

RESEARCH LETTERS

Botulinum Toxin-Induced Immobilization of Lower Facial Wounds

An increasing body of evidence suggests that botulinum toxin-induced immobilization of facial wounds results in enhanced wound healing.¹⁻⁶ Most of these data were acquired on forehead wounds. The forehead is a particularly favorable area to treat because of its low associated risk of inducing temporary functional deficits. The injection techniques applied in wound healing are derived from the widespread experience with cosmetic facial injections in the forehead. In recent years, the indications for botulinum toxin (Botox; Allergan, Irvine, California) treatment of facial lines have been extended beyond the forehead. Analogous to the progression of cosmetic indications, extension of Botox treatment for wound healing to the lower face would seem to be intuitive.

Important functions of the perioral musculature include facial expression, oral sphincter, and articulation. These functions are easily compromised with injection of Botox. Transient functional deficits may therefore be anticipated with immobilization of perioral wounds. The perceived risk of inducing such functional deficits may explain the paucity of reports in the literature on perioral wound immobilization.

After extensive discussion of all aspects of chemoimmobilization of the lower facial wounds, including the off-label use of Botox and the expected transient adverse effects, we have treated selected patients with perioral wounds. The following cases illustrate important aspects of therapy and clinical follow-up.

Report of Cases. *Case 1.* A 26-year-old white woman sustained a crush injury to the lower lip from a motor vehicle crash. The resulting irregular defect involved the vermilion border. Complete transection of the orbicularis oris muscle was observed (**Figure 1A**). The patient was counseled and requested aggressive immobilization of the lower lip. A solution of 7.5 U of Botox per milliliter of lidocaine hydrochloride, 1%, with 1:100 000 epinephrine was injected into the perioral musculature. The immediate paralysis resulting from the local anesthetic agent allowed for titrated injection until the desired degree of paralysis was attained. This required a total of 40 U of Botox in 4 cm³ of lidocaine, 1%, with epinephrine, 1:100 000. Subsequently, the orbicularis oris muscle was reapproximated with simple 4-0 PDS (p-dioxanone homopolymer) monofilament sutures. The remaining soft tissues were repaired with 5-0 Monocryl (poligle-caprone 25) monofilament sutures, and the epithelium

was closed with 6-0 nylon simple vertical mattress sutures (**Figure 1B**). The patient was advised to maintain a soft diet. Flaccid paralysis of the injected portion of the lower lip was observed and closely resembled the degree of paralysis predicted by the injection of the local anesthetic agent. The patient had mildly reduced oral sphincter function with occasional spillage of liquids and mild dysarthria for 4 weeks. She tolerated a normal diet 10 days after closure. The eventual cosmetic appearance of the scar is depicted in **Figure 1C**.

Case 2. A 23-year-old white woman was referred for revision of a left cheek scar, resulting from incisions and drainage of a recurrent facial abscess (**Figure 2A**). A comprehensive general medical workup had been noncontributory. Culture findings revealed pansensitive normal skin flora. On physical examination, a 2 × 1-cm indurated mass was palpated subjacent to a complex widened scar of the left cheek. A mild amount of purulent material was expressed with digital compression. Under systemic antibiotic therapy and frequent intralesional saline irrigations, the drainage discontinued and signs of inflammation abated. The patient was taken to the operating room for excision of the scar and underlying fibrosed abscess cavity. During surgery, 30 U of Botox were injected into the buccinator and zygomatici muscles. One week after surgery, the sutures were removed. Clinically significant paralysis ensued, and no dynamic tension or distortion of the wound was observed clinically (**Figure 2B**). Ten weeks after surgery, muscle function had returned completely.

Comment. Chemoimmobilization of forehead wounds has become an established method to reduce scarring. The botulinum toxin dosages used to immobilize forehead wounds resemble those injected for cosmetic purposes. This treatment allows near-complete elimination of muscle tension on the healing wound. Occasionally, for wounds located near the lateral supraorbital rim, the inferolateral aspects of the frontalis muscle may require more extensive injection than is the case in the treatment of lines and wrinkles.⁷ In general, the dosages applied to treat forehead lacerations range from 20 U to more than 60 U for extensive wounds.

In contrast to the forehead, cosmetic Botox injections to the perioral musculature require only mild reduction in activity and not near-complete paralysis. The injecting surgeon must be able to control the finest nuances of muscle activity to attain the desired cosmetic effect. Excessive treatment can result in an undesirable result, such as transient flattening or ptosis of the lip.⁸ These adverse effects are avoided by careful injection technique and application of small dosages in the range of 1 to 5 U of Botox.

In conditions of pathologic spasticity, such as Meige syndrome, dosages of 20 to 40 U of Botox are typically required to immobilize the perioral musculature. This high

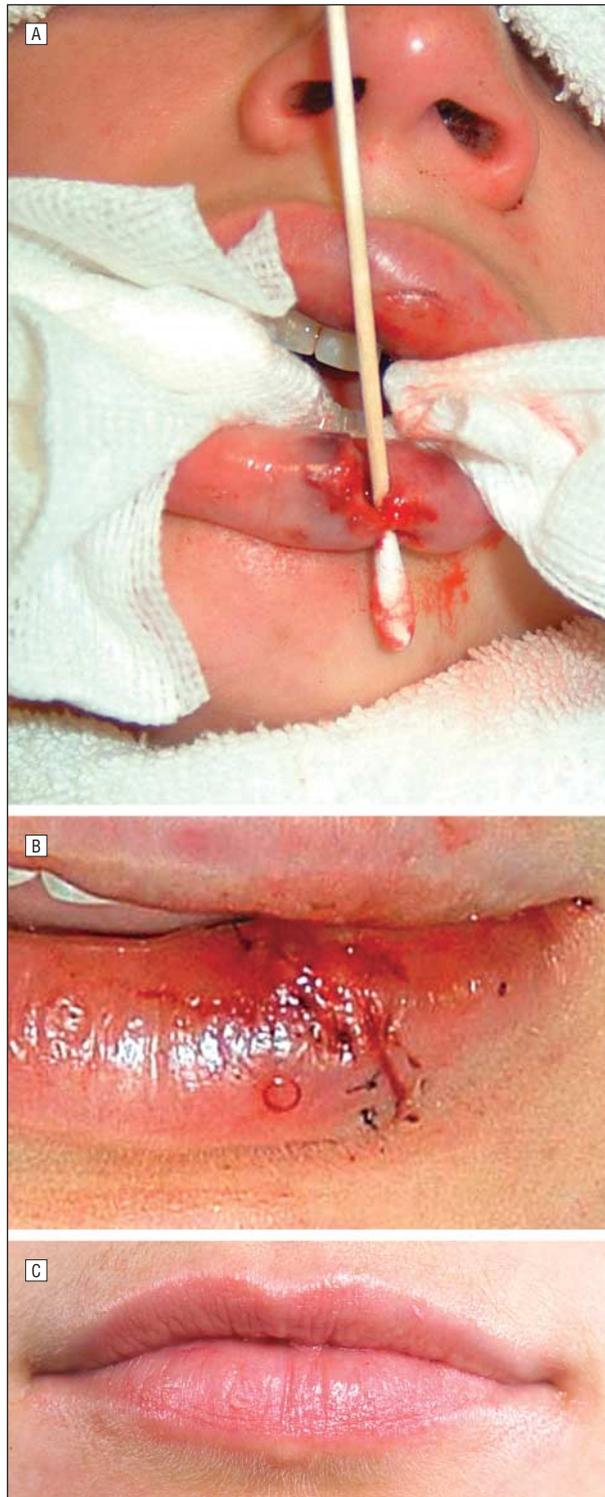


Figure 1. A 26-year-old white woman sustained a crush injury to the lower lip. A, Complete transection of the orbicularis oris, vestibular mucosa, and vermillion border and near-complete transection of the vermillion was observed. B, The wound was closed in layers using standard technique. C, Six months after surgical closure and botulinum toxin A–induced (Botox; Allergan, Irvine, California) chemoimmobilization of the wound, the resulting scar is barely perceptible. The patient wiped off her lipstick prior to obtaining the photograph. The pink discoloration may represent residual pigment.

degree of chemodenervation invariably induces transient functional deficits, including dysarthria and reduction in oral sphincter function.

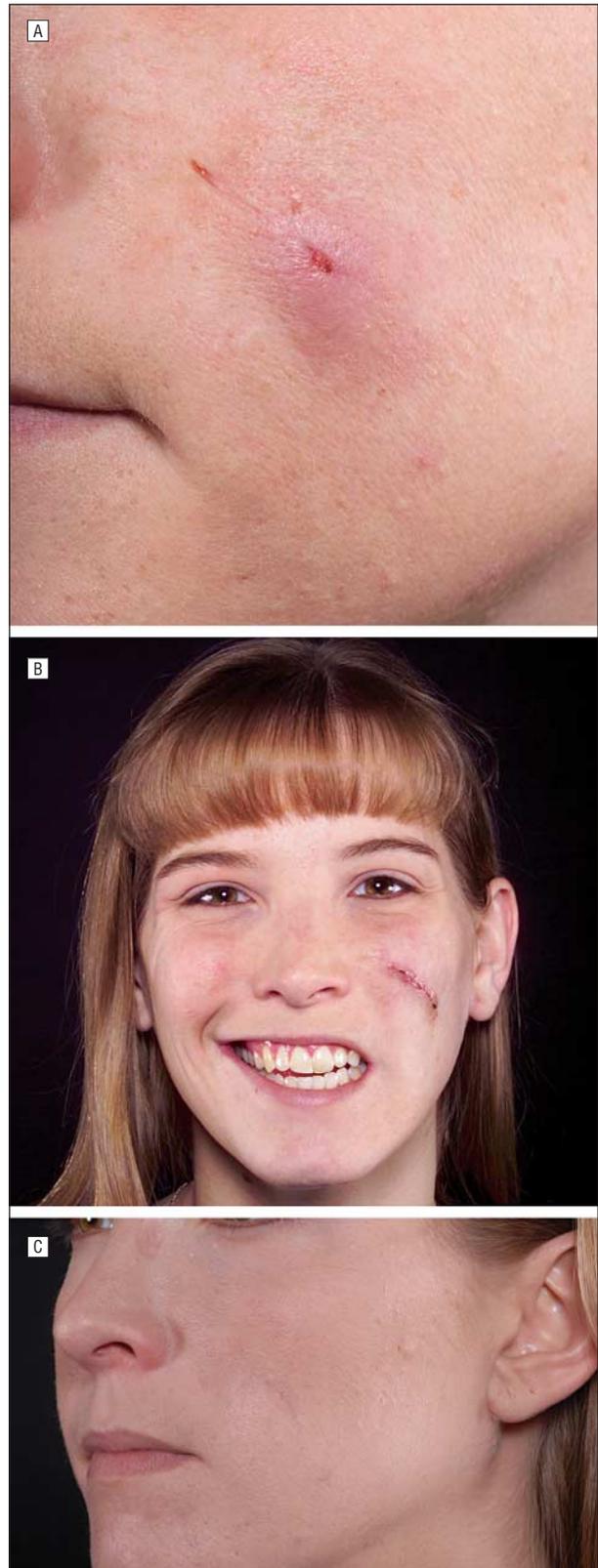


Figure 2. A 23-year-old white woman presented for scar revision and excision of a fibrosed abscess cavity, resulting from multiple incisions and drainage procedures for recurrent facial abscess. A, The patient before surgery. B, After scar revision and excision of the underlying mass, the wound was immobilized with 30 U of botulinum toxin A (Botox; Allergan, Irvine, California). Substantial transient immobilization resulted with no dynamic tension observed in the wound edges. The facial musculature regained complete function. C, One year after surgery, the wound had healed with a favorable result.

The overriding goal of chemoimmobilization of cutaneous wounds is to eliminate dynamic tension on the healing tissues. Paralysis of the muscle groups adjacent and subject to the wound should therefore be as complete as possible.

As illustrated in the cases presented herein, the dosages applied for wound healing in the lower face resemble those used for the treatment of spasticity and are substantially larger than those for cosmetic purposes. The applied dosages resulted in clinically near-complete elimination of dynamic tension on the healing wounds. Observed adverse effects included ptosis of the lip, dysarthria, and decreased oral sphincter function. These adverse effects were expected, clinically mild, and transient.

Patients seeking optimal healing of a traumatic or iatrogenic facial wound are concerned about the eventual appearance of the resulting scar. These patients typically understand well that effective immobilization of a healing wound will transiently compromise muscular activity of surrounding anatomic areas. It has been our experience that these patients are very accepting of the expected temporary functional deficits. We have actually noted that these patients frequently request aggressive immobilization and are willing to trade the transient functional deficits for a potentially better eventual appearance of the resulting scar.

Based on our experience and the cases presented herein, we recommend Botox-induced chemoimmobilization of wounds and lacerations located in the lower face in selected patients. The injecting surgeon should be experienced with Botox injections and should be able to predict the degree of denervation induced with the injection. Reconstituting Botox in a solution of lidocaine with epinephrine is a useful method that allows the surgeon to better predict the delayed paralysis ensuing from Botox.⁹ This method allows more exact titration of the amount of toxin required for the desired treatment effect. We have found this especially useful in the perioral region.

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Fatal Septic Thrombosis of the Superior Sagittal Sinus After Face-lift Surgery Caused by Community-Associated Methicillin-Resistant *Staphylococcus aureus*

A recent report by Zoumalan and Rosenberg¹ highlighted the importance of methicillin-resistant *Staphylococcus aureus* (MRSA) in postoperative wound infection after rhytidectomy. In their study, MRSA was isolated in 4 of 5 patients with surgical site infections after face-lift surgery. Two of the 4 patients required hospitalization for wound care and parenteral antibiotics to cure the infection, whereas the other 2 patients with MRSA wound infections were treated with local care and oral antibiotics as outpatients. Fortunately, prompt treatment with surgical drainage and antibiotic therapy guided by susceptibility testing resulted in excellent outcomes in all patients. It stands to reason, however, that delayed recognition or inappropriate treatment of these infections may not have led to such favorable results. Herein, we report an additional case of surgical site infection following rhytidectomy caused by an epidemic community-associated (CA) strain of MRSA that unfortunately had a delayed diagnosis and tragic outcome.

Methods. In March 2008, a 53-year-old woman was admitted to the intensive care unit with fever, vomiting, obtundation, and a granulated left postauricular scalp incision 6 weeks after undergoing rhytidectomy. The patient had been given a course of cephalexin for preoperative antibiotic prophylaxis 2 weeks prior to surgery. She underwent eyebrow-lift surgery followed by rhytidectomy 5 days later. Two weeks after face-lift surgery, the patient developed swelling, erythema, and tenderness along the postauricular surgical incision extending around the left ear and down the anterior aspect of the neck (**Figure 1**). The wound partially separated and produced bloody drainage. After 2 additional courses of cephalexin, erythema and induration improved but were still evident anterior and posterior to the ear. The sur-