

Treatment of Suture-related Complications of Buried-suture Double-eyelid Blepharoplasty in Asians

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Background: Double-eyelid blepharoplasty is a popular aesthetic surgery in Asians. However, the buried suture technique is associated with complications related to implantation of the suture thread. The present study was performed to identify optimal surgical suture removal techniques in Japanese patients with suture-related complications after buried suture double-eyelid blepharoplasty.

Methods: This retrospective study included 210 upper eyelids of 116 consecutive Japanese patients who had undergone buried suture double-eyelid blepharoplasty at other clinics. All patients underwent suture removal surgery at the author's institution for treatment of suture-related complications. Although 12 patients (10.3%) underwent suture removal surgery alone, 104 (89.7%) underwent secondary double-eyelid blepharoplasty. The outcomes of 3 techniques were evaluated: the small skin incision method, the full skin incision method, and the conjunctival method.

Results: The small skin incision method was performed in 46 patients, the full skin incision method in 63, and the conjunctival method in 7. The success rate of the full skin incision method was significantly higher than that of the small skin incision method (4.8% vs 37.0%, respectively; $p < 0.0001$). Patients with an uncomfortable pulling sensation exhibited a linear scar or depressive deformity without inflammation of the tarsal plate and impingement on the subconjunctival capillary vessels of the tarsal plate or a depressive deformity of the levator muscle. Patients with corneal irritation exhibited chronic inflammation of the conjunctival surface of the tarsal plate.

Conclusions: Suture-related complications of buried suture double-eyelid blepharoplasty in Asians must be treated with suture removal surgery. The full skin incision method is more reliable than the small incision method for such patients. (*Plast Reconstr Surg Glob Open* 2016;4:e839; doi: 10.1097/GOX.0000000000000835; Published online 12 August 2016.)

Double-eyelid blepharoplasty is a popular aesthetic surgery in Asian countries and is performed using one of the 2 alternative approaches: the incisional method¹ or the buried-suture method.² The incisional method is advised in cases of secondary surgery or patients with excessive amounts of fat or redundant skin in the upper eyelid because this technique is associated with a lower rate of double-eyelid loss. The buried-suture method is most often indicated as primary surgery if the patient wants to avoid visible surgical scars. Additionally, the buried-suture method is more easily revised. Ease of

suture removal must be taken into account when performing double-eyelid blepharoplasty because some patients casually decide to undergo surgery, but later change their minds and request to return to their original eyelid.

The main disadvantage of the buried-suture method is the high possibility of disappearance of the newly created double eyelid. To overcome this major complication, a variety of surgical approaches have been described using increased numbers of buried-sutures and other complex procedures.³⁻¹¹ However, buried-suture double-eyelid blepharoplasty involves implantation of the suture thread as a foreign material. Therefore, potential complications caused by foreign material should be considered. The author previously reported various suture-related complications after buried-suture double-eyelid blepharoplasty.¹² Most affected patients have long-term mild pain or an uncomfortable pulling sensation that has been considered negligible subclinical symptoms by surgeons.

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Previous reports have given little attention to suture-related complications; only a few such complications have been included in the literature as common complications of blepharoplasty.¹³⁻¹⁷ The author has frequently encountered patients who underwent buried-suture double-eyelid blepharoplasty using multiple sutures at another facility and had long-term mild pain or an uncomfortable pulling sensation that was relieved after complete suture removal. Therefore, suture-related complications should be considered as potential complications of blepharoplasty. The purpose of this study was to introduce surgical methods for suture removal to treat suture-related complications of buried-suture double-eyelid blepharoplasty in Asians.

MATERIALS AND METHODS

Patients

From January 2003 to January 2012, a retrospective study was conducted on suture-related complications in 116 consecutive Japanese patients who underwent suture-removal surgery after having undergone buried-suture double-eyelid blepharoplasty at other clinics. The series included patients who requested suture-removal surgery because of uncomfortable ophthalmic symptoms such as corneal irritation, a pulling sensation, and a foreign-body sensation. Patients with suture-related skin nodules in the upper eyelids without uncomfortable ophthalmic symptoms were also included. Patients with no suture-related complications who requested suture removal because of dissatisfaction with the prior surgery were excluded from this study. Although 12 patients (10.3%) underwent suture-removal surgery alone, 104 (89.7%) underwent secondary double-eyelid blepharoplasty (buried-suture method, $n = 18$; buried-suture method combined with resection of the pretarsal orbicularis oculi muscle through a small skin incision,¹² $n = 23$; and full skin incision method, $n = 63$) associated with suture-removal surgery. All patients underwent surgery performed by a single surgeon (T.M.). All patients

provided written informed consent. This study conformed to the tenets of the Declaration of Helsinki.

Surgical Methods for Suture Removal

Suture removal is the only treatment that can resolve suture-related complications of buried-suture double-eyelid blepharoplasty. Three surgical methods for suture removal were performed under local anesthesia. A surgical loupe was used for magnification.

Small Skin Incision Method

The small skin incision method was indicated if the number of buried threads was small or at the patient's request. Discussions with the patient and skin findings such as a stab-incisional depressive scar, visible knots of the buried suture, or suture nodules were helpful to locate the buried sutures. A small skin incision was made above the predictable location of the ligation portion of the buried suture. In most cases, blue nylon thread had been used as the buried suture. Blue nylon thread loses its color in time, but the ligated portion might maintain color even after more than 10 years; thus, it becomes a mark for discovery of buried sutures. Using small forceps, the knot of the buried thread was picked up outside the skin incision after dissection of the buried thread from the surrounding scar tissue (Fig. 1A). If only the knot of the buried suture was erroneously removed during suture-removal surgery, the remnant of the buried suture was iatrogenically left in the tarsal plate (Fig. 1B). In such cases, the remnant of the buried suture in the tarsal plate could move toward the conjunctival surface and cause corneal irritation, which should be avoided. After confirmation of continuity of the buried suture, the suture ring was cut and the suture was completely removed.

Full Skin Incision Method Combined with Secondary Double-Eyelid Blepharoplasty

The full skin incision method was indicated when the number of buried threads was large or at the patient's

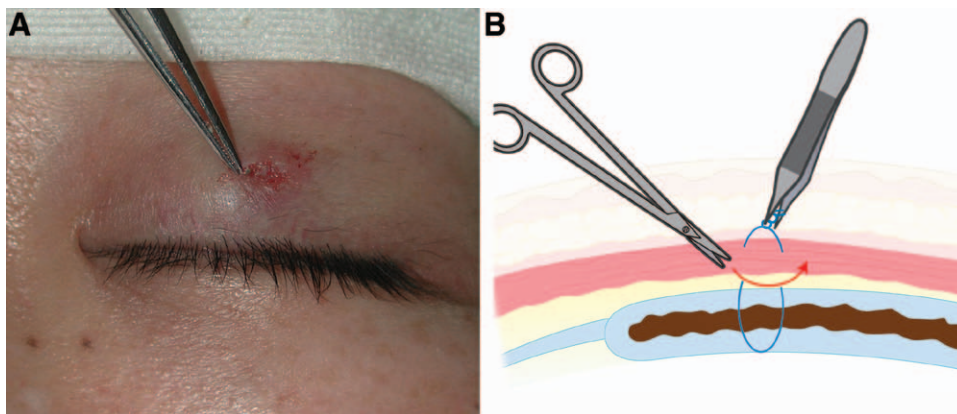


Fig. 1. A, Suture-removal surgery after buried-suture double-eyelid blepharoplasty was performed by means of the small skin incision method. Using small forceps, the ligation portion of the buried thread was picked up outside the skin incision. B, If only the knot of the buried suture was erroneously removed during suture-removal surgery, the remnant of the buried suture was iatrogenically left in the tarsal plate. The remnant of the buried suture in the tarsal plate had the potential to move forward to the conjunctival surface, causing corneal irritation.

request. The full skin incision method is suitable for suture removal because it provides a good view of the surgical field. After full skin incision, the buried sutures were revealed in the surgical field (Fig. 2A). Double-prong sharp retractors were used to stretch the incision, and this helped to reveal the buried sutures under the skin and remove them (Fig. 2B). The strip of the orbicularis oculi muscle was excised immediately above the lower skin edge. The buried sutures were also removed if they were located under the orbicularis oculi muscle (Fig. 2C). Meticulous cleaning using a dry sponge was helpful to discover the buried sutures. The orbital septum was divided to expose the entire levator aponeurosis (Fig. 2D). If any adhesion was present, release of the adhesion was needed. The buried sutures were rarely found in the orbital fat or under the levator aponeurosis. Aggressive and deep dissection can cause partial levator dehiscence, which requires repair. The preaponeurotic fat was completely released from the levator aponeurosis and appropriately excised. If retro-orbicularis oculi fat was excessive, it was also excised. The upper and lower skin edges were both fixed with 7-0 nylon stitches to the levator aponeurosis along the superior tarsal border to create new double eyelids. These stitches were removed after 5 to 7 days. No buried sutures of any kind were used for this method.

Conjunctival Method

The conjunctival method was mainly indicated for late-onset suture extrusion (Fig. 3). Sudden severe corneal irritation occurred in some patients with late-onset suture

extrusion several years after undergoing the buried-suture double-eyelid blepharoplasty. The buried thread in the conjunctiva was easily removed using small forceps because the thread was often broken and free. However, if the buried thread was not removed because the knot was undissolved, the small skin incision method was required.

Outcomes Assessment

The upper eyelids were photographed for record-keeping purposes at the time of suture-removal surgery. During the postoperative follow-up, an interview about the alleviation in symptoms was conducted and local findings were recorded. Fisher's exact test was used to compare the failure rate between the small skin incision method and the full skin incision method.

RESULTS

In total, 210 upper eyelids were treated in 116 patients. Table 1 summarizes the patients' characteristics. The patients' medical histories revealed the following numbers of buried-suture double-eyelid blepharoplasties: 1 surgery in 80 patients, 2 surgeries in 25 patients, 3 surgeries in 10 patients, and 4 surgeries in 1 patient (average of 1.4 surgeries per patient). The mean time interval until suture removal after the buried-suture double-eyelid blepharoplasty was 5.3 years (range, 1 mo to 30 y).

The local findings of the upper eyelid are shown in Table 2. Various types of cases were included in this study. Patients with an uncomfortable pulling sensation exhibited a linear scar or depressive deformity without

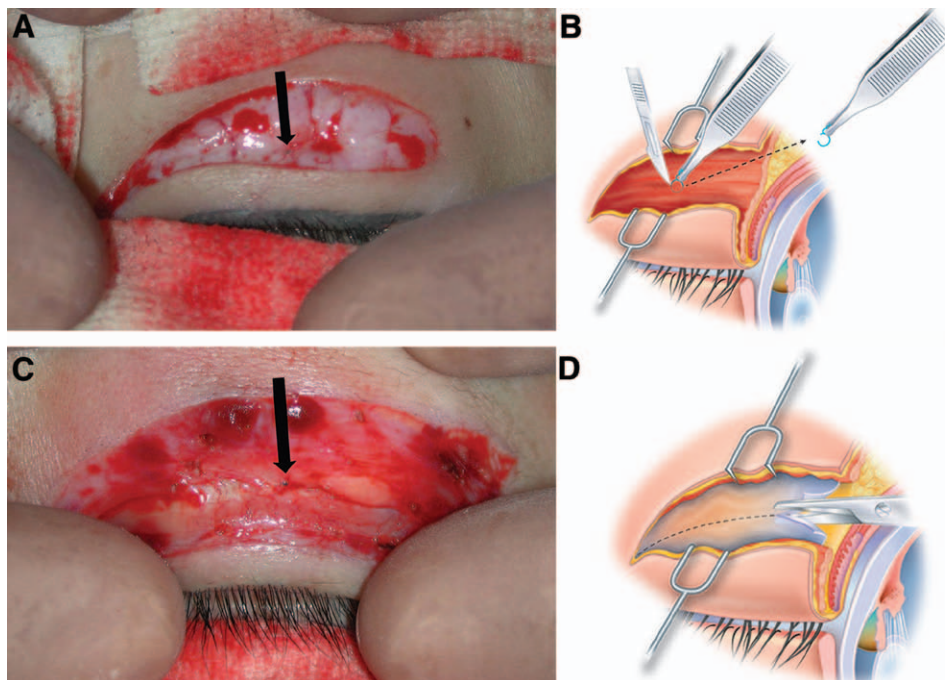


Fig. 2. Full skin incision method combined with secondary double-eyelid blepharoplasty. A, After the full skin incision, the buried suture (arrow) was revealed in the surgical field. B, Stretching the incision open with double-prong sharp retractors made it easier to locate the buried sutures under the skin and remove them. C, The buried suture (arrow) was also removed if it was located under the orbicularis oculi muscle. D, The orbital septum was divided to expose the entire levator aponeurosis.

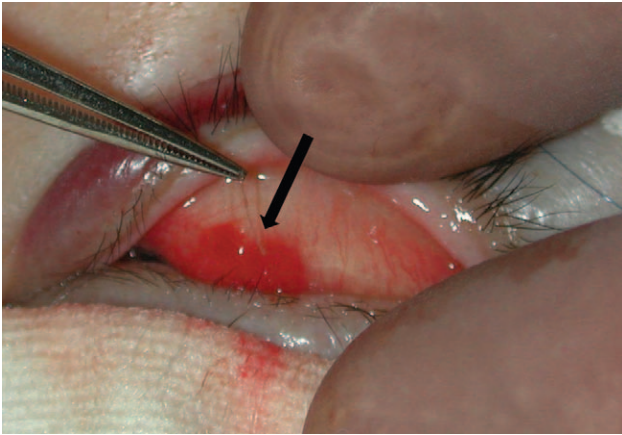


Fig. 3. Conjunctival findings showed late-onset suture extrusion. The ruptured buried suture was easily removed via the conjunctival method using small forceps. Reprinted with permission from *J Jpn Aesthet Plast Surg* 2012; 34:15–21.

Table 1. Summary of Patient Characteristics

No. of Patients	116
Sex, n (%)	
Female	104 (89.7)
Male	12 (10.3)
Mean age, y	29.1 (16–69)
No. of treated upper eyelids	210
Unilateral right upper eyelids	11
Unilateral left upper eyelids	11
Bilateral upper eyelids	94
Mean follow-up duration, mo	7.1 (1–54)*

Data are presented as n, n (%), or mean (range).

*Of 116 cases, 78 (67.2%) were followed up for 1 mo.

Table 2. Local Findings of the Upper Eyelid after Buried-Suture Double-Eyelid Blepharoplasty

	No. of Patients (%)
Conjunctival findings	
Linear scar without inflammation of the tarsal plate	59 (50.9)
Depressive deformity of the levator muscle	2 (1.7)
Chronic inflammation of the tarsal plate	37 (31.9)
Late-onset suture extrusion	12 (10.3)
Cutaneous findings	
Chalazion-like suture granuloma	4 (3.4)
Skin suture extrusion or superficially located suture knot	19 (16.4)

inflammation of the tarsal plate and impingement on the subconjunctival capillary vessels of the tarsal plate (Fig. 4A) or a depressive deformity of the levator muscle (Fig. 4B). In patients with corneal irritation symptoms, such as discomfort, grittiness, and ocular discharge, the conjunctival surface of the tarsal plate showed various degrees of chronic inflammation of the tarsal plate (Fig. 4C). These changes were specifically observed in patients who had undergone the penetrating type of tarsal plate fixation during buried-suture double-eyelid blepharoplasty. This method is a variant of buried-suture double-eyelid blepharoplasty where the surgeon used su-

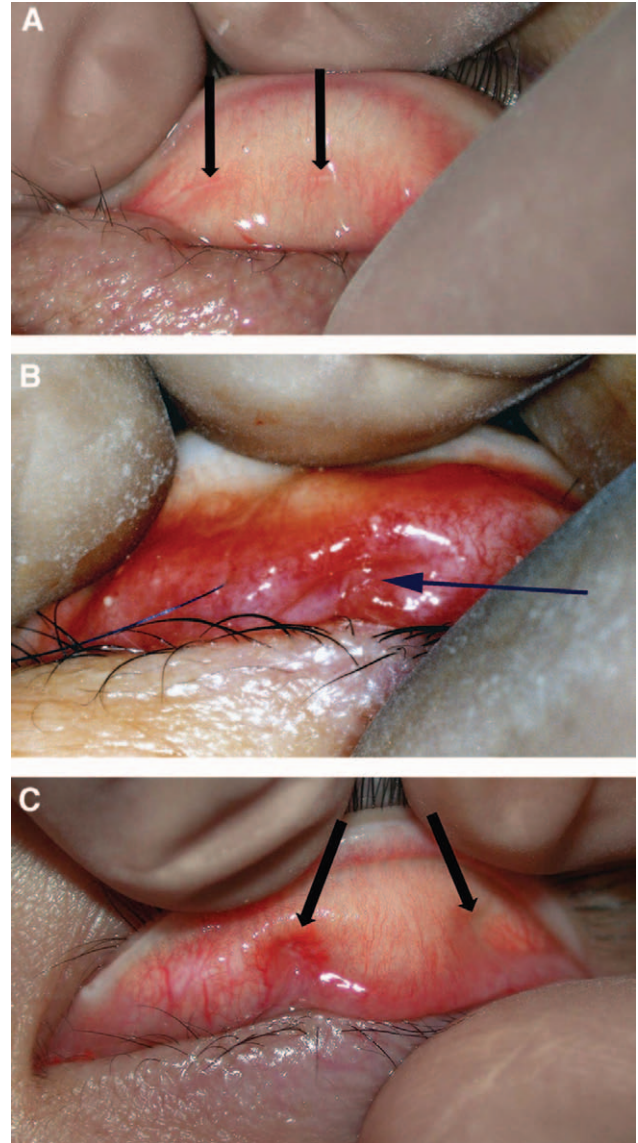


Fig. 4. Conjunctival findings showed (A) a linear scar without inflammation of the tarsal plate and impingement on the subconjunctival capillary vessels of the tarsal plate (arrows), (B) depressive deformity of the levator muscle (arrow), and (C) chronic inflammation of the tarsal plate and depressive deformity of the tarsal plate (arrows).

tures that passed through the full thickness of the tarsal plate, whether from anterior or posterior surface of the tarsal plate, and where the buried knot was located in the front of the tarsal plate. Various degrees of depressive deformities of the tarsal plate were also noted.

Chronic inflammation of the tarsal plate was sometimes associated with chalazion-like suture granulomas, which are small nodules in the deep part of the eyelids (Fig. 5A). Late-onset suture extrusion accompanied by chronic inflammation of the tarsal plate was also seen (Fig. 3). Skin suture extrusion and a superficially located suture knot (visible suture knot) were other cutaneous findings (Fig. 5B). These patients had no uncomfortable ocular symptoms, and they requested the surgical

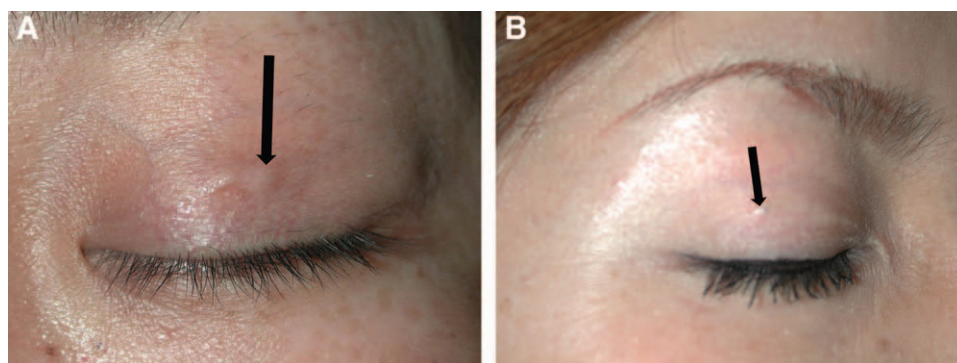


Fig. 5. Cutaneous findings showed (A) a chalazion-like suture granuloma (arrow) and (B) superficially located suture knot (arrow).

procedure for cosmetic purposes. These sutures were easily removed using the small skin incision method.

The results of the surgical procedures for suture removal are shown in Table 3. Among all 116 patients, the small skin incision method was performed in 46 patients, the full skin incision method in 63, and the conjunctival method in 7. The number of sutures removed ranged from 1 to 7 per unilateral upper eyelid (mean, 2.21). Failure of complete suture removal due to the inability to locate the suture or the iatrogenic presence of a remnant of the buried suture occurred in 20 patients (17.2%). The success rate of the full skin incision method was significantly higher than that of the small skin incision method (4.8% vs 37.0%, respectively; $p < 0.0001$).

During the postoperative follow-up after surgical suture removal, chronic inflammation and depressive deformity of the tarsal plate improved in most patients. However, the linear scar of the tarsal plate was unchanged. For many patients, prior symptoms were alleviated after complete suture removal and eversion of the tarsal plate became easier. Of 12 patients who underwent suture-removal surgery alone, 3 (25%) exhibited disappearance of the double eyelids during the follow-up period.

DISCUSSION

Although the most common complications of blepharoplasty are well reported in the literature,¹³⁻¹⁷ there has been little discussion on the suture-related complications of buried-suture double-eyelid blepharoplasty. Suture-removal surgery is necessary to treat suture-related complications of buried-suture double-eyelid blepharoplasty. To the author's knowledge, this is the first report on suture-removal surgery to treat suture-related complica-

tions of buried-suture double-eyelid blepharoplasty in the literature. The author used three surgical methods: the small skin incision, full skin incision, and conjunctival methods. The success rate of the full skin incision method was significantly higher than that of the small skin incision method. Therefore, the full skin incision method is reliable for suture-removal surgery. The conjunctival method was applied to a limited number of patients with late-onset suture extrusion.

Most patients are reluctant to remove the buried sutures causing suture-related complications because the created double-eyelid folds might be lost after suture-removal surgery. Therefore, the time interval between buried-suture double-eyelid blepharoplasty and suture-removal surgery may be long. In such cases, the buried sutures deteriorate and lose color in time, making it difficult to find the buried sutures intraoperatively, especially when using the small skin incision method. In this situation, the full skin incision method may be required to completely remove the buried sutures. In general, many patients are reluctant to undergo the full skin incision method for the very first time because of the major disadvantage of an incisional scar on the upper eyelid skin. Creation of a full skin incision to remove the sutures is less desirable than the buried-suture method, which leaves no visible scarring. However, the full skin incision method combined with secondary double-eyelid blepharoplasty is a more precise and permanent technique.

The conjunctival fixation sites used in buried-suture double-eyelid blepharoplasty include the tarsal plate and the levator muscle.¹⁸ The penetrating tarsal plate fixation method of buried-suture double-eyelid blepharoplasty resulted in specific suture-related complications, such as corneal irritation due to various degrees of chronic

Table 3. Surgical Procedures for Suture Removal

	No. of Patients (%)	No. of Sutures Removed per Eyelid (Mean \pm SD)	No. of Patients with Failed Suture Removal (%)
Small skin incision method	46 (39.7)	1-4 (1.58 \pm 0.83)	17 (37.0)*
Full skin incision method	63 (54.3)	1-7 (2.57 \pm 1.52)	3 (4.8)*
Conjunctival method	7 (6.0)†	1-2 (1.1 \pm 0.33)	0 (0.0)
Total	116 (100.0)	1-7 (2.21 \pm 1.34)	20 (17.2)

*The failure rate of the full skin incision method was significantly lower than that of the small skin incision method ($p < 0.0001$).

†All patients had late-onset suture extrusion.

inflammation and deformity of the tarsal plate. Chronic inflammation of the tarsal plate was occasionally spread out into the subcutaneous tissue along the buried suture. This might result in the formation of chalazion-like suture granuloma at the skin level. Several years after surgery, sudden severe corneal irritation may also occur due to late-onset suture rupture. The suture should be buried completely within the eyelid, and the conjunctival surface of the tarsal plate should remain intact to prevent the conjunctival complications seen when the penetrating-type tarsal plate fixation method is used. This study indicates that the uncomfortable pulling sensation was caused by formation of a linear scar, depressive deformity of the tarsal plate, or depressive deformity of the levator muscle. Postoperative blepharoptosis may occur after the use of the levator muscle fixation method because of the depressive deformity of the levator muscle.

Skin suture extrusion and superficially located suture knots on the eyelid are unfavorable surgical results at the skin level. In the case of superficially located suture knots, the buried threads are visible through the skin as papules, which were found by patients to be aesthetically undesirable. To decrease complications of the eyelid skin, the number of suture knots should be minimal and appropriately located in the orbicularis oculi muscle.

Many surgeons have come to erroneously expect permanent outcomes using buried-suture double-eyelid blepharoplasty; thus, complicated procedures have been developed. After performing these complicated procedures, which include multiple interrupted sutures or continuous sutures, complete suture removal may be difficult using the small incision method.¹¹ In the author's opinion, the simple method is better than more complicated procedures, which make it challenging to remove buried sutures.

Although the suture-related complications of buried-suture double-eyelid blepharoplasty were reduced with our modified techniques,¹² the suture-related complications still occurred in our series. The actual incidence of the suture-related complications of buried-suture double-eyelid blepharoplasty is still unclear and needs to be further investigated.

CONCLUSIONS

Suture-removal surgery is indicated to treat suture-related complications of buried-suture double-eyelid blepharoplasty in Asians. The full skin incision method combined with secondary double-eyelid blepharoplasty is more reliable than the small incision method for suture-removal surgery.

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