Combined Anchor Suture With External Upper Eyelid Blepharoplasty in Asian Patients

Sufan Wu, MD, PhD; Hangyan Shi, MD; Sheng Yan, MD; Yi Sun, MD; Lei Pan, MD; Hua Wu, MD

**Objective**: To study the effect of an anchor fixation stitch in combination with the external incision technique in Asian upper blepharoplasty.

**Methods**: Combined with an upper eyelid blepharoplasty using a conventional external incision procedure, an anchor stitch was used to fixate the dermal layer of the pretarsal skin and the upper edge of the tarsal plate. The procedure was performed in 72 patients with creaseless eyes (50 cases) or with laxity of the upper eyelids due to aging (22 cases). The patients were followed up for 6 to 12 months. The upper eyelid folds were evaluated by the surgeons and by the patients, and the outcome was graded as excellent, good, fair, or poor.

**Results**: Of the 72 patients, 52 (72%) had excellent results and 20 (28%) had good results; no patients had fair or poor results. There were no cases of crease loss after 6 to 12 months of follow-up. All patients were satisfied with the results.

**Conclusions**: The findings show that the combined anchor suture with external surgery is a reliable approach to Asian upper eyelid blepharoplasty both in young creaseless eyelids and in eyelids with laxity due to aging. We suggest that the anchor suture could be used as a routine procedure in Asian blepharoplasty.


**Blepharoplasty has been performed for many years.** Because of the special anatomical characteristics of Asians, approximately 50% of the East Asian population (Chinese, Japanese, and Korean) are born without an upper eyelid fold or with only a partial fold, which can be changed into a crease eyelid by blepharoplasty. Asian upper blepharoplasty, or double eyelid surgery, is used to create an upper eyelid supratarsal crease. It is the most popular aesthetic surgery in China and other East Asian countries. Various approaches, including the incision method, the semioopen method, the suture method, the sutureless method, and even the laser method, have been used to perform the surgery. Among them, the incision method has been considered the approach with the widest indications and the most reliable results.

The mechanism of the blepharoplasty to create the upper eyelid fold involves fixing the pretarsal skin to the tarsal plate or the levator aponeurosis, after which the pretarsal skin is advanced over the tarsus while the patient’s eyes are open, thus creating the upper eyelid fold. In the traditional incision blepharoplasty, the supratarsal fold is formed by the adhesion from natural healing after dissection between the skin and the tarsus. In some cases, however, this attachment is not stable enough to suspend the pretarsal skin on the tarsus and causes the crease to fade or even to disappear mainly because the soft tissue remains on the tarsal plate and interrupts the attachment of the pretarsal skin and the tarsus. Other possible reasons are a relatively heavy pretarsal skin and a small tarsus, especially in cases with thick skin and a puffy upper eyelid (Figure 1). In such cases, it is necessary to use a different approach, one that results in a more reliable attachment of upper eyelid skin to tarsus, which in turn could maintain a more stable and durable upper eyelid fold.

**Methods**

The modified upper eyelid blepharoplasty was used to treat 72 patients (69 female and 3 male) with either congenital absence of the upper eyelid fold (n=50) or laxity of the upper eyelid due to aging (n=22). The patients ranged in age from 17 to 68 years (average, age 31.2 years). All patients were mentally healthy and decided to undergo external blepharoplasty after sufficient consultation with the surgeon. The younger patients wanted the creation of an up-
per eyelid fold, whereas the aged patients wanted the removal of excess upper eyelid skin. No patients had eyelid ptosis.

Surgery
Preoperative Design and Anesthesia

The incision lines for the upper eyelid are designed and marked at a height of 6.5 to 7.5 mm from the margin of the eyelash (Figure 2A). At this height, the midpoint of the pupil (key point) is pushed up with a tiny stick with the eyes open at a straight gaze (the palpebral show should be 2 to 3 mm). The marking line was set initially from the key point and then expanded laterally to the orbital rim at the same height. The patients open their eyelids while the key point is pushed up with a small stick, thereby creating an upper eyelid fold. Medially, the fold can be shaped 2 different ways: tapering nasally or parallel to the eyelash line. The marking line is set medially and stopped approximately 2 mm (tapered) or 4 mm (parallel) away from the medial canthus. In cases with excess upper eyelid skin, a second line should be drawn at a height of 6.5 to 7.5 mm from the margin of the eyelash, with the skin gently stretched until there are no wrinkles in the upper eyelid. The operative field is steriley prepped and draped. Local anesthesia is performed with the injection of 1 mL of lidocaine, 2%, with 1:100 000 epinephrine.

Figure 1. Upper eyelid folds fade away after conventional blepharoplasty without an anchor suture. A 23-year-old patient with puffy eyelids and no upper eyelid fold underwent a conventional blepharoplasty without an anchor suture (A). The upper eyelid folds were fine 7 days after operation (B) but gradually faded away 10 months after surgery (C and D) and required a second operation for revision.

Figure 2. The anchor suture procedure in upper eyelid blepharoplasty. The incision marking is designed in an arc shape, the top of which in the key point at the midpupil is 7 mm above the eyelash (A). After conventional external incision blepharoplasty, an additional anchor stitch is set from the dermis of the pretarsal skin (B) to the upper edge of tarsal plate (C) to create a tight fixation between the skin and the tarsus (D).
Surgical Procedure

The operation is performed 10 to 15 minutes after local anesthesia has been administered to match the optimally effective time of the administration of epinephrine, which can reduce the bleeding of operation. An incision is made with a No. 11 blade along the designated incision lines. In the cases with excess skin, the skin between 2 incisions and a strip of orbicularis muscle beneath it are excised. The filmy soft tissue lying above the tarsal plate is then excised until the total tarsus and the levator aponeurosis are exposed, with care taken to keep the levator aponeurosis intact on the tarsal plate. The orbital septum is then exposed and opened with a short incision, through which the prelevator fat can be gently pressed out and removed. During this step, the conventional operative procedure involves closing the incision with the suture passing from skin through tarsus and back through skin. In our study, however, an additional internal fixation stitch was used to anchor the dermis of the eyelid skin to the upper edge of the tarsus at the key point using 7-0 polypropylene to tightly fixate the skin to the tarsal plate (Figure 2B-D). It is important that the stitch to the tarsal plate does not penetrate the inside of the tarsus and that the position of the stitch is not placed above the tarsi into the levator aponeurosis. After the anchor sutures are completed on both sides, the patients are asked to open their eyes to confirm the shape of the folds and the symmetry of both eyes. The anchor stitches can be adjusted until the folds on both sides are symmetrical and equal in height. The skin incisions are then closed using interrupted sutures in 6 equidistant positions with 7-0 polypropylene. The stitches are made in a skin-tarsus-skin fashion (except for the 1 lateral stitch that was sutured in a skin-aponeurosis-skin fashion because the tarsal plate had become too narrow). During the operation, each bleeding spot was carefully and completely coagulated using bipolar electrocautery. The operation usually takes approximately 45 minutes to complete.

Postoperative Care and Evaluation

After surgery, the incision is covered with eye ointment. The surgical region is left exposed without any dressing or bandage. The patients are encouraged to use their eyes as usual. Oral antibiotics are prescribed for 3 days to prevent infection, and the sutures are removed on the seventh day after surgery.

The patients in our study were followed up for 6 to 12 months. The shapes of the upper eyelid folds after surgery were recorded by medical photography and compared with those before surgery. The results were evaluated by both surgeons and patients. Based on the symmetry of the shape and height of the upper eyelid folds, the scar formation after surgery, and the patients’ satisfaction, the results were graded as excellent, good, fair, or poor (Table). The final judgment was determined by the lowest grade.

RESULTS

Immediately after surgery, the patients were able to open and close their eyes without any difficulty. Swelling and bruising were similar to those with the conventional method and usually resolved within 2 weeks. The upper eyelid folds were wider in the beginning and became stable approximately 4 weeks after surgery. Immediately after surgery, the width of the fold was approximately 3 to 4 mm in the open eye position because of the swelling, which usually decreased and stabilized at 2 to 3 mm after 1 month (Figure 3). Of the 72 patients, 52 (72%) had excellent results and 20 (28%) had good results; no patients had fair or poor results. According to the postoperative survey, all patients were satisfied with their results. There were no cases in which the fold had faded away or disappeared after 6 to 12 months of follow-up.

The buried sutures basically could not be observed from outside the skin. Of 144 buried stitches, 1 (0.7%) was found partially exposed 7 days after surgery and was fully extruded 2 weeks after surgery. It was then removed with forceps. No other patients complained of extrusion of buried sutures after 12 months of follow-up.

COMMENT

Although the upper blepharoplasty is the most popular surgical procedure in Asia, there have been several complications. It has been reported that approximately 10% of Asian patients who undergo blepharoplasty present with complications as a result of the surgery. The fold fading away or even disappearing is one of the most common complications after upper eyelid blepharoplasty. It is usually due to the suture method. It could also rarely occur after an external incision method, as shown in Figure 1. The mechanism of fold loss is the anatomical dehiscence of the adhesion between the skin and the tarsus. Fold loss occurs because (1) the puffy soft tissue above the fold is so heavy that it pushes on the upper fold and narrows it (in some cases with heavy, puffy upper eyelids, this is the main reason); and (2) too much soft tissue or fat tissue remains on the tarsal plate, thereby encroaching on the attachment between the pretarsal skin and the tarsus. It is important to remove the pretarsal soft tissues appropriately: if too much of the soft tissue and orbital fat are removed, the crease will be too high and a supratarsal hollow will occur; however, if too much soft tissue or fat tissue remains, the upper eyelid fold will dis-

---

Table. Evaluation of the Upper Eyelid Fold After Surgery

<table>
<thead>
<tr>
<th>Outcome</th>
<th>HD</th>
<th>SS</th>
<th>IM</th>
<th>PJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>Equal</td>
<td>Completely the same</td>
<td>None</td>
<td>Completely satisfied</td>
</tr>
<tr>
<td>Good</td>
<td>0-0.5 mm</td>
<td>Almost the same</td>
<td>Barely evident</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Fair</td>
<td>0.5-1.0 mm</td>
<td>Some difference</td>
<td>Slight scar</td>
<td>Somewhat satisfied</td>
</tr>
<tr>
<td>Poor</td>
<td>&gt;1.0 mm</td>
<td>Asymmetrical</td>
<td>Obvious scar</td>
<td>Dissatisfied</td>
</tr>
</tbody>
</table>

Abbreviations: HD, height difference (the difference between the measurable height of the 2 upper eyelid folds); IM, incision mark (any IM that remained after surgery); PJ, patient’s judgment (how satisfied the patient was after surgery); SS, shape symmetry (the symmetry of the 2 upper eyelid folds as evaluated by the observers).
appear. The anchor suture prevents the remaining soft tissue from encroaching on the attachment between the pretarsal skin and the tarsus.

The use of the anchor suture in external incision blepharoplasty has been reported for years, but, clinically, this type of suture has not been routinely used in upper eyelid surgery. Most external incision blepharoplasties have been performed without anchor sutures. The anchor suture can fixate the tarsal plate to the pretarsal dermis, with the suture buried under the skin, having a long-lasting effect. The reported anchor blepharoplasties were 3- to 5- or 6-stitch procedures. In our study, however, a 1-stitch procedure was used and proved to create a reliable dermal attachment of the pretarsal skin to the tarsus. For the secondary revised operation, more than 1 anchor stitch is probably necessary owing to the difficulty of the remodeling and reshaping of the upper eyelid fold, whereas in the primary blepharoplasty, 1 stitch at the key point is enough to prevent the fold from fading away. It is not necessary to use several anchor stitches in the primary blepharoplasty, because more suture knots will be left beneath the skin and the operation time will be prolonged. We used the polypropylene suture in our study because these nonabsorbable sutures have a more durable effect and less tissue reaction than absorbable sutures. The 6-0 polypropylene thread was used previously, but, in our study, the 7-0 polypropylene thread proved to be effective for fixing the upper eyelid skin to the tarsal plate. The maximal tension of 7-0 polypropylene is about 300g before ligation and 230g after ligation (data from Ethicon Inc, Somerville, New Jersey); these tensions are strong enough to fixate the eyelid skin to the tarsus. The 7-0 suture could make the knot smaller and therefore less palpable than the 6-0 suture.

The anatomical features of Asian eyelids differ from those of white eyelids in that (1) the width of the upper tarsus is approximately 6 to 8 mm in Asian patients and 10 mm in white patients; (2) the orbital septum fuses with the levator aponeuroses at a lower point in Asian patients than in white patients, and the terminal interdigitations of the levator aponeurosis that attach to the dermis are less prominent and are located lower in Asian patients; and (3) there is more subcutaneous and suborbicularis fat as well as a pretarsal fat pad in Asian eyelids. Based on the above anatomical characteristics, in our study the marking line of the incision was set at a height of 6.5 to 7.5 mm from the margin of the eyelash, which was 3 to 4 mm less than it would be in white patients. The width of the pretarsal skin is almost equal to the height of the tarsus, so the suture point is set just in the upper edge of the tarsal plate, which can make the pretarsal skin stretched flat and turn up the eyelash. It has generally been accepted that blepharoplasty is more complicated in Asian patients than in white patients. Successful blepharoplasty depends on an accurate preoperative design, a precise surgical procedure, and proper placement of the anchor suture.

In conclusion, our findings suggest that the combined anchor suture with external surgery is a reliable approach for upper eyelid blepharoplasty in Asian pa-

Figure 3. Typical cases performed with the anchor suture procedure. A 23-year-old patient without an upper eyelid fold (A) underwent an anchor suture procedure and was followed up at 7 days (B) and 6 months (C and D) after surgery. Based on the evaluation criteria shown in the Table, the height difference, shape symmetry, incision mark, and patient satisfaction were excellent. A 68-year-old patient with laxity of the upper eyelid skin (E) underwent an anchor suture procedure. The height difference 6 months after surgery (D) was assessed as “good,” whereas the shape symmetry, incision mark, and patient satisfaction were excellent.
tients and that it can create a cosmetically satisfactory double eyelid. One anchor stitch in each eyelid could result in a stable attachment of upper eyelid skin to the tarsal plate. This modified method can be performed both in young creaseless eyes and in aging eyes. The anchor suture could be performed as a routine procedure during the Asian blepharoplasty operation, especially in cases with a relatively small tarsus and puffy upper eyelids.

Accepted for Publication: November 1, 2009.

Correspondence: Sufan Wu, MD, PhD, Department of Plastic and Reconstructive Surgery, Zhejiang Provincial People's Hospital, 158 Shangtang Rd, Hangzhou 310014, Zhejiang Province, China (sufanwu@hotmail.com).

Author Contributions: Study concept and design: S. Wu. Acquisition of data: S. Wu, Shi, Yan, Sun, Pan, and H. Wu. Analysis and interpretation of data: S. Wu. Drafting of the manuscript: S. Wu, Shi, Yan, Sun, Pan, and H. Wu. Critical revision of the manuscript for important intellectual content: S. Wu. Administrative, technical, and material support: S. Wu, Shi, Yan, Sun, Pan, and H. Wu. Study supervision: S. Wu.

Financial Disclosure: None reported.

REFERENCES


