

Medical indications of lasers

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Which lasers are used in dermatology?

LASER (acronym of Light Amplification by Stimulated Light of Radiation) is a device emitting amplified light that becomes spatially and temporally coherent. The laser allows a specific action on colored targets of the skin also called chromophores.

In dermatology, the main targets are:

- Hemoglobin (red) for vascular lasers
- Melanin (brown-black) or pigments (for example tattooing) for pigment lasers and depilatory lasers
- Water for ablative lasers, allowing the destruction of pathological or aged tissues to obtain a "re-filling" of the skin. Water for remodeling lasers also allowing by a heating effect of the dermis rich in water an improvement of the quality of the skin without any superficial abrasion
- Some centers also have excimer lasers emitting UV radiation

What are the other energy devices used in interventional dermatology?

Many energetic devices are used in 2017 in interventional dermatology in addition to lasers per se. The most common are:

- pulsed lights (flash or IPL lamps) whose mode of operation is close to lasers: they emit non-monochromatic and non-coherent lights
- light-emitting diodes (LEDs) emitting low-energy lights
- radiofrequencies that use the impedance of the skin to generate heat
- photodynamic therapy which uses a photosensitizer which will be spontaneously oriented towards the area to be treated
- cryotechnics, especially cryolipolysis but also cryosurgery
- ultrasound and more particularly focused ultrasound

Main medical indications:

Most laser and related techniques have been developed to improve patient aesthetics but clinical practice has shown that they can be useful in many pathologies.

- Diseases of hair: folliculitis, pseudofolliculitis, keloid acne of the neck, Verneuil's disease (hidradenitis suppurativa), cyst pilonidal sinus, abnormal hormonal excessive hair (hirsutism in women, tattered, ostomy ports ...) can be treated by depilatory laser.
- Vascular anomalies: couperoses, angiomas and varicosities are treated by vascular laser. Red and swollen excessive scarring, stretch marks mostly red at first, some resistant warts and many other rarer diseases when lesions are rich in blood vessels may also be treated by these vascular lasers.
- Benign skin tumors, warts, molluscum contagiosum can be treated by ablative or vascular laser

- Superficial malignant or "pre-malignant" skin tumors, such as actinic keratosis, superficial basal cell carcinomas, Bowen's disease may be treated by photodynamic therapy or cryosurgery, exceptionally by other lasers, such as vascular lasers, for difficult cases or localizations.

For infiltrating skin tumours, surgery remains the treatment of choice.

- Scars can be attenuated in prevention (early treatment is often advised) and treated with vascular laser, ablative remodeling (+/- fractionated) or microwave-needle radiofrequency devices.

- Congenital or acquired pigment lesions, more or less easily: Ota nevus, café au lait spots, dermatosis papulosa nigra, melasma (pregnancy mask), accidental tattoos or cutaneous siderosis of iron perfusion can be improved by pigment laser.

- Pseudo-gynecomastia can be treated with cryolipolysis

- Several types of lasers have been proposed in the treatment of acne. These lasers give inconsistent results but are sometimes very useful, especially in certain resistant cases or when the usual treatments can't be used.

- Psoriasis specific areas can respond to vascular laser or excimer.

- Excimer laser or lamp at 308 nm also showed their efficiency and excellent tolerance in the treatment of vitiligo (acquired white spots). However it should be proposed on restricted vitiligos and gives interesting results especially in certain areas such as face, neck or trunk.

- Some skin damages of autoimmune diseases (lupus, dermatomyositis, scleroderma, sarcoidosis ...) can be improved by laser.

- Several genetic diseases (neurofibromatosis, Darier's disease, Hailey Hailey's disease, Bourneville tuberous sclerosis) can also be improved by laser.

Important note:

Indications for a laser treatment of dermatological diseases usually depend on the type of lesion and have to be adjusted to each person regarding the treatments already received and the past medical history. However, only your dermatologist will be able to judge which treatment is the most appropriate for you.

This information sheet recommended by the French Laser Society can be given to you by your dermatologist.