

## **Lasers and energy-based devices and scars: Treatment, prevention, alleviation?**

Last update on September 2023

A scar is a mark, a trace that remains after an injury, a burn, a wound, a surgical procedure. It is often composed of a fibrous tissue that is neoformed in relief, which may include signs of inflammation such as redness, visible vessels, and pigmented spots. On the contrary, it is sometimes enlarged, "embossed" and / or hypo-pigmented. The term "scars" covers various aspects.

### **The treatment of scars is difficult.**

Lasers are part of scar management, sometimes combined with surgical treatments and injections of intra-lesional corticosteroids to flatten them or with fillers to level them. By their ablative effect, lasers can smooth the surface of the skin (CO2 or Erbium lasers). Vascular lasers mainly improve color and act on redness and vessels, while fractional lasers act on flexibility, scar thickness, and can induce collagen stimulation for hollow scars. Pulsed dye laser, pulsed polychromatic lights (flash lamps), light-emitting diodes (LEDs), fractional lasers act on different factors of healing, we speak of "photobiomodulation". Treatments with radiofrequency devices also stimulate collagen to improve scars. Fractional lasers can restart the pigmentation for scars that are too pale or depigmented. Pigment lasers can easily remove the tattoo of a scar with inclusion of tar after a road accident.

### **Burn scars and post-traumatic scars.**

These are mainly thickening (fibrosis) and thinning of the skin, retractions, spots and red vessels. Fractional ablative laser, fractional non-ablative laser create micro-wells of heat, to break the fibrosis of scars, and stimulate a new formation of better organized collagen. Depending on the presence of red inflammation or pigmentation, pulsed dye lasers or intense pulsed lights treat these targets and, in addition, provide a general improvement by photobiomodulation, as well as light-emitting diodes (LEDs).

### **Hypertrophic scars.**

These are thickenings of the scar, following a surgery or skin injury. Pulsed dye lasers and/or fractional lasers allow reducing the thickness, improving the flexibility of this type of embossed scar. They can be combined in the same session or in time either on the same area or on portions of scars with different aspects.

### **Keloid scars.**

This is a progressive and non-regressive form that is often more difficult to treat. The scar is often red, continues to swell and moves forward on the skin beyond the starting wound. Major forms may require revision surgery, which is always a delicate operation with unpredictable results.. Then, to avoid recurrence or for less severe forms, pulsed dye laser is most often used in combination with intra-lesional injections of corticosteroids. The application of medicinal substances which can penetrate by micro-wells formed by a fractional laser may also help to stabilize the evolution.

### **Atrophic scars.**

For these hollow scars, fractional modes of ablative and non-ablative laser or radiofrequency with microneedles are the most recommended, sometimes combined with suitable settings that can stimulate collagen.

### **Acne scars.**

These facial scars are often sunken and take on a variety of aspects and shapes, in skin that may be thick with the after-effects of acne. It can take several sessions to alleviate them and it is not possible to completely remove them. The use of CO2 laser, Erbium laser, fractional ablative or non-ablative laser, or fractional radiofrequency will stimulate collagen, smooth the skin and they can, over the course of the sessions, bring an improvement in overall appearance. Treatment of residual acne will be necessary.

### **Post-surgical scars.**

The results of laser treatments on recent scars have been well studied recently. Several lasers can improve the appearance, and guide the early healing process after skin surgeries. For some techniques, these early indications can be made rapidly after the operation (as soon as the stitches have been removed, for example). A specific diode laser, a pulsed dye laser or a KTP, a CO2 or Erbium fractional laser, a non-ablative fractional laser, or even pulsed and LED lights can be used. The physician can combine devices according to the evolution.

**In conclusion**, we should remind that the different laser treatments on the scars are not very painful; a simple anesthetic cream may be prescribed if needed. Scars treatment by laser may require many sessions, and sometimes a combination of devices. If these treatments improve the appearance of the scars, a complete erasure is rarely obtained.

The variety of scars and the complexity of the evolution always requires a specialized consultation to define the possibility of a laser treatment, and the type of device or combination of devices to be used.

***This information sheet recommended by the French Laser Society can be given to you by your dermatologist. Even if it is not sufficient to have an estimate, it helps to give the patient a clear information.***

*The information consultation provides clear explanations on expected outcomes, side effects and possible complications. There are not any reimbursement from social security or medical leave for these aesthetic treatments. Prices are mainly based on the area to be treated. The total cost is to be evaluated with the patient and is the subject of a signed quote.*

*A post-operative order and an advice sheet are given to the patient with the doctor's contact information.*