Early treatment of scars with laser therapy

Wound healing is a complex process, made up of three phases that overlap with each other: inflammation, proliferation and remodelling [1]. The last phase is the remodelling of the extracellular matrix resulting in a mature scar; it lasts from three weeks up to one year [2].

Any disturbance in these phases results in a variety of outcomes, including hypertrophic, keloid or atrophic scarring, pigmentation disturbances and aesthetic concerns [3]. There are numerous treatment options, such as intralesional corticosteroids, topical creams, ointments, patches, cryotherapy, surgery, pressure therapy, and lasers, among others [1]. Laser therapy has great potential to become one of the most important and available treatments for wound healing abnormalities. A laser can produce three types of reaction: photothermal, photochemical or photomechanical. When treating scarring, the photothermal effect is the main interaction [4].

The indications for laser therapy are based on clinical presentation of the scar regarding: erythema, hypo / hyperpigmentation, atrophy / hypertrophy, epithelization, pliability, restriction together with pain and pruritus [2]. Erythema is normal in the first weeks of wound healing but should progressively start to resolve. The three major mechanisms that contribute to erythema in scars are: inflammation, vascularisation and epidermal defects [5].

It has been shown that erythematous scars are more often associated with pain and pruritus, due to the inflammatory stimulation. Due to all of the above, erythema is a highly targeted aspect when treating scars. Lasers, especially vascular devices, are one of the most widely used methods to treat erythema. Laser therapy decreases the redness and controls symptoms like pruritus and pain, and, even after months or years, can manage hypertrophy [4,5].

Vascular lasers emit wavelengths that are absorbed by oxyhaemoglobin and were one of the first types of lasers used to treat scars. The Vbeam® is a flash-lamp excited pulsed dye laser that delivers laser pulses at a wavelength of 595 nanometers, causing coagulation in the targeted vessels. The optimal endpoint is with purpura and darkening of the treated area.

Case report

A 36-year-old female patient with Fitzpatrick Skin Type III, presented after a serious car crash with consequent avulsion of a significant area of facial skin, predominantly on her forehead. As the patient lived some distance from the clinic, she only received two sessions with the Vbeam system over her remaining scar, which was predominantly erythematous, but with a great cosmetic effect on the patient. The sessions took place eight weeks apart. Both treatments were performed with the following laser parameters: 7mm, 8J/cm², 1.5msec. Post-laser recommendations included repairing creams containing zinc oxide and SPF in the morning. She was also advised to stay away from direct sunlight. She had not received previous treatments. Even though only two sessions were performed, and with a greater lapse between sessions than usual, a significant decrease in erythema was achieved, and the patient was greatly satisfied with the results.

Figure 1: Before.

Figure 2: After.

Conclusion

Multiple treatments have been studied and approved for the treatment of scars, including laser therapy. The indications for which type of laser to use are based on erythema, hypo / hyperpigmentation, atrophy / hypertrophy, epithelization, pliability and restriction; also, on symptoms reported by the patient such as pain and pruritus. Symptomatic scars have been widely associated with erythema.

Erythema is a normal finding in the early wound healing process, and it is an indirect marker of vascularity, making it a perfect target for vascular lasers.

Candela's flashlamp-excited pulsed dye laser, Vbeam, delivers laser pulses at a wavelength of 595 nanometers. It exerts a phototermal effect over oxyhaemoglobin in the blood vessels, causing coagulation in the targeted vessels. It has a very effective impact on erythematous, and even hypertrophic scars, decreasing redness and visibility of the scars.

We have noticed an important factor in end results when treating with the Vbeam system, which is the early application of the treatment. When used from the inflammatory stage, the number of sessions is reduced, and the results are most noticeable. Patient expectations are better met. We greatly encourage this type of treatment to be started as soon as possible.

The device's specifications were determined based on the patient's skin type, type of scar and pain threshold. More studies are required to clarify which specific molecules in atrophic scars are targeted by these lasers, in order to produce a 'filling effect' and skin levelling.

Laser therapy is a great alternative for scar treatment, and has significant potential to become a first-line treatment for wound healing abnormalities.

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