

CASE REPORT

Combined Treatment with Botulinum Toxin and 595-nm Pulsed Dye Laser for Traumatic Scarring

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Traumatic scars on skin covering areas of high movement, especially areas on the face, can be stressful for patients. We report two cases of traumatic scars that occurred on the chin, and that were successfully treated with a combined therapy of 595-nm pulsed dye laser (PDL) and intramuscular injection of botulinum toxin. After the treatment, good cosmetic results were achieved in both patients. The only adverse effect during and after the treatments was mild pain, which resolved within several days without any additional treatment. In conclusion, the combination of 595-nm PDL and intramuscular botulinum toxin injection was shown to be a safe and effective treatment for traumatic scars on the mobile chin area in Korean patients. (*Ann Dermatol* 27(6) 756 ~ 758, 2015)

-Keywords-

Botulinum toxin, Cicatrix, Pulsed dye lasers

INTRODUCTION

Botulinum toxin has become one of the most frequently requested products in cosmetic rejuvenation, and recent reports have shown that botulinum toxin can be used to treat hypertrophic scar and keloid^{1,2}. The 595-nm pulsed

dye laser (PDL) has been shown to be effective for treating a variety of traumatic and surgical scars, and patients have experienced improved scar texture, color, and pliability, with minimal adverse effects³.

We report two cases of hypertrophic scars on the chin, a facial region that experiences considerable muscle movement, that were treated with a combination of 595-nm PDL and botulinum toxin injection.

CASE REPORT

Patient 1

A 34-year-old Korean man presented with a linear and arc-shaped hypertrophic scar on the chin (Fig. 1A). Two months before the visit, he underwent suture therapy at a clinic after a trauma. At our institute, he received four treatments of 595-nm PDL (V-beam Perfecta; Candela Laser Corporation, Wayland, MA, USA) at 2-week intervals, combined with injection of botulinum toxin (botulinum toxin type A, purified neurotoxin complex; Allergan, Irvine, CA, USA) immediately after the first laser treatment. He made a total of five visits (0, 2, 4, 6, and 8 weeks). No anesthesia was needed for treatment. A treatment fluence of 8 J/cm², spot size of 7 mm, and pulse duration of 3 ms were used. For botulinum toxin treatment, each vial of onabotulinumtoxinA containing 50 U *Clostridium botulinum* toxin type A with human serum albumin and sodium chloride (Meditoxin; Medy-Tox Inc., Seoul, Korea) was reconstituted with 2.5 ml sterile saline to achieve a concentration of 2 U/0.1 ml, and a total of 8 U was injected into the mentalis muscle. A good aesthetic result was achieved after the combined treatment (Fig. 1B), and he did not experience major adverse effects, except for mild pain during the treatment.

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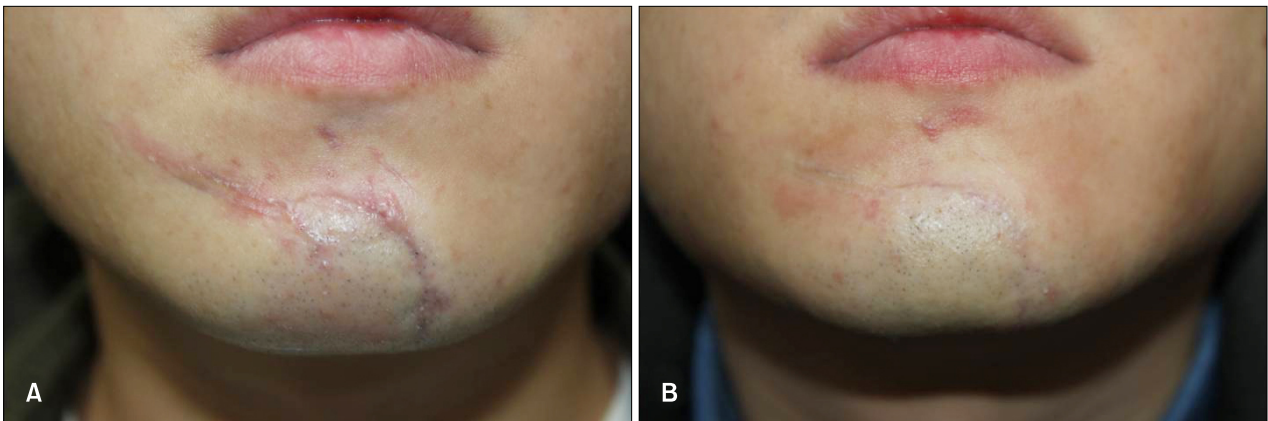


Fig. 1. (A) A long, linear, and arc-shaped scar on the chin (before treatment). (B) After 8 weeks, marked improvement of the lesion was observed after a single intradermal botulinum toxin injection and four 595-nm pulsed dye laser treatments.

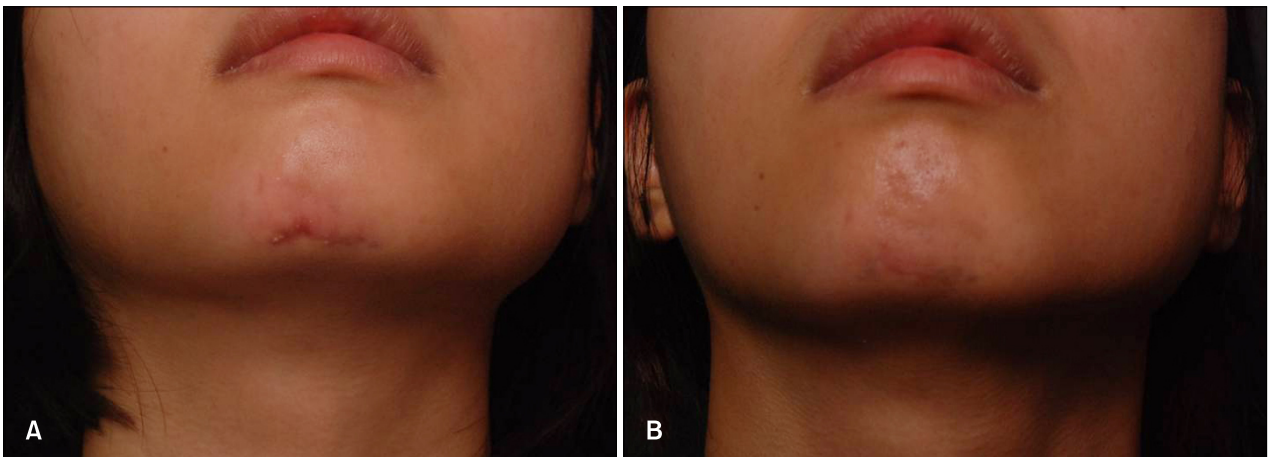


Fig. 2. (A) A prominent erythematous hypertrophic scar on the chin (before treatment). (B) After 8 weeks, marked improvement of the lesion was observed after a single intradermal botulinum toxin injection and two 595-nm pulsed dye laser treatments.

Patient 2

An 18-year-old Korean woman presented with an erythematous linear scar on the chin (Fig. 2A). Two months before the visit, she developed a scar after bumping into the side of a desk. Although she was treated with a topical agent, she was not satisfied with the outcome.

She received two treatments of 595-nm PDL at 3-week intervals. She made a total of three visits (0, 3, and 8 weeks). Immediately after the first treatment, the area around the scar was injected with botulinum toxin. PDL treatment was performed with a fluence of 8 J/cm², a spot size of 7 mm, and a pulse duration of 3 ms for two passes. A total of 6 U botulinum toxin was injected into the mentalis muscle. She was satisfied with the cosmetic result after the combined treatment (Fig. 2B), and experienced only mild erythema and a stinging sensation.

DISCUSSION

The best scar ‘treatment’ is to prevent scar formation, and a number of measures can be employed to optimize healing after a trauma or surgery. The 595-nm PDL laser treatment has been shown to be effective for treating a variety of traumatic and surgical scars, with improvements in scar texture, color, and pliability, with minimal adverse effects³. Ryu et al.⁴ reported the efficacy and safety of early post-operative intralesional injections of low-dose steroids and PDL treatment for preventing thyroidectomy scars, and other reports have shown that both PDL and ablative fractional lasers provide significant improvement in surgical scar healing^{5,6}.

Several recent reports have demonstrated a possible action mechanism for botulinum toxin for hypertrophic scars. Shaarawy et al.⁷ recently reported that intralesional botulinum toxin was equally effective and better tolerated than

an intralesional steroid for treating keloids in a randomized controlled trial. Botulinum toxin might effectively inhibit the growth of fibroblasts derived from scar contracture and reduce the expression of α -smooth muscle actin and myosin II⁸. In addition, the botulinum toxin altered the expression levels of *S100A4*, *TGF- β 1*, *VEGF*, *MMP-1*, and *PDGFA* genes in keloid fibroblasts, which provide useful clues for exploring the function of botulinum neurotoxin (BoNT)-A and finding a novel treatment for keloid scarring⁹.

The skin has intricate features that affect relaxed skin tension lines. These lines develop as a result of underlying muscle activity and are related to visible lines on the skin surface. When a cut or incision runs across the skin tension lines, the wound is distorted every time the underlying muscle contracts. Muscle activity is more pronounced with a larger scar angle relative to the relaxed skin tension lines. An effective method to improve healing and reduce scar formation is to inject the musculature adjacent to a wound with botulinum toxin. This injection paralyzes the musculature and allows optimal healing to occur before muscle activity recovers.

In the two cases presented in this study, satisfactory aesthetic results were achieved in both patients. However, BoNT for scar treatment is still controversial, and the mechanism of this treatment is not certain thus far. Moreover, the treatment protocols and efficacy should be established through clinical trials that involve a large number of patients. Additionally, we could not compare the effects of intradermal botulinum toxin injection alone with those of the combination treatment with intradermal botulinum toxin injection and 595-nm PDL; therefore, further controlled studies are required to address such comparisons.

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