

Laser versus microneedling for the treatment of facial scar – a case report

Laser versus microagulhamento para tratamento de cicatriz facial - Relato de caso

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ABSTRACT

Both microneedling and ablative fractional laser can be used for the treatment of scars. The present article reports the case of a female patient who had the first half of a perioral scar treated with ablative fractional CO₂ laser, and the second half treated with microneedling, using a 2mm roller. Outcomes were superior in the half treated with laser.

Keywords: Cicatriz; Collagen; Lasers

RESUMO

Tanto o microagulhamento quanto o laser fracionado ablativo podem ser utilizados para o tratamento de cicatrizes. Neste artigo relata-se o caso de paciente do sexo feminino foi tratada em metade de cicatriz perioral com laser fracionado ablativo de CO₂ e na outra metade da cicatriz com microagulhamento utilizando roller 2mm. Os resultados obtidos foram superiores na metade submetida ao procedimento com laser.

Palavras-chave: Cicatriz; Colágeno; Lasers

INTRODUCTION

Both microneedling and fractional ablative laser are beneficial for the treatment of scars. A number of conditions involving fibrosis, contractures and scarring can be treated with CO₂ ablative fractional laser.¹ Similarly, microneedling can also be used to stimulate skin remodeling.² In the present case report, the authors compare the use of CO₂ laser *with* that of microneedling for the treatment of a traumatic scar located in the perioral region.

CASE REPORT

A 35-year-old female patient sought medical care related to a scar in the perioral region, caused in an automobile accident during childhood. The patient had undergone three previous reconstructive plastic surgeries at the site aimed at improving the appearance of the scar, nonetheless was still unsatisfied. Moreover, there were limitations in the mouth opening and smiling movements (Figure 1). The scar was divided into two areas, with one of them (located in the right hemiface) being treated with CO₂ ablative fractional laser, and the other (located in the left hemiface) being treated with microneedling. Topical anesthetic (lidocaine hydrochloride – 40 mg/g Dermomax[®] cream, Biosintética, Guarulhos, SP, Brazil) was applied 30 minutes before the procedure and supplemented with injectable anesthesia containing 1% lidocaine hydrochloride with 1:200,000 epinephrine (Xylestesin[®], Cristália Produtos Químicos Farmacêuticos Ltda, São Paulo, SP, Brazil). Fractional CO₂ laser (Sculptor, Vydence Medical) was performed with a 120nm tip, first pass: *random*

Case Reports

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FIGURE 1: Patient with traumatic scar in the perioral region

mode, 140mJ energy, 75 MTZ/cm² density; second pass: brush mode, 30mJ energy, 200 MTZ/cm² density. Microneedling was conducted with Dr.Roller[®] needled cylinders (Mooham Enterprise Co. Gyeonggi-do, South Korea / ANVISA 80669600001). Using 2mm long needles, the rolling movement was performed from 10 to 15 times in the four directions so that 250–300 punctures/cm² were inflicted, causing uniform punctate bleeding (Figure 2). A *drug delivery* formulation containing 4% Hydroxyprolilane, 5% Omega active, 2% Regestril, 2% Matrixyl 3000 and 1.5% IGF fluid anhydrous serum (Dermogral Dispensing Pharmacy, Porto Alegre, RS, Brazil) was applied immediately after the procedure. The selected active principles, such as Hydroxyprolilane and Matrixyl 3000, act in the synthesis of collagen and elastin, while others, such as Regestril and Omega active, inhibit collagenase.³ Two sessions of the procedure were performed with a 20-day interval between them.

The improvement in scarring was evaluated using the Manchester Scar Scale (scores from 5 to 28, with higher scores indicating worse pictures).⁴ The right hand side of the scar, treated with CO₂ laser, presented better outcomes (Figures 3A and B). The initial Manchester Scar Scale score for both sides was 13 points (Table 1). After the treatment, the area treated with laser improved by 5 points, while the area treated with microneedling improved by only 1 point (Table 2).

DISCUSSION

Both microneedling – also termed percutaneous collagen induction – and ablative fractional lasers are effective therapeutic options for the treatment of scars. In addition, both methods



FIGURE 2: Immediate post-procedure – fractional laser was performed in the right hand side half of the scar, while microneedling with 2mm long needles was performed in the left hand side half



FIGURES 3:
A - Outcomes observed 30 days after the procedure.
B - One year after the second session, a better outcome is observed in the right hand side half of the scar, where ablative fractional laser was applied

TABLE 1: Manchester Scar Scale – Pre-treatment

Color	Evident dischromia ³
Bright scar versus non-bright scar	Bright ²
Contour - slightly proud	Indented ²
Distortion	Moderate ³
Texture	Firm ³
Total score	13

allow *drug delivery* processes, which optimize topical delivery of active principles.

The remodeling that occurs after the use of CO₂ laser is caused by the photomechanical effect, which removes the sclerotic scar bands containing thickened collagen and releases the contracted tissue through dermal remodeling. In the literature, the use of CO₂ laser for the treatment of scars demonstrates the presence of improvement in texture and pigmentation. In the case described in the present report, improvement was observed in texture, pigmentation, contour, brightness and distortion. In addition, studies that have used higher densities led to better outcomes, which justifies the parameters chosen in the present case.⁵ Particularly for hypertrophic scars, positive outcomes can be observed in the reduction of scar's firmness, and in the improvement of the surface and contractures.⁶

TABLE 2: Manchester Scar Scale – Post-treatment

	Right hand side (laser)	Left hand side (microneedling)
Color	Mild discromy ²	Mild discromy ²
Bright scar versus non-bright scar	Not bright ¹	Bright ²
Contour	At the same level of the adjacent skin ¹	Indented ²
Distortion	Light ²	Moderate ³
Texture	Only palpable ²	Firme ³
Total score	8	12

Likewise, microneedling stimulates the healing cascade, culminating with the formation of collagen type I. This purpose is achieved as long as the needles penetrate from 1–3 mm, in order to reach the dermis. Since only 50–70% of the total length of the needle penetrates during the rolling process, they should be at least 1.5mm long.² Studies demonstrate that epi-

dermal thickness can be increased by up to 205% by performing serial microneedling sessions. In addition, the dermal connective tissue becomes denser.^{7,8} The needle used in the present case (2mm long) was chosen aiming at inflicting deep injury to the dermis, which is indicated for the effective treatment of scars.² Despite the length of needles was deemed adequate, the authors observed superior outcomes in the area treated with ablative fractional laser.

CONCLUSION

In the present case report, the authors observed superiority of outcomes with the use of CO₂ fractional laser as compared with that of microneedling (2mm long needles) for treatment of a perioral traumatic scar. Nevertheless, this result requires further studies with a greater number of patients (randomized and blinded), as well as a great number of sessions, in order to ratify the findings. The authors also emphasize the possibility of performing *drug delivery* in the immediate post-procedure of both therapeutic modalities, provided that appropriate active principles and adequate formulation for the purpose are employed. ●

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