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THERAPEUTIC HOTLINE

Depressed scar after filler injection successfully treated with pneumatic needleless injector and radiofrequency device

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ABSTRACT: Fillers are known to be associated with a number of side effects, one of the most severe being skin necrosis. The most vulnerable areas are those that are supplied by a single arterial branch; for example, the glabellar and nasolabial folds are susceptible. In this study, we report good cosmetic outcomes were produced by utilizing the pneumatic needleless injector and radiofrequency device to treat depressed scars that occurred after necrosis following filler injection. Initially, applying light-emitting diode treatment and following through with the two devices appears to have synergistic effects for scar remodeling when dealing with treatment of depressed scars with irregular borders.

KEYWORDS: depressed scar, pneumatic needleless injector, radiofrequency device

Introduction

Filler is very common in medical aesthetics procedures because it provides rejuvenating and enhancing improvements. However, fillers are still known to be associated with a number of side effects, one of the most severe being skin necrosis. The most vulnerable areas are those that are supplied by a single arterial branch; for example, the glabellar and nasolabial folds are susceptible (1). In this study, we report the effect of a pneumatic needleless injector and radiofrequency (RF) device on wound healing and scar remodeling in a female patient who had been affected by skin necrosis after having a filler injection.

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Case report

A 27-year-old female visited our hospital to seek relief from skin necrosis that had occurred where she received a filler injection approximately one week prior to presentation. The patient had already received hyaluronidase at the injection site 3 days after the filler injection; however, the pain as well as the skin lesions had worsened. She exhibited erythematous excoriated patches with pustules and crust on the nose and

FIG. 1. **(A) When our patient first arrived to our hospital, she exhibited erythematous excoriated patches with pustules and crust on the nose and nasolabial folds. (B) After 3 weeks, there were improvements in her necrotic skin lesion. (C) Facial scars remained 2 months after inflammation resolved. (D) The erythema and depression of the scar were significantly improved after 6 months of monthly treatment from a pneumatic needleless injector and RF device.**

nasolabial folds (FIG. 1A). As part of our treatment, massage therapy and warm compresses were continuously applied to increase vasodilation. She was also instructed to take aspirin, a prophylactic antibiotic, an antiviral agent, and limaprost, a prostaglandin E1 derivative for 3 weeks. The patient was treated with a light-emitting diode (LED) (SMARTLUX®, MEDMIX Corporation, Seoul, Korea) for 15 minutes every day for 2 weeks. The LED device delivered 635 and 830 nm light with a concurrent power density of 75 mW/cm^2. After these treatments, there were significant improvements on her necrotic skin lesion (FIG. 1B), yet facial scars remained even after 2 months had passed and the inflammation had resolved (FIB. 1C). Seeing this, we decided to use a pneumatic needleless injector and RF device in an attempt to enhance the aesthetic outcome. The patient was treated with a pneumatic needleless microjet injection device, INNOJECTOR^{TM} (Amore Pacific, Seoul, Korea). Through this device, the accelerated jet pierces the epidermis through a small entry point. We proceeded to inject normal saline. The volume of liquid ejected each time was 0.15 mL, with jets ejected at a 2-mm distance. In addition, we used AGNES®, a recently developed RF device (Gowoonsesang Cosmetics, Seoul, Korea), with C-type needles capable of energy distribution that focuses on a target lesion. We applied a current at a high frequency of 120 milliseconds, an intensity of power level 2, and a 1-MHz RF apparatus. The length of time per each session was approximately 5–10 minutes. The erythema and depression of the scar were significantly improved after 6 months of monthly treatment from the pneumatic needleless injector and RF device (FIG. 1D).

Discussion

There are numerous cases when facial scars remain even after effective treatment of the inflammation that occurs as a result of filler injection. Such scars are not merely limited to cosmetic issues, but they are strongly related to negative psychological tendencies such as depression and poor self-esteem. Hence, a number of treatment methods are being tested to reduce facial scars.

LED therapy is capable of modulating numerous cellular functions. One study demonstrated that LED therapy has a positive effect on

preventing postinflammatory hyperpigmentation and scarring (2). Another study found that LED inhibits several inflammatory cells and improves skin barrier function (3). At the cellular level, LED has the capacity to upregulate collagen and procollagen synthesis in human fibroblast cultures (2).

The mechanism of pneumatic needleless injectors is microtrauma. Through this device, the accelerated jet pierces the epidermis through a small entry point. The injection device emits a high-velocity jet (up to 180 m/s) through a 0.1-mm nozzle diameter, permeating the skin and delivering medicine intradermally through liquid propelled by compressed gases. The particles of these materials enter the dermis to a controlled depth, receiving strong pressure from the device, and induce dermal microtrauma that stretches fibroblasts while leaving the surrounding tissue intact as they stimulate growth factors and inhibit collagen breakdown (4). Past studies have found that the effectiveness of pneumatic devices for the treatment of depressed scars of the forehead is found to be secondary to its effectiveness in treating herpes zoster infections (5).

An RF device disperses its energy to an intradermal level at the depth of the insulated needle. The epidermis remains intact and serves as storage for viable tissue, enhancing epidermal turnover and the regeneration of dermal collagen (6). This occurs via initial collagen denaturation within thermally modified deep tissues; neocollagenesis follows in the dermal tissue (7). Another study observed type I and III collagen had been reported to significantly increase after irradiation in the dermis, and their changes were noticed consistently in all layers following RF treatment (8).

Good cosmetic outcomes were produced by utilizing the pneumatic needleless injector and RF device to treat depressed scars that occurred after necrosis following filler injection. Initially, applying LED treatment and following through with the two devices appears to have synergistic effects for scar remodeling when dealing with treatment of depressed scars with irregular borders.

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Conflict of interest

The authors have declared there are no conflict of interest.

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