Subdermal Placement of Sutures in Double Eyelid Surgery

Jesuito S. Zubiri, MD, FACS

Abstract
Increasing numbers of Asian patients of varying ethnicity are expressing preferences and expectations for a specific aesthetic appearance following double eyelid surgery. Those of Northern Mongolian ethnicity (Northern Chinese, Japanese, or Korean heritage) generally prefer a narrow crease, whereas those of Southern Mongolian ethnicity (Indonesian, Filipino, or Malaysian) prefer a wider fold. Older techniques performed until the mid-1990s resulted in a deep fold, giving the patients a more “Western” appearance. In this article, the author describes a modified technique of placing the suture in the subdermal layer, which allows for variety in the width of the fold, enabling the surgeon to retain anatomical aspects that are typical of each patient’s ethnicity. With this technique, an Asian patient may now choose the width of fold that he or she prefers, resulting in a more ethnically natural look.

Keywords
blepharoplasty, double eyelid, oculoplastics, Asian, oriental, featured operative technique

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The earliest publication about double eyelid surgery was from Mikamo in 1896, who described a closed technique employing 3 spaced silk sutures passed from the skin to the palpebral conjunctiva and tarsus and back, and ligated outside the skin. In 1926, Uchida reported a technique utilizing almost the same approach as Mikamo, except Uchida applied catgut sutures with knots buried under the skin. The open technique was first published by Sayoc in 1954. Leabert Fernandez later gave a more detailed description of Sayoc’s technique, with a thorough explanation of the importance of the dermis and levator aponeurosis.

From 1954 to present, most articles have described modifications of the Sayoc technique. One exception was Flowers’s anchor blepharoplasty in 1972, which differed in that significant pretarsal adventitial tissue was removed until the tarsal plate was thoroughly visualized. Flowers’s view was that the anchor to the tarsal plate provided a neat and crisp permanency unattainable with the traditional technique. In 1981, I adapted the technique using 5 sets of sutures, with the first placed at the level of the pupil, then 2 similar sutures placed laterally and medially.

In the past 2 decades, however, a new trend has appeared in Asian blepharoplasty, in which surgical techniques account for more variation. The historical perception of the “classical” Asian eye included an upward slant with an absent crease and an epicanthal fold. The reality, however, is that the Asian eye varies according to ethnicity, which stems from the dispersal of the Mongol race in prehistoric times. In 1900, anthropologist Joseph Denicker expressed his view that the phrase Mongol race referred to 2 subraces: Northern Mongolian and Southern Mongolian. In 1997, population geneticist Matashoshi Nei carried Denicker’s view a step further by identifying ethnic groups within the Mongolian subclassification. Nei stated that the Northern Mongolians typically include Tibetan, Japanese, Northern Chinese, and Korean people, as well as the Ainu of Japan. Northern Mongolians were described as having a single eyelid and a noticeably narrow palpebral fissure, although this may not be a consistent finding. (For example, the Ainu of Japan have deep-set eyes that are not slanted and are, surprisingly, very similar in appearance to the European eye.)

Dr Zubiri is Associate Professor of Plastic Surgery at Cebu Doctors’ University, Cebu City, Philippines, and Chairman of the Department of Plastic Reconstructive Surgery, Vicente Sotto Memorial Medical Center, Cebu City, Philippines.

Corresponding Author:
Dr Jesuito Zubiri, Suite 208 M. Diaz Bldg, Osmana Blvd, Cebu City, 6000 Philippines.
E-mail: jszubiri@cutforapurpose.com
The Southern Mongolians, according to Nei, include Khmer, Filipino, Indonesian, and Malaysian people, as well as the Taiwanese aborigines. This ethnic group tends to have a double eyelid, and the palpebral fissure is not as narrow as that of the Northern Mongolians. Because of these variations, it is expected—and indeed I have also observed—that each Asian patient, depending on his or her ethnicity (Northern Mongolian vs Southern Mongolian) has his or her own peculiar and unique perception of what looks “natural.”

Moreover, the trend mentioned earlier—distinctly noted in the past 2 decades—has been a move away from a “Westernized” postoperative appearance and toward maintaining each patient’s ethnic identity. Patients are expressing a preference for a crease that appears natural in their own culture. Because of this trend, I have found it necessary to modify my technique for double eyelid surgery to suit each patient in his or her particular Asian setting. With my previous technique, the following items were of concern: (1) the fold appeared unusually deep when the last suture was located superficially in the dermis, and (2) not every Asian patient wanted a narrow fold. Moreover, when the last suture had been placed superficially, the scar was prominent when the eyes were closed. In this Featured Operative Technique, I describe a modified technique that relocates the placement of the last suture bite on the dermis-subdermal plane to attain a more “naturally ethnic” look and allows the patient to choose the width of the final fold.

**PATIENT SELECTION AND ASSESSMENT**

First, it should be noted that patients with prominent eyes are discouraged from undergoing this procedure, regardless of whether the prominence is genetic (due to, for example, shallow orbits, microcephaly, or corpus callosum dysgenesis) or is a result of hyperthyroidism. Enhancing the eyelid fold in such patients could result instead in a “surprised” appearance, which is often perceived to be aesthetically unacceptable. As with other surgical patients, any concomitant hematologic problem that would possibly affect hemostasis also precludes surgery.

During the initial consultation, an assessment of the specific features of the patient’s eyes is made. The following aspects are taken into account:

1. Shape of the eye: Is the eye round, oval, or almond shaped?
2. Palpebral fissure: Is the palpebral fissure narrow or wide? Is there a concomitant slant?
3. Thickness of pretarsal skin: If pretarsal skin is thick, is the thickness due to a significant amount of pretarsal fat or to a thick orbicularis muscle?
4. Fullness of the eyelid: How much fat is in the lateral compartment? In the medial compartment?
5. Epicanthal fold: Is the epicanthal fold present? If so, is it prominent? Does the patient want the fold removed or does he or she prefer to keep the fold?

6. Desired final result: Does the patient prefer a small, medium, or wide fold? How much pretarsal show does the patient want?

**Determining the Width of the Fold**

To give the patient an idea of the final postoperative result of the surgery, I place a slightly bent paper clip at varying levels of the eyelid and ask the patient, who is viewing the process through a mirror, where his or her desired fold/crease is located (Figure 1). In young patients who have no excess skin, the clip is positioned at 5 to 6 mm to elicit a narrow fold, at 7 to 8 mm to elicit a medium fold, and at 9 mm for a wide fold. In older patients, or in those who have significant skin overhang, the amount of skin to be removed is measured when the desired height of pretarsal skin is achieved (pretarsal show). To accomplish this, the brow is elevated with the left thumb while the paper clip is held by the right hand. The paper clip is maintained in the position of the width chosen by the patient, and raising the brow changes the pretarsal show. The patient then decides on the desired level of pretarsal show.

The amount of skin to be excised is roughly determined by the difference in the height of the skin overhang (in millimeters) and the level of desired pretarsal show, multiplied by 2. For example, with the paper clip in place, if the pretarsal show is 2 mm from the ciliary margin and, after the brow is elevated, the patient chooses a pretarsal show 5 mm from the ciliary margin, the amount of skin to be excised would be [(5 mm − 2 mm) × 2], or 6 mm. The factor 2 represents the front and back sides of the drooping skin.

**SURGICAL TECHNIQUE**

Except for patients who are undergoing rhytidectomy concurrently with blepharoplasty, all patients receive local anesthesia and the surgery is performed as an outpatient...
procedure. Patients shampoo their hair and wash their faces with a 10% povidone-iodine surgical skin cleanser the night prior to surgery and on the morning of the day of surgery. Thirty minutes before the procedure, the patient is given either oral diazepam (5-10 mg) or midazolam (7.5-15 mg) together with an oral analgesic.

Two drops of proparacaine hydrochloride ophthalmic solution (0.05%) are placed on the eye. The eyelid is everted and the height of the tarsal plate is measured with a vernier caliper (Figure 2). The tarsal plate is usually 8 to 10 mm in height at the level of the pupil and tapers to 3 to 4 mm medially. Laterally, it tapers but ends before the lateral canthus. One arm of the caliper is dipped in methylene blue. With the other arm of the caliper at the ciliary margin, the mark is then translated onto the skin, to represent the lower skin incision (Figure 3A). The skin is marked 5 to 6 mm from the ciliary margin to elicit a narrow fold, at 7 to 8 mm to elicit a medium fold, and at 9 mm for a wide fold. If there is no excess skin, the mark will represent the incision. If there is excess skin, the upper skin incision is marked according to the width calculated preoperatively. Final confirmation is made by grasping the eyelid skin with toothless forceps and the excess skin is evaluated as in standard blepharoplasties. The upper and lower markings meet at a point 5 to 10 mm from the lateral canthus. Medially, they meet as they taper and curve down along the crease of the epicanthal fold (Figure 4).

The skin is infiltrated with lidocaine hydrochloride 2% with a 1:100 000 dilution of epinephrine and then cut with a No. 15 blade. The rest of the excision is completed using needle tip cautery. No muscle is included in the incision (Figure 5). After the skin is excised, a 2- to 3-mm strip of orbicularis muscle is also excised along the superior margin of the lower incision, from the lateral end to the medial end (Figure 6).

After this step, the septoaponeurotic sling and the pretarsal fat come into view when downward traction is placed on the lower incision with a skin hook. Any excess pretarsal fat is removed. Removing pretarsal fat reduces the incidence of excessive and prolonged pretarsal edema postoperatively. One must be cautious, however, not to totally remove the adventitial tissue in the pretarsal area simply for the purpose of obtaining a full exposure of the tarsal plate.

The skin hook is then shifted to the upper incision and, with slight superior traction, the septoaponeurosis and the orbital fat housed inside that envelope can be clearly seen (Figure 7). The septoaponeurosis will lower laterally and run about 30 degrees superiorly as it reaches the midpupillary level. It is important to keep this in mind to prevent accidental injury to the levator aponeurosis.

The septum is opened by cutting a 2-mm strip, beginning laterally. The incision is continued medially—again, running along at 30 degrees superiorly up to the midpupillary level (Figure 8). The septum is safely entered there. Gentle pressure on the globe will cause the excess orbital fat to bulge outward (Figure 9A-F). The fat may then be teased out, clamped, excised, and its base coagulated. A preferred technique is to cut the excess fat at its base using needle tip cautery with a low coagulating current. The tarsal plate can be seen below it (Figure 10), and removing excess fat laterally provides more definition.

After removal of fat in the lateral compartment, the remainder of the septum can be opened under direct vision as it slowly curves down toward the medial canthus. Unless it is significantly excessive, removal of central

Figure 2. The eyelid is everted and the height of the tarsal plate is measured with a vernier caliper.

Figure 3. (A, B) The measurement from Figure 2 is then translated onto the skin.
fat must be avoided, because this may cause unsightly hollowing of the central eyelid.

The skin hook is then transferred to the medial third of the upper incision. If excision of medial fat is
indicated, the area is then infiltrated, the septum is punctured, and the excess fat is removed. The septum should then be completely detached from the levator. Once the fat is removed, the incision line of the septoaponeurosis directs the surgeon to the levator aponeurosis itself, which is seen as a glistening white film layer (Figure 11). The fixation suture will later pass through this structure.

Fixation sutures of 6-0 nylon (Ethicon, Somerville, New Jersey) are placed in 5 areas using a small (P-1) needle. The first fixation suture begins as a 1.5- to 2-mm bite at the anterior-superior border of the tarsal plate at the mid-pupillary level (Figure 12). There are large vascular networks along the most superior border of the tarsal plate, where Müller’s muscle attaches to it (Figure 13). Extreme care must be exercised when placing the fixation suture in
that location. Puncturing one of these vessels can rapidly cause ecchymosis or hematoma. As the needle exits the tarsal plate, it is then passed through the levator aponeurosis with a final 2-mm bite to the dermal-subdermal layer (Figure 14), after which the suture is tied. Some prefer to place the final bite on the dermis itself, but I prefer the final bite on the dermal-subdermal layer because it produces a more natural-looking fold than the unnaturally...
A deep fold that can appear when the suture is placed directly on the dermis.

The fixation suture is secured with 3 square knots buried in the dermal-subdermal plane (Figure 15). Two such equidistant sutures are placed medial and lateral to this suture. Because the tarsal plate ends before the lateral canthus, the most lateral (fifth) fixation suture is passed through the levator aponeurosis and then to the dermal-subdermal layer, after which it is tied. This completes the fixation suture (Figure 16).

When all 5 sutures have been placed, the patient is asked to open her or his eyes and the completed folds are evaluated (Figure 17). Any changes or adjustments should be made at this point before the skin is closed. Two interrupted sutures of 6-0 nylon are placed for proper alignment: one at the level of the lateral canthus and the other at the level of the pupil. The rest of the wound is closed using a continuous 6-0 nylon suture. If epicanthoplasty is needed, it is done at this point. I prefer to utilize Flowers's modification16,17 of the Uchida split V-W technique for epicanthoplasty (Figure 18). The medial extension of the desired inner canthus is marked. That mark represents the apex of the W. The 2 triangular flaps of the W are excised, and the medial canthus is split into a V shape (Figure 19). The corner and sides of the triangular flaps are sutured with interrupted 6-0 nylon (Figure 20).

A video of the author’s technique is available at www.aestheticsurgeryjournal.com. You may also scan the code on the first page of this article with any smartphone to be taken directly to the article on www.YouTube.com.

**Postoperative Care**

Before sending the patient home, an 8-mm strip of self-adhering foam is patterned to the wound and the adhesive side is pasted over it (Figure 21). The self-adhering foam has been found to be more effective than a cold compress in reducing postoperative swelling and preventing ecchymosis. Moreover, the self-adhering foam strip allows mobility so the patient does not have to be confined at
home. The patient is instructed to sleep with the head elevated on 2 or 3 pillows for 2 weeks to minimize swelling. The self-adhering foam strip is removed on the second postoperative day and the sutures are removed on the fifth postoperative day. Oral paracetamol is usually sufficient as a postoperative analgesic and no antibiotics are needed.

RESULTS

This modified technique was performed between April 1998 and April 2012 on 560 patients (18 males and 542 females; mean age, 45 years; age range, 16-65 years). Complications were rare but included asymmetry, crease failure, palpable knots, and extruding sutures.

Asymmetry was the most common complication, occurring in 13 patients (2.3%). It presented as a discrepancy between the right and left vertical heights of the pretarsal lids. Five patients felt that the asymmetry was negligible and declined reoperation. Correction was performed in 8 patients. Asymmetry was usually a result of the suture being placed in the filmy substance next to the tarsal plate, instead of in the tarsal plate itself. Sometimes, it was caused by the skin incisions not being precisely equal in height, which occurred during the skin marking phase. The degree to which the skin was stretched on both left and right sides
may not have been precisely equal, so that the final marks between the left and right (and the incisions that followed) became unequal. Another explanation is a difference in the level of bite to the tarsal plate, such that it may not have been equal on both sides. Exposing the superior border of the tarsal plate by placing the tip of a mosquito clamp on the conjunctival side and elevating the tarsal plate to easily delineate the superior border allowed more precision with suture placement in the tarsal plate.

Crease failure occurred in 9 patients (1.6%). Reoperation occurred in all 9 patients at 6 months, and the crease was restored. Crease failure was caused either by failure of any

Figure 22. (A) This 23-year-old woman presented with absence of the supratarsal fold (double eyelid). (B) One year and (C) 3 years after double eyelid surgery with the author’s modified technique.

Figure 23. (A) This 17-year-old woman presented with absence of the supratarsal fold (double eyelid). (B) One year and (C) 3 years after double eyelid surgery with the author’s modified technique.
1 of the 3 bites in the fixation suture or by the suture having been placed in the thin levator extension rather than in the aponeurosis itself. As mentioned earlier, the tarsal plate diminishes or ends before the lateral canthus. Since the tarsal plate is absent toward the lateral area, crease failure could have occurred when the fifth suture was not secured to the aponeurosis.

Palpable knots occurred in 8 patients (1.4%). Five of the 8 had the knots removed. Palpable knots or extruding sutures were rare, because the knots were placed relatively deep—the last bite being at the dermal-subdermal layer. In areas where knots were palpable, however, a 2-mm slit was made with a No. 11 blade and the suture was removed. There was an extrusion of the suture in only 1 patient (0.2%).

Clinical results are shown in Figures 22 through 25.

CONCLUSIONS

This technique for double eyelid surgery addresses 2 of the problems seen with previous techniques—namely, an unusually deep fold and a prominent scar when the patient’s eyes were closed. It has also allowed the author to maintain a more “natural” look true to each patient’s own ethnicity, rather than simply yielding a standard “Westernized” look in Asian patients.

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