Blepharoplasty in Asia is almost synonymous with double-eyelid surgery, which refers to the creation of a palpebral fold by supratarsal fixation in patients with no visible or a low supratarsal crease. The best way to develop the supratarsal crease is to achieve a permanent attachment between the dermis and the levator aponeurosis/tarsal plate at an appropriate height.

The creation of a double eyelid was first described in 1896 by Mikamo, who employed a suture technique. Subsequently, the art of double eyelidplasty has undergone changes, with varying degrees of invasiveness and complexity. The ultimate goal is to devise a stable double-eyelid fold with predictable, long-lasting results.

Here, we describe our method for developing a double eyelid with a mini-incision technique and present the results we achieved in 526 consecutive patients who underwent the mini-incision upper blepharoplasty between March 1998 and December 2008.
were treated between March 1998 and December 2008. This method combines the benefits of both nonincisional and open techniques; two small (2-3 mm) incisions are made together, with debulking of the pretarsal soft tissues. This enhances the dermal-levator adherence, which is created with 7-0 Nylon sutures. The scar adhesions between a wider portion of the dermis and the underlying tarsus/levator thus reduce the chance of fold disappearance.

**METHODS**

A total of 526 consecutive patients underwent mini-incision blepharoplasty between March 1998 and December 2008 by the senior author (FYGM). There were 479 women and 47 men. The mean age of the patients was 29.4 years (range, 12-75 years). Seventy-three (14%) were under 20 years old, 249 (47%) were 20 to 30 years old, 117 (22%) were 31 to 40 years old, 66 (13%) were 41 to 50 years old, and 21 (4%) were over 51 years old. We employed the mini-incision technique to create a higher fold in patients who were middle age (40-60 years old) or older when they had no obvious dermatochalasis and requested short downtime or were unwilling to accept the open technique because of social reasons. In all patients, the purpose of the surgery was cosmetic enhancement; patients were either seeking a double eyelid or a heightening of their existing fold. Patients were excluded if they were older and demonstrated obvious dermatochalasis, had heavy brow ptosis, or had heavy and redundant eyelid skin.

Because the goal of our study was to assess the long-term maintenance of the fold with this technique, we collected data on the number of patients who experienced disappearance of their double folds following surgery (as well as the interval at which those folds were lost). Attempts were made to identify the likely reasons for the loss by means of a thorough patient history and retrospective intraoperative assessment. To ensure patient satisfaction and accurate collection of data, our practice was to welcome all patients for follow-up at no extra charge if they experienced any problems whatsoever, no matter how long after the procedure. This enabled us to identify complications from the procedure, which we also recorded. Additional data were collected on patients who did not lose their double folds but required subsequent surgery to adjust the height of the folds.

**Surgical Technique**

The height of the fold was determined according to the patient’s preference, as expressed during preoperative consultation. In general, the chosen height was usually 6 to 8 mm above the lash line for women and 5 to 7 mm for men. Immediately before surgery, with the patient sitting and both eyes level with a mirror, the intended fold height was determined by gently pressing a lacrimal probe on the upper eyelid skin while the patient’s eyes were closed. With the probe maintained in position, the patient was then asked to open his or her eyes and look forward into the mirror at the suggested double fold. The lines could then be moved upward or downward, depending on the patient’s preference. This maneuver was usually repeated a few times until the desired position was confirmed by the patient, at which point it was marked. The same maneuver was performed on the contralateral side and symmetry was assessed. It was important to eliminate the activity of the hyperactive frontalis, if present, by fixing the eyebrow manually (with the surgeon’s finger).

Light sedation was given intravenously and local anesthesia was achieved by injecting a small amount of 2% xilocaine with 1:80,000 adrenaline at the proposed incision sites, from skin to tarsus. In the supine position, two 2- to 3-mm incisions were marked on the desired fold line, one at the level of the medial aspect of the cornea and another at approximately the midpapillary line (Figure 1). The skin was then incised and the underlying orbicularis muscle was split. The submuscular areolar tissue and fat were excised to the level of the pretarsal area and levator aponeurosis (Figure 2). Debunking the pretarsal soft tissue...
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allowed more direct contact (and hence firmer adhesion between the dermis and tarsus). The preaponeurotic fat could also be teased out and removed as necessary through this incision. A 7-0 Nylon suture was then placed to anchor the pretarsal fascia/levator aponeurosis to the dermis at the inferior edge of the incision in a double-loop fashion (Figure 3). A single stitch was inserted to close the skin on the incision site. A cold saline pad was placed on the site to cool the upper eyelid before proceeding to the opposite side. The same procedure was performed on the opposite eyelid, after which the double-eyelid procedure was complete.

Postoperative Care

Immediately after surgery, the patient was asked to sit in a reclining position and the eyelids were cooled with an ice pack for an hour before discharge. The patient was advised to apply the ice pack as frequently as possible for two to three postoperative days. Antibiotics, arnica, and analgesia were administered for three days and suture removal was performed on the fourth postoperative day. Patients were advised not to apply cosmetic products on the upper eyelids and to avoid rubbing their eyelids for the following week. Again, all patients were welcomed to return for follow-up or reoperation if they experienced any problems or complications.

RESULTS

A total of 526 cases of mini-incision upper blepharoplasties were included in this study. There were 450 bilateral and 76 unilateral procedures. Of these, a total of 58 patients (11%) subsequently underwent further operations; 26 patients (4.9%) had height readjustment because of dissatisfaction with the initial height (ie, it was too low), 32 patients (6.1%) had subsequent surgeries to reestablish lost double folds. The timing of reoperation ranged one month to 48 months. One of these patients subsequently had a revision of the upper eyelid scar. One patient had a stitch abscess in the upper eyelid wound and subsequently had a minor procedure to drain the abscess. There were no epidermal cysts or suture granuloma formation noted in this series.

The overall disappearance rate of the folds with this technique was 6%. Seventeen of the 32 patients (53%) who experienced fold loss had unilateral loss; 15 had bilateral loss. With regard to the interval between surgery and loss of folds, two patients lost their folds within one month (6%), seven (22%) within six months, nine (28%) between six and 12 months, seven between one and two years (22%), two between two and three years, and five (16%) after three years.

The mean rate of fold disappearance was 14% (32/214) in the first four years when the senior author was performing this technique, but only 3% (11/312) in the last six years during the period of study. This is most likely due to the learning curve for this technique.

DISCUSSION

Asian blepharoplasty has been the single most popular procedure performed among the Hong Kong Chinese. It is reported that as many as 30% to 60% of the Oriental population has some form of supratarsal crease (double-fold) procedure.2-5 There are several principal methods for double-fold operation. They are the nonincisional, semiopen, and open techniques. The suture method offers speedy reconstruction of the double fold, but carries the drawbacks of potential impermanence and inability to correct adipose fullness.6 This is because the double-eyelid fold created with this method depends on the mechanical strength of the sutures between the dermis and the levator aponeurosis or the tarsal plate. The number of stitches, suture materials, and methods might influence the disappearance of the fold. The reported disappearance rate of nonincisional blepharoplasty varies from 1.31% to 16.8%.7-10 The open technique offers permanence, but is more laborious and technically exacting; it also has a longer downtime and a visible scar. Semiopen techniques with incisions of varying sizes and debulking of underlying pretarsal soft tissues to enhance permanence include the Oh method4 and the partial incision technique.6

Our mini-incision technique offers a versatile and reproducible method of double-eyelid creation that features the benefits of both open and nonincisional methods. The primary indication is for patients who do not wish to have a full-length, visible scar on the eyelids. It is also suitable for patients who have loosened folds without pretarsal adhesion (ie, those with fold disappearance following the nonincisional technique). These patients are, in general, of younger age and do not have excessive fat or upper eyelid skin redundancy. For patients with mild to moderate fat excess, minimal fat extraction can be achieved through the tiny incisions.

The mini-incision technique has several advantages over the open technique. As the fold is anchored by two
A Nylon suture is placed to anchor the dermis in a double-loop fashion.

Figure 5. Levator aponeurosis anchorage should be deep, as shown here.

Figure 6. (A) This 21-year-old woman presented for upper blepharoplasty double-eyelid treatment. (B) Immediately after treatment with the mini-incision technique, the correction can be seen. (C) Four months postoperatively, the patient's fold is maintained, even with the eyes closed (D).

fixation points medial to and at the center of the upper eyelid, the new double-eyelid fold will drape smoothly from medial to lateral when the lid elevates. It hence appears more natural. This technique is relatively simple and easy to perform even for the novice surgeon. It has a shorter operating time, and the fold height can be easily adjusted if needed. The incision sites are small and postoperative swelling is minimal. These all translate into less downtime and a quicker return to normal social life for the patient.

This technique, however, also has some disadvantages. It is limited to patients without excessive upper eyelid fat and skin redundancy. There is a possibility of fold disappearance (in our hands, the rate is 6%). Although it is easy to learn and perform, there is a certain learning curve one has to overcome. Differences in suture tension when tying the knots can lead to asymmetrical fold height. Other possible complications include the appearance of epidermal cysts, suture granulomas, or abscesses.

We noted from this series that individuals with oily skin seem to have an increased rate of fold disappearance. We attributed that to a weak dermis due to the abundance of glands and subsequent failure of suture material to grip the dermis. Another important observation was that, in patients who have lost their folds after this technique, almost all losses were a result of the failure of the suture material to adhere to the dermis. We therefore suggest plicating the dermis twice with Nylon sutures in the loop method (Figure 4), for anchoring on the tarso-levator complex.

It is very difficult to study the precise fading rate. Most patients will not return for follow-up if surgery was successful. Even if there are complications or dissatisfaction, some patients may decide to visit other physicians instead.
of returning to the original surgeon for further corrections. It is the senior author’s practice to inform patients of the possibility of fold disappearance and to guarantee free reoperation within a year (and at a discounted fee thereafter). This, we hope, will enhance the detection of fold disappearance in this group of patients.

Although the surgical steps in this technique are rather straightforward, precise incision placement and levator fixation through the tiny incisions require skill and experience. With these, we believe that surgeons will be able to achieve consistent results.

CONCLUSIONS

The mini-incision technique offers a simple, safe, and reproducible approach to double eyelids in patients with no supratarsal folds. It combines the best of both suture and open techniques. This technique allows a more tenacious fixation between the dermis and the tarsal-levator complex, hence resulting in a more permanent fixation. There is a learning curve with this technique, but the authors feel confident that, with experience, other surgeons will be able to duplicate the consistent results presented here.
Disclosures

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

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