

Treatment of varicella skin scars with sequential punch elevation, autologous fat injection and fractional CO₂ laser

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*Received: 3 October 2019
Accepted: 10 December 2019*

Varicella is a common viral infection that occasionally results in scar. Despite a number of measurements taken to combat this infection, they have all been either impractical or limited. The current study presents a 28-year-old woman diagnosed with varicella 10 years ago which caused her to have several depressed skin scars over the face. She was subjected to sequential treatment of punch elevation, fractional CO₂ laser therapy, and autologous fat injection in one session. Over two years of postoperative follow-up, remarkable aesthetic improvements were observed in her face. This method had some advantages including high speed, convenience, application of conventional medical devices, and the minimal manipulation. The only limitation of our method was mild-to-moderate improvement of the previous hyperpigmentation of the scar.

Keywords: varicella scar, punch, autologous fat, CO₂ laser

Iran J Dermatol 2019; 22: 161-164

INTRODUCTION

Varicella is a common viral infection with skin lesions in children which occasionally results in skin scar. It is usually induced due to the immunodeficiency, secondary infection of skin lesions, severe form and the onset of the disease in adulthood ¹⁻³.

Skin scars, caused by varicella, has various forms but usually induce boxcar scar type ^{2,3}.

Several optional treatments with variable outcomes have been suggested for the revision of this type of scar ²⁻⁸.

Herein, we reported a female patient with several sparse boxcar scars over the face, showing a significant improvement by punch elevation, autologous fat injection, and fractional CO₂ laser therapy in one session.

CASE REPORT

A 28-year-old woman presented with several boxcar scars with variable sizes ranging from 1.5 mm to 5 mm on the face (Figure 1).

She had a severe form of varicella 10 years ago. In spite of the systemic intake of anti-viral and antibiotic therapies, she noticed multiple depressed scars on her face several weeks after the infection.

Our patient had received several treatments to treat her skin scars. These treatments include chemical peeling, long-term topical tretinoin therapy, radiofrequency, various laser therapies, punch elevation, subcision and filler injection alone or in combination during the past 8 years. However, none of the mentioned treatments were satisfactory.

After giving information to and obtaining written

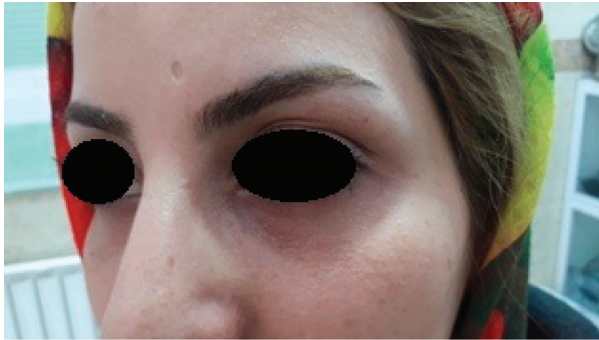


Figure 1. Patient with two scars on the forehead and nose

consent from the patient, she was subjected to a planned procedure.

In this procedure, the scarred area was prepared in a sterile manner, followed by injection of lidocaine 2% with epinephrine. Initially, we used sharp and disposable punches based on the skin scar size. During the punching stage, we applied a moderate tension perpendicular to the relaxed skin tension line (RSTL). Then, autologous fat, which was harvested from the lower abdomen, was injected into the area in different levels of subcutaneous tissue so that the depressed scar area could be slightly elevated from the surrounding tissue.

Finally, the scar area was subjected to fractional CO₂ laser therapy (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. (Figure 2).

After the procedure, we prescribed a repair cream and sunscreen on the treated area for a few weeks and later we recommended a combination of tretinoin and bleaching cream on the area for several weeks. What was observed after one session in a two-year follow-up, was a significant improvement along with patient satisfaction (Figure 3).

DISCUSSION

The severity of varicella skin scars (VSS) is most probably associated with the individual skin repair, severity of varicella, and superimposition of secondary infection¹⁻³. Deep and boxcar VSS induce an unpleasant appearance, which makes the patients ask for appropriate treatments.

Several optional treatments have been suggested, including chemical peeling, long-term topical tretinoin, excisional surgery, subcision, various laser treatments alone or in combination, which have multifarious outcomes, limitations, and



Figure 2. Scar areas treated with punch elevation, fractional CO₂ laser and autologous fat injection



Figure 3. Significant improvement in the scar areas after one session

complications²⁻⁴.

Most of the mentioned treatment modalities cost a lot and require advanced medical equipment, high experience, skilled hands, and multiple sessions.

In a study, 46 patients with various types of atrophic skin scar, including VSS were treated by combined subcision-suction method. Sixty to 90% of the patients showed improvement in the depth and size of scars. This method required multiple sessions, high experience and skilled hands³.

Costa *et al.*⁴ reported the successful treatment of a dark-skinned teenage girl who suffered from multiple round, varicella depressed scars up to 0.5 cm in diameter on the face by multiple sessions of microneedling. Although this method is very simple and easy, it may require several sessions and not be appropriate for deep skin scars. It also needs to be performed in many cases to confirm its effectiveness.

Lee *et al.*² reported that 3 patients with multiple boxcar scars were successfully improved by a combination of intracision and 2940-nm Er:YAG laser therapy. The laser used in this study was not generally available to most dermatology clinics, and intracision required a high experience.

In two studies, a high concentration of trichloroacetic acid (TCA) was used to treat VSS^{5,6}. Barikbin *et al.*⁵ and Agarwal *et al.*⁶ reported a significant improvement in 41% and 69% of patients with VSS, respectively, after multiple treatment sessions over several months of follow-up.

TCA resulted in the modification and improvement of VSS by producing connective tissue through greater collagen construction and fragmentation of elastin fibers in the upper dermis⁵.

Therefore, TCA is suitable for deep VSS and not appropriate for other types of VSS and Fitzpatrick skin types IV- VI.

In a single-center, open-label study⁷, injectable Poly-L-lactic acid (PLLA) was effective in the treatment of patients with acne scar and VSS.

Because of adhesions due to the presence of numerous fibrotic bundles beneath the scar area, especially the deep type, filler injection alone cannot eventuate the bulging of scar regions.

In a study, 3 (2 teenagers and 1 young) patients were subjected to low-dose oral isotretinoin for revision of VSS a few months after varicelle involvement⁸. A marked improvement was observed in pigmentation, size and depth of VSS area.

This treatment is sufficient for the early course after the improvement of acute infection. Moreover, oral isotretinoin is a drug with abundant adverse effects; therefore, it is not used by patients and their parents.

Punch instrument is a simple device used for the removal of benign skin tumors and improvement of rolled skin scars⁹. For achieve better outcomes, we suggest a disposable and sharp punch with different sizes based on VSS and a moderate tension perpendicular to the RSTL during the punching step.

Autologous fat is the safest filler which is effective for skin rejuvenation and some facial defects¹⁰. We injected the fat in different levels of scar until the treated area became bulger than the surrounding tissue.

CO₂ laser is currently an ordinary device used in most outpatient dermatology clinics. It treats the scars and improves the dyspigmentation of many skin lesions through contour modification, collagen re-biosynthesis and remodeling, and alteration of dermal melanophage^{11,12}.

Our therapy protocol exerts multiple synergic effects through improvement of dyspigmentation, collagen remodeling, contour change and appropriate and permanent elevation of the deep VSS.

CONCLUSION

This procedure is a simple and rapid-responding method, which does not require a very advanced device, but a minimal manipulation. The only limitation of this procedure was the mild-to-moderate improvement of the previous post-inflammatory hyperpigmentation in the scar area for which we suggest that this procedure be conducted on more cases with different types of VSS.

Conflict of Interest: None declared.

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