



Mini-incision Blepharoplasty with Pretarsal Fasciectomy for Double-Eyelid Surgery

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Abstract

Background Double-eyelid surgery has been one of the most popular aesthetic surgeries in oriental populations. The objective of this study was to introduce a simple procedure for double-eyelid surgery.

Methods The mini-incision blepharoplasty with pretarsal fasciectomy technique is described and illustrated. Blepharoplasty cases in our practice from June 2018 to December 2019 were retrospectively reviewed. Patients who underwent mini-incision blepharoplasty with pretarsal fasciectomy were followed up for at least 6 months.

Results Of 280 blepharoplasty cases, 32 patients underwent mini-incision blepharoplasty with pretarsal fasciectomy on both upper eyelids. Nineteen patients experienced resolve of swelling within 5 days postoperatively. No loss of fold was observed during follow-up. The satisfaction rate was 93.8%.

Conclusions The mini-incision blepharoplasty with pretarsal fasciectomy is ideal for selected patients requesting double-eyelid surgery. It provides stable, natural, scarless result with minimum complication and rapid recovery.

Level of evidence IV.

Keywords Blepharoplasty · Mini-incision · Pretarsal fasciectomy · Double-eyelid surgery

Introduction

Double-eyelid surgery creates superior palpebral folds by generating adhesions within the eyelids. It has been one of the most popular aesthetic surgeries in oriental populations. Several methods have been proposed to transform the eyelids into the desired look mini-invasively. Tiny-incision and mini-incision blepharoplasty for double-eyelid surgery has been suggested in the past two decades with inspiring results [1–4]. The procedure requires a delicate balance between adhesion promoting and scar prevention. We would like to optimize the outcome and share our experience in mini-incision blepharoplasty with pretarsal fasciectomy, a novel technique with advantages of fast recovering, scarlessness and lasting result, suitable for selected patients.

Methods

Indication

Preoperative simulation is performed by placing a fine tweezer upward with the two tips of its arms about 8 mm apart against the top of the anticipated line of fold while the

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patient stares downward. Turn the tweezer tips upward and backward and tuck the fold in as the patient looks forward. Mini-incision blepharoplasty with pretarsal fasciectomy is appropriate for patients whose preoperative simulation with tweezers or similar simulators elicits ideal shape of the superior palpebral folds (Fig. 1). Patients who are satisfied with the simulation look will most likely be satisfied with their surgical result of mini-incision blepharoplasty.

It is critical to identify the candidates who will benefit from mini-incision blepharoplasty in terms of both recovery time and surgical result. If the patient tolerates long recovery time and expecting a result different from the simulation, traditional methods with full-length incision may be taken to allow excision of excessive tissue and extensive adjustment of the fold line. Patients with slightly or moderately loose upper eyelid skin, normal or slightly atrophic ROOF (indicated by mild concave under the orbital rim [5]) are acceptable. Patients with excessive orbital septal fat, overly redundant eyelid skin and/or weak levator palpebra are generally unable to elicit ideal shape during simulation and thus are contraindicated for this procedure.

Surgical Technique

The palpebral folds are designed 6–8 mm above the superior lid margin on each side in accordance with the simulation. Incision about 6–8 mm long is marked along the most cephalic part of the designed fold (usually right above the pupil, between the level of medial and lateral corneal limbus) as the patient gazes forward. 0.5 ml 2% lidocaine with 1:200,000 epinephrine was injected each side subcutaneously underneath the incision marking. Incisions are made through skin and orbicularis oculi. Dissect on the lower margin of the incision under orbicularis oculi to 1mm above the eyelid margin. Excise the exposed pretarsal fascia and expose tarsus. Use 6–0 nylon

to suture the lower margin of orbicularis oculi to the tarsus. Upper margin of orbicularis oculi is left freely. After hemostasis, close the skin with 8–0 nylon interrupted suture (Fig. 2).

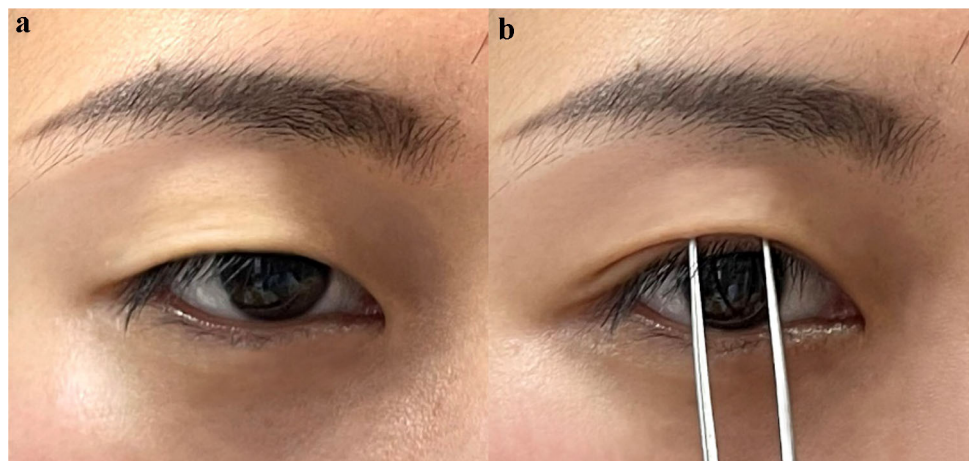
Case Series

Between June 2018 to December 2019, 32 patients out of 280 blepharoplasty candidates underwent mini-incision blepharoplasty with pretarsal fasciectomy, including 7 male patients and 25 female patients in our institutions. The average age was 28 years (range 16–45). Follow-up was conducted via WeChat (an instant messaging app) if the patient could not come by the clinic at the specific time period. Patients were asked if they were satisfied with current outcome or not, and to explain the reason. All patients responded to the follow-up in June–July, 2020. Patients were also told before the surgery that they were welcomed to contact the surgeon or the clinic if they experience any loss of fold or other unaesthetic result.

Results

On postoperative day 5 when the sutures were removed, 19 patients had almost completely resolved swelling, 9 had minimal edema, and 4 did not show up (sutures were removed in outside clinic) but sent us photographs of recovering. By the time of follow-up, the patients were at least 6 months postoperative, with the longest being 24 months (average 15.45 months). No loss of folds was observed. Two patients were dissatisfied and underwent revise surgery: one with loose and multiple folds in the upper eyelid skin before the surgery complaint of heaviness and persistent multiple folds 5 months after the surgery and the other patient with preoperative asymmetry complaint of

Fig. 1 Preoperative simulation. **a** preoperative look of single eyelid. **b** Simulation with a tweezer



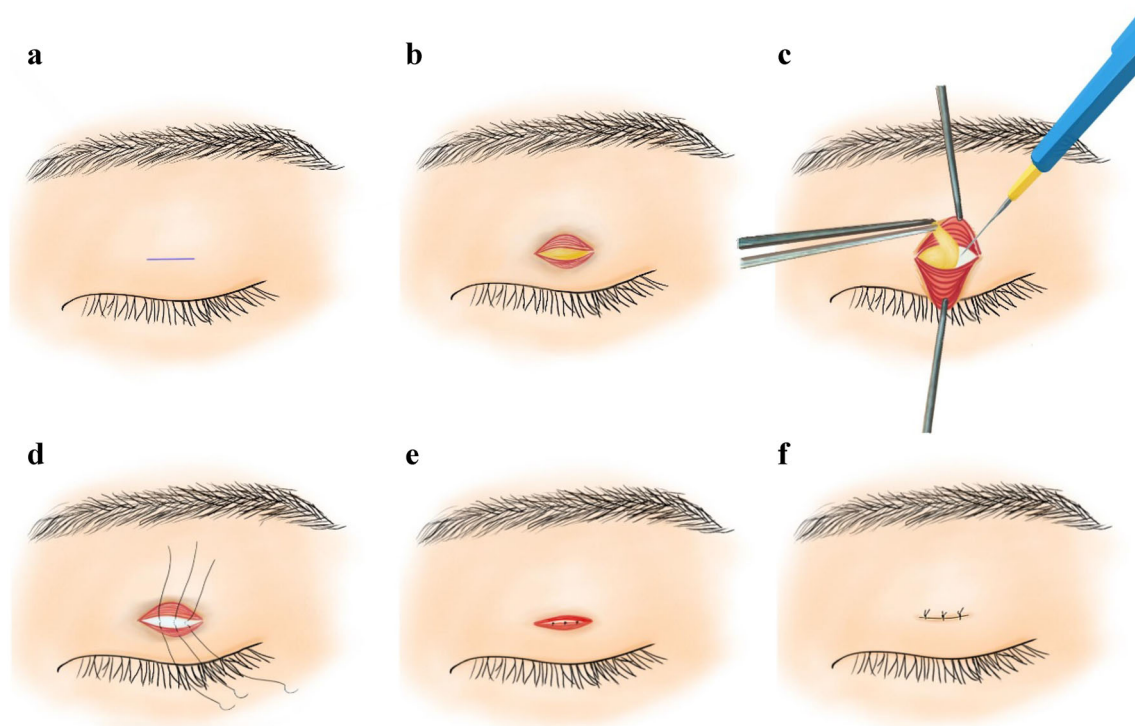


Fig. 2 Surgical technique of mini-incision blepharoplasty with pretarsal fasciectomy. **a** Incision marking. **b** Make incision through skin and orbicularis oculi, dissect and expose pretarsal fascia.

c Excising pretarsal fascia. **d** and **e** Fixation of lower margin of orbicularis oculi to the tarsus and formation of anchoring plane, upper margin left free. **f** Close the wound

continued asymmetry after the surgery. The rest were satisfied with the current outcome. No other patient had surgery-related complaint or filed for revision surgery. The overall satisfaction rate was 93.8% (30/32), p -value is $< .00001$ using Mann–Whitney U Test.

Preoperative, postoperative and follow-up photographs of two cases are shown in Figs. 3 and 4. For most patients, the appearance of the upper eyelids is almost identical between postoperative day 5 (Fig. 3c) and postoperative

day 90 (Fig. 3d), signifying fast recovery. Scars are concealed in the palpebral folds (Figs. 3e, 4d) and invisible upon closed eyes.

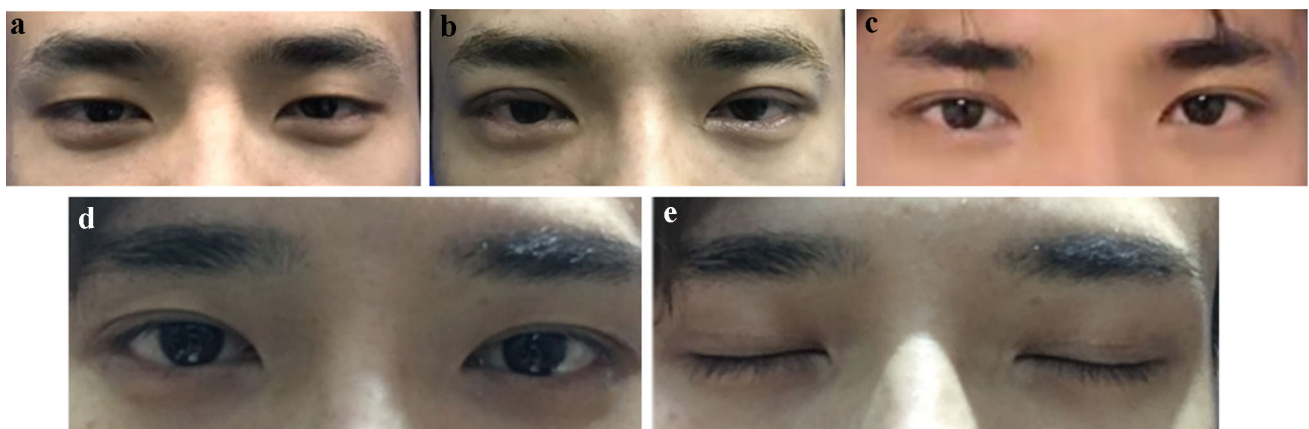


Fig. 3 25-year-old male presented with single eyelid. **a** Preoperative view. **b** Immediate postoperative view. **c** Postoperative day 5. **d** and **e** Postoperative day 90

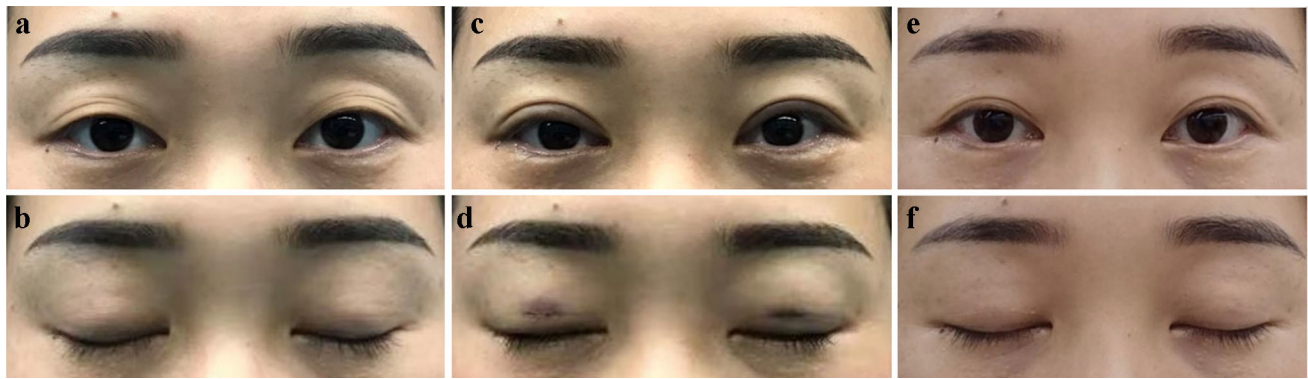


Fig. 4 39-year-old female presented with loose upper eyelids. **a** and **b** Preoperative view. **c** and **d** immediate postoperative view. **e** and **f** 6 months postoperative

Complications and Note of Caution

One patient developed purulent infection within 7 days after the surgery, which may be related to her resuming dance practicing within 24 h post operation. The patient recovered after topical erythromycin ointment application and developed noticeable scarring. She understood the complication and was satisfied with the outcome. Preventing sweating or water into the wounds for 72 h after surgery may be necessary to allow full epithelialization of the surgical wounds and decrease the chance of infection.

No other complication developed intra- and perioperatively in this case series. Minimum chance of hematoma was expected since the scope of dissection was limited, and hemostasis was achieved before wound closure. Cornea abrasion should be avoided with protector in less experienced hands. Potential risk of levator aponeurosis injury is possible as anatomical variation may occur and levator aponeurosis may be mistaken for pretarsal fascia. Pretarsal fascia is a layer of fatty tissue that is continuous with ROOF. Its dynamical behavior is different from the levator aponeurosis as the patient opens their eyes, which can be directly observed during surgery. Suturing of orbicularis to the aponeurosis is acceptable in the case of variation.

Discussion

Complete renovative technique is hard to see today especially for procedures with ancient history like double-eyelid surgery. This technique is our original variation based on existing methods. The keys are mini-incision to aid fast recovering, preservation of the orbicularis to prevent scarring and fasciectomy to prevent loss of folds.

Tiny-incision and mini-incision blepharoplasty for double-eyelid surgery has been suggested. Chen et al. [2] proposed minor-incision technique where a single 1cm incision is put in the center of the future crease, and levator

aponeurosis and inferior dermis are sutured together tightly with 6–0 prolene. No hypertrophic scar was observed. 8/200 cases had partial loss of the crease. No patient developed edema after surgery except for one with hematoma, suggesting that this method promotes fast recovery.

Buried-suture or non-incisional double-eyelid blepharoplasty is a traditional method date back to more than a century ago. Main problem of buried-suture technique is loosening of the fold, with an incidence rate reported to be 1.31%–16.8%. 30% of disappearance occurred within 1 year, 88% within 5 years [6]. Some believe the reason to be insufficient skin exposure to the tarsus and excessive retention of the orbicularis oculi muscle [7]. On the other hand, vigorous excision of orbicularis muscle may cause scarring. Zhang et al. [1] proposed modified double-eyelid operation with three tiny incisions where pretarsal subcutaneous tissue at the level of incisions including a strip of orbicularis oculi and pretarsal adipose tissue was excised. Skin was directly adhered to the tarsus. The scar contracture and dents were noticeable until at least 5 months after the surgery, and less evident in 1 year, making it slightly better than traditional Asian blepharoplasty, suggesting that orbicularis removal other than incision might be a more important factor for scarring.

Park et al. [8] proposed orbicularis–levator fixation. Wu et al. [9] proposed orbicularis–levator–tarsus composite suture technique. Sun et al. [10] proposed orbicularis–tarsus fixation. These techniques all features full-length incision, adhesion of orbicularis to the deeper structures and skin-to-skin wound closure. They all suggested that crease formation requires only solid fixation of the orbicularis, other than the skin or the dermis, to the deeper structures. The preserved muscle provides good blood supply to the skin, helps prevent scarring.

Our technique features on removal of pretarsal fascia, a loose structure that builds in front of the tarsus. Slaking of pretarsal fascia may result in loss of folds as the fixation failed to maintain on the tarsus. Pretarsal fasciectomy facilitates

exposure of the tarsus and promotes strong adhesion of the tarsus to the orbicularis oculi muscle. And since the tarsus is anatomically connected to the levator, contraction of the levator will elevate the tarsus and the adhered orbicularis upward and backward along the convex of the globe and form a crease. In addition, as the muscle is directedly adhered to the tarsus, the adhesion will not be interrupted by muscle contraction or fat in the long run, and therefore helps with lasting of surgical result. In our series, the average follow-up time is 15.45 months and no loss of folds was observed. No loss of fold has been reported by the patients for another 8 months up until the submission of this manuscript.

We recommend this technique to selected patients, in whom fast recovery is demanded, and skin or fat excision is not indicated at the same time. According to our record, 11.5% (32/280) of patients seeking blepharoplasty met the criteria and underwent this novel procedure. Successful preoperative simulation with tweezers for ideal candidates signifies that adhesion fixated at the level between tips of the simulation tweezer shall create an anchoring line that will lead the fold medial and lateral to the incision to follow spontaneously and form a natural-looking crease line without further adjustment.

For patients with folds before the surgery, adoption of this technique may cause persistent multiple folds. Exception to this is with shallow multiple folds (as in Fig. 4a) which are weak adhesions that disappear during simulation and will not affect the surgical result (Fig. 4c–f). Caution should be taken for patients with preoperative asymmetry of the eyes and the eyelids as well, since little additional adjustment can be made through mini-incision.

The limitation of this study consists of suboptimal study design and small sample size. The quantified criteria for preoperative and postoperative evaluation and indication for this technique are yet to be set. The patients were not followed up at a set time prospectively after the surgery but were followed up together retrospectively with the follow-up time between 6 months and 24 months. Patients were told to contact us and file for revision should any loss of fold or other unaesthetic issue occur. Furthermore, this technique is apt for a small portion of single-eyelid population. It will take some years or more to recruit a larger sample size and evaluate the results in a larger time scale.

Conclusions

The mini-incision blepharoplasty with pretarsal fasciectomy is ideal for selected patients requesting double-eyelid surgery. It provides lasting, natural looking, scarless result with minimum complication and short recovering phase. The key is to identify eligible patients preoperatively.

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Declarations

Conflict of interest The authors declare that they have no conflicts of interest to disclose.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent Informed written consent as permission for the use of the patient images was obtained.

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