Medial Epicanthoplasty With the Classic and Modified Skin Redraping Method: A Retrospective Case Control Study

Jiuzuo Huang, MD,* Hefei Wang, MD,† Fengzhou Du, MD,* Xiao Long, MD,* and Zhigang Liu, MD†

**Abstract:** The skin redraping method for medial epicanthoplasty is characterized by some shortcomings which warrants modification. In this study, clinical data of 193 patients who underwent medial epicanthoplasty by the modified skin redraping technique or the classic skin redraping technique were reviewed retrospectively. The patients underwent operation between May 2018 and June 2020 and were followed up for not less than 6 months. Interepicanthal distance, interpupillary distance, patient satisfaction, and postoperative complications were evaluated. In terms of interepicanthal distance/inter-pupillary distance ratio (P > 0.05) and satisfaction score (P = 0.759), the modified skin redraping technique and the classic skin redraping technique were similar. In the classic skin redraping group, there were 3 cases of visible scarring in the lower eyelid, corresponding to significantly more cases than in the modified skin redraping group (n = 0, P < 0.001). There were more out-fold cases in the modified skin redraping group (76/90) than in the classic skin redraping group (17/88) (P < 0.001). Utilizing the modified skin redraping medial epicanthoplasty can prevent medial hooing of the upper eyelid, reduce the probability of visible scarring, and produce more out-fold with concurrent double eyelidplasty compared with classic skin redraping epicanthoplasty.

**Level of evidence:** IV

**Key Words:** Double eyelidplasty, in-fold, medial epicanthoplasty, out-fold, skin redraping

(J Craniofac Surg 2022;33: 1893–1896)

The epicanthal fold is the semilunar-shaped skin that connects the medial upper eyelid and the medial lower eyelid, and this fold is quite common among Asian populations. Medial epicanthoplasty is the procedure to remove the epicanthal fold. Most procedures employ skin release, skin excision, rotations via W-plasty, Z-plasty, skin redraping method, advanced skin flap and rotation skin flap, or V-Y advancement. Because many Asian people have no supratarsal crease, medial epicanthoplasty is usually combined with double eyelidplasty.

The skin redraping method has several advantages: it is easy to plan and implement; it does not produce visible scars or tension along the incision line; and it can be used to correct all types of epicanthal folds. Therefore, since its introduction in 2007, skin redraping epicanthoplasty has been frequently performed.

However, the skin redraping method still has some disadvantages. Redundant skin usually exists on the medial upper eyelid. Moreover, it is difficult to create an “out-fold” with concomitant double eyelidplasty. There are also potential complications, such as undercorrection, overcorrection, and visible scarring.

We developed an innovative modification of skin redraping epicanthoplasty that avoids hooing of the medial upper eyelid, facilitates an “out-fold” with concomitant double eyelidplasty, and minimizes scarring. This study was designed to compare the classic skin redraping technique and the modified skin redraping technique.

**PATIENTS AND METHODS**

Between May 2018 and June 2020, 193 patients (185 female and 8 male) underwent epicanthoplasty and were followed up for > 6 months postoperatively. Among these patients, 178 underwent concurrent double eyelidplasty. Patients’ age was between 17 and 45 years, with a mean age of 24.5 years. The follow-up duration was 6 to 22 months, with an average duration of 11 months. This study was approved by the Institutional Review Board of our institution and adhered to the tenets of the Declaration of Helsinki. Written informed consent was obtained from all patients. The patients’ information is shown in

---

**Level of evidence:** IV

**Key Words:** Double eyelidplasty, in-fold, medial epicanthoplasty, out-fold, skin redraping

(J Craniofac Surg 2022;33: 1893–1896)
FIGURE 1. Simple illustrations of the classic skin redraping epicanthoplasty technique (the left eye) and the modified skin redraping technique (the right eye). A, Schematic diagrams of the 2 procedures. The locations of points A, C, and D are the same for the 2 techniques. Point A is designed as the point for the new medial epicanthus. After stretching the nasal skin medially, the lacrimal lake was exposed, and point C was marked 2 mm medial to it. For the left eye, after drawing a line between points A and C, point B is the point where this line met the edge of the epicanthus. For the right eye, point B is on the lower incision of the upper eyelid. Point D is the lateral point of the incision, which is approximately 2 mm below the eyelashes. The location of point D is dependent on the severity of the epicanthus. B, The layout of the incisions is clearly illustrated after traction of the skin toward the nasal bridge. C, Skin flap dissection. The dense connective tissue beneath skin is dissected, and tension in the medial canthal region is released. D, After release of the OOM, the medial canthal tendon was exposed. A subcutaneous suture was placed with 7-0 nylon, fixing the medial canthal tendon with the old and new medial epicanthus. Point A and point C were then sutured together to create the new medial canthus. E, The dog-ear deformities on both ends of the incision were resected. Flap ABC of the right eye was trimmed meticulously to smooth the lower eyelid incision. F, Skin closure was completed with 7-0 nylon and the immediate postoperative result is shown. The upper eyelid of the right eye is out-fold, while the left eyelid is in-fold. OOM, orbicularis oculi muscle.

Supplementary Digital Content, Table 1, http://links.lww.com/SCS/D906.

Operative Technique
Operation was performed under local anesthesia. For patients who received double eyelid blepharoplasty, the double eyelidplasty was performed after medial epicanthoplasty. The incisions for upper blepharoplasty and epicanthoplasty were not connected, and a skin bridge was intentionally reserved.

Classic Skin Redraping Technique
Point A was designed as the point for the new medial epicanthus. After stretching the nasal skin medially, the lacrimal lake was exposed, and point C was marked 2 mm medial to it. After drawing a line between points A and C, point B was the point where this line met the edge of the epicanthal fold. Point D was the lateral point of the incision, which was approximately 2 mm below the eyelashes. The location of point D was dependent on the severity of the epicanthal fold. The incision line was drawn as a curvilinear line connecting points A, B, C, and D (Fig. 1, the left eye).

After local anesthesia, skin incision (Fig. 2A), subcutaneous dissection (Fig. 2B), and exposure of the medial canthal tendon after selective release the OOM superficial to it (Fig. 2C), similar to the classic skin redraping technique, a subcutaneous suture was placed with 7-0 nylon, fixing the medial canthal tendon with the old and new medial epicanthus. Because of the higher position of point B, the ABC flap was larger than in the classic skin redraping technique. Point A and point C were then sutured together to create the new medial canthus, and flap ABC was meticulously trimmed to smooth the lower eyelid incision. The dog-ear deformities on both ends of the incision were resected, and then the skin suture was completed with 7-0 nylon suture.

Modified Skin Redraping Technique
Points A, C, and D of the modified technique were the same as those of the classic method. Point B of the modified skin redraping method was located at the newly formed supratarsal crease, which was higher than in the classic skin redraping technique (Fig. 1, right eye). After local anesthesia, skin incision (Fig. 2A), subcutaneous dissection (Fig. 2B), and exposure of the medial canthal tendon after selective release the OOM superficial to it (Fig. 2C), similar to the classic skin redraping technique, a subcutaneous suture was placed with 7-0 nylon, fixing the medial canthal tendon with the old and new medial epicanthus. Point A and point C were then sutured together to create the new medial canthus, and flap ABC was meticulously trimmed to smooth the lower eyelid incision. The dog-ear deformities on both ends of the incision were resected, and then the skin suture was completed with 7-0 nylon suture.

Assessment of Outcomes
Digital pictures were taken before operation and during follow-up visits. The interpupillary distance (IPD) and the interepicanthal distance (IED) were also measured before and after operation. To minimize systematic error, the IED/IPD ratio was utilized. Two-sided Wilcoxon rank-sum test was performed for IED/IPD ratio comparison before and after operation in each operative technique. Mann-Whitney U test was performed for postoperative IED/IPD ratio comparison between the 2 different operative groups. The analyses were performed with IBM SPSS Statistics. Statistical difference was defined as P value less than 0.05.

During follow-up visits, the patients were evaluated with a Likert scale (1: very unsatisfied, 2: unsatisfied, 3: neither satisfied nor unsatisfied, 4: satisfied, 5: very satisfied). Patients were also evaluated by plastic surgeons for the presence of complications such as visible scarring, overcorrection, undercorrection, etc.

RESULTS
This study included 193 patients followed up for > 6 months postoperatively. There were 96 patients in the classic skin draping group, and 97 patients in the modified skin draping group. Preoperative and postoperative photos of typical cases are presented (Figs. 3 and 4).

The IED/IPD ratios are summarized in Supplementary Digital Content, Table 2, http://links.lww.com/SCS/D907. Preoperatively, the average IED/IPD ratio was 0.62 (range, 0.57–0.64) and 0.61 (range, 0.56–0.63) in the classic skin draping group and the modified skin redraping group, respectively. There was no statistical difference comparing the IED/IPD ratios between the classic skin draping group and the modified
skin draping group either preoperatively or postoperatively ($P > 0.05$, Mann-Whitney U test). In the classic skin draping group, the postoperative IED/IPD ratio was significantly lower than the preoperative IED/IPD ratio ($P < 0.05$, two-sided Wilcoxon rank-sum test).

In the classic skin draping group with concurrent double eyelidplasty, there were 17 out-fold cases and 71 in-fold cases. In the modified skin draping group with concurrent double eyelidplasty, there were 76 out-fold cases and 14 in-fold cases. There were more out-fold cases in the modified skin draping group (76/90) than in the classic skin draping group (17/88) ($P < 0.001$).

In the classic skin draping group, there were 3 patients of mild undercorrection and 3 patients of visible scarring in the lower eyelid. In the modified skin draping group, there were 2 patients of mild undercorrection. The incidence of visible scarring demonstrated statistical difference between the modified skin draping group and the classic skin draping group ($P < 0.001$).

There were no other postoperative complications, such as overcorrection, hypertrophic scarring, hematoma, or infection. There was no statistical difference in the satisfaction scores of patients between in the classic skin draping group (4.5 ± 0.6) and the modified skin draping group (4.6 ± 0.6) ($P = 0.759$, Mann-Whitney U test).

**DISCUSSION**

The epicanthal fold consists of 3 main components: an inner skin layer, an outer skin layer, and a core structure between them. The main components of the core structure were intermingled fibrotic tissue and muscle fibers. The epicanthal fold was caused by the oblique preseptal OOM histologically, so the key surgical step is orbicularis oculi manipulation for epicanthal fold correction. The OOM beneath the epicanthus was released with the skin redraping technique, and the main causative factor of the epicanthus was corrected. Since its introduction, the skin redraping method has been widely applied for medial epicanthal fold, medial lower lid epiblepharon, congenital telecanthus, and blepharophimosisptosis-epicanthus inversus syndrome.

The etiologic factors of epicanthus include relative skin shortage in the vertical direction, and excess of medial canthal skin in the horizontal direction. However, in the classic skin redraping method, the ABC incision line is horizontal, and the ABC flap is small, which could not remove the excess skin in the medial upper lid. Therefore, hooding usually exists in the medial upper lid. As a result, it is difficult to create an out-fold with concomitant double eyelidplasty. After the small ABC flap advances to the lower eyelid, there is sometimes tension during wound closure, leading to visible scarring. Although there have been several publications with modified skin redraping epicanthoplasty, none have compared their modified technique with the classic skin redraping method.

To overcome the shortcomings of the classic skin redraping method, we developed an innovative modified skin redraping technique. By elevating point B to create a larger ABC flap, the redundant skin between the medial upper eyelid and the medial epicanthus can be removed. With our modified skin redraping technique, hooding in the medial upper eyelid can be avoided. Furthermore, the medial double eyelid crease can also be wider, which explains why there is much more out-fold after performing the modified skin redraping technique and double eyelid blepharoplasty (76/90) than after performing the classic skin redraping technique and double eyelid blepharoplasty (17/88).

The incidence of visible scar after modified Z-epicanthoplasty was reported to be around 9%, which is much higher than the classic and modified skin redraping technique. With the modified skin redraping technique, the relatively large ABC flap is advanced to the lower eyelid incision, relieving the tension and reducing the possibility of visible scarring. Our study demonstrated that the modified skin redraping technique (0/97) led to fewer cases of visible scarring than the classic skin redraping technique (3/96). Although there have been several articles comparing different surgical techniques for epicanthal fold correction, previous studies have not compared the complications of different techniques.

Since the causative factor of epicanthus was considered as the intermuscular connective tissue of the oblique-oriented preseptal OOM, the key operative step is orbicularis oculi manipulation. In our modified skin redraping technique, only a thin layer of OOM was released to expose the medial canthal tendon. Instead of aggressive orbicularis oculi resection, our technique employing orbicularis oculi release can preserve the morphology and
function of the OOM (OOM). In our opinion, the manipulation of the OOM of the epicanthus is similar to that of double eyelidplasty. In the past, double eyelidplasty procedures emphasized orbicularis oculi resection and skin-tarsus suture, leading to a static fold. Currenty, limited orbicularis oculi resection has been advocated to create a dynamic fold.

To minimize scar formation, a skin bridge was purposefully reserved, as the incisions for upper blepharoplasty and epicanthoplasty are not connected. Once the incisions for upper blepharoplasty and epicanthoplasty are connected, there is higher risk for noticeable scar formation.

In our study, a subcutaneous suture was placed with 7-0 nylon, fixing the medial canthal tendon with the old and new medial epicanthus. The major role of this nonabsorbable suture is to reduce the tension in the medical canthal area, thus avoiding scar formation. Another role of this nonabsorbable subcutaneous suture is to adjust the morphology of the medial canthus combined with the individualized design of Point A. For example, if there is an oblique, fishhook-shaped caruncle, Point A should be slightly elevated, and the anchor point of the suture on the medial canthal tendon should also be higher, making the postoperative result more natural.

This study has several limitations. This was a retrospective study with a relatively low level of evidence. Only the skin redraping technique and the modified approach were used in this study. However, there are different severities and types of epicanthus, which might require different surgical procedures. Large-scale prospective studies comparing different procedures for different types and severities of epicanthal folds are required in the future.

CONCLUSIONS

In conclusion, an easy and simple modified skin redraping technique was designed, and satisfactory results were obtained compared with the classic skin redraping method. Modified skin redraping method can prevent skin excess in medial upper eyelid. With concurrent double eyelidplasty, there is more out-fold with modified skin redraping epicanthoplasty. Modified skin redraping epicanthoplasty is easy to implement and is free of tension, which can reduce the incidence of visible scarring.

REFERENCES

1. Uchida J. A surgical procedure for blepharoptosis vera and for pseudoblepharoptosis orientalis. Br J Plast Surg 1962;15:271–276
2. Park JI. Z-epicanthoplasty in Asian eyelids. Plast Reconstr Surg 1996;98:602–609
3. Oh YW, Seul CH, Yoo WM. Medial epicanthoplasty using the skin redraping method. Plast Reconstr Surg 2007;119:703–710
4. Mao R, Zhou L, Yu L, et al. Dual-plane epicanthoplasty in Chinese blepharoplasty. J Cosmet Dermatol 2020;19:3323–3330
5. Liu L, Li S, Fan J, et al. Inverted ‘V–Y’ advancement medial epicanthoplasty. J Plast Reconstr Aesthet Surg 2012;65:43–47
6. Hwang K, Kim H. Historical vignettes of epicanthoplasty. J Craniofac Surg 2016;27:1080–1083
7. Kim JH, Hwang K, Park B. The boomerang epicanthoplasty:a technique that avoids hooding. J Craniofac Surg 2018;29:1813–1816
8. Chung YI, Han KE, Park BY. Restoration of complicated epicanthus: modified reverse skin redraping with mini-epicanthoplasty for rescue in unsatisfied epicanthoplasty patients. Ann Plast Surg 2017;78:613–617
9. Park JW, Hwang K. Anatomy and histology of an epicanthal fold. J Craniofac Surg 2016;27:1101–1103
10. Kakizaki H, Ichinose A, Nakano T, et al. Anatomy of the epicanthal fold. Plast Reconstr Surg 2012;130:494e–495e
11. Oh J, Lee K. Medial lower lid epiblepharon repair solely by skin-redraping medial epicanthoplasty. Br J Ophthalmol 2014;98:1437–1441
12. Choi JW, Gaxiola-Garcia MA, Kang MK, et al. Correction of congenital telecanthus by extended medial epicanthoplasty with skin redraping method. Ann Plast Surg 2019;82:528–532
13. Sa HS, Lee JH, Woo KL, et al. A new method of medial epicanthoplasty for patients with blepharophimosis-ptosis-epicanthus inversus syndrome. Ophthalmology 2012;119:2402–2407
14. Lee Y, Lee E, Park WJ. Anchor epicanthoplasty combined with out-fold type double eyelidplasty for Asians do we have to make an additional scar to correct the Asian epicanthal fold? Plast Reconstr Surg 2000;105:1872–1880
15. Wang G, Zhang S, Ma J, et al. Cosmetic and structural outcomes of two different techniques of medial epicanthoplasty according to epicanthal fold classification and severity: a cohort study. J Plast Reconstr Aesthet Surg 2018;71:1453–1461
16. Sun W, Yin N, Song T, et al. A practical technique combining orbicularis oculi muscle resection-based epicanthoplasty and orbicularis-tarsus fixation double-eyelid plasty for cosmetic blepharoplasty. J Plast Reconstr Aesthet Surg 2019;72:2009–2016
17. Suo L, Li J, Fu R, et al. A four-step technique for creating individual double-eyelid crease shape: a free-style design. Plast Reconstr Surg 2020;146:756–765
18. Park DH, Park SU, Ji SY, et al. Combined epicanthoplasty and blepharoptosis correction in Asian patients. Plast Reconstr Surg 2013;132:510e–519e
19. Wang S, Shi F, Luo X, et al. Epicanthal fold correction: our experience and comparison among three kinds of epicanthoplasties. J Plast Reconstr Aesthet Surg 2015;1351:682–687
20. Kim CY, Lee SY. Structural and cosmetic outcomes of medial epicanthoplasty: an outcome study of three different techniques. J Plast Reconstr Aesthet Surg 2015;68:1346–1351
21. Pan L, Sun Y, Yan S, et al. A flexible suspension technique of blepharoptosis: clinical application and comparison with traditional technique. Aesthetic Plast Surg 2019;43:404–411
22. Kim HS, Hwang K, Kim CK, et al. Double-eyelid surgery using septoaponeurosis junctional thickening results in dynamic fold in Asians. Plast Reconstr Surg Glob Open 2013;11:1–9
23. Sullivan D, Chung KC, Eaves FF 3rd, et al. The level of evidence pyramid: indicating levels of evidence in plastic and reconstructive surgery articles. Plast Reconstr Surg 2011;128:311–314