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Aesthetic Plastic Surgery

New Ideas to Improve the Shape of the Ala of the Oriental Nose

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Abstract. The Oriental nose is smaller and lower than that of Caucasians. The lobule, the movable lower third, is lower and wider when compared with the Caucasian nose, and this region, including the tip, is entirely round. Traditionally, the isosceles triangle of the basal view, which consists of the nasal tip, the columella, and the alae surrounding the nostril, has been used to show the differences between the two races. Alae form two sides of the isosceles triangle and have the greatest influence on the shape of the basal view. For Orientals, the distance between the sides of the alar base is large, and the alae themselves are round and extrude laterally. Aesthetically, this shape cannot be seen as beautiful, and various methods have been applied to correct these deficiencies. However, no one has ever reported a method that directly corrects the shape of alae that extrude laterally. The author has found the technique of correcting the middle part of the ala without leaving any external scars by performing some of the plasties from inside the ala or by grafting cartilages. Successful results have been obtained and are reported here.

Key words: X-plasty—Ala—Basal view—Cartilage graft

Anatomy and Physiology

The entire shape of the nose is changed with the synergistic action between mimetic nasal muscles and the surrounding mimetic facial muscles. In particular, the lower third of the nose is movable and called the lobule. It consists of the nasal tip, alae, columella, and membranous system [1, 3] The movable region is in charge of respiration and changing the size and shape of the vestibule to control moisture and the amount of air breathed in. Since the lateral crus of the alar cartilage exists just above the alar cartilage and its lower rim partially overlaps the ala and interconnects through fibrous tissue, lateral crus may sometimes indirectly influence the shape of the ala. However, in the case of Orientals, the influence of the lateral crus can be ignored because it is not as large as that of Caucasians (Fig. 1) [11].

According to the author's histological review using continuous cross sections, the region strictly defined as the ala mainly consists of collagen fibers in the circumferential area except for nasal muscles located at the center. This means that alae themselves consist only of soft tissues and do not contain any cartilages (Fig. 2).

Muscles that are involved in pulling alae backward and enlarging the nostril are the alar nasalis and the dilator nasalis anterior muscles (Fig. 3). The conditions that exist when the nose is consciously blown are similar to the characteristics of an alar deformity laterally extruding (Fig. 4). Under the circumstances, it can be assumed that these muscles are involved in maintaining the laterally extruding alae in some way in alar deformity cases.

New Ideas to Improve Alar Shape

From the anatomical characteristics of the ala mentioned so far, the author came to the idea of correcting the ala's shape, consisting solely of soft tissues, by

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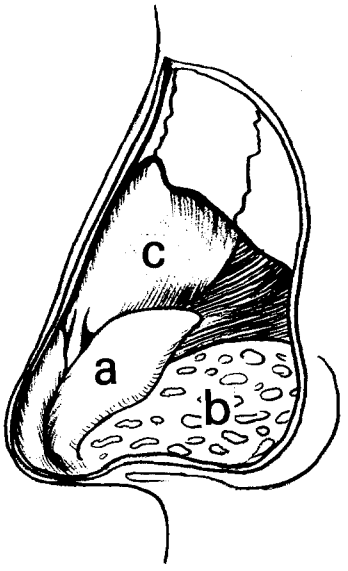


Fig. 1. (a) Alar cartilage, (b) ala, (c) lateral cartilage

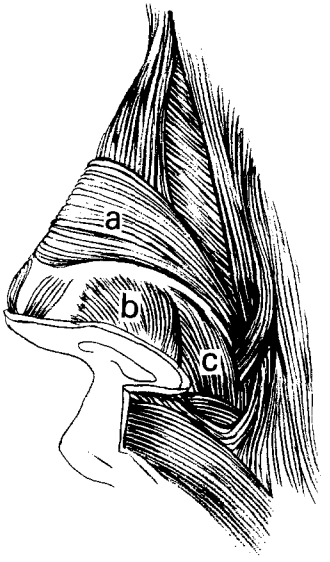


Fig. 3. Nasal muscles: (a) transverse nasalis muscles, (b) dilator nasalis anterior muscles, (c) alar nasalis muscles

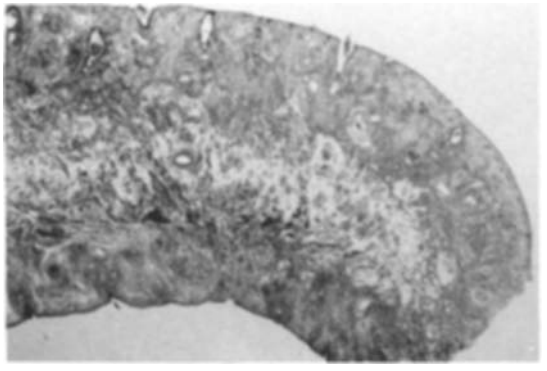


Fig. 2. Cross-section of the middle part of the ala

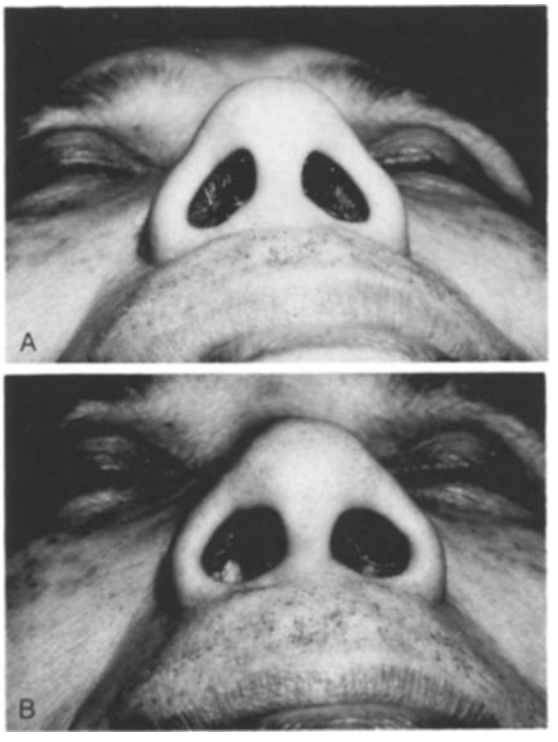


Fig. 4. Nostrils are consciously blown by mainly contracting alar nasalis muscles. **(A)** Static state of the nostrils, **(B)** blown out state of the nostrils. Alae have round curve.

doing X-plasty, which are used to correct soft tissues, from the mucosal side of ala. At the same time, reducing the roundness of the alae can be affected by partially cutting or extending the alar nasalis muscles toweaken them and reduce their role in maintaining the round and laterally extruding shape of alae. For severer cases of ala deformities, I grafted a cartilage into the middle part of the curved ala to forcibly improve the shape of the ala which consists solely of soft tissues.

The results to performing the X-plasty from the mucosal side of ala and grafting cartilage on the ala can be summarized as follows:

1. The lateral extrusion of the alae can be reduced by retracting the upper triangle flap downward. At the same time, the distance from the anterior to the posterior ala is shortened.

2. By replacing and advancing both triangle flaps from the front to the back of each other, the distance from caudal to cephalic of the ala is

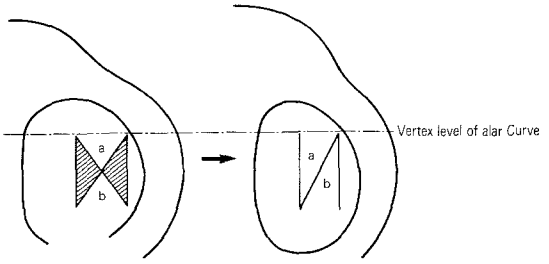


Fig. 5. (Left) Design of the X-plasty inside of the ala, (right) postoperative condition of the X-plasty

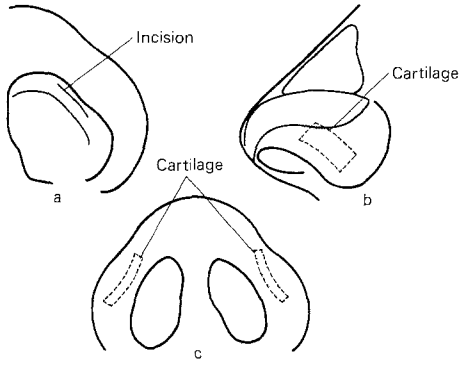


Fig. 6. (a) Site of incision, (b) lateral view of the site of the grafted cartilage, (c) basal view of the site of the grafted cartilage

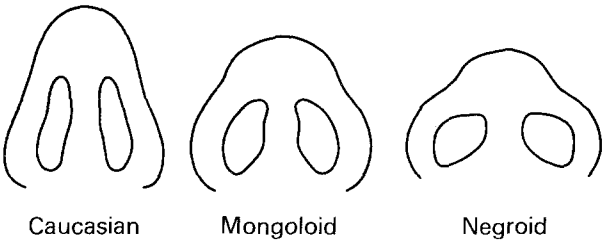


Fig. 7. Differences among races typically shown in basal views

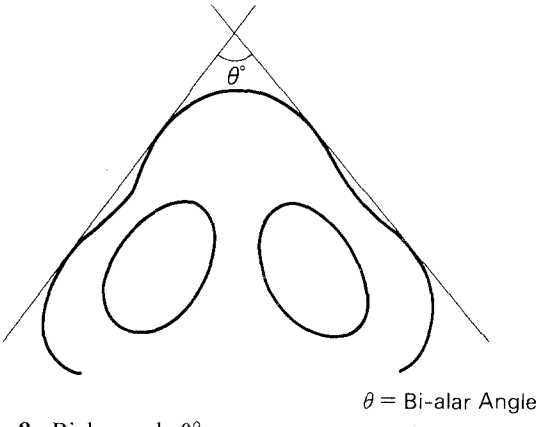


Fig. 8. Bialar angle θ°

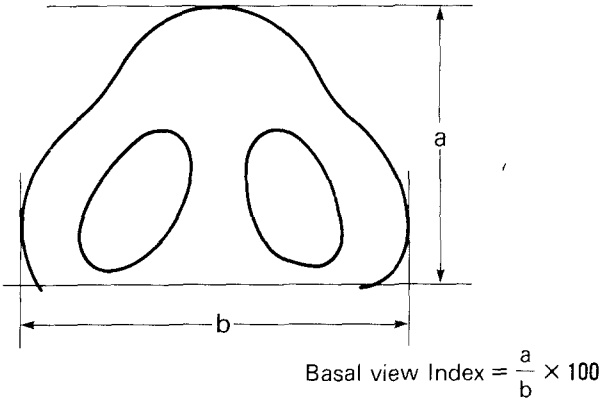


Fig. 9. Basal View Index

extended, and the strength of the alar nasal muscles that maintain the shape is reduced.

3. When the cartilage graft is performed, the curve should be corrected with the grafted cartilage rather than reducing the volume of alae. Accordingly, a severely deformed nose with a very small alae is indicative of this procedure.

Operative Procedure

X-Plasty

This procedure is effective for correcting relatively moderate ala deformities.

(1) When designing the X-plasty in the mucosal side, it is important to place the baseline of the upper triangle flap at the vertex of the alar curve (Fig. 5 left). left).

(2) The incision should be made deep enough to reach the muscle layer. After resecting the shaded area, the upper and lower triangles flaps **a** and **b** should be transposed while advancing, as shown in the Figure 5 (right). By retracting flap **a** downward, the anterior to posterior distance of the ala can be shortened and the curve can be reduced.

(3) Since the objective is to retract down flap **a** as inwardly as possible, you should suture the flap while confirming reduction of the severe curvature, and then suture flap **b**. Partial resection of flap **b** may be necessary to make alae smaller.

Cartilage Graft

Indication for this procedure is a severely deformed ala extrudes excessively in the lateral direction with a short columella and short alae, which is similar to a bilateral cleft lip nose.

(1) Make a perilimb incision at the vestibule at the middle of the alar curve (Fig. 6a).

(2) Using the vertex of the alar curve as the center, undermine the skin from this incision to make a pocket. The size of the pocket should be 1.2 times as large as cartilage to be inserted (Fig. 6b).

(3) Insert the cartilage (15 × 5 mm) collected from auricle into this position so that the curve of the cartilage opposes that of the alar curve (Fig. 6c).

Discussion

Many people have reported that Oriental noses are not as aesthetically beautiful as the Caucasians' [4–7, 9, 12]. According to the report by Oritz-Monasterio and Olmedo [9], the goal of rhinoplasty for the Mestizo people, whose noses are very similar to Oriental noses, is to simulate the Caucasian nose as closely as possible [8].

Shape and Function of the Lobule and Racial Differences in Basal View

The lower third of the nose, which is called the lobule and consists of nasal tip alae, columella, and membranous septum, is movable [1, 2, 6]. The shape changes with the motion of various nasal muscles and the surrounding nasal facial muscles [2, 11]. The basal view of the lobule forms an isosceles triangle which consists of nasal tip, columella, and alae surrounding the nostril. It clearly shows the difference among races (Fig. 7).

Among these components, the ala, which forms the sides of the triangle, has the greatest influence on the appearance of the basal view and can be consciously moved with nasal muscles when one blows the nose. In the case of Orientals, this region, which is thick and extrudes laterally, gives the triangle a wider and rounder appearance. Furukawa analyzed the differences among the basal view shapes by studying the angle created at the intersection of the outer tangent lines of both alae. He called this angle the bialar angle (θ°) and reported the average angles among races: 85° for Caucasians, 90° for Orientals, and 120° for Blacks (Fig. 8) [4, 5]. He expressed the proportion of the nasal breadth to the nasal height as the Basal View Index [columella height (*a*)/nasal breadth (*b*)] and studied the difference. The Basal View Index is about 85 for Caucasians and about 56 for Orientals, a significant difference (Fig. 9).

Correction of Alar Shape

Some methods have been applied to correct the shape of the basal view. The field of reconstructive surgery has various methods that correct bilateral cleft lip nose. Since the objectives of the field of reconstructive surgery are different from those of the aesthetic plastic surgery field, the procedures effective for our field are discussed here.

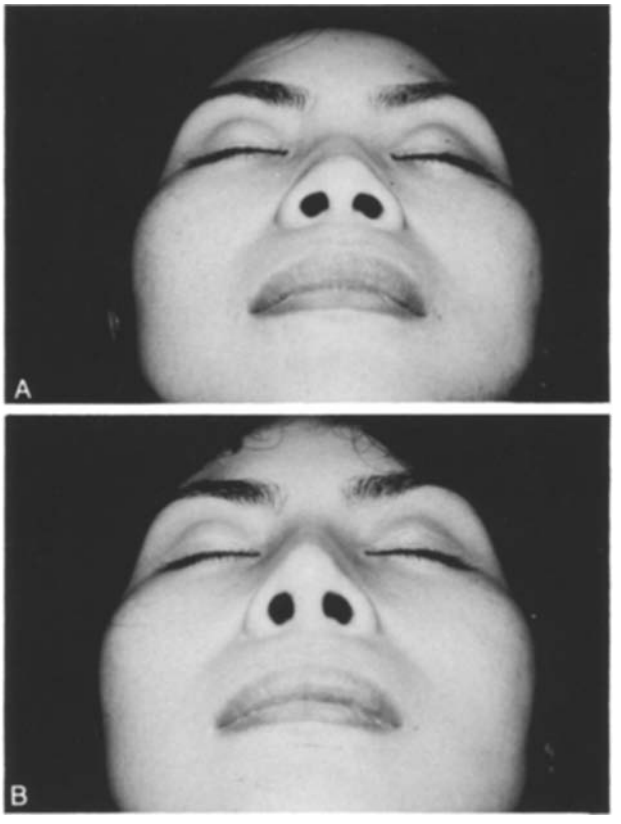


Fig. 10. Round curve is being camouflaged by tip augmentation: (**A**) preoperative view, (**B**) postoperative view

Nasal Tip Augmentation: The Basal View Index can be improved by increasing the height of the isosceles triangle. This method is relatively effective when the extrusion is slight to moderate (Fig. 10), but a drastic augmentation will create excessive tension at the nasal tip and will cause perforation. Therefore, the elongation of the columella is limited in the amount of augmentation possible. In addition, since the length from the upper rim of the nostril to the nasal tip increases, the balance between the columella and the lobule (2:1) will be destroyed, causing an unnatural appearance (Fig. 11).

When lateral extrusion of the ala is severe, there is little hope of camouflaging the shape of ala by tip augmentation (Fig. 12).

Partial Resection of Ala Base: A lateral extrusion of the ala can be reduced by partially resecting the ala base and by reducing the breadth of the entire ala [2, 4, 12] (Fig. 13). This method is effective when alae are relatively long and extruding laterally (Fig. 14). However, short and laterally extruding alae with a short

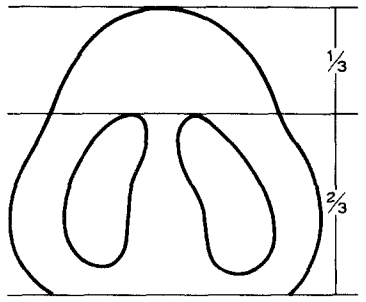


Fig. 11. Appearance of the basal view is unnatural when the columella–lobule ratio is abnormally unbalanced

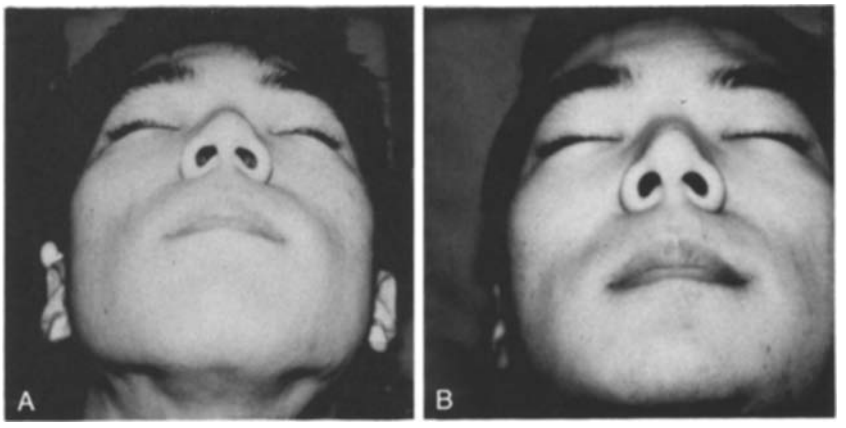
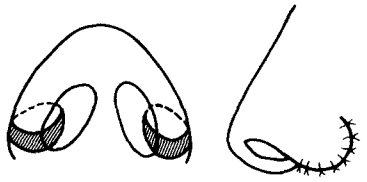


Fig. 12. Tip augmentation could not correct a round curve: **(A)** preoperative view, **(B)** Postoperative view



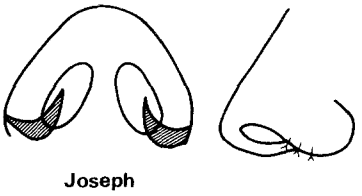


Fig. 13. A procedure to reduce roundness of the ala itself by making the entire ala smaller through a partial resection of the alar base

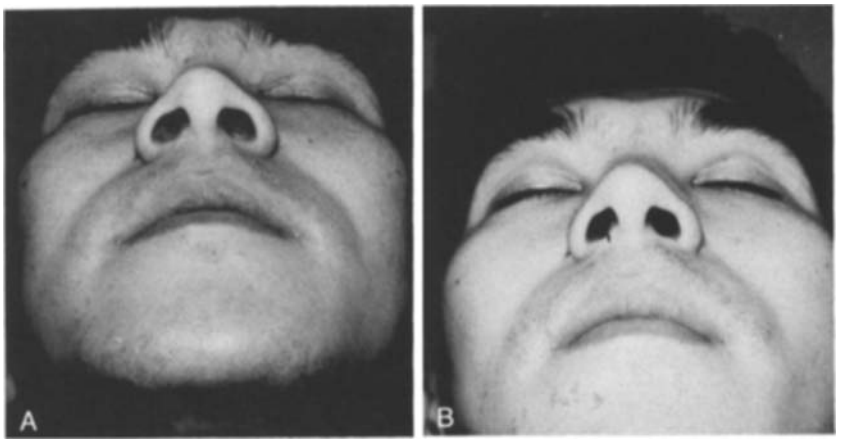


Fig. 14. A partial resection of the alar base was effective for reducing a round curve: **(A)** Preoperative view, **(B)** postoperative view

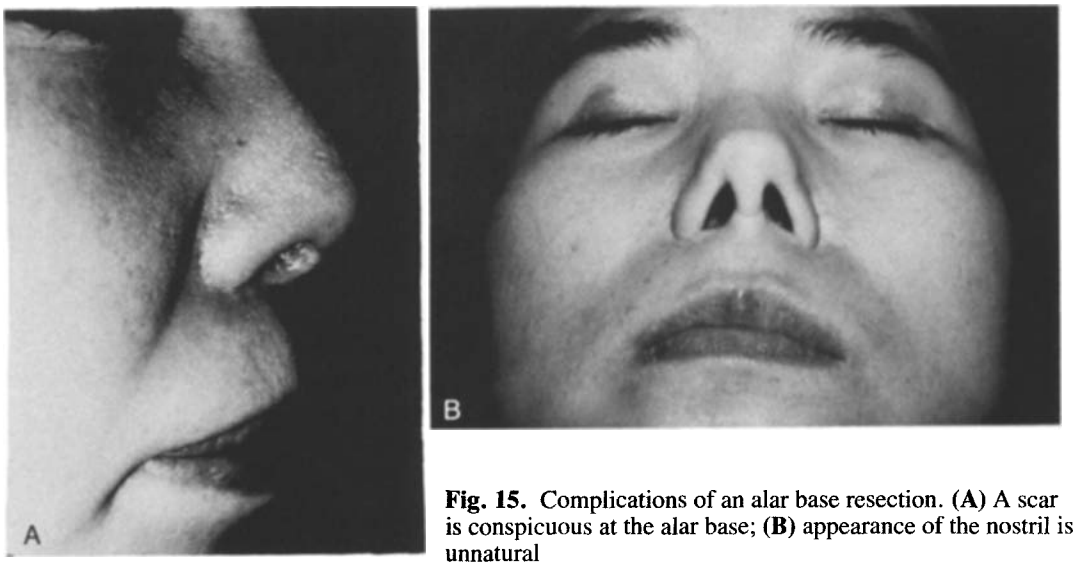


Fig. 15. Complications of an alar base resection. **(A)** A scar is conspicuous at the alar base; **(B)** appearance of the nostril is unnatural

Fig. 16. **(A)** Design of the X-plasty was projected on to the ala. **(B)** An outward curve of the right ala was improved by an X-plasty. **(C)** Preoperative basal view, **(D)** postoperative basal view

Fig. 17. Z-plasty and tip augmentation were combined: **(A)** preoperative basal view, **(B)** postoperative basal view, **(C)** preoperative front view, **(D)** postoperative front view

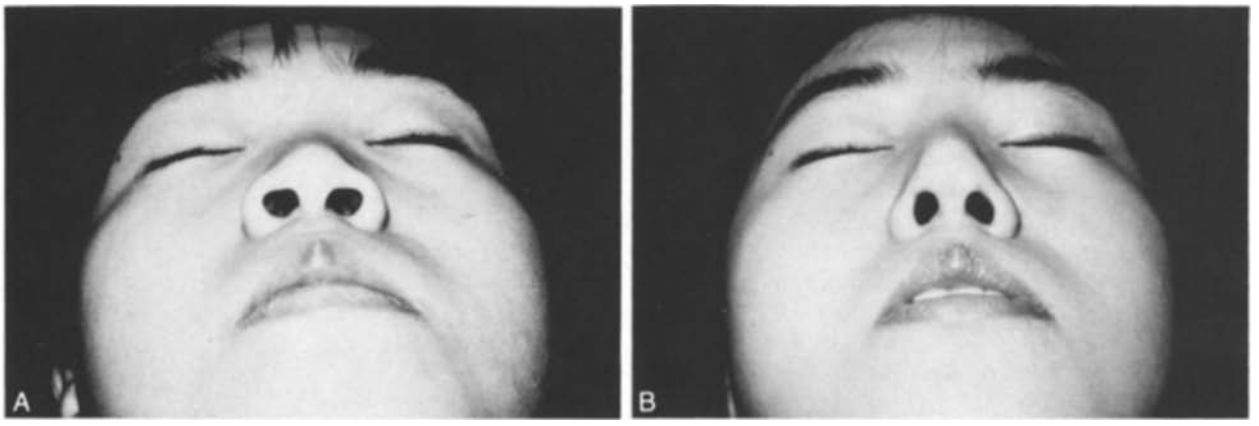


Fig. 18. A 23-year-old female. Cartilage graft and tip augmentation were combined: **(A)** preoperative view, **(B)** postoperative view

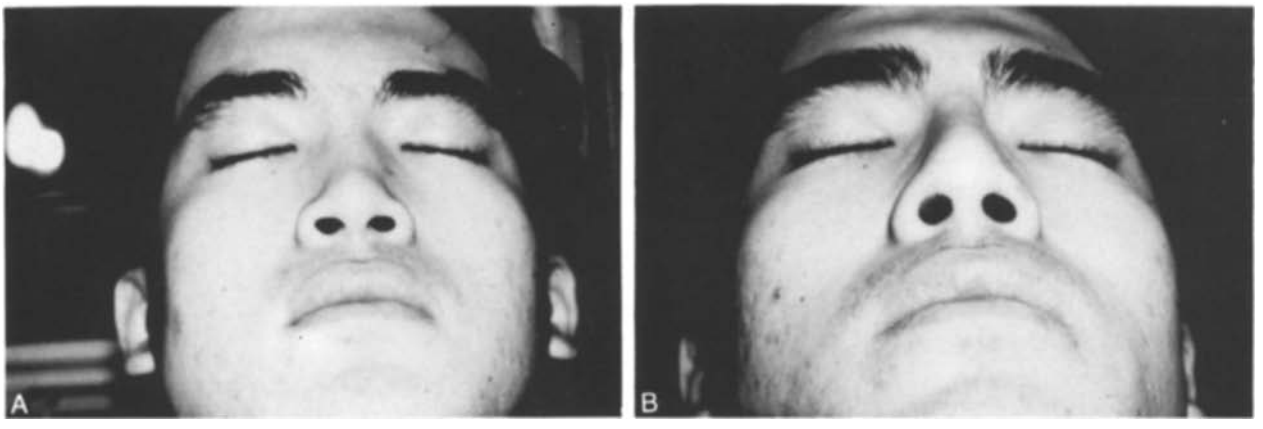


Fig. 19. A 25-year-old male. Cartilage graft and tip augmentation were combined to improve the alar curve: **(A)** preoperative view, **(B)** postoperative view

columella are not indicative of this procedure because the lobule will be reduced further. In addition, this method has the following disadvantages:

(1) Conspicuous scars will remain at the ala–facial junction; scars are more conspicuous in Oriental skin. Since sebaceous glands are well developed in nasal tissues and the surrounding area, it is difficult to create fine scars when the suture is overlapped. Conspicuous scars will create another new problem for patients (Fig. 15A).

(2) If the resected amount from ala–facial junction is increased to reduce the lateral extrusion of the ala, the roundness at the corner of the nostril's lower rim is lost, creating an unnaturally sharp corner (Fig. 15B).

Resection of the Internal Area of the Ala in a Wedge Shape: This method does not leave scars at the ala–facial junction, but has limitation in the amount being resected, and the roundness at the corner of the nostril lower rim is lost.

New Method Designed by Author

Moderate Deformities: Since the end of the ala attached to the caudal side itself is adjacent to the lateral crus of the alar cartilage, the alar shape may sometimes be indirectly influenced. However, the lateral crus of Orientals is so small compared with that of Caucasians that any influence on the ala shape can be ignored.

The author considered that the ala itself consists of soft tissues such as collagen tissue and muscles. The shape of the ala could be changed and the volume reduced by a plasty from the mucosal side. In this way, no scars remain on the skin surface, a distinguishing characteristic of the author's method.

The key points of this method is to position the baseline of the upper triangle flap of the X-plasty at the level of the vertex of the lateral curve of the ala. By rotating and retracting down this triangle, reduction of the alar curve is obtained. At the same time, the anterior and posterior distances of the ala can be shortened, reducing the entire volume of the ala. Of course, in this incision, we can expect functional relaxation of the alar nasal muscle which retracts the nostril laterally.

In summary, the disadvantages of the author's method are (1) if the positions of the triangle flaps are

not correct, no correction can be expected; (2) although the curve at the middle part of the ala is decreased, the shape of the alar base is sacrificed, creating an impression of the alar base flatly extruding.

One case in which the X-plasty was used is a 23-year-old woman. Figure 16A shows projection of the X-plasty to the external skin which will be given to the midala. The shaded area will be resected and the upper and lower triangle flaps will be advanced and sutured. Figure 16B shows the X-plasty completed on the right side. The curve of the ala extruding outward has been corrected and the entire volume of the ala has been decreased on the left side. The preoperative view and the six-month postoperative view are shown in Figures 16C and 16D, respectively. Suturing of the dome at the lower lateral cartilage was used along with this technique.

Case 2 is a 25-year-old woman who had a case similar to case 1 treated with the X-plasty. The preoperative view and the five-month postoperative basal view are shown in Figures 17A and 17B, respectively. Note that the alar curve has been corrected and that the entire volume of the ala has been reduced. When comparing the pre- (Fig. 17C) and postoperative (Fig. 17D) front views, you can see that the entire ala has become smaller. In this case, augmentation is combined.

Severe Deformities: When the nose has a short columella and a short ala extruding laterally, the nostril looks like a bowtie and is similar to a bilateral cleft lip nose. A pocket was created at the middle of the curve from the incision, and cartilage was grafted to correct the shape of soft tissues.

Although various methods to decrease the distance between the ala bases have been reported along with elongation of columella for correcting a bilateral cleft tip nose, all the methods leave some kind of scar on the external skin because a severe deformity must be corrected [2]. However, usually the deformity of the basal view is not as severe as observed in bilateral cleft lip. Considering the objective of the surgery, it is important not to leave the least of scars on the external skin.

According to Denecke and by Meyer [2], cartilage was grafted in the pocket created in the alae to correct the shape of the vestibule with an upper rim retracting backward. In this case, the insertion position is closer to the tip to facilitate insertion nearest to the vestibule edge. In the method presented here, since the objective is to correct the curve of the ala, a pocket for the cartilage graft is created closer to the alar base at the middle of the ala. The perilimb incision near the ala edge of the curve makes creating a pocket and other operative procedures easier and more precise.

Since the size of the ala that would indicate use of this method is not large, the objective is to correct the shape rather than reduce the volume; use of plasties is not recommended since they can also reduce the volume of the ala. Instead, the author recommends that his method be used along with tip augmentation to elongate the columella.

Figure 18 shows the pre- and six-month postoperative views of a 23-year-old woman, and Figure 19 shows the pre- and five-month postoperative views of a 25-year-old man. Satisfactory results were obtained in both cases.

Conclusions

One of the key points of this technique is that the anatomical characteristic that the ala consists of only soft tissues is successfully utilized for directly improving the shape itself. The X-plasty and cartilage graft from the ear are applied to the curve of the middle of the ala. The greatest advantage of this technique is that no scar is left on the external skin. It is possible to use the technique with conventional techniques for better results.

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