

Revision of a depressed scar across a relaxed skin tension line by punch elevation, filler injection, and fractional CO₂ laser

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Abstract

Revision of a depressed scar is more challenging because it does not follow the relaxed skin tension line (RSTL). Several measures have been suggested for revision of this type of scar, and they have a number of limitations, complications, advantages, and disadvantages. A 45-year-old woman presented with a depressed scar measuring approximately 45 × 2.5 mm across the chin area as a result of an accidental sharp trauma 17 years previously. She was subjected to several procedures to revise the scar, but none of them were satisfactory. In our method, multiple punches were created along the depressed scar after performing local anesthesia. Then the punched area was treated with fractional CO₂ laser, and hyaluronic acid was finally injected into the treated area. Significant improvement was seen in the depressed scar during the 12-month postoperative follow-up. The advantages of our method are an easy and quick procedure, no need for very advanced equipment, and absence of any incision or downtime. However, a limitation of this procedure is that it is appropriate only for depressed scars with mild to moderate width and depth.

Keywords: scar, punch, filler, CO₂ laser

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Introduction

The relaxed skin tension line (RSTL) is a crease induced when the skin is pinched. Clinically, tension is minimized when incisions are created along these lines. In cutaneous surgery, one of the most important steps for minimizing the post-surgery scar is that the incision created should be oriented parallel to the RSTLs. A depressed scar oriented across the RSTLs occasionally occurs due to accidental trauma or some elective situations such as removal of benign and malignant skin tumors for which the incision is inevitably oriented across the RSTLs. The depressed scar perpendicular to RSTLs can be caused either by a technical error in the procedure or the patient's healing problem (1, 2).

Many optional treatments have been suggested for revision of this type of scar. These methods have a number of limitations, complications, advantages, and disadvantages (2). Herein we report a female patient with a depressed scar oriented across the RSTLs in the chin area that showed significant improvement with punch elevation, fractional CO₂ laser therapy, and filler injection in one session.

Case report

A 45-year-old woman presented with a 45 × 2.5 mm depressed scar in the chin area (Fig. 1). The patient's chin area was injured as a result of a sharp trauma 17 years previously. The incised area was sutured immediately, but she noticed a depressed scar in the chin area a few months after the trauma.

The patient had been subjected to scar revision through surgery by a plastic surgeon 8 years prior. She had been treated with various treatments, such as filler injection, fractional CO₂, and pulse dye laser therapy alone or in combination starting 5 years previously. None of these treatments were satisfactory for the patient.

After providing information to the patient and obtaining written consent, the patient was subjected to the intended procedure.

In our method, three steps, including punching, laser, and filler injection, were performed in one session.

The scarred area was prepared in a sterile manner and anesthetized using lidocaine 2% with epinephrine. First, we used a very sharp 2 mm disposable punch, which created multiple punches oriented along the depressed scar (Fig. 2). During the punching step, mild to moderate tension was induced perpendicular to the RSTLs. Then, the punched area was treated with fractional CO₂ laser (Jeisys, Edge, Korea) with a density of 6%, pulse energy of 30 mJ, and total fluence of 13.5 J/cm² with 120 μm spot size. Finally, hyaluronic acid was injected into the area in several levels of subcutaneous tissue so that the depressed scar area slightly bulged out from the surrounding tissue (Fig. 3). The treated area was dressed with a repair cream, and the patient was advised to avoid exposure to sunlight for 1 month. No complications have been reported for this procedure so far, and the postoperative outcome has shown significant improvement along with patient satisfaction after one session in the 12-month follow-up (Fig. 4).

Discussion

Revision of a depressed scar that does not follow RSTLs is more challenging for physicians working in cutaneous surgery (3). Several procedures have been suggested for revision of this type of scar, including scar excision and resuturing, single or multiple Z-plasty, W-plasty, geometric broken line closure, subcision and fillers, multi-stage treatment of large scars, and skin flap and grafting. However, most of these methods require special equipment, skilled hands, and occasionally multiple sessions, and they are time-consuming, costly, and associated with possible complications (2, 3).

The procedure with a punch instrument is rapid and easy to learn, and it is followed by minimal complications. Revision of acne scars and promotion of wound repair can be achieved by punch operation (4).

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To prevent a cobblestone appearance and to obtain satisfying outcomes, we used a very sharp small (≤ 2.5 mm) punch with mild to moderate tension perpendicular to the RSTLs during the punching stage. Local injection of hyaluronic acid decreases infection in the injection site and enhances the wound healing process. It is also a relatively well-designed approach to correct a depressed scar (5, 6). Fractional CO₂ laser is accessible in most outpatient dermatology clinics and affects scar revision through contour modification and collagen re-biosynthesis and remodeling (7, 8). We believe our combination therapy has several synergistic effects through contour change, collagen remodeling, and easy and

durable elevation of the depressed atrophic tissue.

Conclusions

The advantages of this measure are an easy and quick procedure, no need for advanced equipment, and absence of any incision or downtime. However, a limitation of this procedure is that it can be used only for scars with mild to moderate width and depth. We suggest that this combination procedure be carried out in more cases with variable depth.



Figure 1 | Patient with a scar oriented across the relaxed skin tension lines.



Figure 2 | Several consecutive linear punches created in the scar area.



Figure 3 | Punched area treated with fractional CO₂ laser and subcutaneous injection of hyaluronic acid.



Figure 4 | Post-treatment site with significant improvement after one session.

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