increases the temperature of the absorbing material. Take precautions to reduce the risk of igniting combustible materials in and around the handling area.

This system is not suitable for use in the presence of flammable mixtures of air or oxygen.

If alcohol is used to clean and disinfect any part of the **ATHENA SUPER ICE**, allow it to completely dry before operating the system.

Flammable materials must be kept at a safe distance from the system.

Do not operate in an environment with volatile solvents such as alcohol, gasoline or other solvents.

When preparing a treatment area, do not use any flammable substances such as alcohol or acetone. If necessary, wash with soap and water before treatment.

Voltage Hazard

The system uses 110V AC power. To avoid personal injury, do not operate the system until the exterior panels are properly closed. Do not attempt to remove or disassemble exterior panels.

Whenever system maintenance is performed, never leave the ATHENA SUPER ICE Systems Powered ON or unattended.

1.9 System Security Features

ATHENA SUPER ICE is equipped with many safety features. All treatment room personnel should be familiar with the location and operation of these safety features.

Emergency Shut-Off Knob

This red knob is used for emergency shutdown. When the button is pressed, this red knob is used for emergency shutdown. When the button is pressed, it To reset the emergency shut-off knob, turn it clockwise. Otherwise, the system will remain powered off.

Running Status Indication

The system has two status indicators: a yellow LED located on the front panel of the device and a buzzer.

The yellow LED has 2 modes:

Steady on - when the system is on and in standby mode

Blinking - glowing and blinking only when the module's trigger and footswitch is pressed. The buzzer beeps: Intermittent during light emission, same as pulse repetition frequency: If the repetition frequency is 2Hz, the buzzer will beep twice per second.

Remote Interlock Connector

The system contains a safety remote interlock connector that should be connected to the external microswitch on the treatment room entrance door. The external remote interlock is connected in series with the foot switch, so when installed, it will cause the system to shut down.

Double Safety Technology For Laser Emission

Diode laser beam emission can only be enabled when the operator simultaneously presses the foot switch and turns on start button; Therefore, accidental lasering can only occur due to a double error condition (minimal risk).

Cooling System

The module is cooled using a thermoelectric cooling method to minimize patient discomfort during treatment and reduce postoperative side effects, such as local skin redness and swelling. The tissue is cooled via a metal ring and a cold sapphire window. During operation, the system can reach a minimum temperature of -30°C.

Temperature Control Protection System

Miniature infrared temperature sensors are installed on both sides of the handle's light outlet, which can capture the skin surface temperature in real time. If the skin temperature exceeds 44°C, the emission of the laser beam will be immediately cut off or blocked.

Through the tissue cooling system, the temperature of the skin surface can be effectively reduced, so that when the laser is irradiated, the heat of the laser will be quickly absorbed and released, avoiding the accumulation of heat effectively .

Through the temperature control protection system, the device provides an immediate protection mechanism when the skin temperature exceeds 44°C.

The combined use provides double safety against burns to the treatment area of the patient.

Laser Modular Design

The modular design ensures the safe use of the **ATHENA SUPER ICE** system. Since the light or laser beam is generated in the module itself, rather than in a console (like a traditional laser drive power supply), there is no need to have an articulated arm or other beam delivery system. In contrast, **ATHENA SUPER ICE** systems module consists of an all-in-one light mixer that combines several emitters to create a uniform, square beam. Since light emission is limited to the module, there is no dangerous light radiation in the console or cables.

During use of the system, the beam is placed on the patient's skin, reducing stray light while increasing the effectiveness of the treatment.

1.10 Equipment Classification

According to the method of protection against electric shock: This system is a Class III(b) device.

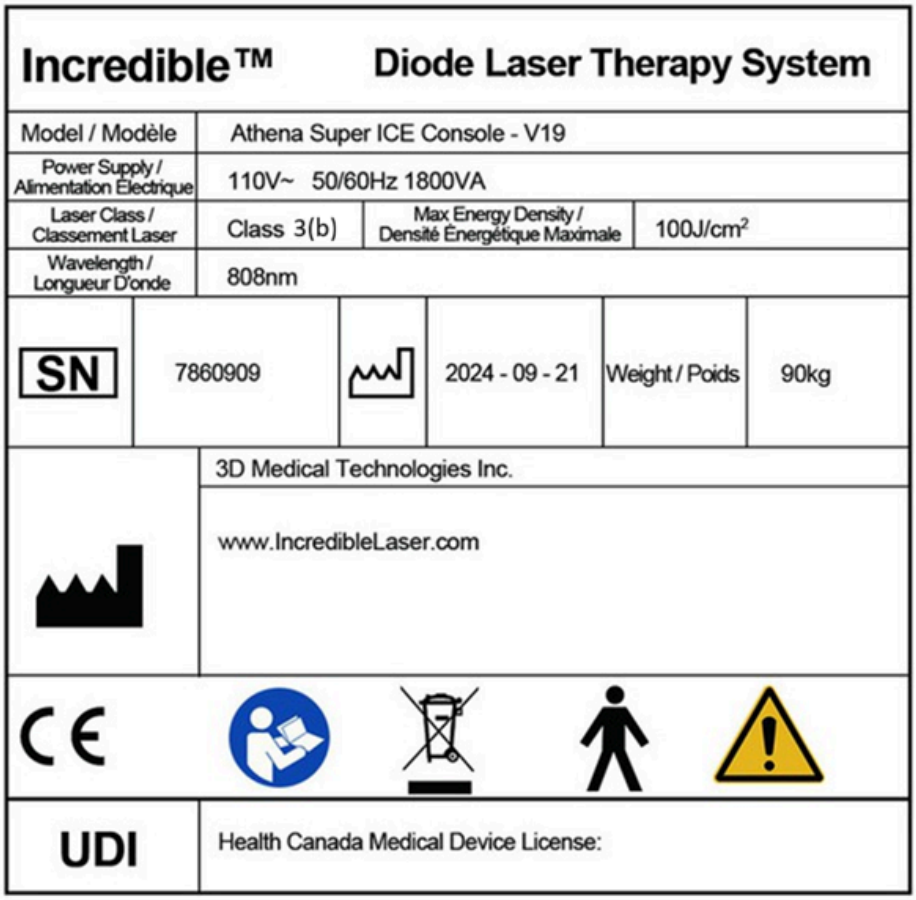
According to the degree of electric shock protection: the laser handle is a type BF part.

- Device tags
- System Label

ATHENA SUPER ICE System carries the following warning, certification and identification labels: The identification label is affixed to the back of the device. This label contains the following information:

- Manufacturer details
- System name and model
- Serial number and manufacturing date

System Electrical Requirements



System Modifications

Unauthorized modifications to the hardware, software, or specifications of the ATHENA SUPER ICE machine will void all express and implied warranties. INCREDIBLE LASER assumes no responsibility for the use or operation of any such modified equipment.

Chapter 2 - Installation

2.1 Introduction

ATHENA SUPER ICE Systems are designed to be installed in a treatment room or clinic and require minimal site preparation.

When purchasing **ATHENA SUPER ICE** Systems, the buyer will perform a complete on-site installation, including initial system testing and calibration. A complete set of instructions is included in this manual.

Equipment delivery and installation are carried out by INCREDIBLE LASER authorized personnel.

Personnel will provide the following services upon delivery:

Unpack the machine package and place it in a suitable and safe place which has been selected in advance.

Verify the integrity of the system and its components.

Connecting system components (handle , foot switches, handle connectors). Plug the system into a designated power outlet.

Test the functional operation of all system components and software. If necessary, coordinate the execution of on-site safety inspections.

Name	No.	Name	No.
HOST User	1	Power Line	1
Manual	1	Foot Switch	1
Treatment Handle	1	Funnel	1
Staff Goggle	2	Therapy Goggle	1
Plastic Pipe	1		

Required Facilities

Before unpacking the system, make sure that the treatment room meets the requirements described in the following sections.

Space and Positioning

The space should be allocated with adequate ventilation and free airflow. The working area of the system should be prepared according to the system dimensions proposed in. To ensure proper ventilation, always keep the sides of the system at least 20 inches (0.5 meters) away from walls or other potential airflow obstructions.

2.2 Electrical Safety

Some components may still be active after the power is turned off, therefore, no part of the device housing may be removed except by authorized INCREDIBLE LASER personnel.

This equipment is grounded through the grounding conductor in the power cord. This protective grounding is critical to safe operation. This device uses isolated AC. Be sure to familiarize yourself with the instrument's components and specifications before use.

- DO NOT open the device even if the equipment is turned OFF.
- DO NOT operate the equipment if the power cord is frayed or damaged.
- Do not immerse or spray the laser console, touch screen with liquids, as this may cause equipment damage and electric shock. Wait for 15 mins.
- Clean the touch screen only when the system is turned off and disconnected from power.

Built-in security measures include:

After switching over the system, perform a software check on all safety-related hardware.

A watchdog loop continuously monitors the operation of the system during operation. The circuit breaker on the service panel protects the system by tripping when the power supply is overloaded. To resume normal operation, reset the circuit breaker by lifting the handle and then restart the system.

If an error occurs, the system displays a warning message to the operator and disables further operations. Refer to the Tech Support team.

2.3 Electrical Requirements

At the customer's request, the system is factory pre-wired for local line voltage. Therefore, this system will require a separate line power supply: 110VAC, 50 Hz, single phase.

Power input lines should be free of transients, voltage and current spikes, sags, and surges. Therefore, the power cord of the **ATHENA SUPER ICE** system should not be shared with other heavy variable loads, such as elevators, air conditioning systems, large motors, etc.

The system needs a safe and reliable electrical environment. Do not overload the power supply, otherwise it will cause the power circuit to burn out or even cause a fire. Avoid the following problems: the power supply of the power board does not meet the requirements, the wiring is messed up, the insulation of the circuit joint part is poor, the joint part is not handled properly, the capacity margin of the air switch, fuse and other protective devices is too small, the power socket plug is loose, the power socket wiring is wrong, etc.

The system is grounded through a grounding conductor in the power cord that plugs into the wall outlet. Good grounding is essential for safe operation.

Environmental Requirements Air Quality:

The system should operate in a non-corrosive environment. Corrosive substances such as acids can damage the surfaces of wires, electronic components, and optical components.

Dust particles in the air should be kept to a minimum. Dust particles absorb light and heat up. Hot particles on optical lenses can damage them. Metal dust is destructive to electrical equipment.

Temperature:

To ensure optimal operation of your system, maintain the following temperature and relative humidity levels:

Working temperature: 5℃~30℃ (41℉~86℉) Working relative humidity: ≤80%

2.4 Installation of Parts

Foot Switch Connection

To connect a footswitch, connect the footswitch's connector to the connection port on the system's service panel. Match the red dot to the red dot on the female part on the device body.

Connect the Laser Handle

To connect the laser handle, connect the access end of the handle to the machine's handle interface.

Distilled Water

After the handle and foot switch are installed, prepare about 3000ml of pure water and add it to the water tank in two batches. After adding it once, turn on the power. When the water level in the water tank drops to 1/3, add the remaining water. When the water level reaches the level shown in the figure (Figure 3-2), the water supply can be started normally.

Schematic Diagram of the Water Tank

Power Outlet

Connect the power source and connect part of the power cord to the electrical outlet on the service panel. Connect the other part to a (110VAC) electrical outlet.

Transportation

During the installation process, if you need to lift the device, place your hands or use appropriate tools on designated areas (such as the bottom of the device or the caster frame) as support points for transportation. Ensure that the product is properly supported, and is not tilted beyond 15° to maintain stability of the device.

Chapter 3 - System Description

3.1 Introduction

This chapter provides a detailed introduction to the **ATHENA SUPER ICE DIODE LASER THERAPEUTIC SYSTEM**. The description covers the system's main components, controls, functional subsystems, and system specifications.

3.2 General System Description

The **ATHENA SUPER ICE DIODE LASER HAIR REMOVAL** therapeutic device is based on the principle of selective photothermal dynamics, as human skin is a relatively transparent structure. Under the powerful laser, the skin behaves like a piece of transparent cellophane. The laser penetrates the skin and reaches the hair follicles, where hair grows. The melanin in the hair follicle absorbs a large amount of laser energy and eventually converts it into heat energy, raising the temperature of the follicle. This process destroys the function of the hair follicle, causing it to lose its ability to regenerate, thereby achieving hair removal.

Laser parameters and other system functions are controlled from a control panel on the console, which provides an interface to the system microcontroller via an LCD touch screen.

3.2 System Components and Controls

ATHENA SUPER ICE Systems consists of the following main components:

- The main console unit includes the main CPU board, power module, laser power supply, laser device, cooling system and switch module.
- Hand tools
- Foot switch

3.3 Main Console

The console unit contains the following system components:

Host CPU Plate

This board controls the operation of the subsystem in real time. It integrates advanced microprocessors, memory chips, and digital and analog interfaces.

This **ATHENA SUPER ICE** device is equipped with self-testing software that uses a watchdog function to continuously monitor system operation.

The software continuously checks the hardware status and if an error condition is detected:

- An error symbol will be displayed
- Audible alarm signal is activated

Power Module

Power modules provide power to system components:

LRS-150-24 DC24V- Cooling system and water circulation system power supply
LBPS-32V110-TEC12- Laser power supply
LRS-350-12 DC12V - Powers control board and color screen
A9-iC65N-2P-20A - Machine circuit breaker

Cooling System

The cooling system includes some fans. Three fans are located inside the system. Two fans cool the laser device and one fan cools the switching power supply.

3.4 Control Panel

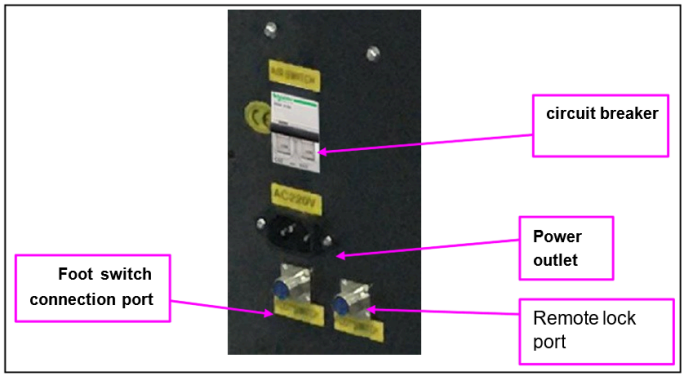
The system control panel includes the following functions:

- **Emergency Shutdown Button -** This is a red mushroom-shaped button used for emergency shutdown of the system.
- **LCD Display -** This touch-controlled screen provides status and settings information for the ATHENA SUPER ICE Systems.
- **Keyswitch -** Turns the system on when activated.

3.5 Maintenance Panel

The service panel (see Figure 4-2) is located on the back of the system. It houses all the controls and connections needed for the system:

- Power outlet
- Circuit breaker
- Foot switch connection port
- Remote lock port



Foot Switch

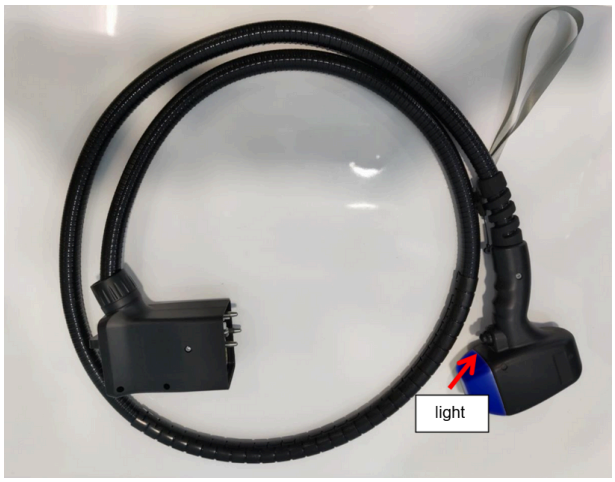
The foot switch is connected to the system through the foot switch connection port on the maintenance panel (see Figure 4-2). Laser emission will only occur when the foot switch is activated.

The footswitch is only enabled when the system is in ready mode. Pressing the footswitch in standby or any other mode will not activate the laser handpiece.

Hand Tools

The handle is part of the machine; the mounting end of the handle is installed on the machine, and when the machine is in a ready state, hold the handle and press the button handle to release the light.

The upper and lower limits of pulse width and energy output size are set in the program. The pulse range can be adjusted according to the screen parameters, and the output energy range can be adjusted according to the screen parameters.



Applicator

Chapter 4 - Cooling & Safety Systems

4.1 SUPER ICE™ Cooling Technology

Industry-leading cooling capacity to **-31°C**
Temperature range: **-31°C to 5°C**
Real-time temperature monitoring
Epidermal protection system
Continuous contact cooling
Pain minimization feature
Revolutionary Technology Platform

4.2 Triple Pulse Technology™

The system features three distinct pulse delivery modes:

Super Glide Mode

Continuous pulse delivery
Up to **10 Hz** repetition rate
Optimal for large treatment areas
Enhanced patient comfort
Faster treatment times.

Static Mode

Precision pulse delivery
Up to **1 Hz** repetition rate
Ideal for sensitive areas
Maximum control and accuracy
Enhanced safety profile

Advanced Single Pulse

- Refined energy delivery
- Minimized patient discomfort
- Precise melanin targeting
- Tissue-protective features
- Optimized treatment
- Multi-Layer Safety Protocols
- Real-time temperature monitoring (**0.1°C** precision)
- Impedance measurement (**1kHz** sampling)
- Melanin content analysis
- Pulse energy modulation

4.3 Automated Safety Adjustments

Dynamic power reduction based on skin temperature
Automatic pulse termination if skin temperature exceeds **42°C**
Real-time fluence adjustment based on melanin index

- Treatment area overlap detection
- Ergonomic Design and Usability
- Handpiece Features
- 12x24mm XL spot size
- Balanced weight distribution
- Ergonomic trigger design
- Built-in cooling system
- 2.0-inch control display

Chapter 5 - User Experience, Laser Output & Fitzpatrick

5.1 User Interface

- 15-inch 4K main display
- Preset treatment parameters
- Skin type selection
- Cooling level adjustment
- Treatment tracking
- Laser Output Specifications

5.2 Fitzpatrick Characteristics

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/ 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 (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
- (Rare) Dark Brown

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
- Eastern European

Fitzpatrick III

- Fair to Medium 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
- Black-brown

Skin Characteristics

- Light beige to olive undertones
- Sometimes burns
- Sometimes peels, 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

- European

Fitzpatrick lV

- Lt- Medium / Olive (Skin Usually 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

- Caucasian mix with dark Ethnicity
- Turkey
- Mediterranean (even ginger)
- Middle Eastern
- Lt Hispanic / Latin
- Lt East Asian
- Some African America

Fitzpatrick V

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

Eye Colour Range

- Any eye colour, but unusually
- 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

- Some Middle Eastern
- Central Asian
- South & Southeast Asian
- Filipino
- Thailand
- Indonesian
- East Indian North – Central
- Pakistan
- African American
- Afro-Caribbean

Fitzpatrick VI

- 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
- Hair Colour 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
- Rapid treatment delivery

Common Ethnic Backgrounds

- Sub-Saharan African
- Afro-Caribbean
- South Indian
- African
- SirLanka

Chapter 6 - Clinical Applications & Protocols

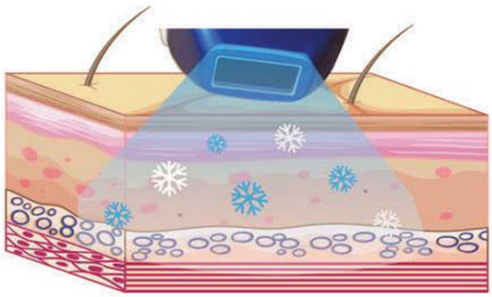
6.1 Treatment Protocols

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

6.2 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 selection
- Energy delivery verification (±2%)
- Pulse duration monitoring (±0.1ms)
- Spot size verification
- Treatment coverage mapping

6.3 Service and Maintenance

Calibration Requirements

- **Energy output:** Every 6 months
- **System Maintenance:** Every 12 months
- **Temperature sensors:** Every 12 months
- **Cooling system:** Every 12 months

Consumable Components

- **Flash lamp replacement:** 150,000,000 shots
- **Cooling fluid replacement:** Every 12 months
- **Air filters:** Every 6 months

Chapter 7 - Maintenance & Troubleshooting

7.1 Maintenance

Incredible Laser Athena Super ICE Diode Laser Hair Removal system is generally easy to maintain.

Distilled Water Level in the Tank

Please ensure that the water level is always maintained over the arrown mark on the water level scale in the back of the Device.

Replacing Distilled Water in the Cooling Tank

1. Replace water in the cooling tank every 6 months or every 3 months if you have very high usage.
2. Only Distilled Water must be used in the cooling tank. Never ever use tap-water or spring water in this system which will void the warranty on the whole device.
3. Open the bottom screw and let the water flow out and the tank get empty.
4. After its empty, please close the screw and refill the water from the top hole, till the water shows above the arrow sign.
5. When you start Athena, the water pump will consume some of the water and the water level may drop. Ensure that you top-up.

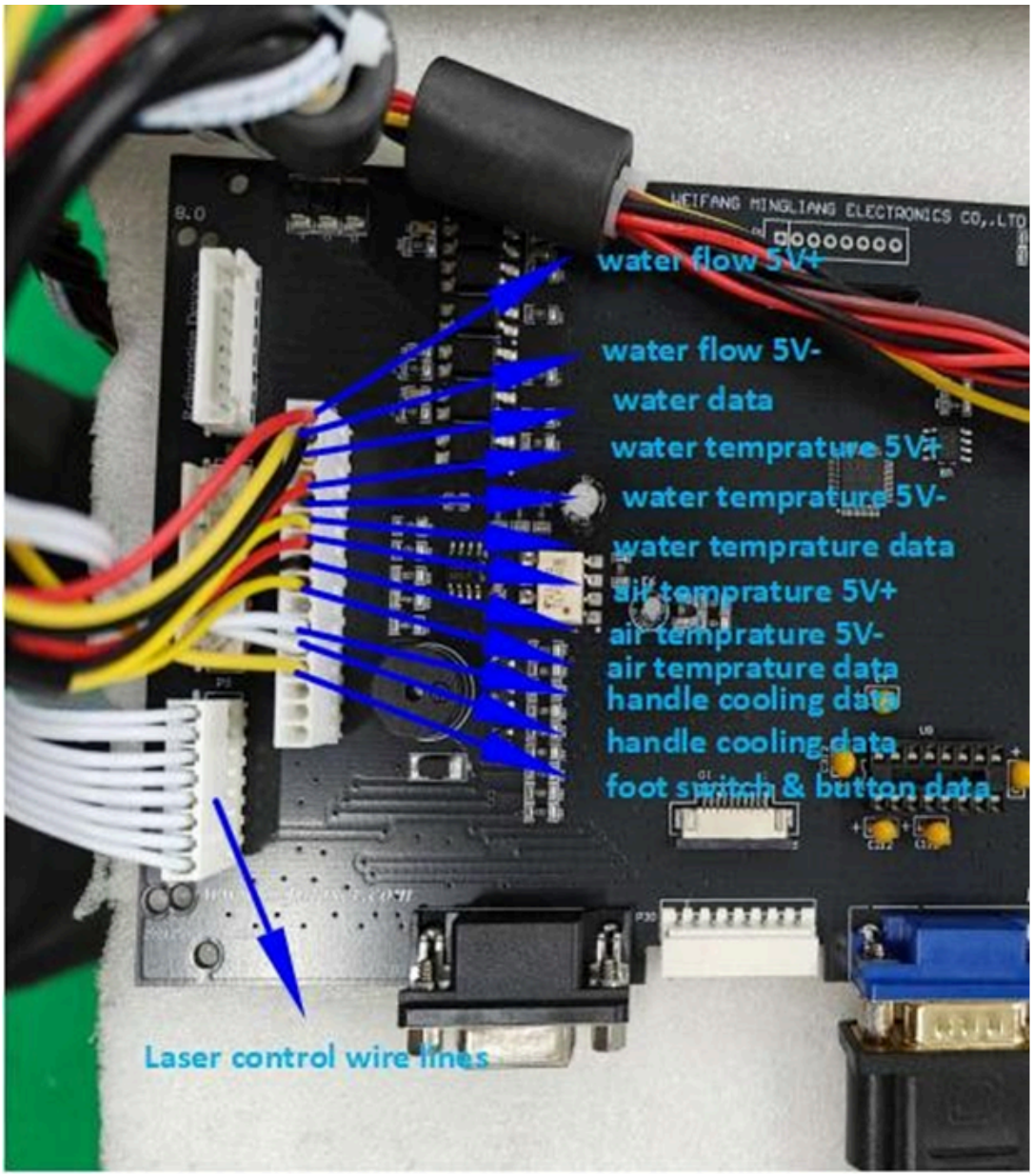
7.2 Replacing Water Filter

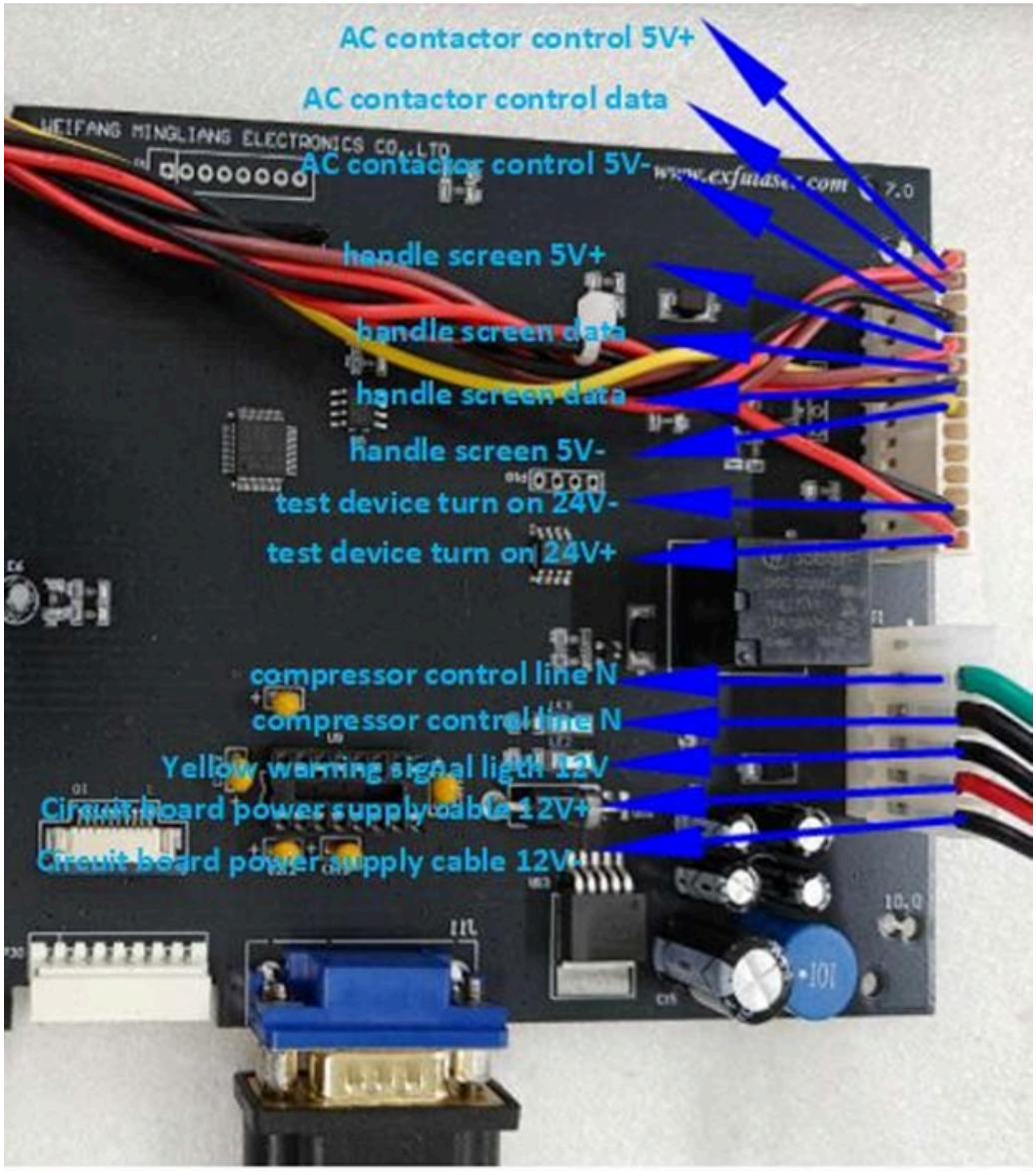
Remove Magnetic Vent Cover by pulling it towards yourself.

The white tall filter, if it has turned brown or shows dark residue, it is time to replace the filter. Please unscrew the placeholder of the Filter and twist the filter off. Replace it with the New Water Filter. Screw back the holding apparatus and place the vent cover back.

You can also get guidance from INCREDIBLE TECH SUPPORT TEAM by calling them at 647-477-9216.

7.3 Circuit Board Terminal Definitions





7.4 Troubleshooting

1. The Machine Screen Does Not Light Up.

Reason Analysis

- The initial boot-up time for the Android system is approximately 100 seconds.
- There may be poor contact or a loose connection in the VGA cable.
- Verify whether the power-on signal is present on the circuit board.
- The Android display screen may be damaged.

Solutions

1. Disconnect the machine's power cord and wait approximately 30 seconds. Reconnect the power and restart the machine. Allow up to 2 minutes for initialization, then observe whether the screen illuminates.
2. Disconnect the power supply again, securely reconnect the screen's VGA cable, and monitor the display after powering on.
3. Using a multimeter, measure the voltage between "24V+" and "–" on the circuit board to confirm power supply status. If no voltage is detected, the 24V switching power supply may be faulty. If voltage is present, proceed to the next step.
4. Replace the Android display screen.

2. Water Flow Alarm

Reason Analysis

1. Low water level within the machine.
2. The water tank stopper has not been replaced with the perforated stopper.
3. The handpiece is not properly connected.
4. Air may be present within the system.
5. Foreign debris in the flow meter may be causing a blockage.
6. Poor contact between the water flow 5V+, –, and Data connections on the circuit board.
7. The flow meter may require replacement.

Solutions

1. Observe the water level in the machine's water tank.
2. Check if the stopper on top of the water tank has been replaced with a perforated stopper.
3. Reconnect the handle, ensuring a secure connection.
4. Turn on the machine and press the two water nozzles at the machine end until water flows out.
5. Disconnect the water pipe at the outlet of the flow meter and observe the water flow. If the water flow is slow, the flow meter needs to be opened to check for foreign matter inside.
6. Check the water flow terminals and reconnect them.
7. The flow meter is damaged.

3. Abnormal Water Temperature/Room Temperature

Reason Analysis

- Sudden and significant temperature fluctuations.
- Temperature consistently displays as 0.

Solutions

1. The temperature control line is experiencing interference; refresh the program and add a ferrite bead to the temperature control line.
2. Check the corresponding interface on the circuit board for poor contact. If poor contact is ruled out, the temperature control line is damaged.

4. High Water Temperature Alarm

Reason Analysis

- The compressor is not starting.
- Insufficient refrigerant in the compressor.

Solutions

1. When the water temperature is above 24 degrees Celsius, touch the compressor with your hand to feel if it is vibrating. If it is not vibrating, short-circuit the two compressor control wires on the circuit board with a wire. If the compressor still does not vibrate, the compressor is damaged and needs to be replaced; if it vibrates, the circuit board is faulty.
2. Use a pressure gauge to check if the compressor operating pressure is 3 bar. If it is too low, R134A refrigerant needs to be added.

5. After Clicking “Ready,” the Controller’s Bar Light Does Not Illuminate

Reason Analysis

- The entire bar light is damaged.
- Poor contact of the signal cable.
- Damaged power supply or circuit board

Solutions

1. Observe if the controller's bar light appears blackened.
2. Reconnect the signal cable, ensuring good contact.
3. Short-circuit the two ends of the G6 optocoupler on the circuit board. If the bar light illuminates, the circuit board is damaged. If it does not light up, the laser power supply is damaged.

6. When the Button Is Pressed, the Screen Shows the Numbers, but the Handle Does Not Emit Light.

Reason Analysis

- The bar is not pre-ignited.
- Poor contact of the signal cable.
- Damaged power supply or circuit board

Solutions

1. Follow the instructions in Category 5.
2. Re-plug the signal cable to ensure good contact.
3. Short-circuit both ends of the G5 optocoupler on the circuit board. If the bar lights up, the circuit board is damaged. If it does not light up, the laser power supply is damaged.

7. After Clicking “Ready,” the Handpiece Treatment Head Does Not Cool Down.

Reason Analysis

- The handpiece cooling element is damaged.
- Poor contact of the handpiece cooling data cable.
- The power supply or circuit board is damaged.

Solutions

1. Replace with a known good handpiece.
2. Reconnect the handpiece cooling data signal cable to ensure good contact.
3. Short-circuit the two handpiece cooling data lines on the circuit board. If it still doesn't cool down, the power supply is damaged. If it cools down, the circuit board is damaged.

Chapter 8 - Hair Anatomy

8.1 Hair 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, full back	Every 8–10 weeks

Recommended Number of Sessions

- 6–10 sessions on average

Additional sessions may be required depending on:

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

8.2 Clinical Training Notes

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.

8.3 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 human body retains the ability to 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 not present during the initial treatment series and therefore were not affected. 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.

8.4 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 the follicles that are in anagen during each session.

How Many Cycles in a Year?

For **most body areas** (legs, arms, torso, back, bikini):

- One full hair cycle can take **4–6 months**
- This means **2–3** cycles per year

Each cycle brings **new follicles into anagen.**

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

8.5 Why 8 Treatments Are the Gold Standard

Each session typically disables **10–20%** of active follicles.

Over multiple sessions:

- **6 treatments** may be sufficient for some clients.
- **8-10 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.

8.6 Clinical Reality (Important for Expectation Setting)

Even after completing a full treatment series:

- **An 80–90% reduction** in hair present during treatment is expected.

New follicles may develop later due to: Hormonal changes

- Aging
- 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.

Chapter 9 - The Skin

9.1 Anatomy

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 **sensory information** from the environment, 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**.

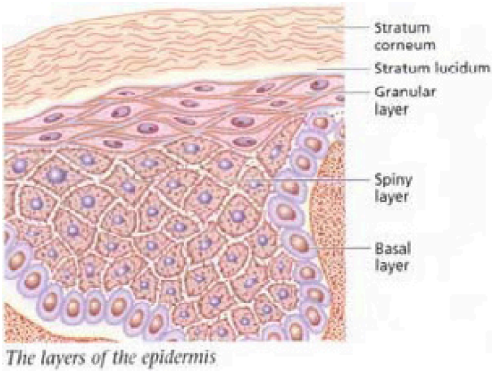
The thickness of the dermis varies by body location, ranging from approximately **0.3 mm on the eyelids** to up to **3.0 mm on the back.**

The 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

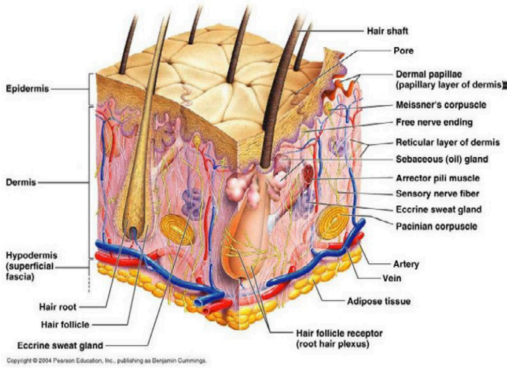
Reticular fibres – support and bind the tissue structure



The layers of the epidermis

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.

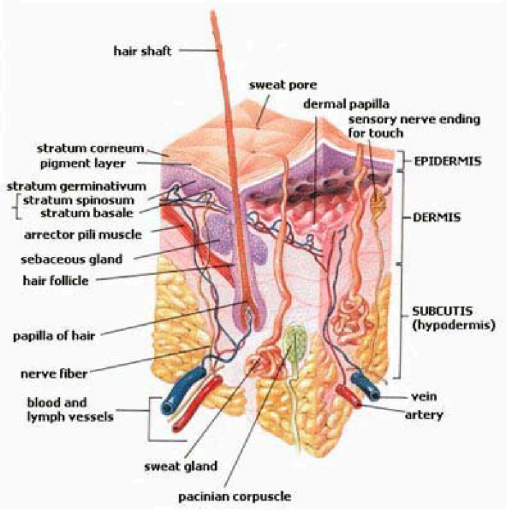
9.2 Specialized Dermal Cells

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.

9.3 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 with their specialized cells**—perfect for training or exam prep.

9.4 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.

9.5 Student Quick Reference - The Skin

The largest organ of the body is approximately 2 mm thick

Three layers: Epidermis, Dermis, Subcutaneous tissue

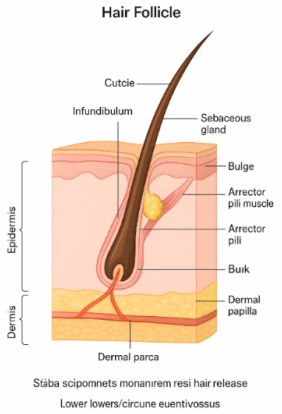
Laser/IPL treatments aim to target dermal targets while protecting the epidermis.
Proper skin assessment is critical for safety and efficacy

Key Training Reminder

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

Chapter 10 - Hair Follicle Anatomy

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



Vertical Divisions

From superficial to deep:

Upper Follicle – infundibulum and isthmus
Middle Follicle – bulge region
Lower Follicle – suprabulbar and bulb areas

The **upper and middle parts** are permanent.

The **lower follicle regenerates** during each hair cycle.

Concentric Compartments

From outermost to innermost:

Connective tissue sheath\Outer root sheath

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

Infundibulum

Extends from the epidermis to the sebaceous gland duct.
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.
The arrector pili muscle connects to the epidermis; contraction erects hair and creates “goosebumps.”

Bulge

Located at the lower isthmus, it is believed to house **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:

- **Henle's layer** – one cell thick; first to cornify
- **Huxley's layer** – 2–4 cells thick; cornifies above Henle's layer
- **Inner root sheath cuticle** – one cell thick; overlaps hair cuticle to anchor the shaft

10.1 Hair Shaft

Visible portion above the scalp; composed of **dead keratinized cells.**
Three layers:

- **Cuticle** – protective overlapping layer; controls water content and adds shine
- **Cortex** – provides elasticity, strength, curl; contains keratin and melanin

- **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

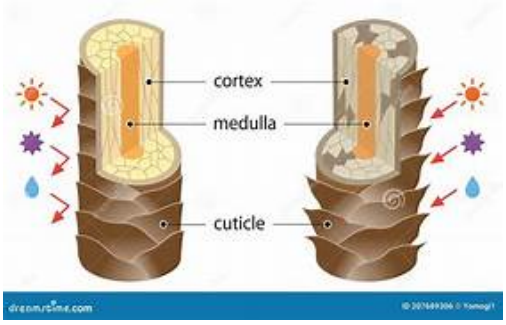
The dermal papilla, located at the base of the hair follicle, plays a crucial role in hair growth and follicle development. It typically appears as a healthy "pear"- shaped structure and contains a highly active population of cells capable of inducing follicle formation from the epidermis.
Structurally, the dermal papilla is composed of spindle-shaped fibroblasts, collagen bundles, stroma, nerve fibres, and a single capillary loop.

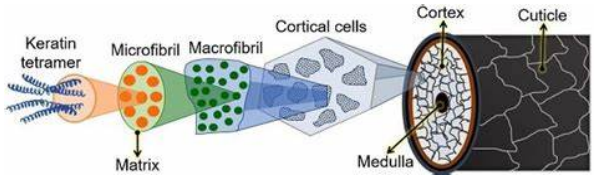
It is continuous with the perifollicular (dermal) sheath, a connective tissue layer that envelops the lower portion of the follicle. This specialized structure directs and regulates hair development and growth throughout the follicle cycle.

10.2 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, linked together in 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:
Hair follicle – the part embedded in the skin
Hair shaft – the portion that extends above the skin surface





10.3 Types of Hair

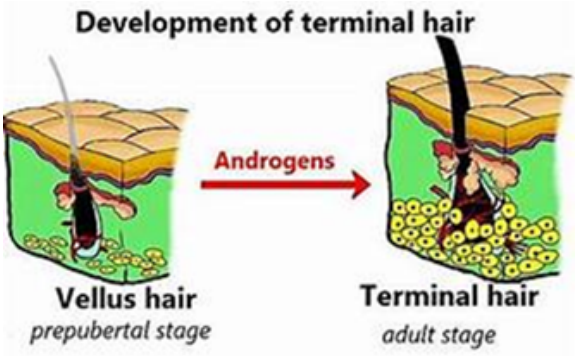
Morphologically, three types of hair grow on the human body: vellus hair, terminal hair, and intermediate hair.

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 terminal hair in diameter.

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 the Diameter of the hair (Thickness)	Description and depth of the Hair
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 coarse	4 mm-medium to deep
Course	4-5 mm-deep
Very Course	5-7 mm-deep to very deep

10.4 Hair Growth Table

Area	Depth of Hair Follicle	Dormancy Circulation	Growth Period Circulation	Hair Follicle Area	Growth Speed Of Everyday
Face					
Upper Lip	1~2.5mm	6 weeks	4 months	500	
Beard	2~4mm	10 weeks	1 year	500	0.38mm
Cheek Whiskers	2~4mm			880	0.32mm
Eyebrow	2~2.5mm	3 months	4~8 weeks		0.16mm

Ear		3 months	4~8 weeks		
Epicranium	3~5mm	3~4months	2~6 years	350	0.35mm
Body					
Armpit	3.5~4.5mm	3 months	4 months	65	0.3mm
Leg	2.5~4mm	5 months	4 months	60	0.21mm
Bikini	3.5~5mm	3 months	4 months	70	
Arm		4 months	3 months	80	0.3mm
Breast	3~4.5mm			65	0.35mm
body	2~4.5mm			70	0.3mm

10.5 Indications for Hair Removal

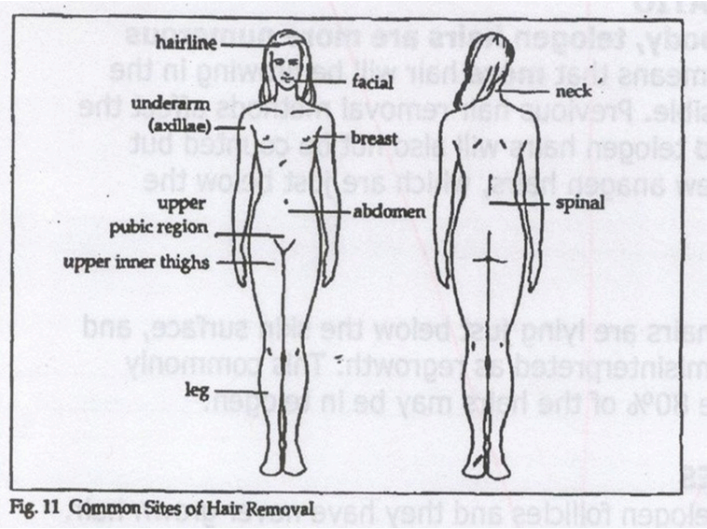


Fig. 11 Common Sites of Hair Removal

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

Specifically Avoid Laser Treatment on:

- Common Viral Warts Moles Herpes Simplex or Cold Sores
- Ingrown hairs Inflamed skin i.e. eczema, skin cancer, rashes etc.
- Active lesions of acne Vitiligo
- Keloid Scarring Tattooed skin
- Never treat abnormal skin

Chapter 11 - Hirsutism

11.1 Excessive Hair Growth

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:

11.2 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
- Upper arms
- Thighs
- Upper back
- Lower back

Maximum score: 36

Hirsutism is typically indicated by≥8 (varies by ethnicity)

Why is the 4-area version 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.

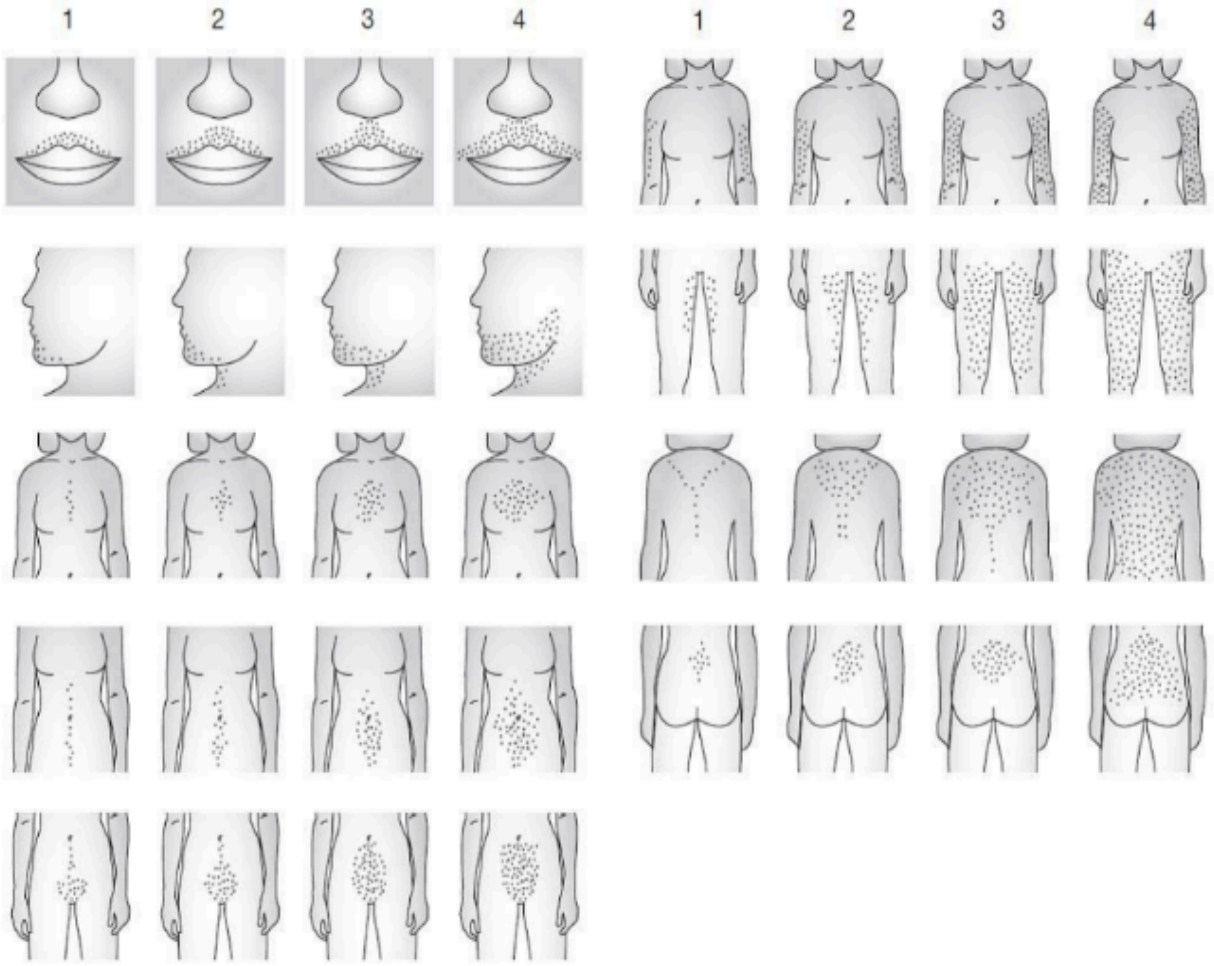


Figure 2 The modified Ferriman–Gallwey scoring system for hirsutism. Each of the nine body areas is rated from 0 (absence of terminal hairs) to 4 (extensive terminal hair growth) and the numbers in each area are added to obtain the total score. A score ≥6–8 generally defines hirsutism. Permission obtained 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.

11.3 What Causes Excessive Hair Growth

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

- Congenital (genetic) predisposition
- Hormonal imbalance
- Pregnancy
- Irregular menstrual cycle
- Psychological or emotional stress
- Production of male hormones
- Hyperthecosis (PCOS)
- Puberty
- Metabolic Disorders
- Menopause
- Some medications
- Excessive hair growth can be hereditary
- Ovarian/ adrenal tumours
- Cushing's syndrome

11.4 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:

Before and 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.

Medication-Induced Hirsutism

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

- Acetazolamide
- Cyclosporine
- Danazol
- Diazoxide
- Genoterol
- Hexachlorobenzene
- Interferon
- Minoxidil
- Oxadiazolopyramide
- Penicillamine
- Anabolic steroids
- Metryrapone
- Testosterone
- Topical Corticosteroids
- Streptomycin
- Tetradecyl sulfate
- Sodium phenytoin
- PUVA therapy

11.5 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.

11.6 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.

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

Chapter 12 - Lasers & Technical Terms

12.1 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.

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 the speed and effectiveness of treatment.

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 for 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)

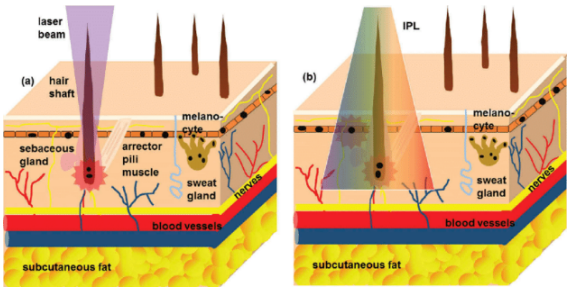
Technology: Unlike true lasers, IPL emits pulsed light at multiple wavelengths simultaneously.

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.

12.2 Coherent and Non-Coherent Light



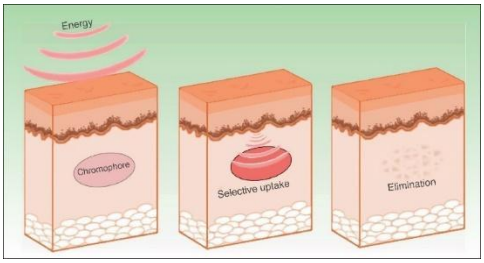
Non-Coherent Light

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 for 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.

12.3 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.

12.4 Wavelength

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

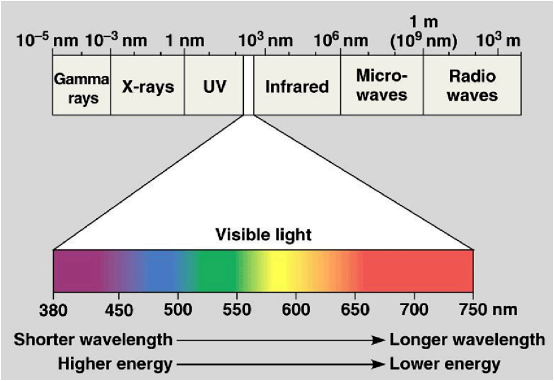
Shorter wavelengths: Carry more energy

Longer wavelengths: Carry less energy, but penetrate deeper into the skin.

The wavelength of light determines:

- The colour of the light
- The absorption by the target chromophore
- The penetration depth beneath the skin is influenced by scattering

Alexandrite 755 nm
Nd:Yag – 1064 nm
Diode 808 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.

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.

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

12.5 Super Ice In HRS Mode Athena

Pre-Treatment:

1) Cleanse with 70% Witchhazel.

2) Mark out the treatment area with white eyeliner.

Shave any residual hairs left on the surface.

Treatment Technique:

1) Apply 1mm of Clear Ultrasonic gel.

2) Secure the wrist strap around the wrist.

3) Pick and place over bony areas (jawlines/shins) and slide and glide over larger areas, wiping your tip after each treatment row. 10% - 20% overlap in the most effective treatment.

Positive Endpoints: Sulphur smell, hair popping, Perifollicular edema, and erythema
Post Treatment: Apply Aloe Vera, 1% HC cream and/or white vinegar
Treatment Intervals: *Face*-every 4 to 6 weeks, *Body*-8 to 10 weeks.

The patient/Client should be clean-shaven and cannot have an active tan (3 - 4 weeks before treatment).

12.6 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.

12.7 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

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 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 13 - The Best Treatment Result After One Session

13.1 Results

Ask the client if they can feel the pain of acupuncture in each hair follicle.

Mild erythema will appear on the skin after laser treatment, and small papules will appear on the skin follicle opening, please refer to the picture below.

(Remember not to blisters and erosion).

Mild Erythem Small Papule

End the treatment immediately after reaching the above treatment end point.

Contraindications:

- People who have **recently received sun exposure** and are about to receive sun exposure.
- People with **photosensitive skin** and those who have **used photosensitive drugs.**
- Those who have **recently taken Isotretinoin.**
- Pregnant women.
- **Severe diabetes, hypertension, heart disease patients.**
- Those with the history of **keloids.**
- **Patients** suspected of having **skin cancer.**
- There are patients with high expectations, patients with mental disorders.
- People with **infected skin** at the treatment site.
- **Hormone cosmetics** such as freckle cream are being used.

13.2 Treatment Skills

1) **Small area treatment** (such as lips, armpits, hairline) with point pressure operation, two points of light at a time! If you can't tolerate it, you can press and release the light once!

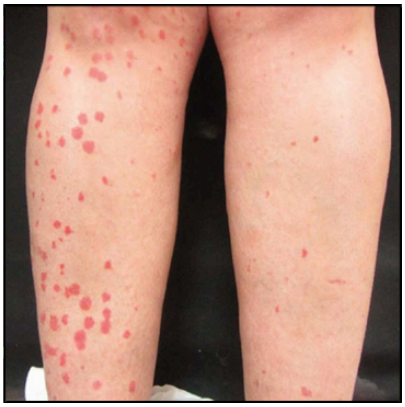
2) **Large area treatment** (limbs, full back, abdomen) and other sliding operations can be imported in multiple directions, allowing light to be better introduced into the hair follicles!

3) **For the limbs, full back, and abdomen treatment,** it is more tiring to press the button for a long time, you can choose to use the foot pedal, so the control is not tired!

4) **If there are dark spots or moles in the hair removal area,** you can use a white liner pen to cover them. If there are large spots or tattoos in the hair removal area, hair removal treatment is not recommended for that area.

5) **If severe redness occurs after treatment,** you can apply cold compress for 15-20 minutes to relieve discomfort. If the skin reaction shown in the following figure occurs, it means severe urticaria. Ask if there is a history of urticaria. You can use Antihistamines for symptomatic treatment.

6) **If any blisters appear due to improper treatment,** please refer to the treatment of burns and apply burn ointment to prevent infection.



13.3 Post-Operative Considerations

1) Strengthen sun protection after surgery, it is best to **use SPF30-50 sun protection products**, go out and wear an umbrella and wear a cap.

2) Note that you can **take a bath only 48 hours after treatment!**

3) There will be **slight flushing, slight burning and pain in the treatment area**, which is normal! If the **discomfort is strong, apply a cold compress for 20-30 minutes** if necessary, and rub the skin without force.

4) **After the operation, the skin appears dry**, you can **apply jojoba oil or olive oil** to alleviate this discomfort!

5) Generally **about 7 days,** it is **easier to fall off or can be easily pulled out!**

6) **Avoid spicy foods and light-sensitive foods** (such as parsley, celery, leek, etc.) within a week.

13.4 Pre-Treatment Advice

- Bleach or depilatory creams should not be used for 2 weeks before or during the
- ATHENA SUPER ICE treatment course.
- Do not use products containing retinol or strong AHA fruit acids prior to or during your hair removal treatment.
- No waxing, plucking or threading during the course.
- Do not sunbathe or use sunbeds 4 weeks prior to and after treatment.
- Body or facial scrubs are recommended 1 week or less before treatment to avoid ingrown hairs.

13.5 Post-Treatment Advice

Expected Side Effects

- Erythema
- Swelling
- Perifollicular Edema

Post Care

- No hot baths or showers – tepid only
- No heat treatments i.e. saunas and steam rooms
- No deodorant, perfumes or scented body lotions or cream
- No swimming or Jacuzzis
- No steam ironing or cooking over boiling saucepans
- SPF 30+ must be worn on exposed skin daily

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	_____

Incident

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

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.
- 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

Examples:

- 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.

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 I

Risk: Diabetes and Laser / IPL Treatment Risk

Clients with diabetes, particularly **Type 1 diabetes** and **Type II 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 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

- lupus
- Porphyria,
- 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.

- Patch Teat
- 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

14.3 Precautions and Screening

A comprehensive consultation must include:

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

14.4 Patch Testing

Patch testing is strongly recommended for:

- Darker Fitzpatrick skin types **IV - VI**

Sensitive skin

- Clients with uncertain skin responses
- Treatment Modifications

Laser settings must be adjusted based on:

- Fitzpatrick skin type
- Hair color 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 - Laser & IPL Treatment Consent Form

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

Clinic Name: _____ Clinic Address: _____

Client Name: _____ 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: _____ Client Signature: _____

Date: _____

Practitioner Name: _____ Practitioner Signature:_____

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.

Chapter 16 - Photo & Media Consent Form

16.1 Consent Wavier

(PIPEDA & PHIPA Compliant)

Client Name: _____ Date of Birth: _____

Date: _____

1. PURPOSE OF CLINICAL PHOTOGRAPHY (MANDATORY)

I understand and acknowledge that clinical photography is a required component of my aesthetic/medical treatment at this clinic. These photographs may include images taken before, during, and after treatment and constitute my Personal Health Information (PHI).

Clinical photographs are collected for:

- Treatment planning and assessment
- Monitoring treatment progress and outcomes
- Medical documentation and continuity of care
- Quality assurance and practitioner education

I understand that refusal to consent to clinical photography may limit or prevent my ability to receive treatment.

2. COLLECTION, USE & DISCLOSURE OF PERSONAL HEALTH INFORMATION

I acknowledge that my photographs constitute Personal Health Information as defined under:

- Personal Information Protection and Electronic Documents Act (PIPEDA)
- Personal Health Information Protection Act (PHIPA) (where applicable)

I understand and agree that:

- My photographs will be collected, used, and disclosed only for identified clinical purposes
- Images will be retained as part of my confidential medical record
- Access to my photographs will be limited to authorized clinic personnel

Reasonable administrative, technical, and physical safeguards are in place to protect my information from unauthorized access, loss, or disclosure.

My photographs will not be disclosed to third parties without my consent, unless required or permitted by law.

3. CONFIDENTIALITY & RETENTION

I understand that:

- My identity will remain confidential
- Photographs will be retained in accordance with applicable record retention laws

I have the right to request access to, or correction of, my personal health information in accordance with applicable legislation.

4. MARKETING & PROMOTIONAL USE – SEPARATE & OPTIONAL CONSENT

I understand that clinical consent does NOT include marketing or promotional use.
Any use beyond my care requires separate, express consent, which I may grant or refuse without affecting my treatment.

⬜ **OPTION A – I CONSENT TO MARKETING USE**

I voluntarily authorize the clinic to use my photographs for marketing, advertising, promotional, or educational purposes, which may include:

- Clinic website and digital platforms
- Social media
- Print or digital marketing materials
- Professional or educational presentations

I understand that:

My name and identifying information will not be disclosed and I will not receive compensation.

This consent may be withdrawn in writing at any time, subject to materials already in circulation.

Client Initials: _____

⬜ **OPTION B – I DO NOT CONSENT TO MARKETING USE**

I do not authorize the use of my photographs for marketing or promotional purposes. My images will remain part of my confidential medical record only.

Client Initials: _____

5. WITHDRAWAL OF CONSENT

I understand that I may withdraw or modify my consent for the collection, use, or disclosure of my personal health information at any time by providing written notice, subject to legal and contractual restrictions.

6. ACKNOWLEDGMENT & SIGNATURE

I confirm that:

The purpose of photography has been explained to me and I understand how my personal health information will be used and protected.

My consent is knowledgeable and voluntary.

Client Signature: _____
Printed Name: _____
Date: _____

Practitioner / Witness Name: _____
Signature: _____
Date: _____

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