Aesthetic Plus

presents

LASER TRAINING MANUAL

FOR MEDICAL PROFESSIONALS

INTRODUCTION

More than ever before, people are turning to laser esthetics for cosmetic purposes. This is because lasers offer a number of advantages over traditional surgical procedures, including: ease of application, convenience, safety, price and minimum downtime. Removal of unwanted hair is the most popular application for the laser. In the US alone, $3.8 billion dollars is spent annually on hair removal, and the demand for esthetic treatments continues to gain popularity each year.

Laser treatments can be done in conjunction with one another, or with traditional cosmetic procedures to obtain optimal results. Such multi-dimensional approaches to laser treatment are common practice. For instance, we might first treat the deep dermis layer to stimulate new collagen production and effect skin tightening. This treatment can be followed by a laser photo facial applied to the superficial layer of the dermis, and I.P.L. for the epidermis to eliminate brown spots and blemishes on the skin. Recently, fractional laser and CAP technology are also gaining popularity to treat wrinkles, skin texture, and effect skin tightening. The combination of the these treatments with skin fillers and botox will produce the best results and allow for the highest level of client satisfaction.

Aesthetic Plus Inc. is specialized in performing training and certification for professional operation of lasers for cosmetic purposes. The goal of this course is to fulfill the laser training requirement and obtain necessary competence for healthcare providers and medical practitioners. By the end of the course, you should be able to successfully demonstrate competence in:

A. Theoretical aspects of laser:

1. Basic theory and laser function.
2. Mechanism and action of laser for hair removal, treating veins, and skin rejuvenation.

B. Clinical aspects:

1. Skin classification and patient selection criteria.
2. Safety, efficacy, and dealing with complications.
3. Assessment and identification of the areas to be treated.
4. Client education: pre- and post-treatment instructions.

The information in this course manual contains, to the best of our knowledge, the generally accepted practices for laser operations in the community. However, in view of the ongoing research, new applications and new laser apparatuses that continue emerging frequently, it is our advice that the practitioner regularly educate himself or herself with the latest information, warnings and precautions concerning the use of lasers. It is also important to closely read and follow the manufacture's instructions for the specific laser machine you employ.

Great effort has been taken to confirm the accuracy of the information in this syllabus. However, Aesthetic Plus is not responsible for any omissions or errors nor any consequences resulting from the application of this information. We make no warranty with respect to the currency and accuracy of the content of this manual. The application of this information remains purely the responsibility of the practitioner.

LASER PHYSICS

Both visible light and the laser cover only a narrow band of the spectrum of electromagnetic radiation. The esthetic laser's wavelength ranges between 400–3000 nm and the frequency ranges between 10–100 Hz. The shorter the wavelength, the higher the frequency, and the higher the energy emitted by the rays. The wavelength of visible light ranges between 400–780 nm.

Frequencies above 10 Hz include the spectrum of ultraviolet rays, X-rays, cosmic and gamma radiation, which are considered ionizing radiation. They are harmful to human tissue because they produce free radicals and can cause mutations. **Visible light, infrared light and lasers emit non-ionizing radiation and do not have carcinogenic or mutagenic effects.** They result mostly in the emission of heat and can be used to target specific skin structures. Their penetration is limited to just a few millimeters.

I.P.L. (INTENSE PULSE LIGHT)

IPL is a high-intensity flush radiation of a wide spectrum of wavelengths ranging between 500 and 1200 nm. Most IPL systems have cutoff filters to remove particular, undesired waves. The specific range of waves that are appropriate for treatment is chosen in this way. The cutoff range can be in the shortwave range or the long-wave spectrum. The laser, on the other hand, delivers a specific wavelength and is defined as monochromatic.

LASER	IPL
Monochromatic	Broad spectrum
Coherent	Non-coherent
Collimated (non-divergent)	Divergent

The use of IPL is similar to the laser with the limitation that it cannot be used on the use on dark or tanned skin.

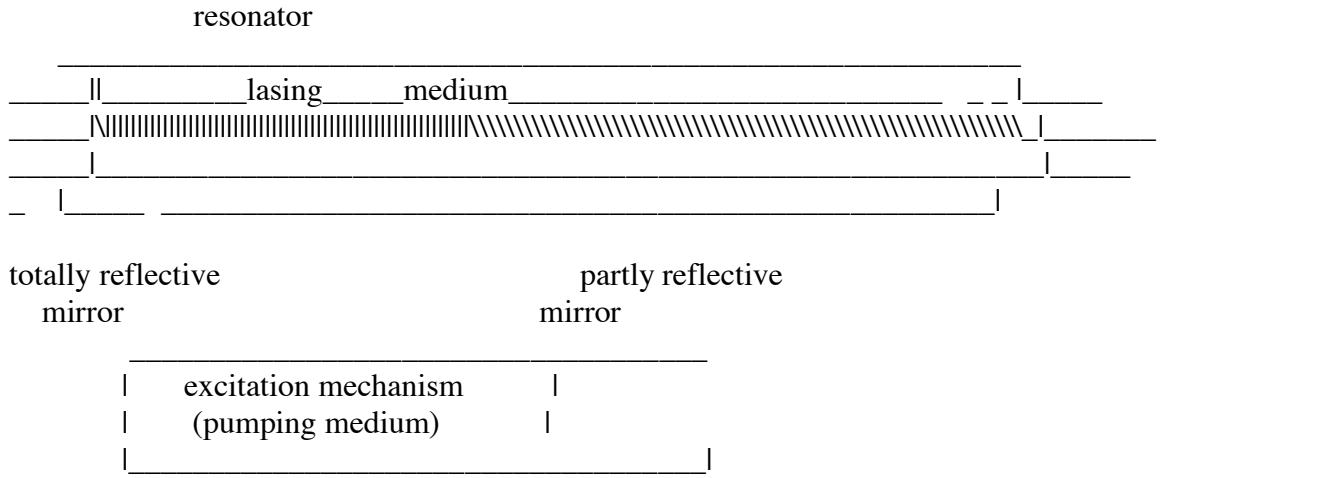
The word LASER stands for:

LIGHT
AMPLIFICATION
STIMULATED
EMISSION
RADIATION

The basic design of a laser includes the following components:

— LASING MEDIUM (gas liquid solid semiconductor)

— EXCITATION MECHANISM (power supply, flash lamp, etc.)
— FEEDBACK MECHANISM (mirror)
— OUTPUT COUPLER (semitransparent mirror)



The resonator contains the lasing medium and the two mirrors. The mirrors are parallel and face each other. The excitation mechanism or pumping medium is the energizing power source or can be a flash lamp. When energy is transferred to the lasing medium, excitation of the atoms occurs. The electrons jump to higher orbits. When they return to their ground state they emit photons of light. The wavelength or the color of that light depends upon the inversion state of the medium, which is the ratio between the excited & non-excited atoms. In high excitation states, if a photon encounters other atoms in the same excitation state, stimulated emission occurs. That atom will emit photons of the same wavelength and the same phase. The photons reflect back and forth between the mirrors, and a cascade effect occurs that creates emission rays of photons of the same wavelength and the same phase as the rays pass through the semi-reflective mirror to be laser rays.

The laser rays are:

A. **Monochromatic** — of one wavelength (one color).

B. **Coherent** — waves are in the same phase focused & high intensity.

C. **Collimated** — with very little divergence.

LASERS CAN POSE MORE OF A HAZARD THAN ORDINARY LIGHT BECAUSE THEY FOCUS MUCH MORE ENERGY INTO A SMALLER AREA.

THE DIFFERENT TYPES OF LASERS

GAS — argon, krypton, xenon, helium, nitrogen

LIQUID — tunable dyes, rhodamine, pulse dye laser

SOLID — ruby, garnet, alexandrite, sapphire, and Nd:YAG
(neodymium:yttrium-aluminum-garnet)

SEMI CONDUCTOR — diode laser

TYPE	SPECTRUM	WAVELENGTH
Argon fluoride	UV	193 nm
Krypton chloride	UV	222 nm
Xenon chloride	UV	308 nm
Xenon fluoride	UV	351 nm
Helium cadmium	UV	325 nm
Nitrogen	UV	337 nm
Krypton	visible	476 nm, 528 nm, 647 nm
Argon	visible	488 nm, 514 nm
Copper	visible	510 nm, 578 nm
Nd:YAG	visible	532 nm
Helium, Neon	visible	543 nm, 594 nm, 633 nm
Gold	visible	628 nm
Rhodamine dye	visible	570 nm ----- 650 nm
Ruby	visible	694 nm
Alexandrite	visible	755 nm
Nd:YAG	near infrared	1064 nm
Erbium	near infrared	1540 nm
Hydrogen fluoride	near infrared	2600 nm, 3000 nm
Carbon dioxide	far infrared	9600 nm ----- 10600 nm