Asian Blepharoplasty

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ABSTRACT

One of the defining features between an individual of Asian descent and someone of Western descent is the presence of an upper eyelid crease. Approximately 50% of Asians do not have an upper eyelid crease. The double eyelid operation, or creation of a supratarsal crease, is the most common cosmetic procedure requested in Asia and the third most common procedure requested by Asian Americans. In this comprehensive article, we explore the art of creating an eyelid crease in the individual who either does not have a crease or has an indistinct crease. We will review the history of the development of Asian blepharoplasty, explain the anatomy of the Asian eyelid and how it differs from the Caucasian eyelid, and clarify how this anatomy then translates to differences in external appearance. The two main schools of surgical techniques will be discussed along with pearls, pitfalls, and personal observations.

KEYWORDS: Asian, blepharoplasty, double eyelid, supratarsal crease

The “double eyelid” operation, or surgical creation of a supratarsal crease, is the most commonly performed aesthetic procedure in Asia.^{1,2} Whereas this procedure is considered by some to be an attempt at Westernization of the Asian eyelid, the first published description of the procedure was in the late 1800s, long before the existence of a strong Western presence in Asia.

Early publication in the Japanese medical literature favored the suture ligation method. In 1896, Mikamo described the “double eyelid” feature and how it was considered an indicator of beauty by writers and artists of that time period. Single eyelids that did not possess a distinct supratarsal crease were described as “monotonous and impassive.”³ He estimated the incidence of the single eyelid in Japanese women to be approximately 17 to 18% and thus concluded that the double eyelid was the physiologically normal appearance. Mikamo’s technique was a modification of a surgical procedure used to correct entropion that was

first described and used in the ophthalmology literature. He referenced Kamoto by saying that the procedure not only corrected entropion but also created a “clear double eyelid and a more attractive look.”³ In this first publication on Asian blepharoplasty, Mikamo described how three sutures were passed through the full thickness of the eyelid to include the tarsus. Each suture was placed approximately 3 mm apart, 6 to 8 mm superior to the lid margin, and removed after 4 to 6 days. He emphasized maintaining an appropriate distance between the lid margin and the suture line such that the double lid remained commensurate with those of Japanese women who had a naturally occurring crease. This again highlights the fact that the initial operation was not intended to Westernize the eyelid but to create an overall more expressive look.^{4–6}

After these initial case reports by Mikamo, little was published until the 1920s, when increased Western presence introduced new concepts of beauty and changed the Asian attitude toward aesthetic surgery. The suture

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ligation technique continued to be the only method and was described by several authors including Uchida.⁷ In Uchida's article, he described his results with 1523 eyelids in 396 males and 444 females. The crease was designed similarly to Mikamo's description; it was placed 7 to 8 mm from the ciliary margin, and the sutures were removed on postoperative day 4.⁷

Maruo described the first external incision technique in 1929. His technique required an incision across the lid 7 mm from the ciliary margin. Closure of the incision included a trans-lid passage from the conjunctiva to the superior tarsal border of the anterior skin edge to the tarsal plate.⁸

Over time, a greater Western influence was clearly seen and reflected in the procedures that followed. Hata described creating a higher crease at 10 mm in 1933, and in the 1940s to 1950s, multiple authors including Hayashi, Inoue, Sayoc, Mitsui, Fernandez, and Boo-Chai described techniques including excision of muscle and fat to create a deeper-set eye in addition to creating a double eyelid.⁹⁻¹⁵

Today, the literature contains abundant material on both suture ligation and external incision techniques, as well as a new focus on procedures to eliminate the epicanthal fold. The surgeon should be aware of the broad range of surgical options in modifying the eyelid and tailor procedures according to each individual patient's preferences, which can vary widely even between different Asian populations. According to the 2006 cosmetic demographics published by the American Society of Plastic Surgeons, Asian Americans compose 6% of the cosmetic patient population with blepharoplasty ranking as the third most commonly requested surgical procedure behind rhinoplasty and breast augmentation. Although most patients desire the creation of a supratarsal crease, the expectation of the size, shape, and height of the crease can differ significantly between different subsets of the Asian population.¹⁶ All in all, most surgeons agree with the idea that the double eyelid procedure should create a lid that remains within the norms for the Asian face, rather than Westernize the eyelid altogether.^{1,2,17}

EYELID ANATOMY

Surgical eyelid anatomy is typically described in layers: (1) skin/subcutaneous fascia, (2) orbicularis muscle, (3) septum orbitale, (4) preaponeurotic fat, (5) eyelid retractors, (6) tarsal plate, and (7) conjunctiva. Each of these structures can be grouped into one of three lamellae. The anterior lamella consists of the skin and orbicularis; the middle lamella consists of the septum, fat, and levator complex; and the posterior lamella consists of the tarsal plate, Müller's muscle, and conjunctiva.

The skin of the eyelid is the thinnest in the body, and there is generally very scant subcutaneous tissue or fat. Fibrous attachments hold the skin and underlying orbicularis muscle together. The orbicularis muscle is divided into an orbital portion that overlies bone and a palpebral portion. The palpebral portion is divided into pretarsal and preseptal portions based on the structures underlying the muscle. The pretarsal portion of the orbicularis is firmly adherent to the underlying tarsus but separates superiorly where the levator inserts into the tarsus. The preseptal portion of the muscle extends between the tarsus and the orbital portion of the muscle.

The orbital septum separates the eyelid into anterior and posterior lamellae. It extends from the superior bony margin as a continuation of the periosteum to the tarsus. The septum fuses with the levator aponeurosis at a variable position usually within 10 mm above the tarsus. Behind the septum, the preaponeurotic fat is encountered, with the upper eyelid containing a nasal and a middle fat pad.

Posterior to the preaponeurotic fat are the eyelid retractors. The levator palpebrae superioris originates at the apex of the orbit and travels outward overlying the superior rectus muscle. As the levator descends down the eyelid, it inserts into the anterior surface of the tarsus, the pretarsal orbicularis, and the skin by fibrotic bands. Müller's muscle, which also originates at the apex of the orbit, lies deep to the levator and attaches to the superior margin of the tarsus.

ASIAN EYELID ANATOMY

The major differences in the superficial appearance of the Asian eye are (1) a "single" lid, or lack of supratarsal crease, (2) amount and location of periorbital fat, and (3) presence of a well-defined epicanthal fold.^{1,2,17} The surgeon should remember that tremendous variations exist even between the different geographic regions of Asia. Northern Asians (Chinese, Korean, and Japanese) fall more under this classic description, whereas those from Southern Asia tend to have a more "Western" appearing eye with a crease, albeit less well-defined.² When Asians do exhibit a "double eyelid," they tend to have a smaller and lower-positioned fold in comparison with Caucasians. Additionally, the fold is usually further obscured by abundant periorbital fat and skin with excess laxity.^{1,17,18} General differences in the anatomy account for the appearance of the Asian eye.

First, the anatomy behind the single eyelid is due to the absence or paucity of fibrous attachments between the levator aponeurosis and the orbicularis and skin of the eyelid. In Caucasians who have a crease, the orbital septum fuses with the levator aponeurosis ~5 to 10 mm above the superior tarsal border. Below this point, the terminal interdigitations of the levator aponeurosis insert toward the subdermal surface of the pretarsal and

preseptal upper lid skin, with maximal concentrations along the superior tarsal border and spreading inferiorly.¹⁹ In the eye without a crease, the levator simply attaches to the superior edge of the tarsal plate without these attachments.^{2,14} Thus, as the levator contracts when the eye opens, there is no invagination of the skin to create a crease.

In a more recent article, Chen describes a new concept of the “glide zone,” which further elucidates why the crease may be obscured in Asians. Here, the eyelid is divided into three layers: the anterior skin and orbicularis; the middle “glide zone,” which consists of preaponeurotic fat; and the posterior levator/aponeurosis and tarsal plate. The crease is viewed as the invagination of the skin as the posterior layer retracts superiorly relative to the anterior layer, and the fold is the passive folding over of anterior skin over the tarsus as the levator actively contracts.²⁰ As previously stated, many Asians do exhibit a crease; however, the crease tends to be smaller and less well-defined. This is due to the fact that the fusion between the septum and the levator aponeurosis occurs more inferiorly and closer to the lid margin.^{2,17} In addition, the crease may be further obscured by preaponeurotic fat that descends over it.

The differing levels of fusion between septum, aponeurosis, and tarsal plate also account for the different location of the periorbital fat seen in Asians. On histopathologic studies of eyelids, the inferior descent of the preaponeurotic fat pad is limited by the fusion of the orbital septum and the aponeurosis. Therefore, in eyelids with a lower level of fusion, such as the Asian eyelid, this fat pad descends more inferiorly compared with the Caucasian eyelid where fusion occurs at a higher level. The periorbital fat in the Asian eye descends to the point where it lies anterior to the tarsal plate, lending to the characteristic “puffy” Asian eye, and occasionally the illusion of ptosis. Additionally, the presence of this fat prevents the fibrous attachments from extending between the levator to the orbicularis and skin (Figs. 1–4).^{17,21}

Several authors have also reported a greater amount of fat in Asian eyelids and not necessarily just a difference in location of the fat pads. Uchida described the presence of four areas of fat pads in Asian upper eyelids. He described the subcutaneous fat, the pretarsal fat, the central (submuscular or preseptal) fat pads, and the preaponeurotic fat or “orbital” pad.²²

Figure 1 Cross section of Caucasian eyelid showing extensions from levator aponeurosis to orbicularis and skin.

Figure 2 Cross section of Asian eyelid showing lower point of fusion of orbital septum and levator, with inferior descent of preaponeurotic fat, and absence of connection between aponeurosis, orbicularis, and skin.

Figure 3 Caucasian eyelid with invagination of skin as the levator contracts upward.

Figure 4 Asian eyelid with no invagination of skin as levator contracts upward.

Jeong describes all of these differences in detail based on a cadaveric study in which he found that Asian eyelids exhibit: (1) diffuse fat on both the anterior and posterior surfaces of the orbicularis that is absent in Caucasian lids, (2) a fibroadipose layer between the orbicularis and the levator aponeurosis that extended between the pretarsal orbicularis and the tarsal plate, whereas Caucasian lids had defined firm connections between the aponeurosis and orbicularis/skin, (3) the septum fuses with the levator aponeurosis below the supratarsal border, but in Caucasians the two structures fuse superior to the supratarsal border, (4) the fused aponeurosis/septum attaches to the tarsal plate an average of 2 mm above the lid margin but fused higher in Caucasians at an average 3 to 4 mm above the margin. For those Asians who have an eyelid crease, the fusion of the septum and aponeurosis is higher than in Asians without a crease. Asians overall exhibit more suborbicularis fat as well as more subcutaneous fat.²¹

The third major difference between Caucasian and Asian eyes is the presence of an epicanthal fold. The epicanthal fold is a skin flap at the medial portion of the eyelid that descends along the side of the nose and is curved concavely toward the medial canthus. Four types of epicanthal folds are described based on the shape of the fold. According to the Johnson classification, these four types are (1) epicanthus supraciliaris, (2) epicanthus palpebralis, (3) epicanthus tarsalis, and (4) epicanthus inversus. Epicanthus supraciliaris originates from the brow and curves downward toward the lacrimal sac. Epicanthus palpebralis arises above the upper tarsus and extends to the inferior orbital rim. Epicanthus

tarsalis, the most common type found in Asians, rises from the upper lid crease and merges into the skin near the medial canthus. Epicanthus inversus originates from the lower eyelid skin and extends to the upper lid over the medial canthus.²³

SURGICAL TECHNIQUES

The general concept in the “double eyelid” operation is to create an eyelid crease by surgically fixing two separate structures together: skin to aponeurosis, skin to tarsus, or aponeurosis to orbicularis. When doing this, preoperative considerations need to include the size and location of the fold, as well as its configuration and its relation to the epicanthal fold.

Chen has previously described the various forms of Asian eyelids, and multiple authors point out that the eyelid crease in Asian patients with a naturally occurring “double eyelid” can take on several different formations (Figs. 5–7). These folds can even vary from eye to eye in the same patient. The shape of the Caucasian crease is described as semilunar (Fig. 8), in that it lies closer to the canthal angles medially/laterally than in the center of the crease.^{18,24} A patient’s request for “double eyelid” surgery should not be considered a desire for a “Western” or Caucasian eye. In fact, having a semilunar crease created is by far the most frequent complaint heard from Asian patients who have had blepharoplasty performed in the United States.²⁵ Rather, it is possible to maintain the ethnic look by creating a smaller double lid that still makes the eye appear larger.^{2,18} These procedures can be divided into two broad categories: external incisional techniques and the less invasive suture ligation

Figure 5 Asian eyelid with a medial epicanthal fold and no supratarsal crease.

technique. The pros and cons of both will be reviewed and discussed in the next section.

NONINCISION OR SUTURE LIGATION TECHNIQUES

Suture fixation using three sutures was the first type of “double eyelid” surgery to be reported in the literature.³ Suture fixation techniques have the advantage of avoiding a visible scar, shorter operative time, quicker recovery, and ease of revision. Because this procedure does not include any skin, muscle, or fat excision, patients with redundant skin or excessive amounts of fat would not be considered appropriate candidates for this procedure.^{24,26}

In Mikamo’s initial operation, he described using three silk sutures ~3 mm apart that traversed the full thickness of the lid to include the tarsus. The sutures were left in place for 4 to 6 days.³ A large number of suture, or nonincision, techniques have been described, and vary according to which eyelid layers are incorpo-

Figure 7 Asian eyelid with a “nasally tapered crease,” or a fold that converges with the lid margin medially.

rated into the suture knot. Whatever the method, the basic premise still relies on the fact that scarring will occur between the tissues incorporated into the suture knot to create the adhesion needed in these structures to produce a crease. Some current methods use permanent sutures and leave the knots buried subcutaneously.

Uchida emphasized in his technique the importance of adhesion between the tarsus and the pretarsal skin.²² Maruo, Harada, Mutou, and Khoo’s methods were all used and reviewed by Song and Song in 1985. Each of these methods achieved adhesion of tarsus to pretarsal skin by full-thickness ligation sutures that included the tarsus. Song and Song emphasized the importance of tarsus to pretarsal skin adhesion by describing their technique in which sutures do not traverse the full thickness of the lid but rather only from the subcutaneous tissue through the superficial portion of the tarsus.²⁶ Liao et al added to this principle in a procedure using three sutures that traverse the full thickness of the lid including the tarsus and also created an “arcade” to connect each point with a subcutaneous stitch with

Figure 6 Asian eyelid with a “parallel crease,” or a fold that remains parallel to the lid margin along its entire length.

Figure 8 Caucasian eyelid with a “semilunar crease,” where the fold is typically closer to the lid margin medially and laterally than in the center of the eyelid.

Figure 9 Three points of suture placement are marked along the planned location of the crease in the suture method.

intentions to increase inflammation and therefore provide longer-lasting results. They reported only 3 of 315 patients returning for disappearance of the fold.²⁷

Baek et al reviewed their experience with 762 patients undergoing creation of a supratarsal crease using a single suture nonincision technique. The height of the fold and its relation to the epicanthal fold are decided by the patient and physician together, most often 6 to 8 mm above the lid margin. The tissue adhesion occurs here not between the tarsus and skin but between the aponeurosis and orbicularis/skin. This tissue adhesion is fashioned to simulate the fibrous attachments between levator aponeurosis to orbicularis/skin in naturally occurring folds. Their technique differs from other popular methods in that they use a single suture to create a wide sling rather than three separate suture points of adhesion. With this method, they reported a 2.9% disappearance of fold at 5 years follow-up.²⁵

Further efforts to increase the amount and durability of scar adhesion are described in more recent techniques. Lee et al described debulking of pretarsal tissue to include muscle, pretarsal fat, and septum through small stab incisions prior to placement of the ligation sutures. In their opinion, removal of this tissue allows for a wider area of contact between dermis and tarsal plate resulting in better and longer-lasting scar adhesion. In their experience with 327 patients, there was no loss of the fold at an average of 13 month follow-up (range, 2 months to 2 years).²⁸

Yang also described the removal of orbital fat in the preaponeurotic layer with a "limited incision" technique. He used a 3- to 4-mm incision to place a single ligation suture attaching aponeurosis to pretarsal skin, but included debulking of preaponeurotic fat as a maneuver to increase adhesion and decrease late disappearance of the fold. He reported one early and two late disappearances of the fold in 76 patients over 3 years.²⁹

Megumi also incorporates debulking of orbital fat in his suture technique to prevent disappearance of the fold. He performs this step through a limited incision in the conjunctiva instead of through the skin. A single running suture is used to create a sling across the length of the lid incorporating tissue from conjunctiva to the subdermal tissue at the superior border of the tarsus. This method also has the advantage of specifically placing the buried knot closer to the conjunctival side of the lid rather than the skin side, thereby decreasing

Figure 10 Transconjunctival method of suture technique: One needle is passed from point A to subcutaneous layer and back through point B. The needle is then passed through the same points from B to A, and the knot is tied on the conjunctiva side.

Figure 11 Full-thickness transconjunctival method of suture technique: Each needle of a double-armed suture is passed through the full thickness of the eyelid. One needle is then passed through the same exit hole to meet the other at a stab incision in the skin. The knot is then tied subcutaneously through the stab incision.

Figure 12 Suture technique with stab incision and adhesion between aponeurosis and skin/subcutaneous layer: One needle is passed through a stab incision, point A, to the level of the aponeurosis layer, rather than full thickness, and exits at point B. The same needle then enters through point B and is passed back through the stab incision, where the knot is left subcutaneously. Limited debulking of orbital fat can also occur through stab incisions.

the likelihood of visibility. Megumi reported only three patients with disappearance of the fold in a series of 280 patients³⁰ (Figs. 9–12).

EXTERNAL INCISIONAL TECHNIQUES

Whereas the suture technique is attractive in that it is less invasive, these techniques do not allow the surgeon to address very excessive periorbital fat, orbicularis, or skin that is often present.^{24,26} Incisional techniques are generally believed to produce longer-lasting results by surgically fixing layers together, rather than relying solely on scar formation and adherence in a constantly moving structure.³¹ Numerous techniques have been used and vary based on which structures are fixed together. In general, they can be grouped into two broad categories: (1) skin-levator-skin (or skin-tarsus-skin) and (2) levator aponeurosis/superior tarsal border to inferior subcutaneous plane.¹

In the skin-levator-skin method, suture is passed from the inferior edge of the skin incision, through the distal fibers of the levator aponeurosis, and back through the superior edge of the skin incision.¹ Fernandez describes this method as the “simple” technique; because no orbicularis or fat is excised, this method will tend to create a smaller, “oriental” fold, and is generally not recommended for patients with excessively fatty lids or patients desiring a larger crease.¹⁴ If the tarsus is sutured to the skin edges rather than the levator aponeurosis, the result will be a static crease (a surgically created crease that is obvious on downward gaze), as opposed to dynamic crease (a surgically created crease that fades on downward gaze).¹

In the levator aponeurosis to inferior subcutaneous plane method, buried sutures are used to form adhesions between the levator aponeurosis and the subcutaneous tissue of the inferior incision.¹ Fernandez describes this technique as the “radical” procedure, creating a deeper crease than his “simple” technique.¹⁴ Sheen described fixing levator to orbicularis rather than

to the dermis. The permanent fixation of aponeurosis to dermis, as per Sheen, leads to a permanent visible fold rather than a dynamic invagination of the eyelid as it opens.³² Park also describes suture fixation of the aponeurosis to orbicularis. He points out that the pretarsal skin is tightly adherent to underlying orbicularis, and the two move as a unit. Because Caucasians have fibrous attachments between aponeurosis and orbicularis above the tarsal plate, the orbicularis and adherent skin invaginate as the eye opens. However, in Asians with no levator attachments to the orbicularis, no fold is seen. As the levator pulls the tarsal plate up, the skin-orbicularis unit slides over the tarsus and obliterates the fold. In his procedure, he attaches the levator aponeurosis to the orbicularis, and because the orbicularis and skin are tightly adherent, suture fixation to skin is an unnecessary step. Park also believes fixation to the subdermal plane is less effective than orbicularis fixation due to the small, flimsy amount of dermis/subdermal tissue³¹ (Figs. 13 and 14).

Millard describes successful results using only “supraorbital lipectomy” to debulk the eyelid, achieving a crease without levator or tarsal fixation to the orbicularis or skin.³³ Likewise, Bang believes that the most important determinant of the eyelid crease is the amount of soft tissue separating the levator aponeurosis from the skin. He reports a method of debulking orbicularis, connective tissue, and pretarsal fat, with placement of “basting” sutures to close the dead space without ever fixing the levator to the skin. In his series of 48 patients followed over 6 to 20 months, he reports two patients complaining of a fold being too high, and one patient with an indistinct fold.³⁴

Chen’s technique incorporates both debulking and surgical adhesion between the levator aponeurosis and skin. First, the vertical height of the tarsal plate at the center of the eyelid is measured with the eyelid everted. This measurement, usually 6.5 to 8.5 mm, is then transposed on the external skin at the center of the eyelid. The remainder of the crease is marked from this

Figure 13 Skin-levator-skin external incisional method: Suture is passed through the interior edge of the skin incision, through the levator aponeurosis, and back through the superior edge of the skin incision.

starting point depending upon the type of crease desired. If a parallel crease is preferred, a line is simply drawn medially and laterally from this point parallel to the lid margin. For a nasally tapered crease, the medial third of the line is drawn to taper toward or merge with the medial epicanthal fold. The lateral third of the line is similarly drawn to remain parallel or slightly flared, based on the surgeon's design and patient preference. This first line is the inferior incision and will be the site and shape of the crease; the superior incision line is marked ~2 mm above and parallel to the inferior incision. After the incision is made, this thin layer of

intervening skin is excised with scissors, leaving any subcutaneous fat, pretarsal and preseptal orbicularis exposed.³⁵ The distance between the inferior and superior incision can vary from patient to patient depending on how much skin redundancy the patient has, with the occasional patient requiring no skin excision at all.

Next, a portion of the subdermal tissue is excised, to allow adequate adhesions to form between the levator aponeurosis and the subcutaneous tissue. In cross section, the area of the tissue to be debulked takes the shape of a trapezoid. The inferior extent of the tissues to be debulked hinges on the superior border of

Figure 14 Levator aponeurosis to inferior subcutaneous plane external incisional method: Suture is placed from subcutaneous tissue at the inferior edge of the incision through the aponeurosis, and the knot is tied in the subcutaneous layer.

the tarsus, and the excised skin is the anterior border of the trapezoid. The dissection is then beveled up through the supratarsal and preseptal orbicularis starting at the superior incision. Because the orbital septum fuses with the levator more inferiorly in Asians, it is encountered quickly in this supratarsal area. As the septum is visualized, it is opened horizontally to expose the preaponeurotic fat, which can also be included as part of the debulking process. As the tissue between the aponeurosis and skin incision is debulked, this will allow easier adhesion and invagination of the skin to form a well-defined crease.¹⁸

Closure involves two steps. Nonabsorbable sutures of 6-0 silk or nylon are used to pick up the lower skin edge and subcutaneous tissue, the levator aponeurosis along the superior tarsal border, and then the upper skin edge. Five to 6 of these are placed and tied individually as an interrupted suture. The rest of the incision is closed using a 6-0 or 7-0 silk/nylon in a subcuticular fashion. In the senior author's opinion, this technique gives the best chance of forming a dynamic crease. The use of absorbable sutures tends to create a static crease with some patients complaining of a persistent foreign body that occasionally requires secondary removal.¹

EPICANTHUS

Though the epicanthal fold varies widely in size and shape, it is present in some form in 60 to 90% of Asian eyelids and has the effect of obscuring the medial canthus.^{2,36,37} Whether or not to correct epicanthus during Asian blepharoplasty remains controversial. This is considered a normal feature of the Asian face by several authors such that revision is often not necessary unless the patient prefers otherwise.^{14,17,18} The exact anatomic explanation for the epicanthal fold is unknown. The fold is present in 100% of babies but disappears in all but 2% of the non-Asian population. The incidence in Asians is estimated at 40 to 90%.^{38,39} Theories as to why it persists in Asians are a relative lack of skin in the vertical dimension compared with the horizontal dimension, and an underdeveloped nasal

root.⁴⁰ Millard comments that to get a true "round" or Western eye, the epicanthus must be eliminated.³³ Several procedures exist to either soften or obliterate this fold of skin. The impetus to simultaneously correct this area comes from the idea that as excess eyelid skin is excised and eyelid tissue is fixated at a higher level during creation of an eyelid crease, a greater deal of tension is placed across the epicanthal fold, and it is subsequently accentuated in its appearance.^{40,41} Some authors also believe the overall look of the newly created supratarsal fold is weakened if the epicanthal fold remains.⁴⁰⁻⁴² One of the most popular techniques described initially was the Mustarde four flap, or jumping man, technique. However, this technique is criticized for creating incisions in the canthal region that lead to webbing, unnatural folds, and noticeable scarring in this area, as well as being too aggressive in obliterating the fold.⁴¹ Thus, there have been tremendous efforts to develop newer methods. These include modified Z-plasty, Y-V, inverted Y-V, and "no-scar" techniques. Transposition and advancement techniques including Z-plasty, Y-V, inverted Y-V and Y-W attempt to redistribute the skin in such a way that the fold disappears and the lacrimal lake becomes exposed.^{36,37,39,41} Authors favoring advancement techniques rather than transposition techniques highlight the fact that with advancement, scars can be extended to join a supratarsal fold incision in the upper lid. This avoids having to extend scars closer to the nasal skin where the greatest amount of scarring usually occurs^{24,27} (Figs. 15-18).

The no-scar technique involves debulking of tissue underneath the fold. Yen et al describe this method as performed in combination with upper lid blepharoplasty.³⁸ Rather than placing an incision in the medial canthal area, they debulk the tissue subcutaneously through the incision created for the upper blepharoplasty. Tissue debulking involves resection of hypertrophic orbicularis in this area that some believe creates tension on the skin resulting in the fold. After anatomic and histologic studies of the tissues within the fold by Lee et al, they conclude that the medial canthal ligament attaches to the skin of the fold with orbicularis

Figure 15 Markings for Park epicanthoplasty: Point A is the point on the epicanthal fold corresponding with the medial end of the underlying lacrimal lake; point B is where the epicanthal fold meets the lower eyelid skin; point C is placed medial to point A, at a distance equivalent to A-B. Point D, not marked here, is the medial end of the lacrimal lake; and point E lies along the line of the planned supratarsal crease.³⁹ These same markings are demonstrated on Figs. 17 and 18, where the epicanthal fold has been stretched medially to expose the medial end of the lacrimal lake.

Figure 16 Flap EABD is elevated, and the tissue within triangle ECA is surgically removed. Flap EABD is placed into triangle ECA. Point A can then be sutured to point D and the incisions closed. The resulting scar is shown at the right.

fibers running through this flap of skin.⁴⁰ Their surgical technique also involves subcutaneous debulking of orbicularis and release of the medial canthal tendon attachments with downward redistribution of the skin by anchoring it to deeper tissues.

Chen believes that with his technique, a nasally tapered crease will merge with the origin of the epicanthal fold and create an eyelid that appears similar to that observed in Asians who have a naturally occurring crease, obviating the need for epicanthoplasty and avoiding potential complications.¹⁸

Figure 17 Markings for Park Z-epicanthoplasty, as explained in Fig. 15.

Figure 18 Markings for Park Z-epicanthoplasty with epicanthal fold stretched medially so that point D becomes exposed.

COMPLICATIONS

Asymmetric folds are the most common complication after this procedure with reports as high as 35%.^{17,43,44} Asymmetry can be seen in the form of unequal height or uneven shape.¹ Causes of asymmetry include differences in preoperative marking, differences in the width of skin excised, different levels of tension on the skin during supratarsal fixation, failure of establishing firm adhesion of the levator to dermis, and differing amounts of fat excision or late fading of the crease on one side compared with the other. Some recommend waiting as long as 6 to 9 months prior to any surgical revision to account for asymmetry secondary to prolonged postoperative edema.^{1,43-45}

An excessively high fold is seen in ~6 to 7% of patients.^{44,45} Folds are considered too high if they are placed above the superior border of the tarsal plate. The tarsal plate is usually 5 to 8 mm in Asian patients, and those creases that are created too high will result in an unnatural or startled appearance. At times, the fold becomes higher than planned due to adhesions between the orbicularis and skin above the level of surgical fixation. This can also be seen in cases where there is aggressive undermining or overresection of subcutaneous and orbital fat.^{14,17,43} Aggressive resection of preaponeurotic fat pads can also lead to a high fold with a hollowed supratarsal sulcus and occasionally multiple skin folds.¹

Fading or disappearance of the lid fold occurs in 0 to 3% of cases and is more frequent with suture techniques than with incisional techniques. This also occurs at a higher rate if absorbable sutures are used. The ultimate cause is failure to create permanent adhesion between levator and muscle or dermis.^{44,45} Chen notes that at the time of reoperation, it is common to find inadequately debulked tissue.¹

Blepharoptosis can also occur after Asian blepharoplasty if the levator is either damaged or scarred in such a way that prevents its normal function. This can occur if the level of fixation of the aponeurosis to muscle or dermis is placed too high. Also, inadvertent separation of the levator from the tarsal plate during excision of tissue has also been published as a cause of ptosis.^{44,45} Ectropion occurs when the levator is attached to the dermis too close to the ciliary margin or at a level that exceeds

what the normal skin tension will allow.^{14,44} The tension of the levator on the eyelid will lead to eversion of the lid margin. This occurs if the inferior incision is placed too low or if the inferior skin flap is sutured at a level too high on the levator.

Bleeding, ranging from prolonged ecchymosis to massive hematoma, can and has been seen after this procedure. The causes and rates of occurrence are similar to those for blepharoplasty in other populations.^{14,17,44}

CONCLUSION

Asian blepharoplasty can be a very effective procedure in the hands of a well-informed surgeon. As illustrated in this article, there are various ways to create a supratarsal crease in the Asian patient who desires a "double eyelid." To meet the patient's and the surgeon's expectations, a thorough understanding of the anatomy is imperative and essential to a surgical procedure that allows such small margins for error. Careful planning, execution, and postoperative care will result in high patient satisfaction and low complication rates.

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