

Reducing the Volume of Upper Eyelids in East Asians Increases Vertical Palpebral Height

Tae-Yul Lee¹ · Hyung-kyu Kim¹ · Dong-il Choi²



Received: 9 December 2022 / Accepted: 19 March 2023 / Published online: 4 April 2023
© Springer Science+Business Media, LLC, part of Springer Nature and International Society of Aesthetic Plastic Surgery 2023

Abstract

Background Correcting puffy eyelids is important for improving the first impression. The puffiness is most predictable corrected by tissue resection and fat excision. Fold asymmetry, overcorrection, and recurrence can sometimes occur after levator aponeurosis manipulation. The objective of this study was to introduce a method of volume-controlled blepharoptosis correction (VC) without levator manipulation.

Methods The medical records of patients who had undergone upper blepharoplasty between 2017 and 2022 were retrospectively reviewed. Questionnaires, digital photographs, and charts were used to evaluate the surgical outcomes and complications. The degree of levator function was graded as poor, fair, good, or very good. Levator function must be above good (>8 mm) to employ the VC method. Poor and fair grades of levator function were excluded because they require levator aponeurosis manipulation. The margin to reflex distance (MRD) 1 was assessed preoperatively, 2 weeks postoperatively, and at follow-up visits.

Results Postoperative satisfaction was 4.3 ± 0.8 with no postoperative discomfort (0%), and the duration of swelling was 10.1 ± 2.0 days. Regarding other complications, no fold asymmetry (0%) was observed, although hematoma formation was observed in 1 (2.9%) patient in the VC

group. Significant differences were observed in the changes in palpebral fissure height over time ($p < 0.001$).

Conclusions VC can effectively correct puffy eyelids and create natural-looking, beautiful, and thin eyelids. Thus, VC is associated with higher patient satisfaction and surgical longevity without serious complications.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Blepharoptosis · Levator aponeurosis · Volume-controlled correction · Debulking · Fibro-adipose tissue

Introduction

The typical Asian eye (Fig. 1) differs from the Caucasian eye in terms of the puffiness of the upper eyelid, narrowness of the palpebral fissure, and a common lack of a supratarsal crease [1]. Approximately 60% of East Asians are born without double eyelids; 68% of Koreans do not have natural double eyelids—almost the highest level in the world [1–3]. This is because the dermis and soft tissue of the upper eyelid are thick, and puffy eyelids are common [4, 5]. In addition, the difference in the position of the orbital septum between Asian and Caucasian individuals results in puffiness in the Asian patient.

There are various methods for correcting puffy eyelids and ptosis of the upper eyelid region. The most popular and conventional surgical method is to manipulate the levator aponeurosis and excise the upper eyelid skin via upper blepharoplasty [6]. However, despite advances in levator

✉ Dong-il Choi
medicaldoctor@empas.com

¹ Department of Plastic Surgery, Korea University Ansan Hospital, Gyeonggi-do, Republic of Korea

² Gangnam-Seoyon Plastic Surgery Clinic, 421 Samyoung Building, Gangnam-daero, Seocho-Gu, Seoul 06614, Republic of Korea



Fig. 1 A 26-year-old man presented with a typical Asian eye, puffiness of the upper eyelid, and narrowness of the palpebral fissure

aponeurosis, fold asymmetry, overcorrection of ptosis, and recurrence of blepharoptosis can sometimes occur [7]. In addition, some people may complain of postoperative discomfort due to levator traction and lagophthalmos and may develop dry eye syndrome after surgery. It is difficult to make double eyelids look natural for people with puffy eyelids, and they tend to be loose even after they are made surgically [8]. In other words, there may be factors associated with puffy eyelids that inhibit the opening of the eyelids.

There have been several reports on the anatomical structures that cause puffy eyelids and strategies to correct them [2, 8–10]. Matsuo et al. [1, 2, 8] suggested that the lower-than-normal position of the transverse ligament determines the location of the preaponeurotic fat to limit the vertical width of the palpebral fissure. Choi et al. [9, 10] introduced the limited retromuscular fibrofatty tissue resection technique as a senile upper blepharoplasty for mild ptosis. However, with respect to the previously described lower-positioned transverse ligament, it was confirmed that there was no significant difference in eye size, even when the lower-positioned transverse ligament was removed. In addition, an appropriate amount of retromuscular tissue resection and correction has not yet been established. There is also a lack of data on the effectiveness of the tissue resection method and on correction maintenance during follow-up.

In our experience, surgery to remove the factors that inhibit eye enlargement, thus limiting eye opening, can make the eyes look more natural and cosmetically enlarged without ptosis correction surgery. Our technique does not rely on levator aponeurosis surgery, and the eye opening gliding plane is not violated. This improves the longevity of the results by reinforcing the gliding plane of the periorbita. Thus, natural eye opening movement is improved.

Based on this finding, we hypothesized that the tissue removal of eye opening antagonists may also play an important role in ptosis correction. Therefore, this study aimed to determine the effect of volume-controlled ptosis correction without levator aponeurosis advancement surgery and compare its effects on preoperative and long-term follow-up outcomes.

Methods

Materials

The study protocol was approved by the institutional review board (approval number: 2021AS0004) and conducted in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from all patients.

We retrospectively reviewed the medical records of 274 patients who underwent upper blepharoplasty, with or without levator manipulation, at our institution between March 2017 and February 2022. Upper blepharoplasty was performed in patients who wanted to correct their puffy eyelids, the narrowness of the palpebral fissure, and double eyelids. Surgical outcomes and complications were evaluated using digital photographs and charts. Of the 274 patients, those who met the following inclusion criteria were included in our analyses: (a) primary upper blepharoplasty or blepharoptosis with thick skin and soft tissue and those with mild to moderate ptosis; (b) no history of filler, fat injection, or tread lifting; (c) postoperative observation duration ≥ 9 months; (d) no preoperative significant fold asymmetry; and (e) those who wanted to correct their puffy eyelids without levator aponeurosis surgery. Cases of pseudoptosis due to skin sagging and involutional ptosis were excluded. A total of 35 patients (21 men and 14 women) with a mean age of 30.4 ± 4.9 (range, 19–45) years met the inclusion criteria. Most patients were Korean and one was Japanese. The mean postoperative follow-up period was 14.1 ± 3.3 months; the longest follow-up period was 22 months. Table 1 summarizes the patient characteristics. The surgical method was volume-controlled blepharoptosis correction (VC) and did not involve levator manipulation.

Algorithm to Choose a Surgical Method

The desired outcomes were discussed through interviews with the patients. The decision to do VC technique was a personal choice of the surgeon and the patient. The degree of levator function was graded as poor, fair, good, or very good based on the classification reported by Lisman et al. [11], in which poor was defined as levator function ≤ 4

Table 1 Demographic characteristics of the patients

	VC group (n=35)
Age (years)	30.4 ± 4.9
Sex	
Male (%)	21 (60.0)
Female (%)	14 (40.0)
Smoking	
Non-smoker (%)	30 (85.7)
Smoker (%)	5 (14.3)
Duration of follow-up (months)	14.1 ± 3.3
Race Korean (%)	34 (97.1)
Non-Korean (%)	1 (2.9)

Values are presented as mean ± standard deviation.

VC volume-controlled blepharoptosis correction.

mm, fair as 5–7 mm, good as 8–10 mm, and very good as ≥10 mm of levator function. The VC method was used for good and very good grades. Poor and fair grades were excluded because they require levator complex advancement or frontalis suspension.

Prerequisites for VC Method

Above-good levator function (>8 mm) is essential for the VC method. The measurement by Berke's method required the examinee to direct their focus as low as possible, with the examiner inflicting as much pressure as possible on the forehead around the eyebrows of the examinee with their thumb to prevent any influence of the frontalis muscle [12, 13]. Subsequently, with the examinee focusing as much as possible, the distance of the movement within the middle area of the superior palpebral margin was measured.

The thick dermis and soft tissue of the upper eyelid, both essential for VC, were assessed by designing a double eyelid line using a bougie [4]. The dermis and soft tissue were judged to be thin when the double eyelid line designed could be visible for more than 2 s. The dermis and soft tissue were judged to be thick if the eyelid disappeared within 2 s. Patients without thick dermis or soft tissue were not indicated for the VC method.

Surgical Technique

Preparation

Surgeons were preoperatively made aware of the status of the eyelid regarding levator function, ptosis grade, the presence of asymmetry, dermis thickness, and frontalis

muscle function. The preoperative design for the double eyelid line was made while the patient was in a seated position. All surgical procedures were performed under local anesthesia with 2% lidocaine and 1:100,000 epinephrine. The design of the lower flap was the same as that of traditional upper blepharoplasty. With the patient in a sitting position and the operator lifting the forehead upward, the operator designed the height of the lower flap to be approximately 5–7 mm.

Surgical Steps

The orbital septum was opened after incision and excision of the skin and the underlying orbicularis oculi muscle (OOM) in the designated area (Fig. 2a). In the preaponeurotic space, the orbital fat and levator aponeurosis were separated using electrocautery along the gliding plane. The septal fat was excised, removing a large amount of submuscular fibro-adipose tissue (Fig. 2b). Excess OOM and adipose tissue could be easily removed while retracting the anterior septum in the caudal direction. If the OOM remained at the incision site, we performed a complete excision of the OOM underneath the skin incision line for lower flap fixation. If the OOM had hypertrophied, 1/2–1/3 of the OOM was debulked through beveling approximately 1 cm above the incision line (Fig. 2c; asterisk; *). This was beneficial for correcting the puffy eyelids. Excess soft tissue trimming was performed without levator surgery (See Video, Supplemental Digital Content 1, which shows volume-controlled ptosis correction without levator surgery). Therefore, meticulous hemostasis was essential, as was immediate revision of any hematoma. The height and contour of the eyelid were tested with the patient in upright seated and supine positions. After volume debulking procedures, the end point was intraoperatively judged by asking the patient to open their eyes—the volume was considered to be properly removed if they could comfortably open their eyes, which had been blocked by excessive soft tissue. Lower flap fixation was performed at 4–5 points, and nylon 7-0 was used for three-points-fixation of the OOM, tarsus, and septoaponeurosis junctional thickening (SAJT) together. The skin closure was performed with 7-0 black silk in a simple interrupted fashion.

Analysis of Margin to Reflex Distance (MRD) 1 and Definition

The margin to reflex distance (MRD) 1 was assessed preoperatively, 2 weeks postoperatively, and at follow-up visits. The patients were seated for photography, and the distance between the reflex of the patient's cornea and the upper eyelid margins was measured using Adobe Photoshop CS5 Portable (San Jose, CA, USA) [13, 14]. For the

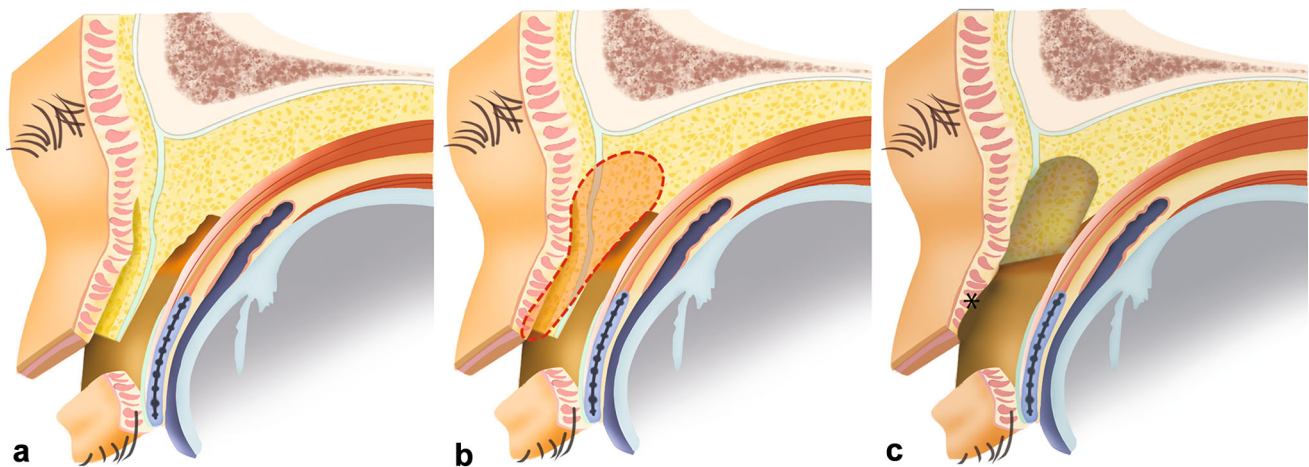


Fig. 2 Design and schema of volume-controlled ptosis correction without levator aponeurosis surgery. **a** Preoperative status. **b** Surgical dissection plane for the volume-controlled ptosis correction

analysis, photographs taken 2 weeks postoperatively were defined as immediate postoperative photographs. The exact change in MRD1 could be measured by 2 weeks postoperatively, as the postoperative swelling had subsided.

Questionnaires and Satisfaction

The questionnaires gathered information on the patients' demographic characteristics, their satisfaction with the aesthetic outcomes, and complications. The satisfaction sections included nominally scaled questions using a 5-point Likert scale (1=very unsatisfied to 5=very satisfied) to assess the patients' satisfaction with their final surgical results.

Statistical Analysis

Data were analyzed using SPSS (version 21.0; SPSS, Chicago, IL, USA), and repeated-measures analysis of variance was used to compare the pattern of changes in MRD1 during follow-up. Statistical significance was set at $p < 0.05$.

Results

The healing process was uneventful in all patients. There were no cases of lagophthalmos, chemosis, or infections. A total of 33 (94.2%) patients were satisfied with their surgical results at follow-up and reported that their chief complaints improved after surgery.

Table 2 shows satisfaction, swelling, and complications in the VC group. Postoperative satisfaction was 4.3 ± 0.8 ; no postoperative discomfort (0%) was reported; and the

technique. **C** Removal of the septal fat, orbicularis muscle, and retromuscular tissues. The area of OOM debulking is indicated by an asterisk (*).

Table 2 The satisfaction, swelling, and complications of the patients

	VC group (n=35)
Satisfaction ^a (score:1–5)	4.3 ± 0.8
Duration of swelling ^a (days)	10.1 ± 2.0
Discomfort after surgery (%)	0 (0)
Hematoma (%)	1 (2.9)
Fold asymmetry (%)	0 (0)

^aValues are presented as mean \pm standard deviation

VC volume-controlled blepharoptosis correction

duration of swelling was 10.1 ± 2.0 days. Regarding other complications, there were no cases of fold asymmetry (0%), although hematoma formation was observed in 1 (2.9%) patient in the VC group. Hematoma disappeared after hematoma evacuation.

To compare the trends in palpebral fissure height, changes in the MRD1 values over time were assessed concurrently (Fig. 3; Table 3). The VC group showed a steeper increase in the MRD1 values at 2 weeks postoperatively than at the long-term follow-up. There were significant differences in the MRD1 values among the three time points (Table 3; $p < 0.001$).

Representative Cases

There were three cases of VC (Figs. 4, 5 and 6).

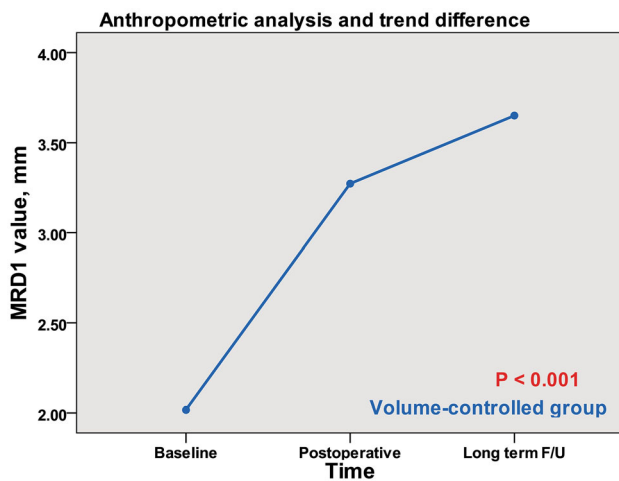


Fig. 3 Trend differences in the palpebral fissure height at baseline, 2 weeks postoperatively, and long-term follow-up. Trend differences among the three time points were assessed by repeated-measures one-way analysis of variance

Table 3 Anthropometric analysis and surgical outcomes of patients

	VC group (n=35)	p-value
Baseline	2.0 ± 0.7	< 0.001*
Postoperative	3.3 ± 0.7	
Long-term follow-up	3.7 ± 0.7	

Values are presented as the mean ± standard deviation. There was a significant among the three time points ($p < 0.001$).

VC volume-controlled blepharoptosis correction.

*Statistically significant

Discussion

There were several reasons for high satisfaction among the patients in the VC group (Table 2). First, functional improvement was possible in the VC group, increasing over time and capable of being maintained for a long duration, because of the removal of the structures hindering wider opening of the eyes [15]. Although the levator function was good, the puffiness of the upper eyelid with a narrow vertical palpebral fissure height suggested the presence of an antagonistic structures [16]. We had previously suggested that the hypertrophic OOM and heavy submuscular fibro-adipose tissue could also hinder the increase in vertical palpebral fissure height [17–19]. Thus, the functional improvement could also be attributed to the disappearance of the structures that was blocked from above the gliding plane, which facilitated the opening of the eyes and enhanced comfort over time [6, 9].

There were no complaints of discomfort in the VC group, indicating that it became much easier to open the eyes after surgery. Second, the VC method was not found to be destructive as it preserved the gliding plane. In particular, the VC method sufficiently released the pre-aponeurosis tissues from the gliding plane so that the gliding plane could function well independently [20]. In contrast, levator aponeurosis manipulation should be performed when the levator function grades are poor and fair [12]. Although the puffy eyelids and narrow vertical palpebral height were improved with levator surgery, the patients sometimes complained of postoperative discomfort with levator traction, dry eye syndrome, and an impression



Fig. 4 A 25-year-old man presented with a typical Asian eye with puffiness of the upper eyelid and narrowness of the palpebral fissure (same patient as in Fig. 1). His levator function was 8 mm (grade:

good). He underwent medial epicanthoplasty and volume-controlled blepharoptosis correction without levator aponeurosis surgery. **a** Pre-operative. **b** Postoperative 2 weeks. **c** Postoperative 13 months.

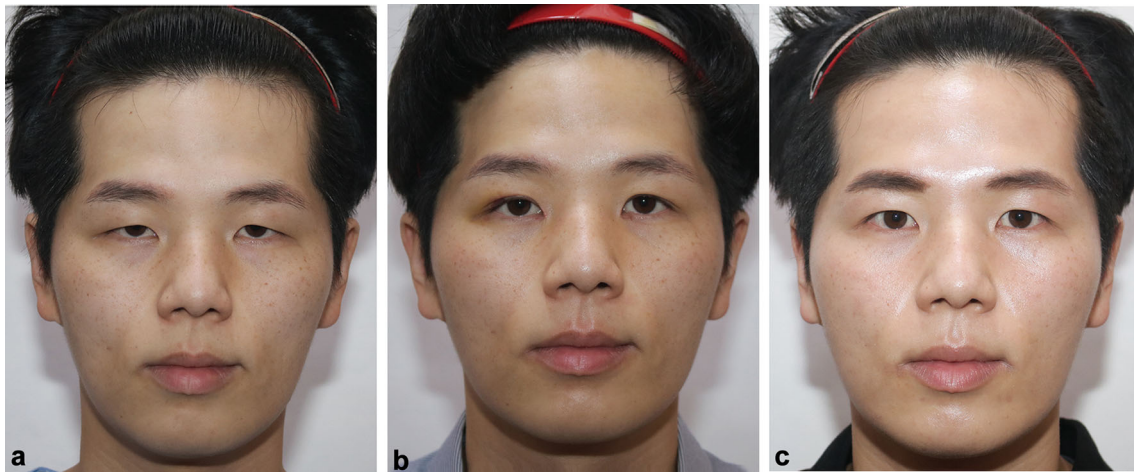


Fig. 5 A 31-year-old man presented with a typical Asian eye with puffiness of the upper eyelid and narrowness of the palpebral fissure. His levator function was 9 mm (grade: good). He underwent medial

epicanthoplasty and volume-controlled blepharoptosis correction without levator aponeurosis surgery. **a** Preoperative. **b** Postoperative 2 weeks. **c** Postoperative 17 months.



Fig. 6 A 23-year-old woman presented with puffiness of the upper eyelid and narrowness of the palpebral fissure. Her levator function was 10 mm (grade: good). She underwent volume-controlled blepharoptosis correction without levator aponeurosis surgery. **a** Preoperative. **b** Postoperative 2 weeks. **c** Postoperative 12 months.

hematoma formation was observed in the VC group in the early period of the introduction of the VC method; however, it did not occur after meticulous hemostasis with bipolar cautery. However, since the range of dissection is wide and structures with bleeding tendency, such as the OOM, were partially removed, it was always necessary to pay attention to hemostasis in the VC group.

Although the lower-positioned transverse ligament and the lower insertion of the septum are thought to be the main causes of puffy eyelids, this anatomy alone cannot explain all the puffiness in Asian eyes. Matsuo et al. [1, 8] suggested that the transverse ligament is in a lower position in puffy eyelids. However, in practice, some people with puffy eyelids do not have a lower-positioned transverse ligament, while there have been cases where a lower-positioned transverse ligament was found in people who did not have puffy eyelids. In particular, the release of the lower transverse ligament did not increase the palpebral height.

Soft tissue removal creates a slimness of the fold. In particular, when the heavy feeling was corrected in patients with puffy eyelids, there was a marked increase in MRD1 even without levator manipulation. However, in case of excessive removal of the OOM, the pre-septal OOM and OOM of the orbital layer may cause multiple folds due to synechia. Therefore, beveled partial excision is recommended (Fig. 2c). Although submuscular fibro-adipose tissue can be removed as much as possible, it must be excised and beveled because of insufficient evidence of the functional aspects of the debulking of the orbicularis muscle. The thicker the soft tissue of the eyelid, the more that can be removed.

There are multiple theories for the difference between Caucasian and Asian eyelids; the most reasonable ones are

that their appearance was unnatural [21, 22]. Third, there was no fold asymmetry after surgery in the VC group. Therefore, overall satisfaction was higher in the VC group.

Because the VC method requires wide dissection and more soft tissue removal, the duration of swelling was longer than expected in the VC group. One case (2.9%) of

related to the fusion level and structural differences between the orbital septum and the levator aponeurosis [23]. Asian eyelids are characterized by lower fusion of the orbital septum to the levator aponeurosis and have relatively more developed, thick tissue around the supratarsal crease. In addition, tissue removal was performed only on the upper flap, not on the lower flap. Therefore, we did not observe any post upper blepharoplasty syndrome (PUBS) in our study despite the aggressive extent of tissue excision.

The term “SAJT” describes the proximal end of the septal extension and conjoined fascia. In Asians, this region of the septal tissue is thickened and is also the area where the outer and inner layers of the septum join. The terms “septal extension” and “conjoined fascia” describe septal tissue that extends distally from SAJT.

Many studies have been conducted on the SAJT, the precise anatomical structure used for lower flap fixation in our study, but with some controversial findings. Siegal et al. [24] described the conjoined fascia as a membranous fusion of the levator aponeurosis and orbicularis fascia. Mendelson et al. [25] reported the use of a supratarsal technique with conjoined fascia. However, Reid et al. [26] performed anatomical studies and described this structure as septal extension as a “distinct fibrous anatomical layer, which extends from the orbital septum to cover the tarsus.” Kim et al. [27] reported a method of making a dynamic fold using the SAJT, which is identical to the method described here.

This study has several limitations. First, it focused only on East Asians, particularly Koreans. Additional studies are needed on Asian populations to determine whether other populations differ anatomically and clinically. Second, our 2D imaging data included MRD1, but not volume. Third, as there was no quantitative analysis of the volume-controlled amount and MRD1 improvement, further research is needed to investigate the exact relationship between these two factors. Fourth, there was an improvement of ~1.7 mm in the MRD1 value despite the aggressiveness of the procedure. However, this improvement may be somewhat insufficient to achieve blepharoptosis correction across different populations. Fifth, this surgical method was limited to a special group of patients with heavy and bulky upper eyelids. Finally, the purpose of this study was to introduce the VC method. Further studies are needed to compare potential complications of VC vs. formal ptosis correction.

Conclusions

Blepharoptosis correction using the VC method can effectively correct puffy eyelids and create natural-looking, beautiful, and thin eyelids. The VC method can increase

patient satisfaction and surgical longevity without causing complications, such as asymmetry, lagophthalmos, retraction, and traction discomfort.

Author Contribution T-YL: Drafting of manuscript, analysis of data and operation. HK: Acquisition of data. DC: Operation and critical revision of thesis.

Funding None of the authors have a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

Declarations

Conflict of interest The authors have no conflicts of interest to disclose.

Ethical Approval The study protocol was approved by the Institutional Review Board of our institution (Approval Number: 2021AS0004) and was performed in accordance with the Declaration of Helsinki. For this retrospective study, formal consent was not required.

References

1. Yuzuriha S, Matsuo K, Kushima H (2000) An anatomical structure which results in puffiness of the upper eyelid and a narrow palpebral fissure in the Mongoloid eye. *Br J Plast Surg* 53:466–472
2. Tanaka Y, Matsuo K, Yuzuriha S, Shinohara H, Kikuchi N, Moriizumi T (2008) A transverse ligament located anterosuperiorly in the lower orbital fat space restricts lower eyelid retraction in the Mongoloid eye. *J Plast Reconstr Aesthet Surg* 61:603–609
3. Lee TY, Shin YH, Choi DI (2020) Reconstruction of medial epicanthal fold using v-y advancement and turnover flap. *J Plast Reconstr Aesthet Surg* 73:363–368
4. Lee TY, Kim KB, Choi DI (2019) Incisional ptosis correction with hidden double fold in Asian patients. *Aesthetic Plast Surg* 43:133–138
5. Choi Y, Kang HG, Nam YS (2017) Three skin zones in the Asian upper eyelid pertaining to the Asian blepharoplasty. *J Craniofac Surg* 28:892–897
6. Codner MA, Kikkawa DO, Korn BS, Pacella SJ (2010) Blepharoplasty and brow lift. *Plast Reconstr Surg* 126:1e–17e
7. Lee TY, Shin YH, Lee JG (2020) Strategies of upper blepharoplasty in aging patients with involutional ptosis. *Arch Plast Surg* 47:290–296
8. Ban M, Matsuo K, Ban R, Yuzuriha S, Kaneko A (2013) Developed lower-positioned transverse ligament restricts eyelid opening and folding and determines Japanese as being with or without visible superior palpebral crease. *Eplasty* 13:e37
9. Choi SG, Suk SW, Yoon KC (2019) Limited retromuscular fibrofatty tissue resection in upper blepharoplasty for senile patients. *Arch Aesthetic Plast Surg* 25:131–136
10. Yoon KC, Park S (1998) Systematic approach and selective tissue removal in blepharoplasty for young Asians. *Plast Reconstr Surg* 102:502–508
11. Zoumalan CI, Lisman RD (2010) Evaluation and management of unilateral ptosis and avoiding contralateral ptosis. *Aesthet Surg J* 30:320–328
12. Park DH, Jung JM, Song CH (2008) Anthropometric analysis of levator muscle function. *Plast Reconstr Surg* 121:1181–1187

13. Alghoul MS, Bricker JT, Venkatesh V, Gupta AR, Vaca EE, Sinno S, Ellis MF, Mustoe TA (2020) Rethinking upper blepharoplasty: the impact of pretarsal show. *Plast Reconstr Surg* 146:1239–1247
14. Han HH, Kim MS (2019) Transconjunctival Müller's muscle tucking method for non-incisional correction of mild ptosis: the effectiveness and maintenance. *Aesthetic Plast Surg* 43:938–945
15. Kim YS, Roh TS, Yoo WM, Tark KC, Kim J (2008) Infrabrow excision blepharoplasty: applications and outcomes in upper blepharoplasty in Asian women. *Plast Reconstr Surg* 122:1199–1205
16. Boo-Chai K, Cohen M (1994) Aesthetic facial surgery in orientals. In: Cohen M, Goldwyn RM (eds) *Mastery in plastic and reconstructive surgery*. Little, Brown and Company, Boston, pp 2059–2087
17. Kim HS, Kim KK (2020) Subbrow lift using frontalis sling to correct lateral orbital laxity. *Aesthetic Plast Surg* 44:2119–2126
18. Hwang K (2013) Surgical anatomy of the upper eyelid relating to upper blepharoplasty or blepharoptosis surgery. *Anat Cell Biol* 46:93–100
19. Watanabe K (1993) Measurement method of upper blepharoplasty for orientals. *Aesthetic Plast Surg* 17:1–8
20. Knize DM (2009) Anatomic concepts for brow lift procedures. *Plast Reconstr Surg* 124:2118–2126
21. Lelli GJ Jr, Lisman RD (2010) Blepharoplasty complications. *Plast Reconstr Surg* 125:1007–1017
22. Trussler AP, Rohrich RJ (2008) MOC-PSSM CME article: blepharoplasty. *Plast Reconstr Surg* 121:1–10
23. Locke MB, Nahai F, Greco RJ, Jarrett NJ, Metcalfe DB, Miotto GC, Perdakis G, Eaves III FF, Baumann L, Weisberg E (2017) *Volume Two: Aesthetic. Plastic Surgery: Volume 1 Principles*
24. Siegel R (1984) Surgical anatomy of the upper eyelid fascia. *Ann Plast Surg* 13(263–265):268
25. Mendelson BC, Luo D (2015) Secondary upper lid blepharoplasty: a clinical series using the tarsal fixation technique. *Plast Reconstr Surg* 135:508
26. Reid RR, Said HK, Yu M, Haines GK III, Few JW (2006) Revisiting upper eyelid anatomy: introduction of the septal extension. *Plast Reconstr Surg* 117:65–66
27. Kim HS, Hwang K, Kim CK, Kim KK (2013) Double-eyelid surgery using septoaponeurosis junctional thickening results in dynamic fold in asians. *Plast Reconstr Surg Glob Open* 1:1–9

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.