

Comprehensive Considerations in Blepharoplasty in an Asian Population: A 10-year Experience

Lingli Guo · Hongda Bi · Chunyu Xue ·
Junhui Li · Chao Yan · Jianxing Song ·
Mingli Zhang · Xin Xing

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Abstract

Background This article discusses the effectiveness, patient selection criteria, complications, and the appropriate procedures for lower blepharoplasty in an Asian population.

Methods During the past 10 years (1998–2008), a total of 2400 patients underwent lower blepharoplasty in our department. Four different types of lower-blepharoplasty procedures were performed, including the traditional transcutaneous skin flap procedure ($n = 862$), the transcutaneous skin-muscle flap procedure ($n = 738$), the transconjunctival procedure ($n = 433$), and Hamra's procedure (septal reset and fat-replacing technique) ($n = 367$). Among these 2400 patients, 925 were available for follow-up. The length of follow-up ranged between 1 month and 10 years.

Results Most of the patients were satisfied with the result, but 32 patients had some postoperative complications, including five patients with ectropion, five with hollow eyes, two with dry eyes, and 20 with retraction.

Conclusions Transconjunctival blepharoplasty is the first choice for primary eyelid bags. Transcutaneous lower blepharoplasty (skin flap or skin-muscle flap procedures) is indicated for the senile eyelid with excess skin and muscles. If supporting structures (skin, muscle, and septum) show laxity and other aging stigma are present, including tear trough deformity and obvious skeleton rim, Hamra's

procedure (septal reset and fat-replacing technique) is performed.

Keywords Transconjunctival lower blepharoplasty · Transcutaneous lower blepharoplasty · Hamra's lower blepharoplasty · Asian population

The well-known saying “eyes are a window to the soul” reflects the perception that a beautiful face begins with the eyes. The lower-eyelid contour in youth is smooth, but with advanced age it is disturbed by dermatochalasis, herniated fat, tear trough deformity, nasojugal groove, static rhytides in the periorbital region, and crow's feet. The periorbital area is a cosmetically sensitive area of the face, and lower blepharoplasty is currently one of the most commonly performed aesthetic procedures. Lower blepharoplasty has been introduced in China to rejuvenate the lower eyelid since the late 1970 s and includes the traditional skin flap transcutaneous procedure, the skin-muscle flap transcutaneous procedure, the transconjunctival procedure, and Hamra's procedure (the septal reset and fat-replacement technique).

Before the operation, the plastic surgeon must carry out a comprehensive analysis of the patient and choose the proper rejuvenation procedure to obtain a satisfactory aesthetic result. During the last 10 years (1998–2008), a total of 2400 patients underwent lower blepharoplasty in our department. Among these 2400 patients, 925 were available for follow-up. Reviewing our experience with lower-eyelid blepharoplasty from the last 10 years, we conclude that the principles and the choice of appropriate procedures are different for Asians compared to Caucasians. The aim of this study is to demonstrate the effectiveness, patient selection criteria, complications, and the

L. Guo · H. Bi · C. Xue · J. Li · C. Yan · J. Song · M. Zhang ·
X. Xing (✉)
Department of Plastic Surgery, Changhai Hospital, Second
Military Medical University, 168 Changhai Road, Shanghai
200433, China
e-mail: Xingxin56@yahoo.com.cn; xingxin1956@yahoo.com

appropriate procedures of lower-eyelid blepharoplasty in an Asian population.

Anatomy

The surgical anatomy of the lower eyelid is composed of an anterior and a posterior lamella. The anterior lamella is composed of the orbital septum, the orbicularis oculi muscle, and the skin. The orbicularis oculi muscle is further divided into pretarsal, preseptal, and orbital segments. The posterior lamella is composed of the tarsus, lower-eyelid retractor (or lower capsulopalpebral fascia), and the conjunctiva. The anterior lamella (skin, orbicularis oculi muscle, and septum) inserts into and supports the tarsal plate, which is responsible for the proper position of the lower-eyelid tarsus. When the supporting structures are vertically shortened, commonly as a result of overresection in blepharoplasty, lower-eyelid retraction, or ectropion, will occur. Laxity of the tarsus or the canthal ligament (especially lateral) will result in senile retraction or ectropion.

The infraorbital fat, located between the anterior and the posterior lamella, is bound anteriorly by the infraorbital septum and posteriorly by the lower-eyelid aponeurosis. The infraorbital fat is divided arbitrarily into three compartments, medial, central, and lateral, by means of the inferior oblique muscle and Lockwood's ligament. Eyelid bags arise from the pseudoherniation of the orbital fat due to gravity or the lengthening and attenuation of support structures (skin, orbicularis oculi muscle, and septum).

Tear trough deformity is another common problem encountered in the aging lower eyelid. It begins medially below the inferior orbital rim, extending laterally along the orbital rim. The laxity of the ligament, the descent of the malar fat pad, and the descent or atrophy of the orbital fat pad contribute to the formation of the tear trough deformity (Fig. 1).

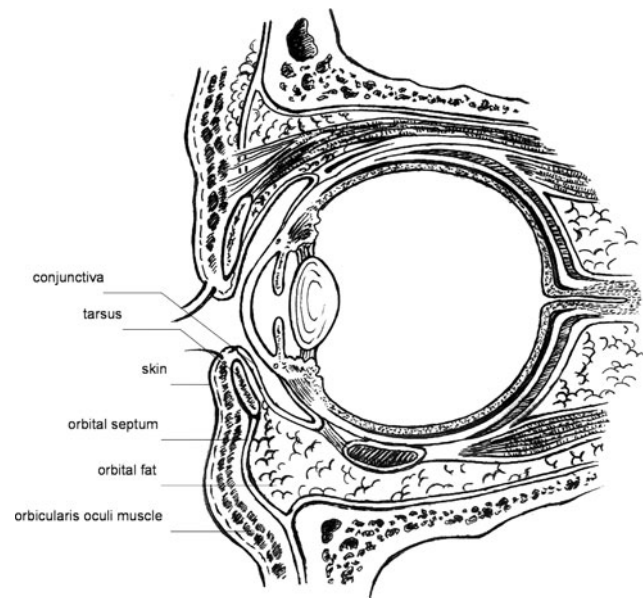


Fig. 1 Schematic diagram for surgical anatomy of lower eyelid

Preoperative Evaluation and Selection of Procedures

Before surgery a thorough medical history is recorded. An ophthalmic examination is done; eye diseases such as glaucoma and high-grade myopia will affect the aesthetic results. All anticoagulant drugs are discontinued at least 1 week before the operation, and diseases such as Graves' disease, diabetes, and hypertension are controlled properly before the operation. Before the operation, elasticity of the skin, tension of the orbicularis oculi muscle and septum, herniation of orbital fat, and existence of other aging stigma, including scleral show, tear trough deformity, and periorbital wrinkles, are evaluated and recorded by taking a standardized digital photograph. Lower-eyelid laxity should be evaluated via the snap test [1, 2]. The surgeon discusses various views with the patient before the operation and then chooses the proper procedure (Table 1, Figs. 2, 3, 4, 5).

Table 1 Signs of aging in the periorbital area and selection of proper procedures

Skin	Orbicularis oculi muscle	Septum	Orbital fat	Scleral show	Tear trough deformity	Procedures
Tight, no rhytides	Robust	Robust	Herniation	No	No	Transconjunctival blepharoplasty
Chalasis, obvious rhytides	Robust	Robust	Herniation	No	No	Transcutaneous skin flap blepharoplasty
Chalasis, obvious rhytides	Laxity	Robust	Herniation	No	No	Transcutaneous skin-muscle flap blepharoplasty, either combined with lateral canthus anchoring procedures or not
Chalasis, obvious rhytides	Laxity	Laxity	Herniation	Obvious	Obvious	Hamra septal reposition method, either combined with lateral canthus anchoring procedures or not

Fig. 2 a, b The transconjunctival blepharoplasty technique is the first choice for use in young patients with fat herniation but without excessive skin and muscle redundancy



Fig. 3 Transcutaneous blepharoplasty skin flap procedure is suitable for patients with protruding papebral bags and obvious rhytides but without laxity of the muscularis and tear trough deformity

Surgical Procedures

Transconjunctival Blepharoplasty

Approximately 0.5 ml of 2% lidocaine with 1:200,000 epinephrine is administered by the transconjunctival route posterior to the tarsal plate. An incision of 0.5 cm is made through the conjunctiva just below the tarsal plate. The aponeurosis and lower-eyelid retractor are dissected to expose the orbital fat, and the globe is pressed gently, enabling the excess orbital fat to protrude. A total of 0.05 ml of anesthetic is injected into the orbital fat; the excess fat of the medial, central, and lateral compartments are excised; and hemostasis is achieved with careful bipolar electrocautery (Fig. 6).

Traditional Transcutaneous Blepharoplasty: Skin Flap Procedure

The incision line is marked with methylene blue with the patient in the supine position. The skin incision is placed 2 mm below the lash line; it starts medially below the level of the punctum and follows the limbus palpebralis to the level of the lateral canthus, then angles down and continues laterally for a few millimeters. Approximately 1.0 ml of 2% lidocaine with 1:200,000 epinephrine is injected transcutaneously. The skin is incised along the marking line. The flap is dissected between the skin and the orbicularis oculi muscle using curved ophthalmic scissors. Hemostasis is achieved with bipolar cauterization. The skin flap is developed and retracted inferiorly. Then the orbicularis oculi muscles are separated parallel to and 5–6 mm cephalad to the inferior orbital rim to expose the herniated orbital fat. The excess of central, medial, and lateral fat pads is excised conservatively. The skin flap is draped back and trimmed as necessary; the incision is closed with seven or eight interrupted sutures of 7-0 nylon monofilament (Fig. 7).

Transcutaneous Blepharoplasty: Skin-Muscle Flap Procedure

The incision line is placed in a manner similar to that of the skin flap procedure. After anesthesia, the skin is cut along the marking line. Then an incision is made in the muscle 2–3 mm inferior to the skin incision, leaving the pretarsal muscle intact. Blunt curved ophthalmic scissors are used to dissect under the muscular layer. The skin-muscle flap is

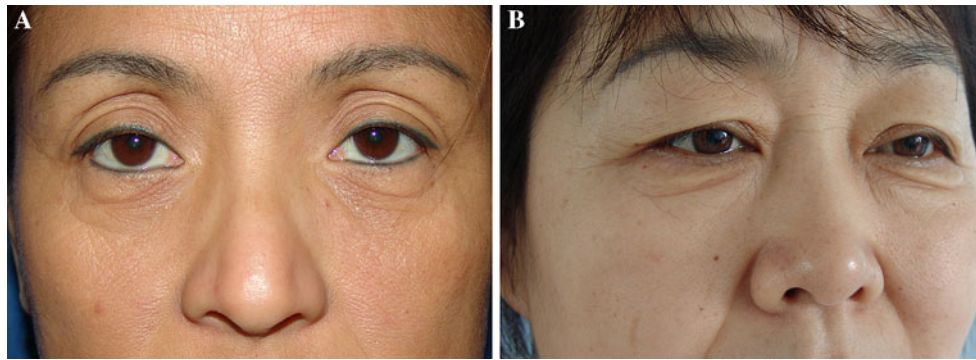


Fig. 4 a, b Transcutaneous blepharoplasty skin-muscle flap procedure is performed primarily in patients with skin and muscle laxity and/or significant skin wrinkles but without tear trough deformity and

obvious scleral show. Additional lateral canthopexy or canthoplasty is performed on some patients with lower-lid laxity or prominent eyes

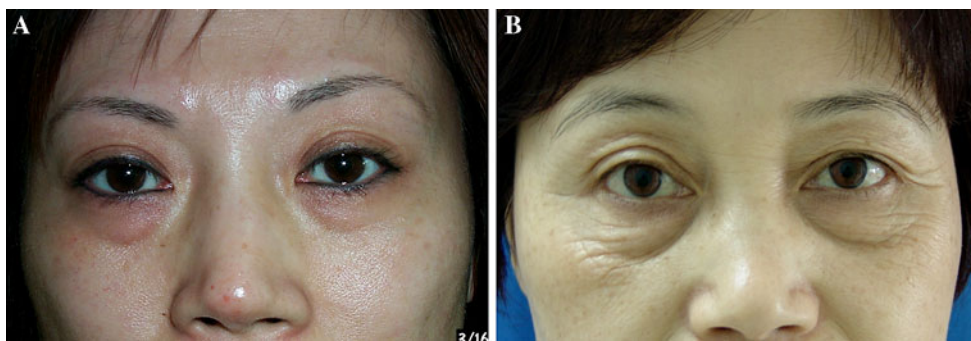


Fig. 5 a, b Hamra's septum repositioning procedure should be restricted to patients with laxity of the anterior lamella (skin, muscle, and septum) of the lower eyelid, accompanied by obvious tear trough

deformity and scleral show. Additional lateral canthopexy or canthoplasty is performed on some patients with lower-lid laxity or prominent eyes

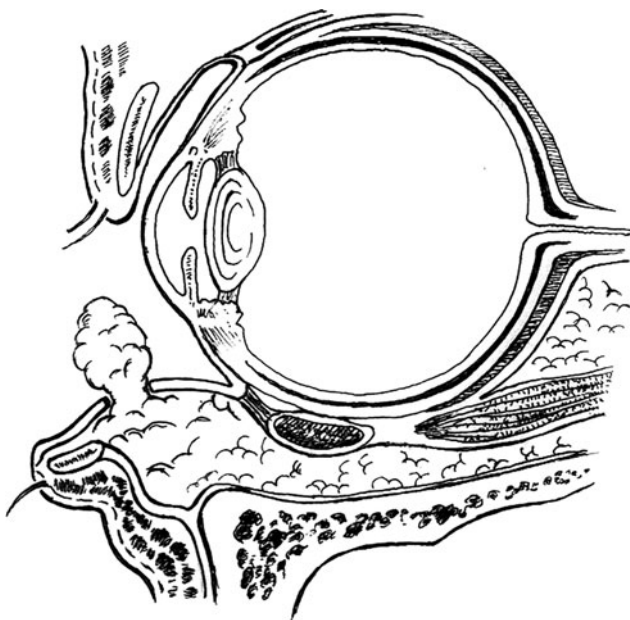


Fig. 6 Schematic diagram for transconjunctival blepharoplasty

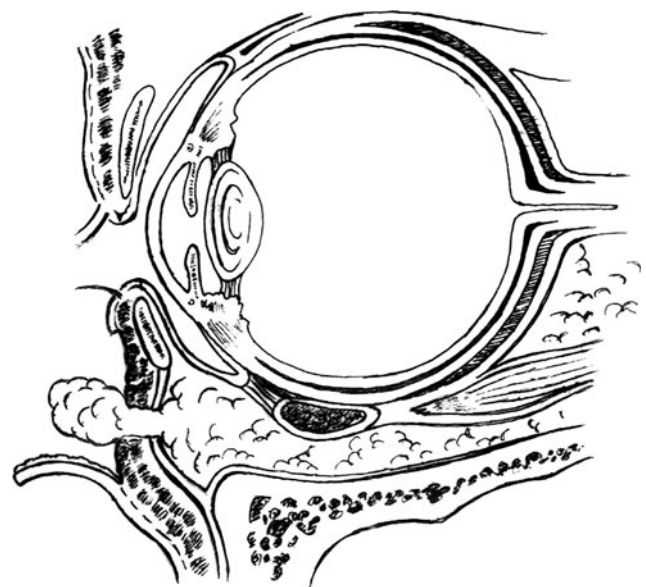


Fig. 7 Schematic diagram for traditional transcutaneous blepharoplasty skin flap procedure

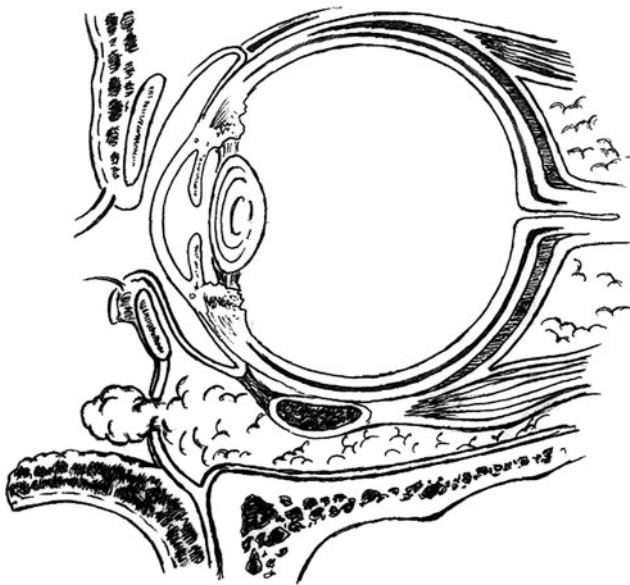


Fig. 8 Schematic diagram for transcutaneous blepharoplasty skin-muscle flap procedure

developed and retracted inferiorly, exposing the orbital fat. The herniated orbital fat of the medial, central, and lateral compartments is removed conservatively. Hemostasis is achieved with bipolar cauterization. The skin-muscle flap is draped back and trimmed as necessary. The skin incision is closed with seven or eight interrupted sutures of 7-0 nylon monofilament. The muscular incision does not need suturing. If retraction or lateral canthal laxity exists before surgery, lateral canthal anchoring procedures should be carried out (Fig. 8).

Hamra's Septal Reposition Procedures

The incision line is placed in a manner similar to that of the skin flap procedure. After anesthesia, the skin and the orbicularis oculi muscle are cut. The septum and orbicularis oculi muscle are dissected inferior to the arcus marginalis. The skin-muscle flap is retracted inferiorly using the eyelid retractor, exposing the orbital septum and arcus marginalis. The eyeball is pressed gently on the upper eyelid and the orbital fat bulge is observed. If the bulge is uneven, several fold sutures are placed on the prominent area of the bulge. The septum along the arcus marginalis is cut with scissors to expose the orbital fat. The eyeball is pressed and the orbital fat herniation is observed again. The excess orbital fat is partially removed by an incision. The lower portion of the septum is immobilized and the orbital fat is attached to the periosteum 3–5 mm below the arcus marginalis. The septum is tightened and the depression anterior to the infraorbital margin is filled with the orbital fat. The eyeball is pressed gently, the orbital fat herniation is examined again, and if it is

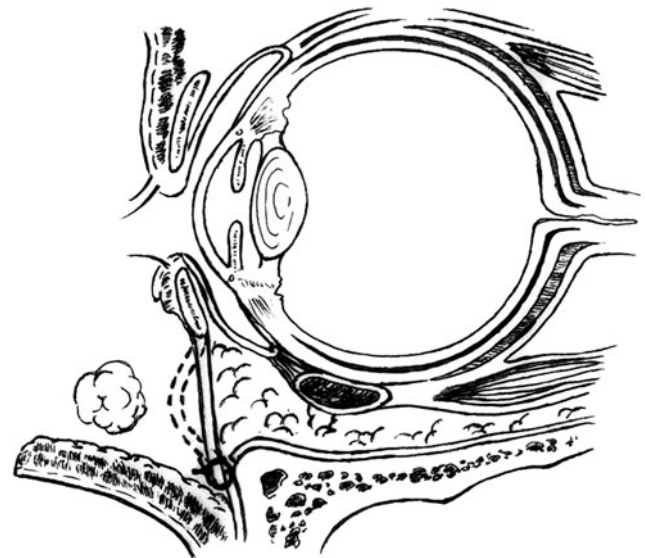


Fig. 9 Schematic diagram for Hamra's septal reposition procedure

still present, the septum is cut, the excess fat is removed, and the septum is sutured. The excess skin and muscle are trimmed, and then the incision is sutured (Fig. 9).

Postoperative Care

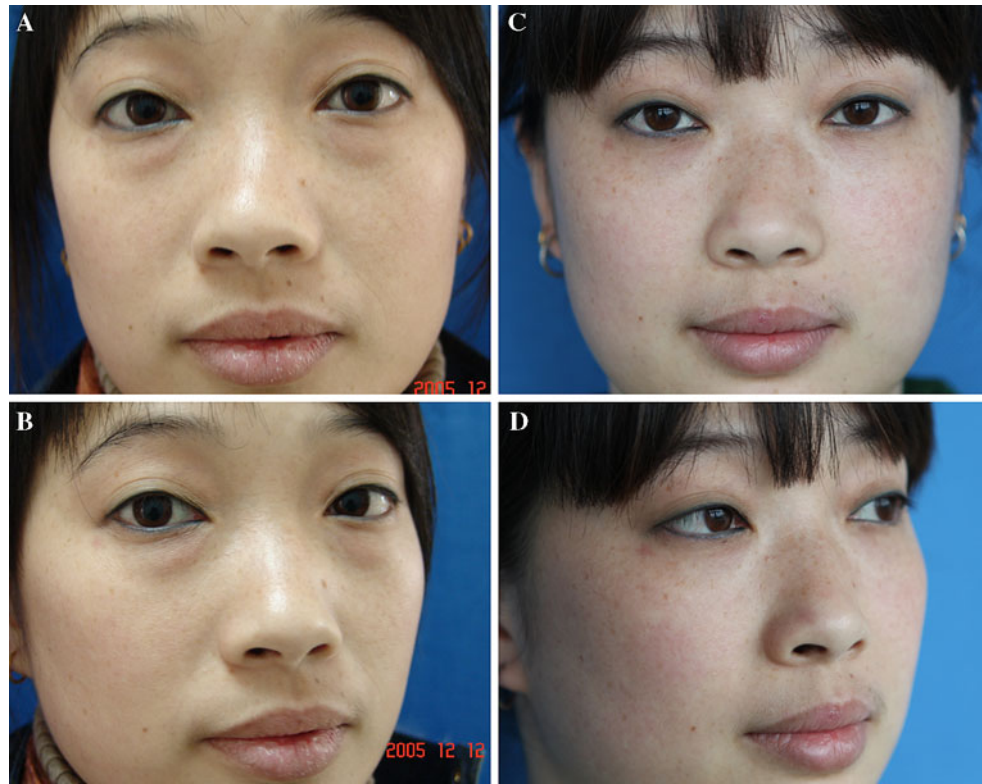
The patients are instructed to apply ice compresses during the first 24 h to minimize swelling. One to two eye drops are used every 4–6 h for 2–3 days. Chloramphenicol eye drops are avoided because some patients could be allergic. The skin incision site should be cleaned with hydrogen peroxide and antibiotic ointment the next day. Oral antibiotics (Cephalexin) and discutiencia are used for 3 days. The skin sutures are removed 5 days after the operation.

Results

During the past 10 years (1998–2008), a total of 2400 patients underwent lower blepharoplasty in our department. Four different types of lower blepharoplasty procedures were performed: (1) traditional transcutaneous skin flap procedure ($n = 862$), (2) transcutaneous skin-muscle flap procedure ($n = 738$), (3) transconjunctival procedure ($n = 433$), and (4) Hamra's procedure (septal reset and fat-replacing technique) ($n = 367$). The patients were requested for follow-up every month for the first 3 months and then every 3 months 6 months later in the clinic department. Of these 2400 patients, 925 were available for follow-up. The length of follow-up ranged between 1 month and 10 years. Overall lower-eyelid contour, skin fold, fat bags, scar appearance, tear trough deformity, scleral show, and postoperative eyelid position were evaluated. The surgical

Table 2 Complications of the four types of lower blepharoplasty procedures

	No. of patients			
	Hollow eyes	Dry eyes	Ectropion	Retraction
Transconjunctival procedures	0	0	0	0
Transcutaneous skin flap procedures	2	1	0	5
Transcutaneous skin-muscle flap procedures	3	0	4	12
Hamra's septum reposition procedures	0	1	1	3

Fig. 10 An 18-year-old woman before and after transconjunctival blepharoplasty. **a, b** Preoperative views. **c, d** Three-year postoperative views

outcome was graded by the degree of patient satisfaction using the scale of excellent, good, ordinary, and poor results. About 90% of the patients had excellent or good results; about 5% of the patients, most of whom had traditional skin flap or skin-muscle flap procedures, had ordinary results; and about 3% of the patients ($n = 32$) had poor results. Thirty-two patients had some postoperative complications that included hollow eyes ($n = 5$), dry eyes ($n = 2$), ectropion ($n = 5$), and retraction ($n = 20$) (Table 2). The patients with ectropion and retraction were treated with massage or corrected using lateral canthopexy or canthoplasty; they obtained a satisfying result. The detailed techniques are not discussed in this article (Figs. 10, 11, 12, 13).

Discussion

To date, blepharoplasty is one of the most commonly performed cosmetic surgeries [3]. The procedures vary and

include transconjunctival and transcutaneous procedures, the latter also including skin flap procedures, skin-muscle flap procedures and Hamra's procedure (septal reset and fat-replacing technique). The proper choice of procedure for a particular patient and achievement of satisfactory aesthetic results are problems that haunt the plastic surgeon.

Congenital excessive orbital fat and laxity of the supporting structures of the lower eyelid contribute to palpebral bags [4–6]. About 10% of patients seeking lower blepharoplasty have primary eyelid bags that result from excess congenital orbital fat, which occurs mostly in the young. Over 90% of lower-eyelid bags can be ascribed to laxity of the supporting structures (skin, orbicularis oculi muscle, orbital septum, tarsus, and the lateral canthal tendon), with or without excess orbital fat [7]. Other aging stigma of the lower eyelid include obvious tear trough deformity, aging double-convex lid-cheek complex, the deep and wide orbit, obvious skeleton rim, and the

Fig. 11 A 28-year-old woman before and after transcutaneous skin flap blepharoplasty. **a, b** Preoperative views. **c, d** Two-year postoperative views

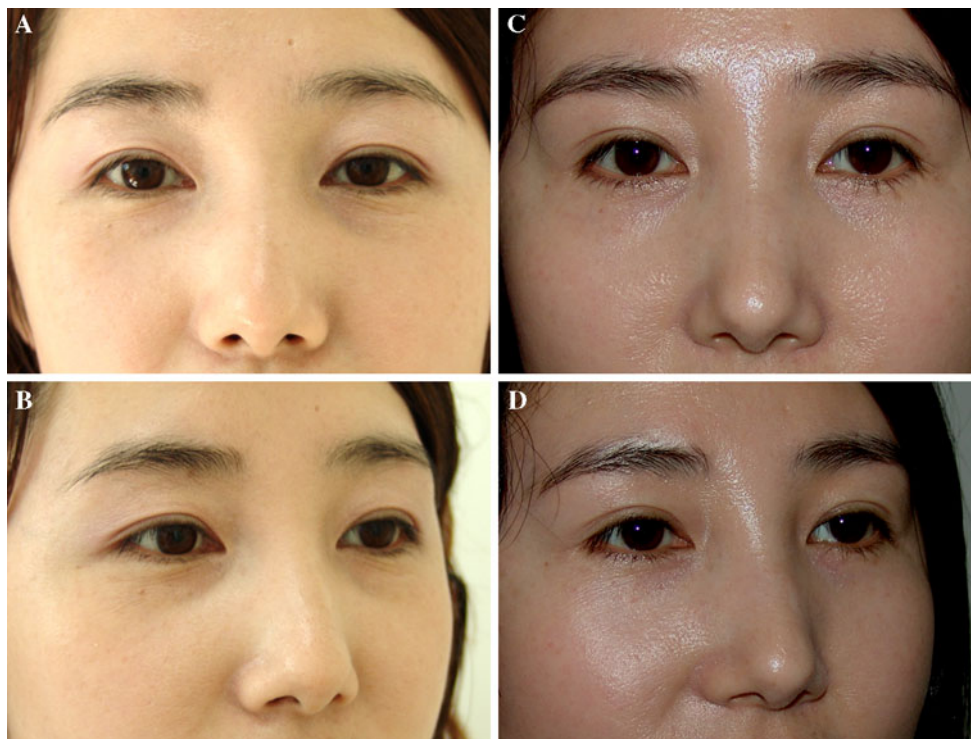
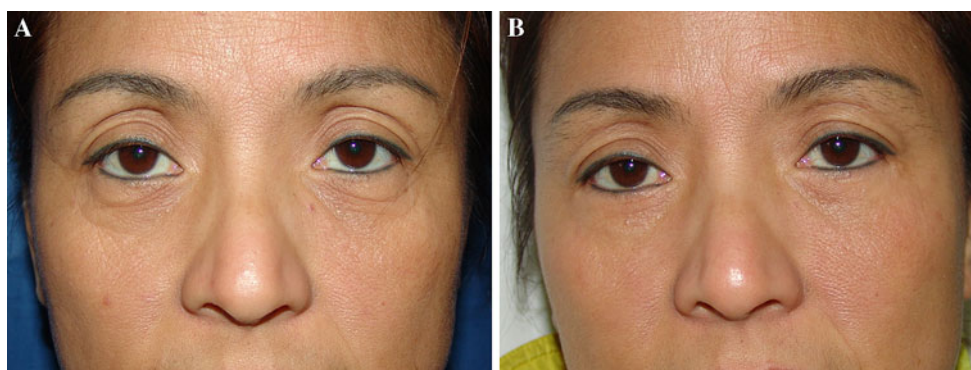


Fig. 12 A 42-year-old woman before and after transcutaneous skin-muscle flap blepharoplasty. **a** Preoperative view. **b** One-year postoperative view



appearance of eyelid bags [5, 7]. Thorough assessment of the cause and expression of palpebral bags is necessary for optimal and safe selection of the surgical rejuvenation procedure to use.

Some plastic and aesthetic surgeons prefer the transconjunctival procedure, which was first described by Bourquet in 1924 and popularized since 1974 [8]. The advantages of the transconjunctival procedure include avoidance of external incisions and scars, less swelling, and fast recovery. The integrity and innervation of the orbicularis oculi muscle are maintained in the transconjunctival procedure. Therefore, the strength of the muscle is retained, and the potential for scar contraction on both the skin and the orbicularis is avoided. The chance of lower-eyelid retraction or ectropion is decreased. In contrast, excess skin and muscle and periorbital rhytides cannot be treated with transconjunctival surgery. In a

Caucasian patient with such conditions, chemical peeling or laser resurfacing should be used. Because chemical peeling or laser resurfacing can be used to improve the skin quality of the lower eyelids, it is believed by some surgeons that if orbital fat resection is indicated, transconjunctival lower blepharoplasty can also be performed on patients with skin laxity, even in the elderly [9, 10]. We do not think this method is suitable for Chinese patients because of the difference in skin type between Caucasians and Asians, who have a higher risk of hyperpigmentation after chemical peeling or laser resurfacing. Rather, transcutaneous blepharoplasty is a reliable and effective procedure for older Asian patients [11].

During the last 10 years, a total of 2400 patients underwent lower blepharoplasty in our department. Transconjunctival and transcutaneous procedures were performed. Among these 2400 patients, 925 were available

Fig. 13 A 40-year-old woman before and after Hamra's septum reposition procedure. **a, b** Preoperative views. **c, d** Two-year postoperative views



for follow-up. The length of follow-up ranged between 1 month and 10 years. A great majority of the patients were satisfied with the results, but 32 patients had some postoperative complications, including hollow eyes, dry eyes, ectropion, and retraction. Ectropion and retraction were serious complications and mainly occurred after transcutaneous blepharoplasty, as the integrity of the orbicularis muscle and sometimes the innervation of the muscle were destroyed [12]. Some patients (about 5%), who had undergone traditional skin flap procedures or skin-muscle flap procedures, obtained ordinary results because other aging stigma such as tear trough deformity and scleral show were not corrected.

Reviewing our 10 years of experience with lower-eyelid blepharoplasty, we conclude with the indications, advantages, and disadvantage of the different types of blepharoplasty in an Asian population.

For the primary baggy eyelid, mostly in young patients with fat herniation but without excess skin and muscle redundancy, the transconjunctival blepharoplasty technique is the first choice. Since it cannot treat laxity of the orbicularis oculi muscle and wrinkles, results in older patients are always unsatisfactory.

Excess skin and orbital fat can be removed at the same time with the transcutaneous blepharoplasty skin flap procedure, while the strength of the orbicularis oculi muscle is retained, which is an advantage of this procedure. Its shortcomings are that laxity of the muscle and tear trough deformity cannot be corrected and that the scar is obvious in some patients. Therefore, this procedure is suitable for

patients with protruding palpebral bags and obvious rhytides but without laxity in the muscularis and tear trough deformity.

Transcutaneous skin-muscle flap procedures cannot only remove excess orbital fat, but can also correct laxity of the skin and the muscle. A disadvantage of this procedure is that the orbicularis oculi muscle is destroyed, resulting in lower-eyelid retraction and even ectropion in some cases. To avoid these annoying complications, the orbicularis oculi muscle is excised 2–3 mm lower than the skin incision line in skin-muscle flap procedures so that the strength of the pretarsal orbicularis oculi muscle is retained and the scar constrictions of the skin and the muscle are in different planes [13]. Lateral canthal anchoring is advised in patients with lateral canthal laxity and prominent eyes, otherwise retraction and ectropion are possible [2, 14]. Another disadvantage of this procedure is that the tear trough deformity cannot be corrected. Thus, in our experience skin-muscle flap procedures are performed primarily in patients with skin and muscle laxity but without tear trough deformity and obvious scleral show.

Hamra's septum reposition procedures can remove excess orbital fat, correct tear trough deformity, and mask the obvious skeleton rim. This procedure can refresh the appearance of periorbital aging, lift the cheek at the same time, rejuvenate the lid-cheek complex, and provide long-lasting results [15]. This procedure, however, is complicated and difficult to perform, and the recovery time is long. Therefore, the indication for its use should be strict. In the authors' opinion, Hamra's septum reposition should

be restricted to patients with laxity of the anterior lamella (skin, muscle, and septum) of the lower eyelid accompanied by obvious tear trough deformity and scleral show.

Conclusions

Transconjunctival blepharoplasty is the first choice for the treatment of primary eyelid bags. Transcutaneous lower blepharoplasty (skin flap or skin-muscle flap procedure) can remove excess orbital fat and correct laxity of the skin and the muscle at the same time, and is indicated for the older eyelid with excess skin and muscle. Hamra's procedure is performed if supporting structures (skin, muscle, and septum) show laxity and other aging stigma such as tear trough deformity and obvious scleral show are present. Comprehensive consideration of the characteristics of eyelid bags in Asian populations, choosing suitable procedures, and performing them carefully are critical in achieving satisfactory aesthetic results.

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