

OCULAR SURGERY NEWS®

The voice of 63,000 ophthalmologists worldwide™

ocularsurgerynews.com

Vol. 18, No. 3 • February 1, 2000

Myectomy provides best functional surgical improvement for blepharospasm

Cosmetic advances in myectomy surgery for blepharospasm provide faster healing, outpatient surgery, much less morbidity and fewer complications.

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Special to OCULAR SURGERY NEWS

Blepharospasm and facial dystonia have been present since at least the 16th century when Pieter Breughel painted the man in Figure 1, but any useful diagnosis and treatment did not occur until the second half of the 20th century. The best



Sixteenth century painting by Pieter Breughel (Breughel's syndrome). (Courtesy of Dr. Richard Hesse, Oshner Clinic.)

surgical treatment has been shown to be myectomy.

I have been performing myectomy operations for 25 years and have performed nearly 800 procedures. For the first few years, I did limited myectomy operations by removing the excess skin and underlying orbicularis muscle in the upper eyelids that I felt comfortable in removing. This is still what many surgeons refer to as a limited myectomy operation. While healing was predictable with this operation and nearly all patients were improved short term, with time, virtually all patients recurred. Botulinum treatment was not available at this time and either myectomy or neurectomy sur-

geries were the best treatments.

The full myectomy technique

After experiencing recurrence in nearly all cases with limited myectomies, I became more and more aggressive with muscle removal and developed a technique that I termed the full myectomy, where nearly all of the squeezing muscles of the upper eyelids were removed (Figures 2, 3). This included the pretarsal orbicularis, the preseptal orbicularis, the orbital orbicularis, and the corrugator supercilii and procerus muscles between the brows. These muscles were removed through a brow incision and an eyelid crease incision. This operation first was published in 1981.

While the long-term results in most blepharospasm patients were very good, the cosmesis was unpredictable, and the morbidity and healing time of the operation was significant



Extensive surgical dissection required for full myectomy of right side in earlier cases.



Orbicularis muscle removed at full myectomy.

(Figure 4). Because of the chronic lymphedema or swelling, which was much worse when upper and lower eyelid myectomies were performed at the same sitting, it became obvious early on that at least the lower eyelid surgery should be performed at a second stage. Touch-up operations were frequently required to improve cosmesis and/or remove any residual squeezing muscles.

Botulinum A toxin was first described for blepharospasm in 1981 and was approved by the Food and Drug Administration for that use in 1989. Following the routine use of

patient from obtaining an adequate result. Many patients who feel they are failures of botulinum toxin actually have weakness in the squeezing muscles of the eyelids, but droopiness of the eyelids, inability to open the eyelids or excess baggage in the eyelids prevents the patient from obtaining a good result. Whether or not botulinum A toxin is working can be easily determined by asking patients to squeeze the eyelids shut intensely and then try to forcibly pry the eyelids open with the fingers. The patient with normal squeezing requires significant force with the fingers to force the eyelids

Botulinum A toxin will not help these associated eyelid problems, and if increased doses are used, ptosis or droopy eyelids may result.

In the first group of patients, these functional and cosmetic deformities are corrected and a limited myectomy is performed by removing the orbicularis muscle in the upper eyelids and in the lateral raphe and temporal regions (Figure 5). This improves function and cosmesis, while reducing squeezing in the upper eyelid region and should eliminate the need to inject botulinum A toxin in the upper eyelid.

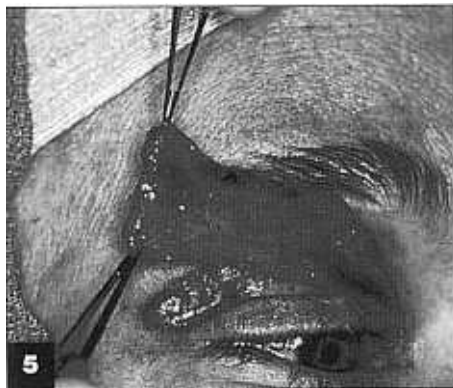
This operation is performed through an upper eyelid crease incision, which is the same incision used for cosmetic surgeries of the upper eyelids. Combining the surgery with present-day techniques used for cosmetic surgery, such as sculpting the brow fat pads, releasing the brow aponeurosis and trying to raise the brow from internal or external approaches, usually provides a very good cosmetic as well as functional result. Sculpting and repositioning the brow fat also helps keep the skin tissues from sticking to the superior orbital rim. At this same operation, droopy eyelids (ptosis) are corrected by tightening the levator aponeurosis, and other malpositions of the eyelids are corrected.

This group of patients predictably achieves good results and is the most satisfied group of patients, as they achieve the benefit of both botulinum A toxin and surgery, which improves their function and cosmesis. The post-operative use of botulinum A toxin is needed in virtually all cases as an adjunct to this treatment.

In the second group of patients, botulinum A toxin also is working at weakening the squeezing muscles, and they may have the associated cosmetic and functional deformities of the first group. However, in addition, these patients are unable to adequately open the eyelids, even when the eyelids are not in spasm or squeezing. In this group, it requires seconds to sometimes minutes after the spasms have ceased for the patient to open his or her eyelids. You can see the elevations of the brows and facial movements attempting to help open the eyelids after the spasms have ceased (Figures 6, 7).



Good functional result following earlier full myectomy, but cosmetic deformities include chronic lymphedema, ptosis and edema of left upper lid, hollowing and tissue irregularities of lateral areas and brow and temple, mid-face and cheek sag, and marked volume deficit and step off in junction of eyelid and cheek region where muscle was removed.



Eyelid approach to myectomy presently used.

botulinum toxin as the first-line treatment for blepharospasm, the patients presenting for myectomy became a more difficult group of patients, as they were the "failures of botulinum toxin."

The "failures of botulinum toxin" must be differentiated into three groups. First, it must be determined whether botulinum A toxin actually is failing to cause weakness in the eyelids or if other problems are preventing the

open, whereas paralysis of the muscles of the eyelids allows the eyelids to be opened easily. This simple test differentiates true "failures of botulinum A toxin" in which the squeezing muscles are not weakened by the toxin versus those cases that have associated deformities or problems.

Easiest patients to treat

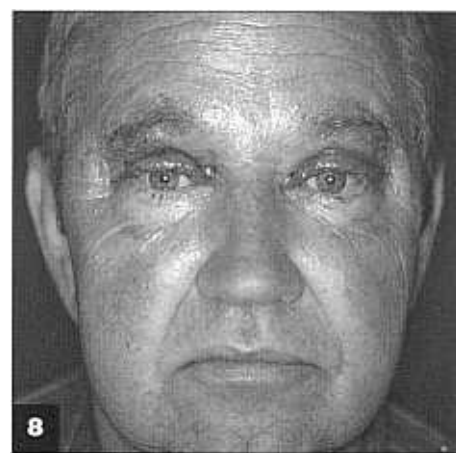
Therefore, the first and easiest group of patients to treat with myectomy surgery are those in whom botulinum A toxin weakens the squeezing muscles, but have developed excess baggage in the eyelids, stretching of the levator aponeurosis or tendon that raises the upper eyelids (ptosis), droopy brows and, on some occasions, malpositions or in-turning or out-turning of the eyelids and the lashes. Any of these conditions may occur in eyelids with aging, but blepharospasm greatly aggravates and precipitates these conditions. These conditions further aggravate and/or may precipitate blepharospasm.



Patient with blepharospasm demonstrating spasms of eyelids and face.



Same patient as in Figure 6, just seconds after spasms cease, still unable to open eyelids. Note brow elevation and ineffective attempt to open eyelids (apraxia of lid opening).



Present day patient 2 days after myectomy and patch removal. The surgery is now an outpatient surgery with much more rapid recovery. Note the absence of tissue irregularities and volume deficits.

Apraxia of lid opening

This group of patients has a condition we refer to as apraxia of lid opening. This group is treated with a limited myectomy similar to that described in group 1, but more tightening and advancement of the levator aponeurosis or tendon of the elevating muscle of the eyelid is required. In addition, it is essential that all the upper eyelid orbicularis, including the central pretarsal muscle down to the lash follicles, be removed. Even a small amount of residual orbicularis function in the central upper eyelid may inhibit function of the levator muscle that elevates the eyelid. When botulinum A toxin is injected into this central area of the upper eyelid, ptosis may result and may make the apraxia of lid opening worse. It is very important for physicians to diagnose associated apraxia of lid opening in blepharospasm patients considered "failures of botulinum toxin," as increasing the dose of botulinum A toxin may make the ptosis worse. Patients with severe apraxia of lid opening associated with blepharospasm are a more difficult group of patients in which to achieve excellent postoperative functional improvement. However, most are greatly improved by the limited myectomy, levator tightening and correction of the functional and cosmetic deformities of the eyelid and brow region.

A few of these patients may require a frontalis suspension as a second procedure if the eyelids still do not open

well enough. This is an operation called a frontalis sling or frontalis suspension, where the eyelids are then elevated by the forehead muscles. We prefer Gore-Tex material for the frontalis suspension in these cases.

True "failures of botulinum A toxin"

The third group of patients are the true "failures of botulinum A toxin," for the drug fails to weaken the squeezing muscles of the eyelids. There is a small percentage of patients in which Botox (botulinum toxin type A, Allergan) has virtually no effect initially, and in other cases it

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— Richard L. Anderson, MD, FACS

may lose its effect with time.

In the past, I treated this group of patients with a full myectomy, similar to that which I originally described. Over the past few years, I have modi-

fied my approach to what I term an extended limited myectomy and, except in cases of severe brow ptosis, perform the operation through an upper lid crease incision. I can now remove virtually the entire orbicularis of the upper eyelid and brow region through this incision, as well as the extended canthal and lateral raphe region, including the temporal portion of the lower eyelid orbicularis.

In addition, a portion of the corrugator muscle between the brows can be removed. The tendon of the levator aponeurosis is tightened to correct any ptosis, and the lateral canthal tendon is tightened to lengthen and stabilize, as well as tighten the eyelids. This is combined with the techniques used for cosmetic surgery such as brow fat sculpting and temporal cheek fat and suborbicularis oculi fat (SOOF) elevation to help provide more natural contours to the eyelid regions and to help avoid the volume deficit noted laterally and inferiorly after myectomy surgery.

Fat sculpting and repositioning

Better healing occurs by repositioning more soft tissue into the areas of volume deficit. By fat sculpting and repositioning, which we have borrowed from recent mid-face cosmetic, surgical advances, we have improved cosmetic results and decreased morbidity and healing time (Figure 8). If a brow incision is required and complete removal of the squeezing muscles between the upper brows is

required, we prefer to allow the extended upper lid myectomy to heal before the brow surgery is performed. In many cases, following the extended limited myectomy, the patients who were becoming refractory to botulinum A toxin treatment will again have good effect from botulinum A toxin when the treatment can be focused on the area of the squeezing muscles between the eyebrows and in the lower eyelids.

The amount of botulinum A toxin is decreased and can be focused in the residual squeezing areas, and the efficacy of the botulinum toxin and the time between injections is usually increased following the extended limited myectomy. If botulinum A toxin still provides inadequate relief of spasm in the residual muscles, then surgery above the eyebrow, as well as a lower lid myectomy, can be combined at the second operation. We prefer to wait approximately 6 months between operations for complete healing. Swelling from the eyebrow surgery is prevented from dissecting into lower regions and the lower eyelids because of the first surgery. By doing the full myectomy surgery in this manner and in these two stages, both surgeries can be performed as outpatient surgeries, suction drains are avoided, and the morbidity and complications of surgery are markedly decreased while the cosmetic result is greatly improved.

Sculpting the brow fat pads and releasing the brow aponeurosis through the upper blepharoplasty incision has been the greatest recent advance in cosmetic surgery of the upper eyelids. Raising the cheek fat pads, SOOF and mid-face elevation has been the greatest recent advance in lower lid blepharoplasty or cosmetic surgery of the lower eyelids and mid-face.

Sag of mid-face region

The sag of the mid-face region, which occurs in virtually all patients with time, can now be improved and combined with eyelid surgery. This mid-facial sag is especially a concern in blepharospasm patients undergoing myectomy of the lower eyelid. In the past, it was very difficult to maintain lower eyelid position following removal of the orbicularis muscles, which support the



Patient 6 weeks after myectomy with excellent functional and cosmetic results.

eyelids, and lower lid retraction and ectropion was a concern in all patients and a complication in many. Combining the elevation of the cheek fat pads and SOOF and mid-face lift provides sup-

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port and elevation to the mid-facial tissues and takes inferior tension off the lower eyelids, reducing complications and improving cosmesis.

Similarly, gravity works on the brows and the brow fat pads to make them descend inferiorly with time and more rapidly in blepharospasm patients. Sculpting the brow fat pad, as well as repositioning fat pads of brows and cheeks into positions of volume deficit or where tissues previously would stick down to underlying bone or deep structures, has provided more rapid healing

and improved cosmetic results. Except in patients who have never had a response to botulinum A toxin, I recommend that it be tried again after the extended limited myectomy in all patients. Many patients who have gradually responded poorly to botulinum A toxin will now become responders again.

Patients in all three groups require botulinum A toxin less frequently with fewer units and fewer injection sites. Many patients now present for botulinum A toxin for cosmetic reasons for the squeezing muscles and frown lines between the brows, and for the crow's feet and wrinkles in the lateral aspect of the lower eyelids. Botulinum A toxin cosmetically works better than removal of muscles in these regions. Therefore, for functional as well as cosmetic reasons, continuing to use botulinum A toxin in these areas, if working, makes sense.

Best functional surgical improvement

The myectomy has always, and I believe will always, provide the best functional surgical improvement to patients suffering from blepharospasm. By combining the techniques that we have learned for cosmetic surgery of the brow and mid-facial region, as well as using botulinum A toxin for cosmesis in the facial region, I believe that we have maintained the excellent functional improvement of myectomy surgery combined with much better cosmesis. The treatment we have outlined also provides faster healing, outpatient surgery, much less morbidity and fewer complications than our original myectomy description. The sharp transition zone between areas of muscle removal and areas in which muscle is not removed is more gradual and acceptable with the techniques described. One of the biggest complications of the original myectomy surgery was the chronic lymphedema or swelling that lasted for months to sometimes years. The edema and lymphedema have been markedly shortened by these new techniques.

In summary, while I doubt that I can say that the functional results of a myectomy have improved greatly over the past few years, I can certainly say that

the cosmetic results have improved and the complications and morbidity associated with the operation have been markedly decreased (Figure 9). I believe that the myectomy operation has always been the best surgical treatment for blepharospasm. And eliminating many of the negative side effects makes this surgery a much more desirable option

to consider when botulinum A toxin is not providing adequate relief of blepharospasm, or if functional or cosmetic deformities of the eyelids are present that prevent the patient from achieving an optimal result.



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