

# CO<sub>2</sub>RE Laser for Burn Scar and Striae Distensae Patients

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## Background

Striae distensae, also known as stretch marks, are a common cosmetic indication encountered in the aesthetic practice. These aesthetically challenging skin lesions can occur in different anatomic regions, such as the abdomen, shoulders, hips, legs, flanks, and buttocks, and can be a source of significant psychological burden and distress in the affected patient.

Striae distensae are linear dermal scars, accompanied by overlying epidermal atrophy, and can result from rapid stretching of the skin associated with rapid growth and weight fluctuations, as well as hormonal changes associated with puberty, pregnancy, body building, and hormone replacement therapy.<sup>1,2</sup> Typically forming perpendicular to the direction of skin tension lines, younger striae distensae may present as flat, linear lesions with or without pruritus, and have a pinkish color, which over time can turn red or purple in color, then termed striae rubra. Older, longer-standing striae distensae lesions, known as striae alba, are typically atrophic in texture, hypopigmented (white) in color, and have a scar-like quality.<sup>2-4</sup>

Many different treatment modalities and approaches have been used to improve the appearance of striae distensae; however, a definitive treatment solution remains elusive for this common cosmetic concern. Various treatment options include topical retinoids, chemical peels, as well as microdermabrasion, with each treatment approach having varying degrees of efficacy, safety, and tolerability.<sup>5</sup> Previous work has shown that newer lesions respond better to therapy when compared to older, longer standing striae lesions.<sup>6</sup> Several different energy-based devices and technologies have been used to improve the cosmesis of striae distensae, including laser and light modalities, as well as radiofrequency, with various degrees of success.<sup>7-12</sup>

As with striae distensae, scars can also be a significant source of anxiety and psychological distress in the

affected patient. Scars represent focalized areas of fibrous tissue that replace normal skin after trauma, and result from the biological process of wound repair. The different scar types include keloidal, contracture, hypertrophic, and acne, and each has their own set of challenges regarding optimal therapy. Burn scars, in particular, can be especially challenging to treat, and can often present with a myriad of characteristics. They can appear depressed, raised, shiny, smooth, or rough, can be hyper- or hypopigmented, may exhibit a play of different colors during the healing process, and can be thicker and tougher in texture when compared to normal skin.

Treatment options for the aesthetic improvement of a scar include injections of botulinum toxin, intradermal injectable products, and silicone sheeting; all of which have shown efficacy in minimizing the appearance of the scar, but have failed to improve motility. Energy-based devices, such as the CO<sub>2</sub> laser, have yielded positive clinical outcomes in the cosmesis of scar tissue, as well as improvements in complicating contractures.<sup>13-15</sup> We present here 2 distinct cases: one patient with striae distensae over the abdomen, and one with a severe burn scar over the right arm, both receiving treatment with the CO<sub>2</sub>RE laser device (Syneron Medical, Yokneam, Israel), offering a combination of surgical, classic, and fractional CO<sub>2</sub> treatment options.

## Case 1

A 37-year-old healthy Caucasian female with Fitzpatrick Skin Type III presented in our clinic with an approximately 6-month old severe burn scar located over the ventral upper right arm, cubital fossa, and forearm (Figures 1 and 2). Beyond the aesthetic appearance, the burn scar area was further complicated with severe contractures over the elbow joint, impeding free movement of the arm. Approximately 6 months after the burn incident and appropriate consultation, the patient opted for

CO<sub>2</sub>RE therapy to address the burn scar.

The patient underwent a total of three treatment sessions, with each treatment performed at 4 to 6 week intervals (4 weeks at the beginning and 6 weeks at the end). The parameters used on the CO<sub>2</sub>RE laser were as follows: Deep Mode, 4% coverage, 60 mJ, and the square 7.5 x 7.5 mm resurfacing mode shape. Continuous air-cooling was provided throughout the treatment. Following each treatment session, the target area was further cared for with epithelial regenerators, with or without antibiotics, and a sterile wound dressing was applied.

The downtime associated with each treatment was minimal, consisting of a few days of skin wounding and mild erythema. The patient reported high satisfaction from treatment and is very happy with the treatment outcome. In addition to the significantly improved cosmetic appearance of the burn scar, the patient also reported a greater range of motion of the arm.

Figure 1



Figure 2



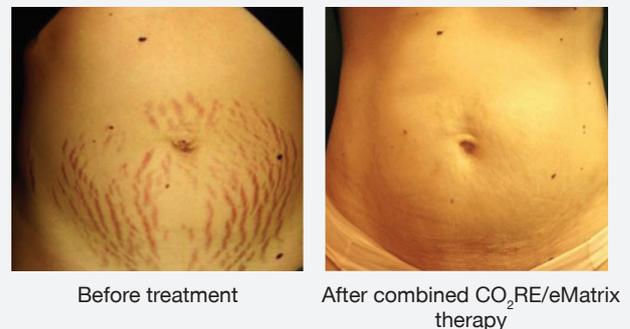
## Case 2

A 36-year-old healthy Caucasian female with Fitzpatrick Skin Type II presented to our clinic with several months standing postpartum striae distensae (striae rubra) over the lower abdomen and flanks (Figure 3). After trying and failing other therapeutic modalities to improve the appearance of the striae, we opted to treat the relatively young lesions using a combination protocol consisting of a set of CO<sub>2</sub>RE and eMatrix treatments. During

eMatrix Sublative treatment, bipolar radiofrequency energy is delivered in a fractional manner via an array of multi-electrode pins.

The patient first received a series of three eMatrix treatments (3 passes, 96 mJ/pin), followed by a series of two fractional treatments with the CO<sub>2</sub>RE laser. Each of the treatment sessions were spaced 4 to 6 weeks apart. The CO<sub>2</sub>RE parameters used were as follows: Deep Mode, 50 to 70 mJ, 4 to 5% coverage, and the square 7.5 x 7.5 mm resurfacing mode shape. As with the burn scar patient, the downtime was minimal, with only mild wounding and erythema lasting approximately one week. The patient was highly satisfied with the combination therapy and the cosmetic outcomes with this approach.

Figure 3



## Discussion

Both striae distensae and scars are two common cosmetic concerns seen in many aesthetic practices. Although numerous therapies and treatment modalities have been tried and have succeeded in improving their appearance, optimal treatment still remains challenging for these cosmetic concerns.

The therapeutic impact of a variety of laser and light sources has been explored in the treatment of striae distensae and scars. However, these modalities are often limited by their side effects, including postinflammatory hyperpigmentation (PIH), as well as prolonged healing times, which can occur more frequently with ablative lasers. Viewed as a milestone in aesthetic medicine, fractional technology has been shown to achieve significant cosmetic outcomes, while keeping the side effects and downtime associated with other technologies and approaches to a minimum. Bridging the divide between ablative and nonablative lasers, fractional lasers create columns of microthermal treatment zones (MTZ) surrounded by healthy unaffected tissue, resulting in much quicker healing times.

Syneron's CO<sub>2</sub>RE device is a second-generation fractionated CO<sub>2</sub> laser system for surgical applications requiring the ablation, vaporization, excision, incision,

and coagulation of soft tissue. The versatile platform incorporates a mode (Fusion), which allows the user to treat both superficial and deep skin layers simultaneously with precision-control over the predetermined intensity, pattern, and depth of ablation. CO<sub>2</sub>RE enables superficial ablative treatments at variable densities for a peel-like effect, as well as deep ablative treatments for dermal remodeling. The CO<sub>2</sub>RE system offers six different ablative treatment modes: four modes for fractional skin resurfacing and treatment of wrinkles and fine lines (Lite, Mid, Deep and Fusion Modes), one mode for fully ablative resurfacing (Classic Mode), and one mode for incisions (Surgical Mode). During treatment, the CO<sub>2</sub> laser energy is readily absorbed by water and the skin resurfacing increases the amount of sub-epidermal collagen, leading to improvement in skin texture and tone, as well as wrinkled skin and scar tissue, including traumatic scarring.

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## Conclusion

The results we achieved in the burn scar were significant at 2 weeks post CO<sub>2</sub>RE treatment, demonstrating a more homogenous skin color and tone across the scar and improvements in hypertrophic/thicker scar areas, as well as a greater motility of the arm. Similarly, the results achieved in our striae rubra patient were also very positive. Both the Sublative RF treatment with the eMatrix device, as well as the CO<sub>2</sub>RE system have shown efficacy in improving the appearance of striae distensae when used as a monotherapy. In our patient, we opted for a combination eMatrix/CO<sub>2</sub>RE therapy treatment: 3 treatments with eMatrix, followed by 2 treatments with CO<sub>2</sub>RE. The positive clinical outcomes achieved in both of these historically challenging-to-treat cosmetic concerns underscore the high efficacy and versatility of the CO<sub>2</sub>RE system.