Wonder Jabs

Advanced applications of botulinum toxin for facial rejuvenation

by Dr Wong Chin Ho

Botulinum toxin is a powerful neurotoxin produced by gram-positive anaerobic bacterium Clostridium botulinum. It acts by blocking the release of acetylcholine at the presynaptic nerve terminal, causing chemical denervation.

Botulinum toxin is currently used to treat various medical conditions, including strabismus, hemifacial spasms, dystonias, spasticity, tics, synkinesis, hyperhidrosis, achalasia, and sphincter dysfunction.

Cosmetic Applications

Botox has wide-ranging cosmetic applications. For cosmetic use, it is currently only FDA-approved for the treatment of glabella frown lines. All other cosmetic applications are considered off label use. Despite this, the off label cosmetic use of Botox has a very long safety record, with several millions treatment done worldwide.

Experience has shown that it can be applied to different areas of the face with profound effect with safety and predictably. Knowledge of the mechanism of action of the toxin, precise placement and detailed knowledge of the anatomy of the face are keys to safety and efficacy.

Conventionally, the use of botox was targeted at specifically paralysing the muscle that is responsible for particular frown lines, for example, the corrugators for the glabella frown line and masseter for the square jaw. However, with more advanced concepts of using botox, cosmetic results can be achieved by targeting different structures simultaneously, selectively leaving antagonistic muscles activated to cause the relative shifting of soft tissues, improving skin texture by paralysing dermal insertion of very

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fine muscle fibers as well as shrinking the parotid glands to further shape the jawline. This entails the injection of the toxins at multiple different levels, from subdermal to subperiosteal, as well as the use of various dilutions of the toxin, in regular, meso and as microdilution, depending on the nature of organs targeted. These advanced concepts are best presented as illustrative cases that follow.

Figure 1

Figure 2

Figure 3

Case Illustrations

The patient in **[Figure 1]** (left side, pretreatment) presented with the complaint of hyperactive glabella muscles as she frowned frequently during animation. She was also bothered by the active pretarsal orbicularis of the lower eyelid that caused an excessive pretarsal bulge as well as wrinkling around the lower eyelid which accentuated her tear trough deformity. One can also note that her brow has started to descend with heaviness and early drooping of the lateral part of her upper eyelids. Botox was used on her for three purposes, to relax the frown lines, to chemically lift the brow and lastly, to rejuvenate the lower eyelid. To achieve this, 20U of botox was injected into her corrugators and procerus. 4U of botox was used to paralyse her superolateral orbicularis oculi. No botox was used in her frontalis, especially to laterally allow it to lift the brow, and 6U of botox in 0.4cc of NaCl (microbotox) was diffusely injected into the lower eyelid at the subdermal level.

When seen one week later **[Figure 1]** (right side), one can appreciate the profound rejuvenating effect of the treatment. The glabella frown lines have been eliminated. Her lateral brow has been lifted, with a higher and more pleasing arch to the brow. Her upper eyelid is also more crisp with the upper lid creases running parallel to the upper eyelid margin. The fullness and hooding of the lateral part of the upper eyelid has been significantly improved. In her lower eyelids, the skin texture has improved with smaller pores and much less fine lines. The pretarsal bulge has been eliminated and the tear trough (which is the result of puckering around the tear trough ligament as a result of contraction of the orbicularis oculi) had been significantly softened by the microbotox treatment.

The patient is **[Figure 2]** (left side, pretreatment) presented with asymmetric eyebrows (with her left brow being more ptotic) as well as mild ptosis of both her eyes. She was not keen for any surgical intervention. The aim of her treatment was to raise her left brow as well as to open both her palpebral aperture slightly (ptosis correction). 20U of botox was used to relax her corrugators and procerus, 6U of botox was used to paralyse her left superolateral orbicularis oculi and 1U microbotox was used at the medial and lateral edges of her upper eyelid to weaken her upper eyelid pretarsal orbicularis to allow the levators to open the eye more. The figure on the right showed her result, one week later. Note that the lines in the glabella have been eliminated. The left brow was raised significantly and the palpebral apertures visibly enlarged, correcting the ptosis.

The patient in **[Figure 3]** (left side, pretreatment) has a very wide jaw. She was not keen on jaw contouring surgery. Because of the prominence of the muscle, gland and jaw, a more aggressive injection of the botox is needed. 40U of botox was injected into each side, into the masseter, preperiosteally to promote bone remodelling and higher up to reduce the bulk of the parotid gland. The figure on the right shows her result after one month, after her third botox treatment. A profound 'reshaping' of the lower face was achieved with these treatments.

In conclusion, with recent understanding of anatomy and precise delivery of the botox, advanced applications of botox can safely and predictably address a variety of problems patients present with. Its versatility can be further expanded when combined with fillers and when used to compliment surgical treatments. MG

Reference
Carruthers J, Carruthers A. Botulinum toxin in facial rejuvenation: an update. Dermatol Clin. 2009 Oct;27(4):417-25, v.