

# Treatment of senile entropion with botulinum toxin

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**SUMMARY** Botulinum toxin was used to treat senile entropion in 12 patients by injection into the preseptal orbicularis muscle of the lower lids. It produced relief of symptoms in 10 patients but this was transient, lasting for an average of 14.8 weeks before orbicularis function returned. The technique is simple and easy to perform, and may be useful in selected patients, but surgery offers a more permanent result.

Senile or spastic entropion is a common cause of ocular discomfort and disability in the elderly. Aging changes cause tissue laxity in the lid retractors, canthal tendons, and tarsal plate of the lower eyelid. Involutional loss of orbital content also plays a part in increasing the effective lid laxity.<sup>1</sup> There is an upward movement of the preseptal and pretarsal parts of the orbicularis muscle, which then act to roll the upper lash-bearing edge of the eyelid against the globe. If this is neglected, corneal complications may ensue.

A variety of surgical procedures have been devised over the years to correct the inturned lower lid, but after most of these the condition may recur.<sup>1-6</sup> The techniques consist of one or more permutations—from shortening the lower lid retractors, shortening the horizontal length of the tarsus, forming a barrier to upward movement of the preseptal orbicularis muscle, or tightening and tethering this muscle at the lower border of the tarsal plate. A further therapeutic possibility would be to prevent the inward rolling of the lid by weakening that part of the orbicularis muscle responsible—the preseptal part and probably the upper pretarsal part near the lash margin.

The safety of localised injections of botulinum toxin into the extraocular and periorbital muscles has been demonstrated recently in the treatment of strabismus and idiopathic blepharospasm.<sup>7,8</sup> The toxin blocks the release of acetylcholine at myoneural junctions, and the resulting local flaccid paralysis recovers only with the growth of new end plates from the peripheral motor neurone axons, which takes many weeks. An injection of botulinum toxin into the orbicularis muscle of the lower eyelid would be expected to stop the upridding and inverting

effect, though not affecting the associated tarsal and lid retractor laxity.

We report the results of treatment with botulinum toxin in 12 patients with senile entropion.

## Patients and methods

Twelve patients with senile entropion accepted treatment by injection after explanation of the effect of the toxin and the alternative treatment methods available. Six men and six women were treated; their mean age was 70.7 years (range 54–86). Nine patients had had the entropion for six months or less, but three had a much longer history, and two of these had had previous entropion surgery, twice in one case. Five patients had bilateral entropion, seven unilateral. The toxin was obtained from Dr A B Scott, of the Pacific Medical Center, San Francisco, and its use required a detailed consent form under the auspices of the United States Food and Drug Administration, the Department of Health and Social Security, and St Thomas's Hospital Ethical Committee. The toxin was supplied in ampoules containing 140 units (equivalent to 50 nanograms) of freeze-dried botulinum toxin A. This was reconstituted and diluted with sterile normal saline for injection to provide 12.5 units in 0.5 ml. This was injected subcutaneously over the orbicularis muscle 3–4 mm below the lashes, along the length of the lower lid. The patients were re-examined within 48 hours, again after one week, and at lengthening intervals thereafter. The success of the treatment was assessed by the presence or absence of spontaneous entropion and symptoms. Residual or returning inverting power was assessed by observing the tendency for the lid to

turn in on forcible voluntary lid closure with the upper lid held open.

### Results

There was no apparent latent period before the entropion was relieved, because the volume of the injection at this site tended to pull the lashes from the globe mechanically. In 11 patients (including the two who had had previous surgery) the relief was immediate and sustained. In one patient the injection had failed at the first subsequent visit, probably because it was placed too close to the lid margin so that the preseptal orbicularis was not paralysed, and surgical treatment was arranged. One patient was lost to follow-up. The mean duration of relief from the entropion for the remaining 10 patients was 14.8 weeks (range 6–28 weeks). Four patients had second injections, and follow-up was long enough to observe an increased duration of effect in two of these, the period of symptomatic relief being extended from 14 weeks and 12 weeks after the first injection to 36 and 22 weeks respectively.

At this stage both patients had a surgical correction. The length of time to recurrence varied widely, but this reflects the return of symptoms rather than the return of orbicularis function. By using the forced lid closure test already described the return of orbicularis function could be seen to precede symptomatic relapse, which was very variable, as many patients seem able to tolerate minor degrees of entropion without complaint.

The only side effect observed was a temporary facial droop with slight flattening of the cheek reported by one patient and observed in another. Despite the precise localisation of the injection, our impression was that the toxin spread to weaken the pretarsal and preseptal parts of the orbicularis muscle inferiorly. No diplopia or extraocular muscle weakness occurred in any of these patients. Ectropion did not occur. There were no systemic effects, but some patients found the injection painful.

### Discussion

This small study demonstrated the effective but temporary relief of senile entropion by obliterating the action of the orbicularis muscle at the lower lid.

This is despite a previous study in which paralysing the orbicularis with an injection of local anaesthetic was ineffective in relieving involuntional entropion.<sup>9</sup> Botulinum toxin appears to be effective for about three months and may be repeated. There may be a suggestion that a second injection is effective for longer than the first, possibly owing to some subsequent muscle atrophy or persisting disruption of muscular innervation, though this has not been the experience with the treatment of essential blepharospasm.

Surgical treatment of senile entropion is more reliable and persistent and must remain the treatment of choice. Botulinum toxin is, however, easy to use and is very safe at these minute dosages. It has the advantage that it can be given at the initial consultation and may have a role to play for patients where there is a long waiting list for surgery, or in those unable or unwilling to have an operation, and in the few cases where transient relief of the entropion is all that is required. If the pharmacological action could be potentiated, it would be more effective, and it is possible that repeated injections would induce more muscular atrophy with longer periods being required between injections.

Botulinum toxin is at present available only to authorised investigators, but it is likely to become more generally available for a variety of uses in the near future.

### References

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