Secondary Upper Lid Blepharoplasty: A Clinical Series Using the Tarsal Fixation Technique

Bryan C. Mendelson,
F.R.C.S.E., F.R.A.C.S.,
F.A.C.S.

Daniel Luo, Grad.Dip.Surg.
Anat., F.R.A.C.S.

Toorak, Victoria, Australia

Background: One hundred consecutive secondary upper lid blepharoplasties were reviewed retrospectively to determine the lid characteristics of patients undergoing secondary blepharoplasty and the outcomes of all the procedures, which were performed using a tarsal fixation technique performed by one surgeon.

Methods: The median age of the patients was 54 years, and 99 percent of the patients were women. The median time since primary blepharoplasty was 8.7 years (range, 2 to 22 years). At surgery, no additional skin was removed in 37 percent, and the median amount excised in the remainder was only 2 mm. Revision surgery was performed in 13 percent, mainly for incomplete correction of asymmetry (5 percent) or ptosis (4 percent). Nonsurgical complications were mainly ocular (8 percent). There were no cases of persistent postoperative lagophthalmos or dry eyes.

Results: The term “postblepharoplasty look” was introduced to describe the different aging changes that follow primary blepharoplasty, mainly dermatochalasis (70 percent), with a high or absent and often poorly defined lid fold, with fat distribution irregularities. The tarsal fixation technique is advantageous in secondary blepharoplasty, as its benefit does not depend on further skin removal, minimizing the risk of lagophthalmos and dry eye syndrome. Lipoinfiltration for volume contouring is another major advance. The higher revision rate in secondary blepharoplasty reflects the incidence of asymmetry, lid ptosis, and scar from the original blepharoplasty, and from ongoing aging.

Conclusions: The postblepharoplasty look of patients undergoing secondary upper lid blepharoplasty differs from the lid appearance of patients presenting for primary blepharoplasty. Tarsal fixation and lipoinfiltration are major advances in secondary upper lid blepharoplasty. (*Plast. Reconstr. Surg.* 135: 508e, 2015.)

Those who are enamoured of practice without theory are like a pilot who goes into a ship without rudder or compass and never has any certainty where he is going.

—Leonardo Da Vinci

Secondary upper lid blepharoplasty is not an uncommon procedure following a previous aesthetic blepharoplasty, although the incidence of this has not been reported.¹ The reasons for secondary surgery include lack of complete satisfaction with the result of the original blepharoplasty and recurrence of aging changes of the lid.

From the Centre for Facial Plastic Surgery.

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From the functional, aesthetic, and surgical perspectives, the upper lid has two distinct segments, the infrabrow and the tarsal. These are structurally separated by the lid crease, whose attachment is of variable definition. The infrabrow segment, from the brow down to the crease, includes the lid fold in its lower part and is of variable size. When the lid fold is developed, it hangs and overlaps the lid crease and the upper part of the tarsal segment. The objective in primary blepharoplasty is to reduce excessive hanging of the lid fold by skin resection, with or without orbital fat reduction, usually with additional skin resection to tighten pretarsal skin laxity. Technically, a secondary upper lid blepharoplasty is not as straightforward as a primary blepharoplasty because of sequelae from the original operation. These include the surgical scar,

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which is often not in the correct position; internal tissue scarring that may obscure the definition of tissue layers; and other iatrogenic factors consequent on the amount of skin and orbital fat previously resected. This clinical review of a significant patient series was undertaken to define the eyelid characteristics of patients undergoing secondary upper lid blepharoplasty in addition to the surgical details and results.

PATIENTS AND METHODS

The experience with 100 consecutive patients who underwent secondary upper lid blepharoplasty over a 22-year period was reviewed retrospectively. All of the procedures were performed using a tarsal fixation technique by one surgeon (B.C.M.). The series included only those patients who had a proper secondary blepharoplasty (Fig. 1), specifically excluding those who underwent a minor revision or adjustment within the first 12 months.² Several of the patients were having a tertiary blepharoplasty. The case notes, including the detailed operation reports, were reviewed and the preoperative photographs were analyzed critically. All postoperative complications and reoperations were evaluated.

The tarsal fixation technique used was based on that described by Flowers,^{3,4} which evolved into a standardized procedure during the early learning curve experience. As in a primary tarsal fixation blepharoplasty, the planned height of the pretarsal skin segment was correlated with the measured height of the patient's tarsal plate. This distance determined the location of the lower incision from the lid margin. The intended height of the infrabrow skin segment determined the distance marked for the upper incision line

from the midbrow. The ideal distance, between 19 and 21 mm, was compromised by a skin shortage in many patients, resulting from "overresection" in the previous blepharoplasty. The maximum height of the excess skin for excision, usually just above the lateral canthus, was recorded.

The surgical technique was as follows (Fig. 2). Excess skin, between the upper and lower markings, was excised, followed by excision of an orbicularis muscle strip immediately above the lower skin edge, sufficient to reveal the upper edge of the tarsal plate. The pretarsal orbicularis, with the overlying skin remaining attached, was then elevated off the tarsal plate to allow complete removal of the membranous pretarsal extension of the levator aponeurosis (also called conjoint fascia)⁵ from the anterior surface of the tarsal plate. This aided visibility of the edge of the tarsal plate in preparation for suture fixation. The edge of the levator aponeurosis was carefully defined by releasing its attachment to the septum orbitale exactly at the "sling" where these two structures fuse. Excess deep medial fat was removed in the standard technique, which remained unchanged throughout the series. The management of "excess" central lid fat changed from the generous removal of fat in the early years, to a philosophy of volume conservation, which is important in secondary patients who already had excision with their initial procedure. The suture repair consisted of a standardized series of "three-point fixation" sutures, attaching (1) to the upper edge of the tarsal plate, (2) the free edge of the levator, and (3) the upper edge of the pretarsal orbicularis. The final skin and muscle closure was tension free except in those with a previous skin shortage.

RESULTS

Secondary blepharoplasties constituted 10 percent of all upper lid blepharoplasties performed during the 22 years of the review. There were 977 primary blepharoplasties, of which 925 were performed using a tarsal fixation technique and 52 were performed using a traditional technique; tarsal fixation was used in all of the secondary cases (100). All but one of the secondary patients (99 percent) were female patients. The median age was 54 years (range, 32 to 81 years). The median time from primary surgery was 8.7 years (range, 2 to 22 years). Seven percent of the patients were Asian.

The reasons for secondary blepharoplasty included recurrent dermatochalasis (70 percent), blepharoptosis (11 percent), and dissatisfaction

Fig. 1. The "postblepharoplasty look" of fine transverse skin wrinkles with a minimal lid fold, in a 56-year-old woman, 9 years after upper blepharoplasty.

Fig. 2. Technique of tarsal fixation blepharoplasty. (*Above*) Dissection phase 1. The composite pretarsal skin, muscle flap is elevated, allowing complete removal of the pretarsal extension of the levator from the outer surface of the tarsal plate. (*Center*) Dissection phase 2. The levator edge is defined, aided by preliminary release of the septum orbitale from the levator at the sling. The preaponeurotic fat is contoured. (*Below*) Reconstruction. Internal suturing using a standard series of three-point fixation sutures unite the edge of the levator to the upper edge of the tarsal plate and the pretarsal orbicularis. (Printed with permission ©Levent Efe.)

Fig. 3. Amount of skin excised versus number of patients.

with the aesthetic outcome from primary surgery (9 percent), relating to the height of the lid fold, or asymmetry of the skin and fat pads, either bulging or hollowing from previous overresection. No specific reason was documented in 10 percent.

At surgery, the median distance of the lower incision from the lid margin over the mid pupil was 10.5 mm (range, 7 to 11 mm). The median distance of the planned upper incision from the midbrow was 19.5 mm (range, 11.5 to 24 mm).

The amount of skin resected was reported in 81 patients. In 31 of these patients (37 percent), no skin was resected because of a measured skin shortage. Of the 50 patients reported to have had skin resection, the median width of resected skin was 2.0 mm (range, 0 to 5 mm) (Fig. 3).

The median reported width of orbicularis muscle excised was 1 mm (range, 0 to 5 mm). Management of the retroseptal fat was in accord with individual requirements. Seven patients (7 percent) did not require any fat pad adjustment. Deep medial fat was removed in 90 percent and central fat adjustment was performed in 36 percent. This latter figure was influenced by the change of technique in 2005 in which the focus changed to conserving central fat to maintain infrabrow fullness. An excess lateral prolongation of the central fat pad was transposed medially to add volume to the medial end of the central fat pad while also improving the lateral infrabrow contour, as described by Flowers. Also, some lateral retroorbicularis fat was removed when this improved lateral lid contour.² Lipoinfiltration to correct hollowing of the infrabrow segment was performed in 19 patients (19 percent) as this became incorporated into the routine in the latter 5 years. The mean volume lipoinfiltrated was 0.5 ml per side.

Most patients (84 percent) had one or more additional facial rejuvenation procedures performed at the time of their blepharoplasty. Fifty-three patients (53 percent) underwent a face lift, 41 patients (41 percent) had a lift of the upper third (temporal lift, 21 percent; coronal brow lift, 20 percent), and 39 patients (39 percent) underwent a lower lid blepharoplasty. Eight patients (8 percent) had a midcheek lift (Table 1).

The reoperation rate was 13 percent (13 patients). Five patients (5 percent) with incompletely corrected asymmetry had further small skin excision and/or lipofilling and four patients (4 percent) required adjustment of incompletely corrected ptosis. Three patients with a degree of upper lid retraction secondary to scarring or levator shortening required surgical revision. One patient required resuturing of a disrupted skin closure (Table 2).

Early postoperative complications, not requiring reoperation, occurred in eight patients. Postoperative chemosis occurred in four patients (three had simultaneous lower lid blepharoplasty) and resolved with time and standard lubrication measures. Two patients had postoperative lid asymmetry secondary to asymmetry of the brows corrected with botulinum toxin. Two patients had ocular irritation; a recurrence of blepharitis in one and unexplained postoperative eye

irritation without corneal exposure in the other. There were no cases of persistent postoperative lagophthalmos.

The primary blepharoplasty was performed by the senior author in only 10 of the 100 patients. In seven of these, a traditional skin, muscle excision technique had been used and a tarsal fixation technique was used for the other three. The need for a secondary upper lid blepharoplasty was much higher following a traditional blepharoplasty than after a tarsal fixation blepharoplasty in this experience.

DISCUSSION

As this is the first published series of secondary upper lid blepharoplasties, there is not a reference for comparison with these findings. In fact, it is surprising there are not statistics available on the incidence of recurrence following a series of primary blepharoplasties. A limitation of this study is that it is the experience of a single surgeon and without controls. Accordingly, it is not possible to know whether the 10 percent rate of performing secondary blepharoplasties (as a proportion of all blepharoplasties) is typical.

The median time interval between primary and secondary surgery of only 9 years is somewhat revealing about the lasting quality of upper lid blepharoplasties in general. However, the context in this series could be a factor affecting the time interval in that most of the secondary blepharoplasties (84 percent) were performed with concomitant facial rejuvenation surgery, suggesting earlier secondary surgery for their upper lids to be in youthful harmony with their overall rejuvenation.

Characteristics of the Aging Upper Eyelid following Primary Blepharoplasty

There were some common lid characteristics of the patients undergoing secondary blepharoplasty. The most frequent was dermatochalasis, in 70 percent (by definition, “apparent excess eyelid skin associated with aging”⁶) with, in lesser degrees, asymmetry, blepharoptosis, and irregularity. Not infrequently, the skin “excess” was present in normal gaze, but with the skin becoming tight on downgaze and lid closure because of a skin shortage. In other words, dermatochalasis and lagophthalmos can coexist in the postblepharoplasty patient, with the skin excess being present according to the lid position.

The lid appearance of patients requiring a secondary blepharoplasty differs from the

Table 1. Concomitant Procedures at the Time of Secondary Upper Lid Blepharoplasty

Concomitant Procedures	No.
None	16
Face lift	53
Upper third	41
Temporal lift	21
Coronal brow lift	20
Lower blepharoplasty	39
Mid cheek lift	8

Table 2. Surgical and Nonsurgical Complications in 100 Secondary Upper Lid Blepharoplasties

Complications	No.
Surgical	
Total	13
Residual asymmetry	5
Ptosis, incompletely corrected	4
Upper lid retraction	3
Wound dehiscence	1
Nonsurgical	
Total	8
Chemosis	4
Ocular irritation; blepharitis and unexplained	2
Brow asymmetry	2

Table 3. Components of the Postblepharoplasty Look

Skin	
	Dermatochalasis: apparent skin excess
	Pretarsal laxity/crepiness
	Loosely attached lid crease
Fold	
	High/absent fold
	Lid fold irregular/asymmetric
Fat	
	Medial fat pad bulge, persistent or recurrent
	Central fat pad: hollow from overresection

typical appearance before a primary blepharoplasty, where “baggy lids” is the predominant feature. The bagginess results from prolapse of the preaponeurotic orbital fat, which carries the lid fold farther forward and down beyond the lid crease. If attenuation of the lid crease attachment accompanies this prolapse, the fold descends even lower over the tarsal segment, closer to the lid margin. This aging Caucasian configuration is not dissimilar to that of the youthful Asian lid.⁷

Secondary blepharoplasty patients usually have had preaponeurotic fat removed as part of their original blepharoplasty, and do not have sufficient fat remaining to prolapse and cause displacement of the fold skin. For this reason, the laxity appears as a series of finely pleated transverse skin folds in the pretarsal area and immediately above, when the lid is not tense. This combination of pretarsal skin laxity in the absence of a lid fold of comparable fullness and laxity seen with ongoing aging changes after a previous upper lid blepharoplasty

is the characteristic “postblepharoplasty look” (Table 3 and Fig. 4).

Prominent medial fat contributes to the aged lid appearance by reducing the depth of the lid concavity medially. The most likely cause of prominence of the medial lid fat following previous blepharoplasty is underresection, including an overlooked fat pad.⁸ Ongoing aging may unmask upper lid fat secondary to remodeling of the bony orbital rim.^{9–11}

The reason for using a tarsal fixation technique routinely for secondary upper lid blepharoplasty was based on previous favorable experience with the technique in primary blepharoplasty. Although the technique has been available for many years, in general the benefits of tarsal fixation are not well appreciated and it is not widely performed. The primary focus with this technique is the formation of a precise and durable lid crease. The stable fixation provided by this crease allows control of the tarsal segment independent of the infrabrow segment. In addition, the fixation at the lower edge of the infrabrow segment assists in the formation of a proper lid fold. Skin that would have appeared redundant had the procedure been performed by standard excision (without strong fixation) is taken up by the deeper crease and thus can be conserved in the lid fold in a controlled manner without it being lax (Fig. 5).

Importantly, following proper tarsal fixation, the lid fold is natural in both function (as a

Fig. 4. (Left) Age 48, 12 years after upper lid blepharoplasty. (Right) In 2012, 3 years after secondary upper lid blepharoplasty using the tarsal fixation technique. The tarsal plate measured 9.0 mm. The lower incision marking is 9.5 mm from the lash line, and the upper incision marking is 18.5 mm from the mid brow. Maximum skin removal of 1 ml allowed only part of the scar to be excised. Excess lateral prolongation of the lateral fat pad translocated medially; a moderate amount of deep medial fat was removed. Lipoinfiltration of 0.5 ml on the orbital rim and 0.5 ml deep into the infrabrow segment. Concurrent surgery, face lift, and augmentation of the temple were performed by placing 1.0 ml of hydroxyapatite granules on the zygomatic process of the frontal bone.

Fig. 5. (Left) Age 44, 2009, 3 years after blepharoplasty. (Right) Two years after deep temporal lift and tarsal fixation blepharoplasty: no skin excised, medial translocation of lateral fat excess, and fat grafting of 0.5 ml into the infrabrow segment.

dynamic skin reserve) and appearance. Skin stored in the fold is released progressively on downgaze to lengthen the infrabrow segment of the lid and avoid lagophthalmos. Lid tightness, compromising lid function, occurs only if insufficient skin is present as a result of overresection of the lid fold skin with the original (or subsequent) blepharoplasty.

Conserving skin is a high priority in secondary blepharoplasty,¹ given that the risk of lagophthalmos is increased. As a result of the surgical contouring that follows the crease fixation, the role of skin excision in these cases was limited to the removal of only true skin excess and not the apparent excess that arises when there is inadequate fixation at the crease. This accounts for—what would seem to surgeons not familiar with this technique—an unexpectedly small amount of lid skin excised compared with the amount in standard techniques.¹²

The tendency to develop dry eye syndrome (keratoconjunctivitis sicca) increases with age and

can be exacerbated by lid surgery because of the slight lagophthalmos that frequently occurs during the healing period.^{13,14} The surgical focus on skin conservation resulted in there not being any cases of overt lagophthalmos, accounting for the low incidence of postoperative dry eyes (<2 percent). Although this was not a prospective study to specifically evaluate the incidence of dry eyes, given that this complication is so distressing for patients and the patient follow-up sufficiently detailed, we are confident the incidence was recorded correctly.

The other reason for using tarsal fixation was to prevent recurrence of the postblepharoplasty look (Figs. 6 and 7). Only three patients in the series had undergone a primary blepharoplasty using tarsal fixation and they were during the earlier, learning phase (1991 to 1996).

The principles of tarsal fixation upper lid blepharoplasty, as described, are of importance,

Fig. 6. (Above) Age 46, 1992, 4 years after primary blepharoplasty. (Below) Twenty years after tarsal fixation blepharoplasty with 4-mm skin excision (prelipofil era). No further lid surgery, 2 years after face lift.

Fig. 7. (Above). Age 29, 1989, 2 years after two blepharoplasties. (Center) Three years after tarsal fixation blepharoplasty with no skin excision and coronal brow lift (prelipofil era). (Below) Twenty-one years after the tarsal fixation blepharoplasty. No further upper lid surgery, but 2 years after face lift with hydroxyapatite midcheek augmentation.

and a comparison of specific techniques is beyond this discussion. To minimize recurrence following tarsal fixation, several important technical details were incorporated into the technique. These included the following: (1) avoidance of pretarsal laxity resulting from leaving “excessive” pretarsal skin width, by precise measurement and correlation of this with the height of the patient’s tarsal plate; (2) encouraging adherence of the pretarsal

orbicularis to the tarsal plate by complete removal of the filmy pretarsal extension of the levator; and (3) protecting the crease fixation from being weakened by the traction effect that results on lid closure when the skin is excessively tight.

When a traditional technique is used for secondary blepharoplasty, it is usual to remove more skin. If a large skin excision is performed, the tendency is for the thicker and less distensible infrabrow skin to be recruited into the dynamic fold of the lid. Tightness of this inelastic skin exaggerates the tendency for the incision to rise over time associated with stretching of the thinner pretarsal skin. Stretched skin becomes crepey at rest, when the lid is not under tension.

The adherence of the pretarsal tissues to the surface of the underlying tarsal plate minimizes the recurrence of pretarsal laxity. Stable long-term smoothness of the pretarsal skin, in all lid positions, was obtained by the deeper fixation to the tarsal plate, and not by overall lid skin tension. Accordingly, the infrabrow skin from the brow to the crease could then be redraped to include a lid fold. This infrabrow distance should ideally be between 19 and 21 mm (depending on the height of the brow and the projection of the orbital rim relative to the globe). When this amount of skin was not present, no skin was excised, and in some cases with a skin shortage there was insufficient skin to form a correct lid fold (Fig. 8).

Management of the scar from the original operation also necessitates a compromise when the scar is not within the area of planned skin excision. Technically, it is necessary for the incision to be in relation to the upper edge of the tarsal plate. If the old scar was located too far above the intended lid crease, it could not be reused. In such a situation, a new incision was placed in the correct location and the original scar “ignored.” This did not result in any healing difficulties between the original and new incisions, and the original “high scar” became less visible on the undersurface of the lid fold.

Hollowing of the central infrabrow region is a common contour problem in secondary blepharoplasty patients as a result of previous overresection of lid fat, and is exaggerated by senile enophthalmos. A major advance in secondary blepharoplasty has been the restoration of lid volume by lipoinfiltration using the Coleman technique¹⁵ and retroseptal fat transposition. Based on the understanding that the orbital septum attaches onto the deep aspect of the superior orbital rim, fat was lipoinfiltrated deep, onto the periosteum on the undersurface of the orbital rim and into the preseptal fat pad.¹⁶ In

Fig. 8. (Left) Age 54, in 2007, 18 years after primary blepharoplasty. (Right) Three years after tarsal fixation with 3-mm skin excision and removal of deep medial fat only. Concurrent face lift, deep temporal lift, and canthopexies.

contrast to primary lid lipofilling, a small amount of fat (our average was only 0.5 ml) placed deep helps restore the infrabrow segment fullness. This has the benefit of reducing laxity of the fold skin in addition to restoring the correct aesthetic proportion between the two lid segments, and is a result that cannot be achieved by skin tightening alone. Instead of excising a prominent lateral extension of the central fat, it became routine to transpose this excess fat medially to help reduce hollowing of the medial central fat compartment.

Brow Ptosis

Failure to recognize the brow's contribution to pseudoblepharoptosis has been reported as the most common reason for secondary blepharoplasty.¹ Although this statistic was not specifically recorded, 41 percent of the patients in the study did have a brow correction (either a temporal lift or coronal brow lift) as part of their periorbital rejuvenation. In addition, many of the more recent patients had a subtle lift of the outer brow obtained by brow lipoinfiltration.

Blepharoptosis

Aging changes of the upper lid include senile ptosis and dermatochalasis, and these tend to coexist.¹⁷ For this reason, a significant number of patients (12 percent) required correction of lid ptosis performed with their secondary blepharoplasty. The “open,” anterior approach used in the tarsal fixation technique provides the ideal exposure for ptosis correction inherent in the tarsal fixation blepharoplasty in which the levator is fixed to the tarsal plate, with or without advancement. The presence of preoperative ptosis was associated with a higher revision rate (33 percent).

Asymmetry

Precision of lid crease definition is a benefit of the tarsal fixation technique; yet, ironically, this precision tends to exaggerate the visibility of small asymmetries, whether they are residual from the original blepharoplasty or consequent to the asymmetry of brow position that tends to develop with the periorbital skeletal asymmetry of aging. The definition of preoperative asymmetry is important both to adequately prepare the patient and to factor the difference into compensatory corrections with the operation.

CONCLUSIONS

There is a postblepharoplasty look, characterized by dermatochalasis, which differs from the lid bulging that precedes primary blepharoplasty. In secondary blepharoplasty, the risk of lagophthalmos and postoperative dry eyes is minimized by the skin conservation made possible using the tarsal fixation technique. The secure lid crease provided by proper tarsal fixation provides independent control of the pretarsal and infrabrow segments and improves the lid fold. Restoring infrabrow volume, in the presence of good crease fixation, further improves lid aesthetics.

Daniel Luo, Grad.Dip.Surg.Anat., F.R.A.C.S.
180 Stirling Highway
Nedlands, Western Australia 6009, Australia
dluo@redimed.com.au

PATIENT CONSENT

Patients provided written consent for the use of their images.

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