

Lasers in Dermatology

“Laser” stands for “light amplification by the stimulated emission of radiation.” Lasers are sources of high-intensity light with the purpose of trying to target certain tissue and minimize damage to other tissue. In dermatology, lasers are commonly used for these conditions:

Vascular lesions

Lasers have been used successfully to treat a variety of vascular lesions including superficial vascular malformations (port-wine stains), facial telangiectasias, hemangiomas, cherry angiomas, and pyogenic granulomas. The pulsed dye laser is the laser of choice for most vascular lesions as its wavelength range is 585-595 nm, which is close to the wavelength of hemoglobin in vascular lesions. Side effects include postoperative bruising (purpura) that may last 1-2 weeks and transient pigmentary changes. Crusting, textural changes and scarring are rarely seen. With the V beam version of a pulsed dye laser, the risk of bruising is usually less. Non-laser intense pulsed light (IPL) devices can also be used for treating vascular lesions.

Pigmented lesions

Melanin-specific lasers can successfully lighten or eradicate a variety of pigmented lesions such as freckles and sun spots. The short pulse laser systems effectively treat the lesions by confining their energy to the melanosomes, which are the tiny granules containing melanin inside the pigment cells. The results of laser treatment depend on the depth of the melanin and the color of the lesion and are to some degree unpredictable. Superficially located pigment is best treated with shorter wavelength lasers while removal of deeper pigment requires longer wavelength lasers that penetrate to greater tissue depths. Caution is needed with laser therapy in skin of color, as permanent hypopigmentation and depigmentation may occur. Successfully treated lesions may recur.

Hair removal

Lasers can be used to remove excessive and cosmetically disabling hair due to hypertrichosis or hirsutism. Laser treatments remove dark hair quickly, and it may take three to six months

before regrowth is evident. Several treatment cycles are required with the spacing between treatments dependent on the body area being treated. Laser treatments are less painful and much quicker than electrolysis. Complications are rare but superficial burns, pigmentary changes and even scarring may occur. Increased growth of fine dark hair in untreated areas close to the treated ones has been reported. Both increased and reduced localized sweating have been reported after treatment. Suitable devices include long-pulsed ruby and alexandrite lasers, a diode (810nm), millisecond Nd:YAG and non-laser intense pulsed light.

Facial wrinkles, scars, and sun-damaged skin

Pulsed CO₂ and erbium:YAG lasers have been successful in reducing and removing facial wrinkles, acne scars and sun-damaged skin. Recently non-ablative lasers and fractionated lasers have been used to stimulate the dermal collagen while minimizing damage to the surface skin cells (epidermis). Multiple treatments are required to smooth the skin.