Repair of Unsatisfactory Double Eyelid After Double-Eyelid Blepharoplasty in Asian Patients

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Objectives: To summarize the types and causes of unsatisfactory double eyelid results after double-eyelid blepharoplasty in Asian patients and to explore the corrective methods.

Methods: Various methods are used to repair different types of unsatisfactory double-eyelid results following double-eyelid blepharoplasty. The basic principles are that scar adhesions should be released as much as possible, the normal anatomic structure is restored, the radian of the double eyelid is adjusted, and the position of the double eyelid is relocated.

Results: After 3 months to 5 years of follow-up, most patients who initially had unsatisfactory double-eyelid results after double-eyelid blepharoplasty were satisfied with the results of corrective surgery.

Conclusion: It is important to avoid complications at the first double-eyelid blepharoplasty because corrective surgery is difficult.

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Some Asians have a single upper eyelid, upper eyelid hypertrophy, or downward growing eyelashes, which make their eyes appear small and droopy. Having a pair of attractive double eyelids is desired by many Asians, especially women. Double-eyelid blepharoplasty can increase the height of the palpebral fissure and make the eyes look more lively. As a result, this surgery has become increasingly popular in China.2

However, with more frequent performance of double-eyelid blepharoplasty, postoperative complications have become apparent that are related to flawed preoperative design, improper operative procedure, unsatisfactory management after surgery, or other circumstances.3 In this study, we analyze 415 cases of double-eyelid blepharoplasty and summarize the cause of the complications, corrective methods, and preventive measures to optimize patient satisfaction.
After double-eyelid blepharoplasty, a wide double fold on an Asian face often looks unnatural. Factors that cause excessively wide double fold include the following: too much skin is retained below the fold, skin is sutured up to the superior levator muscle, or the orbicularis oculi muscle and the orbital fat are resected excessively, resulting in upward retraction. Correction requires readjustment of the height of the double fold, so these patients must undergo another surgical procedure. We generally excise the scar and some skin below the fold if needed, release adhesions above the tarsus, dissect the lower edge of the orbicularis oculi muscle and the orbital fat, and fully release adhesions above the orbicularis oculi muscle and under the orbital fat, which makes them freely movable. We move the lower edge of the orbicularis oculi muscle and the orbital fat down to the superior margin of the tarsus, then suture the orbicularis oculi muscle and the orbital fat to the tarsus. It is preferable that the superior margin of the tarsus is covered by the orbital fat. The orbicularis oculi muscle is sutured to the predetermined height of the tarsus fascia, and the radian of the double fold is adjusted. If retraction of the orbicularis oculi muscle and the orbital septum is too severe to be pulled down to the superior margin of the tarsus, a bipedicled fibroaponeurotic muscular flap is used. The skin is closed with sutures separately, which may or may not attach the skin to the tarsus.

Narrow double fold results from conservative surgery or loose adhesions between the skin and the tarsus. For patients with an excessively narrow double fold, the loose upper eyelid skin needs to be excised and fat in the orbital septum needs to be removed. When the superior margins of the tarsus are exposed, the incision is closed with sutures that attach the levator palpebrae superioris aponeurosis and tarsus (Figure 1 and Figure 2).

Table 1. Standards of Double-Eyelid Repair

<table>
<thead>
<tr>
<th>Region</th>
<th>Value or Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palpebral fissure width, mm</td>
<td>30-34</td>
</tr>
<tr>
<td>Inner intercanthal distance, mm</td>
<td>30-36</td>
</tr>
<tr>
<td>Palpebral fissure height, mm</td>
<td>10.0-12.5</td>
</tr>
<tr>
<td>Distance between the margin of the upper eyelid and the eyebrow, mm</td>
<td>15-20</td>
</tr>
<tr>
<td>Angle between the inner canthus and the palpebral fissure, degree</td>
<td>48-55</td>
</tr>
<tr>
<td>Angle between the lateral canthus and the palpebral fissure, degree</td>
<td>60-70</td>
</tr>
<tr>
<td>Angle between the horizontal plane and the internal and external canthus connection, degree</td>
<td>10</td>
</tr>
<tr>
<td>Exposure of the cornea, %</td>
<td>50-80</td>
</tr>
<tr>
<td>Approximate distance that the cornea should be covered by the margin of the upper eyelid at the orthophoric position, mm</td>
<td>2</td>
</tr>
<tr>
<td>Location of the highest point of the open upper eyelid</td>
<td>Junction of the inner and intermediate thirds</td>
</tr>
</tbody>
</table>

Figure 1. Excessively narrow double fold before surgery (A) and 1 week (B) and 1 year (C) after surgery.

Figure 2. Excessively wide double fold before surgery (A) and 6 months (B) and 5 years (C) after surgery.

Figure 3. Depression of the upper eyelid before surgery (A) and 1 year after surgery (B).

DEPRESSION OF THE UPPER EYELID

Asian upper eyelids appear to have palpebral hypertrophy because of excessive fat in the upper eyelid orbital septum and a thickened orbicularis oculi muscle. To obtain the effect of a thin upper eyelid, too much fat may be removed from the
orbital septum during double-eyelid blepharoplasty. This may cause depression of the upper eyelid, difficulty in lifting the eyelids, and lazy eyes. In other cases, postoperative adhesions between the eyelid skin and the orbital septum can occur when excessive orbicularis oculi muscle is removed, resulting in failure of the muscle to cover the anterior part of the orbital septum. Repair for depression of the upper eyelid involves the following steps: a new incision is made that follows the previous line, adhesions are released, an adequate amount of fat from the lower eyelid is filled into the depression after the orbital septum is opened, the upper margin of the tarsus is covered by the orbicularis oculi muscle, and the incision is closed.

In some cases, there is insufficient lower eyelid fat to fill severe upper eyelid depressions. Adipose tissue from other parts of the body can be used. We use a 2-mm-diameter cannula to remove fat from the abdomen or from the lateral thigh. After cleaning and filtering the adipose tissue, the upper eyelid depression is injected with 2 to 3 mL of adipose tissue on each side. Because the fat absorption rate is 50%, this procedure must be repeated 2 or 3 times every 3 to 6 months to maintain correction of the depression. Fat should not be injected into the orbicularis oculi muscle because adverse effects will result in the formation of a convex upper eyelid.

For patients who had excessive removal of the orbicularis oculi muscle during double-eyelid blepharoplasty, corrective procedures involve the following steps: the inferior margin of the orbicularis oculi muscle is identified, the superior and inferior borders of the orbicularis oculi muscle are released, the orbicularis oris muscle is moved down to the anterior part of the exposed orbital septum (to cover it and fix them together), the orbital septum is separated from the skin, and the incision is closed (Figure 3).

Figure 4. Unsatisfactory radian of the double eyelid before surgery (A) and immediately (B) and 6 months (C) after surgery.

Figure 5. Bilateral asymmetric double eyelid before surgery (A) and 1 year after surgery (B).

### Unsatisfactory Radian of the Double Eyelid

Excessive tissue retention above the tarsus, uneven removal of the orbicularis oculi muscle, insufficient removal of the orbicularis oculi muscle, and severe epicanthal fold can lead to an unsatisfactory radian of the double eyelid. During suturing of the double eyelid, inconsistencies in anchoring the skin to the tarsus and an uneven vertical position of the skin and tarsus also may result in an unsatisfactory radian.

The corrective procedure is to incise the upper eyelid skin, adjust the radian of the double eyelid, release the adhesions completely, and trim the excessive fat above the tarsus. In particular, the lateral orbicularis oculi muscle should be released and incised. Attention should be paid to the location where the tarsus is sutured to avoid affecting the radian of the double eyelid.

For patients whose unsatisfactory radian of the double eyelid is caused by the epicanthal fold, the repair method is to release the orbicularis oculi muscle around the inner canthus and to remove the fat around the inner canthus. If necessary, epicanthoplasty should be performed (Figure 4).

### Disappearance of the Double Eyelid

There are many reasons why the double eyelid may disappear as a complication of blepharoplasty. One cause is that the skin is not firmly anchored to the tarsus, which occurs when there is insufficient exposure to the tarsus because of loose tissue above the tarsus and excessive retention of the orbicularis oculi muscle. Corrective surgery can be performed by incising the primary incision line, trimming loose tissue and the orbicularis oculi muscle above the tarsus (especially the orbicularis oculi muscle at the inner canthus and outer canthus, clearly exposing the tarsus), and anchoring the skin to the tarsus. Disappearance may also occur because the double eyelid rarely forms in patients whose eyes have mild ptosis and a weak levator palpebrae superioris muscle. Correction is the same as that for ptosis.

### Bilateral Asymmetric Double Eyelid

Bilateral asymmetric double eyelid may occur after blepharoplasty as a result of imprecise preoperative measurements, incorrect height where the skin is anchored to the tarsus, or uneven excision of bilateral upper eyelid skin. A repair operation can be performed after 3 months. If the position of the upper eyelid fold is too high, a new eyelid fold is designed to match the width of the contralateral upper eyelid, and the skin is excised between the new incision and the original incision. We then separate the subcutaneous tissue above the incision and scar adhesions until the orbital septum and the orbicularis oculi muscle are relaxed. The skin and tissue are relocated and sutured without tension. If the position of the upper eyelid fold is too low, the new incision follows the original line, and the skin is then dissected precisely under the inferior margin of the incision. If necessary, a piece of skin above the incision can be...
removed, and flexibility of the skin allows the inferior margin of the incision to be moved upward. The tarsus should then be exposed, and the skin is sutured. The height where the suture is anchored to the tarsus should be slightly higher than the incision (Figure 5).

UPPER EYELID WEAKNESS

In some cases of acceptable shape and radian of the double eyelid after blepharoplasty, patients have difficulty in lifting their upper eyelids. This complication results from injury to the superior levator muscle. Formation of traumatic eyelid ptosis occurs because the aponeurosis of the superior levator muscle is improperly sutured, resulting in adhesions between the superior levator muscle and the orbital septum. This can be corrected by releasing the scar adhesions above the tendon sheath of the superior levator muscle, partially dissecting and moving the orbicularis oculi muscle down to cover the released aponeurosis of the superior levator muscle, and then suturing the skin (Figure 6).

DEFORMATION OF THE UPPER TARSAL MARGIN CAUSED BY POSTOPERATIVE INFECTION

Infection after blepharoplasty can cause deformation of the upper tarsal margin of the upper eyelid. A new incision follows the original line. Scar adhesions should be released and the normal anatomic position should be restored. Z-plasty is used to extend the mucosal width of the contracted tarsus. There are 3 methods to correct the length of the deformed tarsus. The first method uses triangular resection of the tarsus. The second method involves suturing together the tarsus and the outer canthus after shortening the tarsus. The third method requires an incision along the gray line, and a cross suture is placed to smooth the margin of the tarsus after 2 triangle tissues are resected, 1 from the conjunctival layer and 1 from the skin layer. The margin of the upper eyelid tarsus should be covered by the orbicularis oculi muscle. Special attention should be paid to the radian of the double eyelid during suturing (Figure 7).

RESULTS

A total of 415 patients were followed up for 3 months to 5 years after double-eyelid blepharoplasty. Of these, 377 were satisfied, 26 saw significant improvement, and 12 were dissatisfied with the results. Table 2 summarizes the corrective surgery for postoperative complications. If injury occurs to the organization and structure of the upper eyelid during the initial operation (ie, deformation resulting from upper eyelid infection, damage to the levator palpebrae superioris muscle, or depression of the upper eyelid), the complications are difficult to correct.

By 2007, our Department of Plastic and Reconstructive Surgery had performed about 8000 cases of double-eyelid blepharoplasty, with complications occurring 1.4% of the time. Three primary causes of double-eyelid surgery complications relate to preoperative design, level of surgical expertise, and patient variation.

Some surgeons lacking knowledge and experience in preoperative design of upper eyelid procedures among Asian patients may indulge a patient’s request (eg, formation of a westernized eyelid) without considering the appearance of the face as a whole. This may lead to an excessively wide or narrow double fold or to bilateral asymmetric double eyelid. In addition, preoperative assessment and examination should be carefully performed to identify any diseases such as bilateral eyelid asymmetry, slight ptosis, and dislocation of the lacrimal gland. These precautions will minimize the incidence of complications.

For surgeons who have not mastered double-eyelid blepharoplasty, some unwanted results may occur. Among surgeons inexperienced in this procedure, it is not uncommon to see an irregular incision, inadequate retained tissues above the tarsus, and removal of an improper amount of fat from the orbital septum. Excessive tissue will cause insufficient exposure of the tarsus, resulting in an unstable double eyelid or disappearance of the double eyelid. If the retained tissues are insuf-
cient, the skin and tarsus will adhere tightly, and the double eyelid will look unnatural. Excessive resection of the orbicularis oculi muscle may result in an abnormally high triple eyelid. Another complication is the non-smooth shape of the eyelid from the irregular resection of the orbicularis oculi muscle and the inadequate resection at the inner and outer canthus regions. This may lead to depression of the upper eyelid or triple eyelid because too much fat in the orbital septum has been removed. In contrast, the eyelid would look plump if insufficient fat is removed.

Some patients are predisposed to hypertrophic scarring after injury, which can occur in the upper eyelid after double-eyelid blepharoplasty. Among patients in whom hypertrophic scarring occurs, it is sometimes difficult to obtain an aesthetically pleasing double eyelid with surgery. In some patients whose tarsus is short, soft, and thin, the incision cannot extend to the inner canthus region, the eyelid remains short, and results of blepharoplasty are unsatisfactory. Patients with an obvious epicanthal fold will also be dissatisfied with the results of surgery.

To avoid complications after double-eyelid blepharoplasty, surgeons must master basic knowledge of ocular anatomy, attain proficient surgical skills, and have knowledge of aesthetic standards. They should candidly discuss the patient’s motivations and aesthetic goals during the preoperative consultation.

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REFERENCES


Table 2. Corrective Surgery for Complications of Double-Eyelid Blepharoplasty

<table>
<thead>
<tr>
<th>Anomaly Before Blepharoplasty</th>
<th>Satisfied</th>
<th>Saw Significant Improvement</th>
<th>Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessively wide or narrow double fold (n=133)</td>
<td>125 (94.0)</td>
<td>7 (5.3)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Unsatisfactory radian of the double eyelid (n=115)</td>
<td>109 (94.8)</td>
<td>5 (4.3)</td>
<td>1 (0.9)</td>
</tr>
<tr>
<td>Disappearance of the double eyelid (n=62)</td>
<td>62 (100)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Depression of the upper eyelid (n=21)</td>
<td>14 (66.7)</td>
<td>4 (19.0)</td>
<td>3 (14.3)</td>
</tr>
<tr>
<td>Upper eyelid weakness (n=27)</td>
<td>19 (70.4)</td>
<td>4 (14.8)</td>
<td>4 (14.8)</td>
</tr>
<tr>
<td>Bilateral asymmetric double eyelid (n=49)</td>
<td>45 (91.8)</td>
<td>3 (6.1)</td>
<td>1 (2.0)</td>
</tr>
<tr>
<td>Deformation of the upper tarsal margin caused by postoperative infection (n=8)</td>
<td>3 (37.5)</td>
<td>3 (37.5)</td>
<td>2 (25.0)</td>
</tr>
</tbody>
</table>

*Satisfied: percentages of satisfied patients; SAW Significant Improvement: percentages of patients who saw significant improvement; Unsatisfied: percentages of patients who were not satisfied.

*Percentages do not sum to 100 due to rounding.