Nonsurgical Fat Removal in Cosmetic Blepharoplasty: A New Technique

Michael Evan Sachs, M.D.
Stephen L. Bosniak, M.D.

A new technique of minimally invasive fat removal during cosmetic blepharoplasty is described. This lipolytic diathermy technique has been used successfully in more than 100 patientes during the last3 years and is compared with routine excisional fat removal. The main advantage of this technique lie in its ability to dissolve the fat without surgical excision, thus obviating the inherent complications that arise from such dissection. The technique uses a diathermy unit to cause lipolysis of the fat pockets within their intact septa compartments and can be used for both upper and lower lid ferniated fat. This procedure has been found to be exceptionally efficient and predicatable and adds another level of safety to cosmetic blepharoplasty.

From the Department of Otolaryngology-Head and Neck Surgery, New York Medical College, and the Departments of Facial and Ophthalmic Plastic and Reconstructive Surgery, New York Eye & Ear Infimary, New York, NY.

Address reprint requests to Dr. Sachs, 129 Central Park South, New York, NY 10019.

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The control of herniated or pseudoherniated periorbital fat is an essential step in obtaining a desirable contour of the upper and lower lids during cosmetic blepharoplasty. Various techniques for accomplishing this goal have been used and, in general, are highly effective, safe, and predictable [1, 5]. All of these techniques, however, share certain limitations and associated complications due to surgical dissection, excision, and subsequent cauterization of the fat stump.

A new technique of minimally invasive fat removal, termed lipolytic diathermy, has been used successfully in more than 100 patients during the last 3 years. Its main advantage lies in its ability to dissolve the periorbital fat without surgical excision, thus obviating the inherent complications that arise from such dissection. The technique uses a diathermy unit to produce lipolysis of the fat pockets within their intact septal compartments and can be used for both upper and lower lid herniated fat. We have found that the procedure is exceptionally efficient and predictable and adds another level of safety to cosmetic blepharoplasty.

The main impetus for development of the lipolytic diathermy technique was the desire to overcome the need for dissecting and excising fat, which is associated with many of the untoward results during cosmetic blepharoplasty. In general, fat excision carries a risk of immediate and delayed postoperative bleeding from dissection of the fat pad and release of the fat stalk after cauterization. The most feared
consequence of this problem is retrobulbar hematoma and possible blindness. Although not definitively proven, there is ample evidence to suggest a relationship between postoperative bleeding and blindness [2, 6]. More specifically, fat excision in the upper lid brings the levator aponeurosis as well as the superior oblique muscle into surgical jeopardy.
Minimizing dissection of these two fat pads would prevent postoperative ptosis due to inadvertent levator injury and downward gaze diplopia due to injury to the superior oblique muscle. Similarly, lower lid fat excision risks injuring the inferior oblique muscle, causing possible upward gaze diplopia.

Technique

The upper lid fat is exposed by the following procedure. Methylene blue is used to outline the incisions before local anesthesia is injected. Preferred anesthetic infiltration is 2% lidocaine (Xylocaine) with 1: 100,000 epinephrine using a 30-gauge needle. Direct placement of the anesthetic solution in a plane

below the orbicularis oculi muscle simplifies the dissection, while the ballooning effect of the anesthesiain the upper lid causes tension on the skin and facilitates the creation of an exact incision line. The scalpel is beveled outward, which slightly rotates the blade approximately 20 degrees from the vertical, and skin and muscle are incised in one layer, which quickly exposes the septum and the herniated fat. The upper lid fat is identified in two separate areas: a large, sausage shaped middle fat pad and a more rounded, medially placed fat pad that is usually quite deep. Fat removal is accomplished routinely by placing gentle pressure on the globe while inserting a 30-gauge stainless steel needle into the mid-portion of the fat pocket. The area is cauterized with a Davol EMS System 2000 BP cautery unit until the fat is liquefied and the simultaneous scarring of the septum is complete. This process causes an infolding of the orbital septum and helps form a youthful, defined supratasal crease. The technique is applied to all remaining fat pads,and particular care is taken to manipulate the needle so the the direction of insertion ensures maximal contact with the major substance ofthe fat pad. This precaution allows for more efficient and controlledcauterization (Fig 1). Inferiorly, a skin muscle flap is used for optimalexposure of the fat pockets and direct viewing of the fat necrosis,which ensures more control of the inferior lid contouring.

Although we are aware this technique still involves entering theseptum, we believe that a 30-gauge needle is minimally invasive andunlikely to puncture a subseptal vessel. If a vessel is punctured, con-trol of bleeding can be instituted almost immediately after the cauterization (Fig 2).

The lipopolytic diathermy technique is most efficient when theseptum is left intact, as this precaution seems to enhance the cautery'sability to cause lipolysis of the fat compartment efficiently. Figure 3shows three separate frames taken from a 16mm film of the lipolyticdiathermy technique. Notice the complete obliteration of the fat compartment.

Results

We have used this technique in a controlled study of a total of 200 patients. One hundred patients were operated on using a routinefat excision technique with subsequent cauterization of the base of thefat pad, and 100 underwent cosmetic surgery using the lipolyticdiathermy technique (Table 1). Strict photographic documentationof each patient was recorded and scored by independent medical photographers.

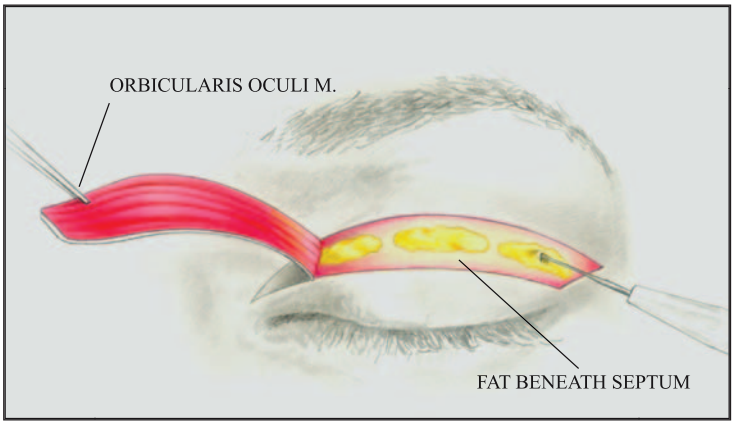

Fig 1. Technique of lipolytic diathermy for upper lid.

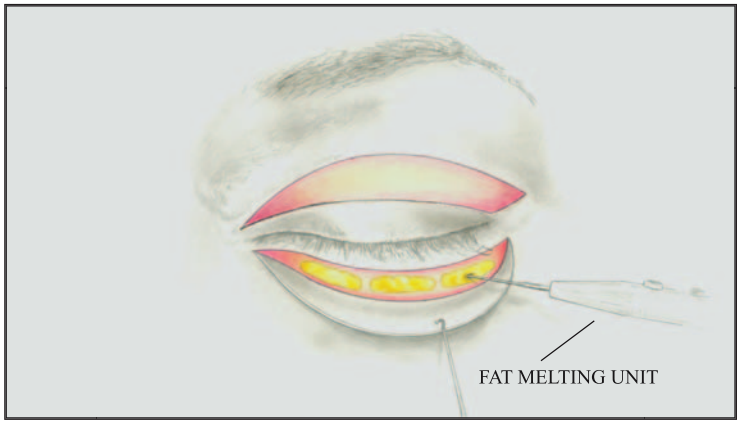

Fig 2. Technique of lipolyiic diathermy for lower lid.

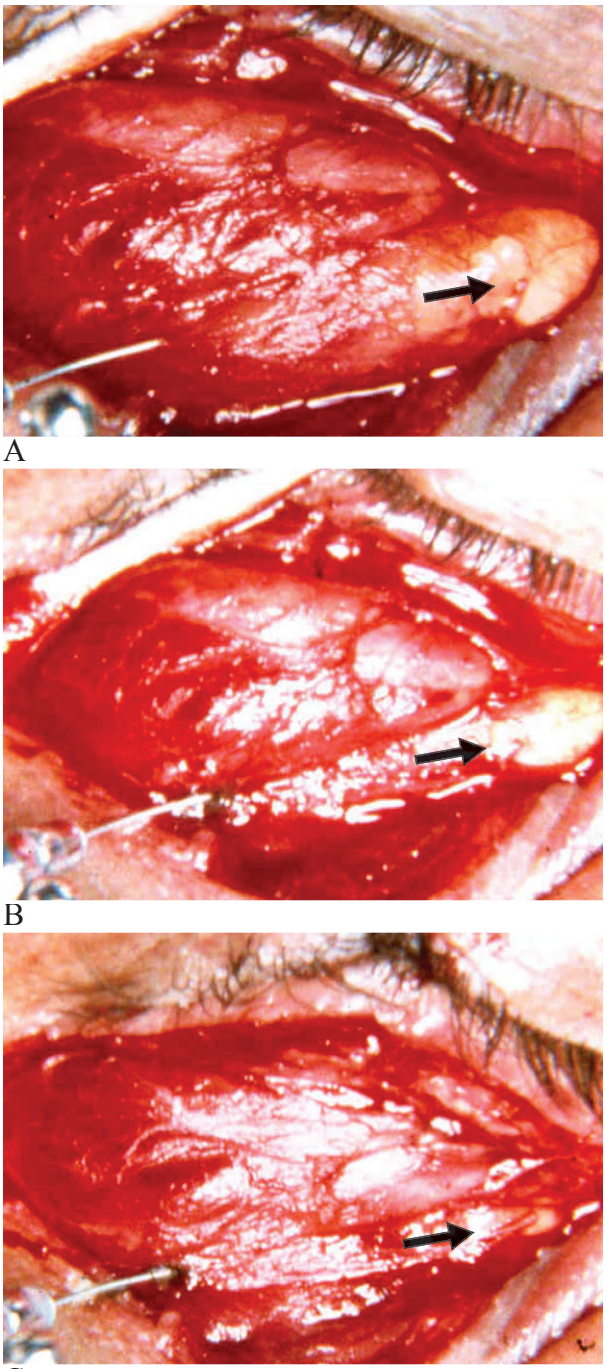

Fig 3. (A-C) Enlargements of lipolytic diathermy technique made from 16-mm film. Arrow points to herniated periorbital fat pad in lower lid. Note lipolysis of fat pad within a time frame of 0.9 second.

Table 1. Clinical Study Statistical Outline (June 1978-June 1984)

	Routine Excisional Technique (N=100)	Lipolytic Technique (N=100)
Follow-up time		
>3 yr	72	43
>1 yr	20	26
>6 mo	8	31
Sex		
Men	17	26
Women	83	74
Procedure		
Upper lids	3	9
Lower lids	6	3
Combined	91	88

Table 2. Comparison of Routine Excisional Technique and Lipolytic Techniques

Complications	Routine Excisional Technique (N=100)	Lipolytic Technique (N=100)
Recurrent prolapse	5	1
Postoperative bleeding	1	0
Contour defect		
Convex	4	0
Concave	2	2
Ectropion		
Permanent	0	0
Transient	6	1
Decrease in visual acuity	0	0
EOM imbalance	0	0
Persisten lymphedema	1	0

EOM=extraocular muscle.

These reports indicated that similar results were obtained with both procedures.

Table 2 compares the techniques and their complication rates and highlights the merits of the lipolytic procedure. In general, the recurrent prolapse of periorbital trial and a definitively greater control of the contoured defects, convex type, was obtained. The number of patients who expirenced transient immediate postoperative ectropion also was significantly decreased, and there was no increase in complications referable to bleeding, permanent ectropion,

Fig 4. A 30-year-old woman treated with lipolytic diathermy technique. (A) Preoperative view. (B) One year postoperation. Note that no skin, muscle, or subcutaneous tissue was trimmed. The result is due only to lipolysis of fat.

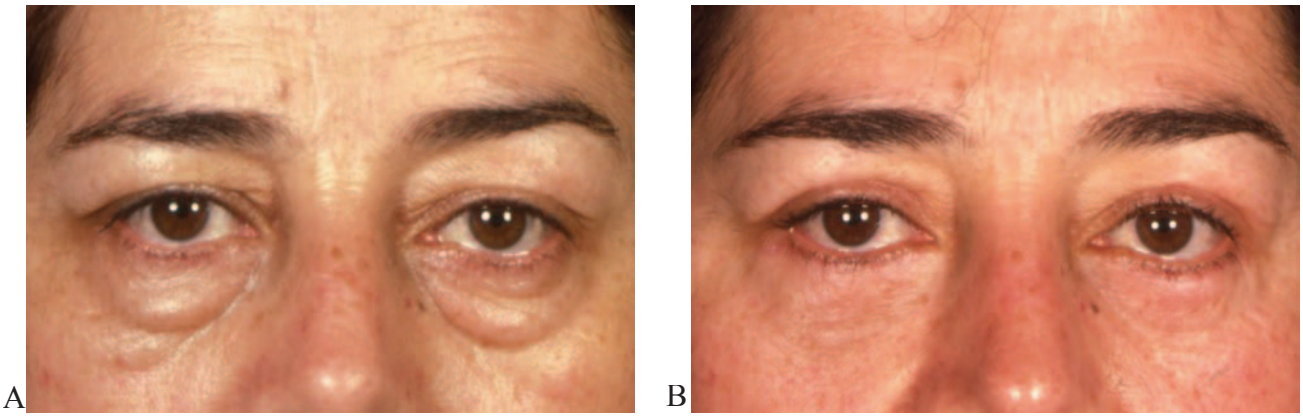

Fig 5. A 63-year-old woman treated with lipolytic technique. (A) Preoperative view. (B) 3 years postoperation. Note that skin and muscle were trimmed concomitantly with the application of fat lipolysis.

extraocular muscle imbalance, decreased visual acutity, or persisten lymphedema. Figure 4 shows the dramatic results obtained with the lipolytic diathermy technique ub a younger patient in whom no skin, muscle, or subcutaneous tissue was trimmed and only fat underwent lipolysis. This patient, used as a control model, amply demonstrates the effectiveness of this technique. Fig 5 shows a long-term follow-up in an older patient.

Discussion

The advantages of a surgical technique that decreases operative time, minimizes tissue dissection, and, by it's inherent design, inhibits subseptal bleeding are obvious.

In addition, we believe that reherniation of the fat pad is prevented by the concomitant reinforcement of the septum caused by a controlled burn and subsequent scar formation. The concept of true herniation versus pseudoherniation is still in dispute, with two opposing etiological theories. Most surgeons believe that orbital fat, analogous to an inguinal hernia, exerts pressure on an attenuated septum, which eventually allows the fat to balloon out. Putterman and Urist [4] believe that a true hernia exists between the rim of the septum and the levator aponeurosis in the upper lid and between the rim of the septum and the capsulopalpebral fascia in the lower lid. In reality, a combination of these two conditions may exist in any individual patient. Regardless of the etiological process, however, the diathermic technique will strengthen the septal wall.

Direct visualization of the fat currently is advised, which necessitates the creation of a skin muscle flap inferiorly and a partial excision of muscle superiorly. Future developments of this technique include the use of an intrinsically insulated bipolar needle, which could be used transcutaneously or transmuscularly, obviating the need for tissue dissection. This improvement would be particularly valuable in instances of congential fat herniation in younger patients, in whom prominent fat pockets are the only deformity and there is no need to revise muscle or skin. This anticipated development also would allow for a bipolar cauterization to take place, thus decreasing the theoretical potential danger of injury to orbital structures by direct current passing through the eye and adnexa.

Although the potential for tragedy exists whenever cautery is used near ocular structures [3] these fears remain theoretical. In the 100 patients reported in this study, there has not been one complication relative to the use of a cautery unit. Preoperative and postoperative ophthalmological examinations included full visual fields, visual acuity measurements, intraocular pressure determination, and fundus examination. Careful, timed analysis of operation revealed that, compared with that needed for the lipolytic technique, the routine cosmetic blepharoplasty technique required a 20% longer cautery time to accomplish the fat removal. Interestingly, the intact septum seems to insulate the adjacent ocular structures from thermal injury. This finding was noted subjectively during the operative procedure and is currently under investigation in our laboratories with the use of tissue temperature probes.

The lipolytic diathermy technique also has been used successfully to remove the fat pads overlying the malar eminence. This technique uses the same 30 gauge, $1^{1/2}$ in-long needle positioned under the inferior portion of the skin muscle flap, thus obviating the need for additional incisions. The fat pad overlying the malar eminence is exposed and liquefied. When true festooning of the lower lid and malar eminence exists, a separate incision overlying the bulge is recommended so that exact skin tailoring can be executed.

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