Botulinum Toxin: An Aid for the Treatment of Crow's Feet - A Case Report

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Abstract :

The pursuit of youth and beauty has undergone a resurgence of interest which is evidenced by increasing cosmetic procedures. In the present century, botulinum toxins (BTs) have gone from the deadly poison to remarkably versatile therapeutic agent. It works by inhibiting the release of acetylcholine at neuromuscular junction interrupting the contraction process of the muscles and causes a temporary paralysis. Blockade is temporary, after which there is a return of neuromuscular function. Inactivation of muscles of facial expression by chemodenervation with botulinum toxin remains an off-label indication. Nevertheless, it continues to be a safe and effective technique to improve dynamic rhytides and is the treatment of choice for the hypertrophic lateral fibers of the orbicularis oculi muscle that can cause the superimposed crow's feet.

Keyword: botulinum toxins, neuromuscular junction, chemodenervation, rhytides, crow's feet

Aim: This study was aimed to clinically evaluate the efficacy of Botox injection for the improve dynamic rhytides and the treatment for the hypertrophic lateral fibers of the orbicularis oculi muscle that cause the superimposed crow's feet. The objectives were to compare pre-operatives and post-operative improvement of crow's feet and patient satisfaction responses after botulinum toxins injection

Introduction

A paramount objective of modern cosmetic surgery is improvement in facial aesthetics[1]. A major reason for seeking professional help is dissatisfaction with the facial appearance in addition to functional problems[2]. The rhytides that radiate axially from the lateral canthus, the crow's feet, are a common source of frustration for patients, as they can be one of the earliest signs of aging. Although extrinsic actinic damage may be contributory, hypertrophy of the lateral fibers of the orbicularis oculi muscle that encircles the eye and is responsible for blinking is the primary etiology of these rhytides. Historically treatment options have included soft tissue augmentation, resurfacing (topical, chemical, abrasive, and ablative and nonablative lasers), and surgical intervention. However, no one treatment adequately addresses all of the changes of senescence around the eye-in particular, the underlying muscular component. Blephar-oplasty surgery, alone or adjunctively, is also incomplete, as it is primarily suitable for correction of lower and upper eyelid fat pad herniation and skin redundancy. In an attempt to address the hypertrophic lateral fibers of the orbicular is oculi muscle, often concomitant with blepharoplasty surgery, the muscle was partially excised or spread out and fixed to the periosteum[3]. Currently an alternative to surgery is local muscular chemodenervation with botulinum neurotoxin. The intramuscular injection of small amounts of the toxin results in a weakness or partial paralysis of the exposed striated muscle and an effacement of the superimposed dynamic cutaneous rhytide. The clinical benefit usually occurs within 1 week of injection, with a duration of approximately 3–4 months. Treatment of the muscles of facial expression is not without risks, and complications can also occur in the periocular region. While these complications are disconcerting aesthetically and can cause functional impairment, they do completely resolve radually and spontaneously. Reported adverse events in the periocular area include ecchymosis, residual static rhytides, accentuation of preexisting eyelid dermatochalasis and/or fat pad herniation, diplopia, and lip ptosis[4-7].The atypical complication of impairment of lacrimal gland function with a consequent abnormal Schirmer's test following the injection of botulinum toxin type A neurotoxin into the lateral canthal region is reported.

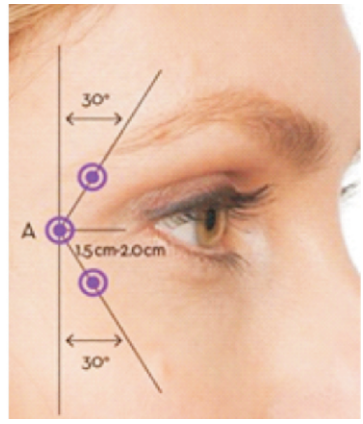
Case Repoart

A 45-year-old cooperative, motivated and aesthetically conscious, medically healthy patient came to department of orthodontics for overall improvement of his facial appearance and smile. On physical examination we found that he was having a aesthetically pleasing smile but due to progression in his age patient developed crow feet at corner of his eyes. Seeing the patients positive attitude towards his overall facial appearance led us to consider another treatment option, Botox. The pros and cons of injecting Botox were discussed with the patient who was very respective to the idea which targeted his chief complaint of crow's feet.

Botox and Injection Technique[8]

BOTOX (BTX-A: purified botulinum Toxin Type A), is a sterile, vacuum dried neurotoxin complex produced from fermentation of hall strain clostridium botulinum toxin type A, grown in a medium containing casein hydrolysate, glucose and yeast extract. BTX-A was diluted according to the manufacturer's recommendations to yield 2.5 units per 0.1 ml by addingn4.0 ml 0.9% Normal Saline to 100 units of vacuum dried BTX-A. Under sterile conditions, 2.5 units were injected at three sites per side.

Crows feet are the fan shaped lines and wrinkles that radiate out from the outside corner of the eye. Crows feet are worsened when smiling, laughing or squinting.



Muscles involved in crows feet lines and wrinkles[8]

Orbicularis Oculi muscle. This is the big ring shaped muscle, highlighted in the image, that surrounds the eye. The Orbicularis Oculi muscle contracts like a purse string around the eye which then accentuates the crows feet.

Technique

- The patient sits back on the dental chair with the backrest up.
- The area is cleaned.
- The skin overlying the muscles to be injected is marked out with a skin marker. The exact placing of the injection points are different between people and depends on the muscle action observed when wrinkling the forehead.
- In some people the crows feet radiates upwards, in some equally upwards and downwards and in some people mostly downward.
- The muscles are injected. It takes about 1-2 minutes.
- Light pressure is applied to the area to prevent bruising.
- The skin marker marks are wiped off.

Botox Dosage:

- Orbicularis Oculi muscle Botox injection (highlighted in the image above) for crows feet:
  - in females: 6-9 units
  - in males: 9-16 units

Aftercare:

- Some patients experience a slight headache that can be relieved with Paracetamol.
- Slight bruising can occur, but can be concealed with make-up. It resolves in a few days.
- The effect will kick in after 3-10 days and last between 2 and 7 months, depending on the Botox dosage used and the patients physiology. Some patients dissolve Botox faster than other patients.
- First time patients will sometimes be requested to return after 2-3 weeks for a check-up and top-up if required.
- Most patients have the injections repeated once or twice a year.

Results

The result were markedly noticeable at 1 weeks. We can seen in prebotox and postbotox photograph of patient (fig 1-4).

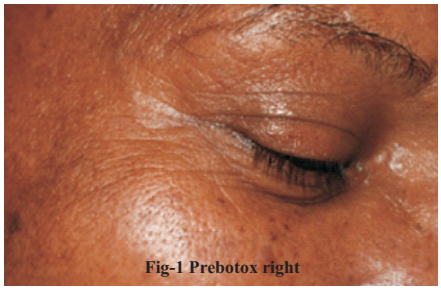


Fig-1 Prebotox right

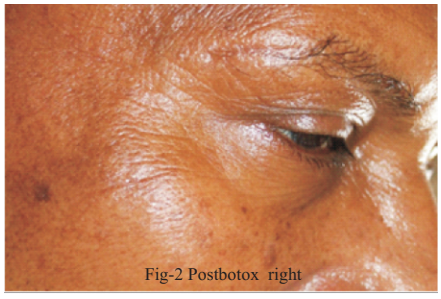


Fig-2 Postbotox right

Fig-3 Prebotox leftside

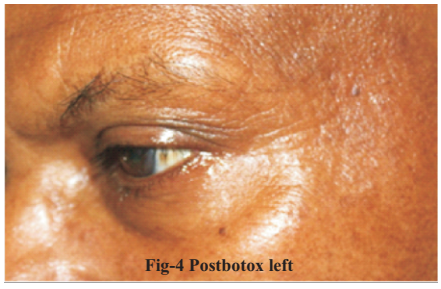
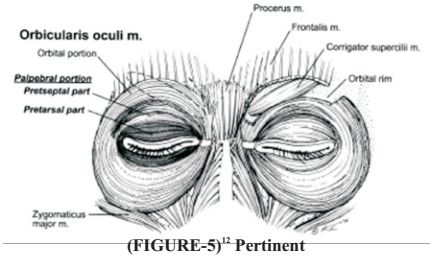


Fig-4 Postbotox left

Discussion

Hypertrophic fibers of the orbicularis oculi muscle primarily account for periocular rhytides, and improvement of these lateral wrinkles with botulinum toxin type A is well documented[9-11]. Injection guidelines include maintaining a 1.0 cm margin from the bony orbit (1.5 cm from the lateral canthus) to avoid paresis of the lateral rectus muscle and consequent diplopia, staying above the zygomatic arch and the adjacent zygomaticus major muscle which could result in lip ptosis, and injecting in a subdermal plane to aid in minimizing ecchymosis from interrupting the rich underlying vascular plexus[5]. As an adjunct to treating the lateral fibers of the muscle, botulinum toxin type A may be injected into the inferior fibers of the orbicularis oculi muscle at the lateral canthus and/ or underneath the midpupillary line[8]. This improves the infraocular eyelid folds and lines and imparts a more annular or open appearance to the eye.

The eyelids are complex structures, and accurate knowledge of the muscular anatomy as well as function is crucial to obtain satisfying and reproducible results. The orbicularis oculi is a muscle that is arbitrarily divided into orbital and palpebral portions. The orbital component is the peripheral part of the muscle that covers the bones and muscles of the upper cheek, lateral orbital area, and lower frontal forehead. The central part of the orbicularis oculi muscle covers the eyelid and is referred to as the palpebral portion, which is further subdivided into the preseptal and pretarsal parts based on their relationship to the underlying orbital septum and tarsal plate[12] (Figure 5).



(FIGURE-5)[12] Pertinent muscle anatomy of the periocular region.

The pump action of the excretory system of the lacrimal apparatus is a function of the pretarsal orbicularis oculi muscle that contracts to force fluid into the tear sac. When contracted during blinking, a negative pressure sucks fluid into the tear sac; when released, positive pressure forces fluid into the nasolacrimal canal[13-15]. Therefore paresis, partial or total, of the pretarsal portion of the orbicularis oculi muscle can impair nasolacrimal outflow by inhibiting the pumping action of the orbicularis oculi muscle and alter the Schirmer's test.

The Schirmer's test is the standard method to evaluate the status of reflexive tear production. To administer the test, a topical anesthetic is dropped into the eye and a Schirmer paper strip is placed in the inferior cul-de-sac at the temporal palpebral conjunctiva of the lower eyelid. This strip is removed at 5 minutes, and a normal wetting measurement should be between 10.0 and 15.0 mm. Hyposecretion is manifested as a lower value. When tear secretion is insufficient, diminished aqueous tear expression, dry eye (keratitis sicca) symptoms, and ocular irritation can occur. Diminished bilateral tear expression is associated with advancing age, medications (diuretics or antihistamines), previous ocular surgery, or facial nerve dysfunction (Bell's palsy). Unilateral or acute diminished tear function requires evaluation[16,17]. In this case, the diminished tear secretion and ocular irritation correlated to the administration and duration of botulinum toxin type A.

Conclusion

As opposed to various other procedures, Botox has proven to be a minimally invasive, effective alternate for the correction of craw's feet.this effacement with botulinum is a tremendous source of satisfaction for both patients and physicians.

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