Rhinoplasty Considerations in the Ethnic Patient

The East-Asian Patients

Marn Joon Park, MD, Yong Ju Jang, MD, PhD*

KEYWORDS

• East asian rhinoplasty • Deviated nasal septum • Hump nose • Short nose • Revision rhinoplasty • Dorsal convexity • Dorsal augmentation

KEY POINTS

- Augmentation is one of the most important considerations in the rhinoplasty of East Asian patients.
- Building a strong supporting structure in the septal framework is the key element for successful augmentation.
- With the frequent usage of silicone implants in East Asian rhinoplasty, the surgeon should properly address the possible long-term adverse outcomes of silicone implants. Nasal deviation due to the displacement of the silicone implant or deformed and shortened nose due to the contracture in the tissues surrounding the silicone implant are the 2 most important features.

INTRODUCTION

The crucial importance of augmentation rhinoplasty should be considered when consultation for or undertaking rhinoplasty in the Asian population. The relatively flat East Asian nasal profile indicates the key role of the augmentation rhinoplasty process in achieving a satisfactory cosmetic outcome, and in addition to augmentation, correction of the deviation, hump, saddle, and short nose deformity should be adequately performed.[1]

Understanding the anatomic differences between the East Asian nose and the Caucasian nose is a key prerequisite for corrective surgery because the nasal anatomy of the East Asian patient differs from that of the Caucasian patient.[2] The East Asian patient tends to have thicker skin with more pronounced subcutaneous soft tissue as well as low nasal tip height and weak support from the lower lateral cartilages (LLCs). Moreover, the height of the dorsum and radix is often very low, and this is accompanied by a smaller, shorter, and thicker nasal bone.[3] Furthermore, the septal cartilage is often very thin and small, which leaves an inadequate amount of cartilage for use as graft materials for providing structural support or dorsal augmentation, and necessitates the harvesting of additional cartilage for grafting. A unique challenge of rhinoplasty in the East Asian patients is that the surgeon must be capable of appropriately managing silicone-implant-related complications as displacement, infection, and secondary deformity due to contracture are major complications of silicone rhinoplasty.

In this article, we describe the surgical procedure and outcome in 4 representative cases: augmentation of a flat nose, hump and deviated nose, revision rhinoplasty in a patient with deviated nose, and severely contracted nose.

Department of Otorhinolaryngology-Head and Neck Surgery, Asan Medical Center, University of Ulsan College of Medicine, 388-1 Pungnap 2-dong, Songpa-gu, Seoul 138-736, Republic of Korea
* Corresponding author.
E-mail address: 3712yjang@gmail.com

Facial Plast Surg Clin N Am 30 (2022) 527–540
https://doi.org/10.1016/j.fsc.2022.07.007

CASE STUDY/PRESENTATION

Case 1. Primary Rhinoplasty for the Correction of Flat Nose

Case presentation

A 36-year-old woman visited the clinic with complaints of a flat nose and symptomatic nasal septal deviation. The patient had poorly developed nasal bone as well as weak support from the upper lateral cartilage (ULC) and septum, which caused shortening, flattening, and concavity of the nasal dorsum (**Fig. 1**A). The patient had relatively thick skin and underdeveloped alar cartilages, which manifested as a poorly defined, underprojected tip. Moreover, slightly retracted columella and an increased nasolabial angle were noticeable. During the preoperative consultation, the patient expressed a desire for a more elongated nose with an adequately projected tip and well-augmented dorsum, ultimately creating a balanced brow-tip-dorsal esthetic line. For the tip, the patient demanded mild derotation and better definition and projection.

Operative procedures

Under general anesthesia, the skin–soft tissue envelope was elevated through an inverted V-shaped transcolumellar and marginal incision (**Fig. 2**). Elevation of the bilateral septal mucoperichondrial flap revealed thin, weakened, and poorly developed septal cartilage deviated to the right side. After ensuring the preservation of sufficient septal cartilage for an L-strut, the deviated septal cartilage, vomer, and perpendicular plate of the ethmoid (PPE) was resected and harvested. For augmentation, the patient's sixth costal cartilage was harvested and designed into strip-like pieces that were used as bilateral extended spreader grafts (ESGs) on both sides of the dorsal septum. A caudal septal extension graft (CSEG) was sandwiched between the ESGs in an end-to-end relationship with the caudal septum, simultaneously derotating and projecting the tip. The ULCs were reapproximated to the septum–ESG complex using 4 to 0 polydioxanone suture (PDS), and the LLCs were sutured to the CSEG to project and slightly derotate the tip. We found that the tip needed more augmentation to meet the desired esthetic goal, and therefore, 2 layers of tip graft were added for additional tip projection and tip definition. After elevating the nasal tip, dorsal augmentation was undertaken using a

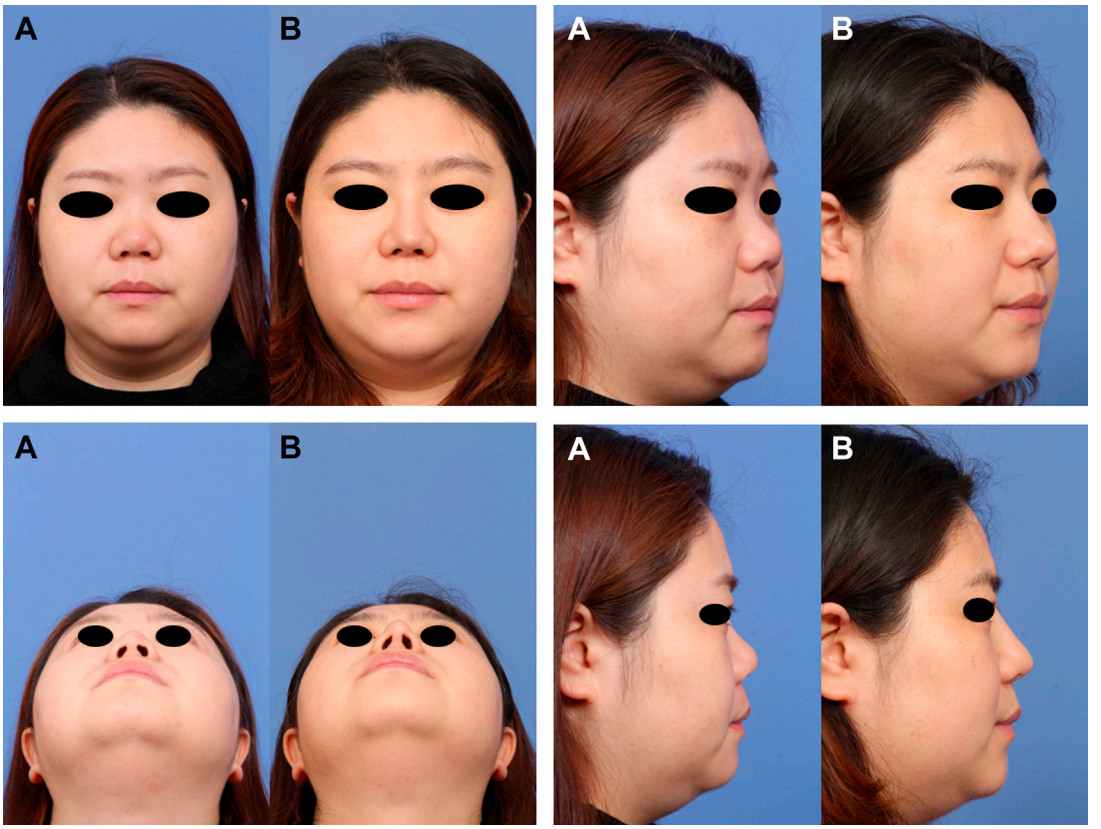

Fig. 1. Preoperative (*A*) and 1 year postoperative (*B*) photographs of a patient with flat nose. The short, flat dorsum with underprojected, poor tip definition was successfully augmented, as seen in the postoperative image.

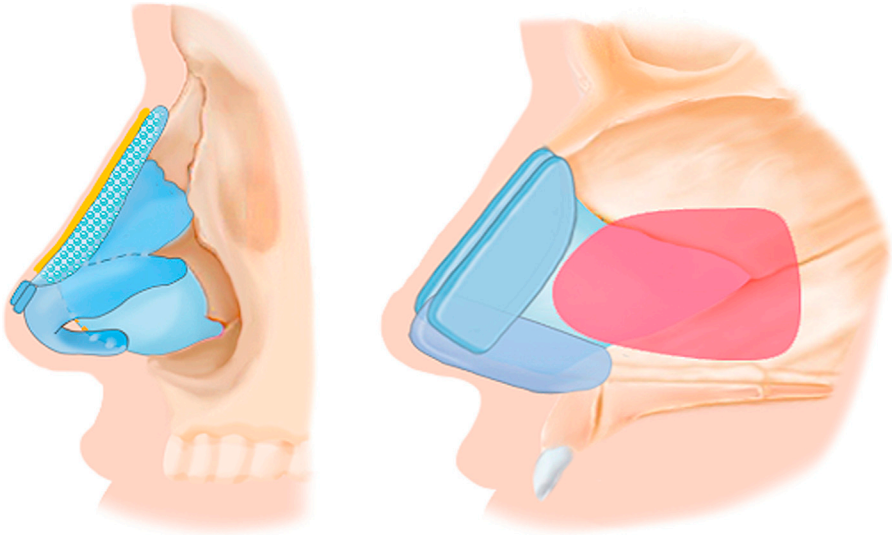

Fig. 2. The surgical procedures for case No. 1. Bilateral extended spreader grafts, caudal septal extension graft, glued-and-diced costal cartilage dorsal implant, and multilayered tip graft were inserted for dorsal augmentation and tip projection.

glued-diced costal cartilage implant that was shaped with a Jang cartilage mold as follows (**Fig. 3**): to create the dorsal implant, cadaveric fascia lata (California Transplant Services, Inc., Carlsbad, CA, USA) measuring approximately 4 × 1 cm was obtained and designed to provide the dorsal surface of the implant. Fibrin glue (Greenplast Q, GC Pharma Co., Ltd., Republic of Korea) was then applied between 2 and 3 layers of diced costal cartilage. The cap of the mold was assembled, and the mold was manually compressed to drain out excess fluid and glue. Using a

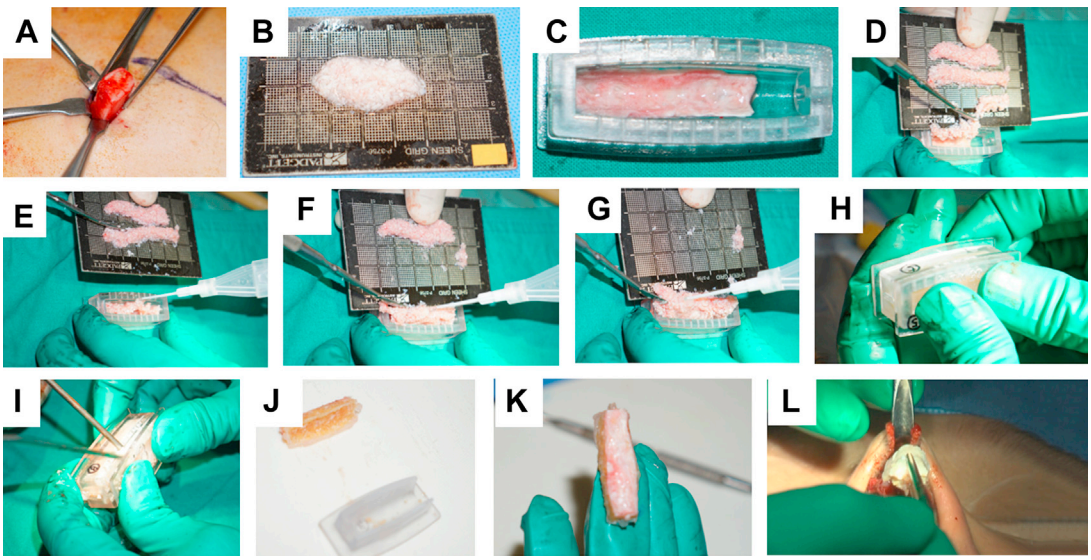

Fig. 3. Fabrication of a glued-and-diced costal cartilage dorsal implant. (*A*) The costal cartilage is harvested. (*B*) Harvested costal cartilage is diced. (*C*) The perichondrium was separated from the costal cartilage, and layered on the bottom of the 3D-printed cartilage mold. (*D–G*) Afterward, the mold is filled with layers of diced costal cartilage with fibrin glue. (*H, I*) The cap of the mold is closed, and the mold is compressed to drain out the excessive fluid within the implant. (*J, K*) The implant is taken out of the mold. (*L*) The fabricated implant is being inserted in the dorsum. On insertion, the surface of perichondrium or fascia should face the dorsal aspect, to achieve a natural looking dorsal line.

4 cm × 3 mm-mold, a dorsal implant of the corresponding size was fashioned. The implant was carefully inserted over the nasal dorsum, following full exposure of the nasal dorsum using the retractor and skin hooks. The transcolumellar and marginal incisions were closed, followed by nasal taping and Aquaplast splinting.

Postoperative outcome

The patient had an uneventful postoperative recovery without any complications. At the 1-year postoperative follow-up, an esthetically pleasing and well-defined brow-tip-dorsal esthetic line with improved tip definition was noticeable (see **Fig. 1**B). Basal view revealed that improved tip projection and nostril shape with better symmetry and orientation had been achieved. On three-quarter and lateral view, a well-augmented and straight dorsal line was noted with a slight degree of derotation. Additionally, a subtle supratip break in the dorsal line aided a more natural-looking feminine appearance in this patient.

Discussion

There is vast diversity in the shape of the East Asian nose. Case 1 typifies a fraction of patients who require significant dorsum and tip augmentation. Augmentation of the nose should commence with the lower-third of the tip, and septal extension grafts constitute a reliable and robust option for augmenting this region. Among the various techniques of septal extension grafting, we prefer expanding the L-strut and the caudal septal framework through a combination of bilateral ESGs with unilateral CSEGs in an end-to-end fashion (**Fig. 4**). In most cases, the septal cartilage is relatively weak and is present in inadequate quantities to properly augment the septal cartilage framework.[4–6] Therefore, when selecting the grafting material, we prefer to use the costal cartilage due to its abundance and strength. Septal extension grafts are hidden grafts that can avoid the common complication of tip graft showing. However, when the degree of projection is inadequate and the patient needs better definition of the tip due to thicker skin, additional tip grafting is needed. Tip grafting techniques that are useful in Asians include the shied graft, multilayer tip grafts, and tip onlay grafting (**Fig. 5**). The grafting method should be selected from the characteristics of the native anatomy of the tip cartilage and the esthetic goal of the patients. When placing the tip grafts, it is important to soften the margin by meticulous carving or to camouflage with crushed cartilage or perichondrium around the tip grafts.

Adequate dorsal augmentation highlights the essence of rhinoplasty in typical East-Asian patients. Based on the authors' experience, the glued-diced costal cartilage dorsal implant using a mold (see **Fig. 3**) serves as a reliable option for dorsal augmentation. Dorsal augmentation using the diced cartilage has increasingly gained popularity these days because it can provide a natural, esthetically pleasing dorsal line and sufficiently augment the dorsum.[7–11] As shown in the photograph obtained at the 1-year postoperative follow-up of this patient, the described method allows the creation of a natural-looking dorsal line, with minimal risk for dorsal implant migration or warping.[12]

CASE 2. CORRECTION OF HUMP AND DEVIATED NOSE

Case Presentation

A 21-year-old man visited the clinic with a complaint of a hump and deviated nose. The patient had a history of nasal trauma that was previously managed with a closed reduction in another clinic 8 years ago. On examination, the patient had a nasal septum that deviated to the left side as well as corresponding nasal obstruction. In the frontal view, there was a left-sided nasal bony axis deviation and a right-sided cartilaginous deviation (**Fig. 6**A). Basal view revealed the relatively low

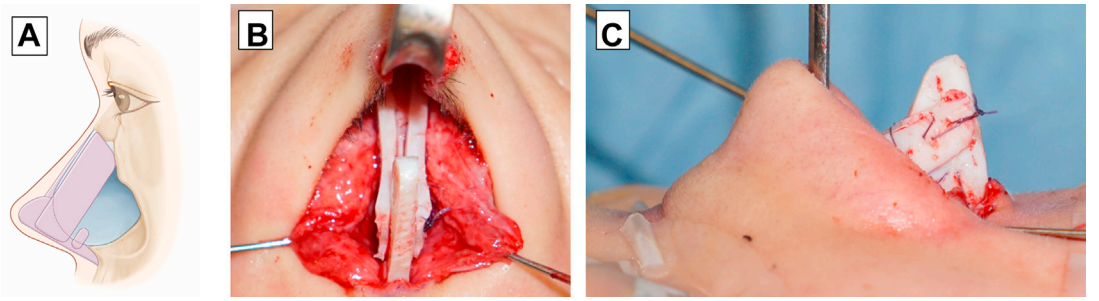

Fig. 4. (*A*) Caudal septal extension graft (CSE), which was sandwiched between the bilateral extended spreader grafts. The CSE was placed in an end-to-end relationship with the caudal septum. Intraoperative image of the frontal (*B*) and lateral aspect (*C*).

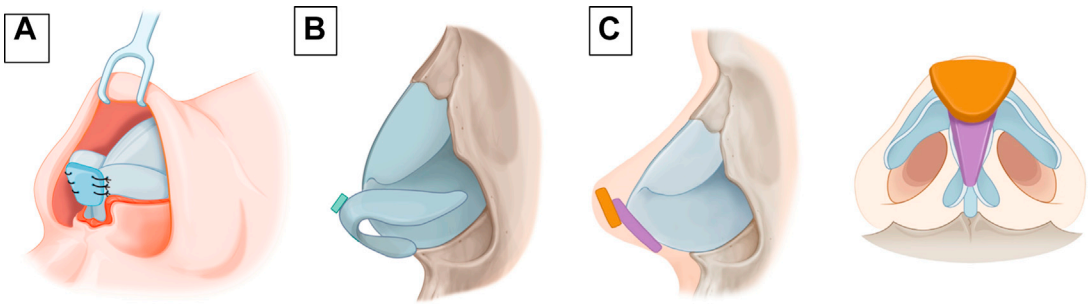

Fig. 5. Various tip graft techniques for improving tip esthetics. (*A*) Shield graft. (*B*) Tip onlay graft. (*C*) Multilayer tip grafts. First, a shield graft is placed, projecting the tip. Second, another graft is added on top of the shield graft.

tip height. On the three-quarter and lateral view, dorsal convexity was noticeable around the rhinion area.

Operative Procedures

Under general anesthesia, open rhinoplasty was undertaken through an inverted V-shaped transcolumellar and marginal incision. Ensuring septal L-strut structure preservation, the deviated septal cartilage, vomer, and PPE were resected and harvested (**Fig. 7**). The bony hump was reduced with manual rasping of the nasal bone and uncapping of the underlying cartilaginous hump (**Fig. 8**). Next, the cartilaginous hump in line with the dorsal septum was resected incrementally, and the overriding ULCS are gently trimmed out. A bony batten graft, which was created using the

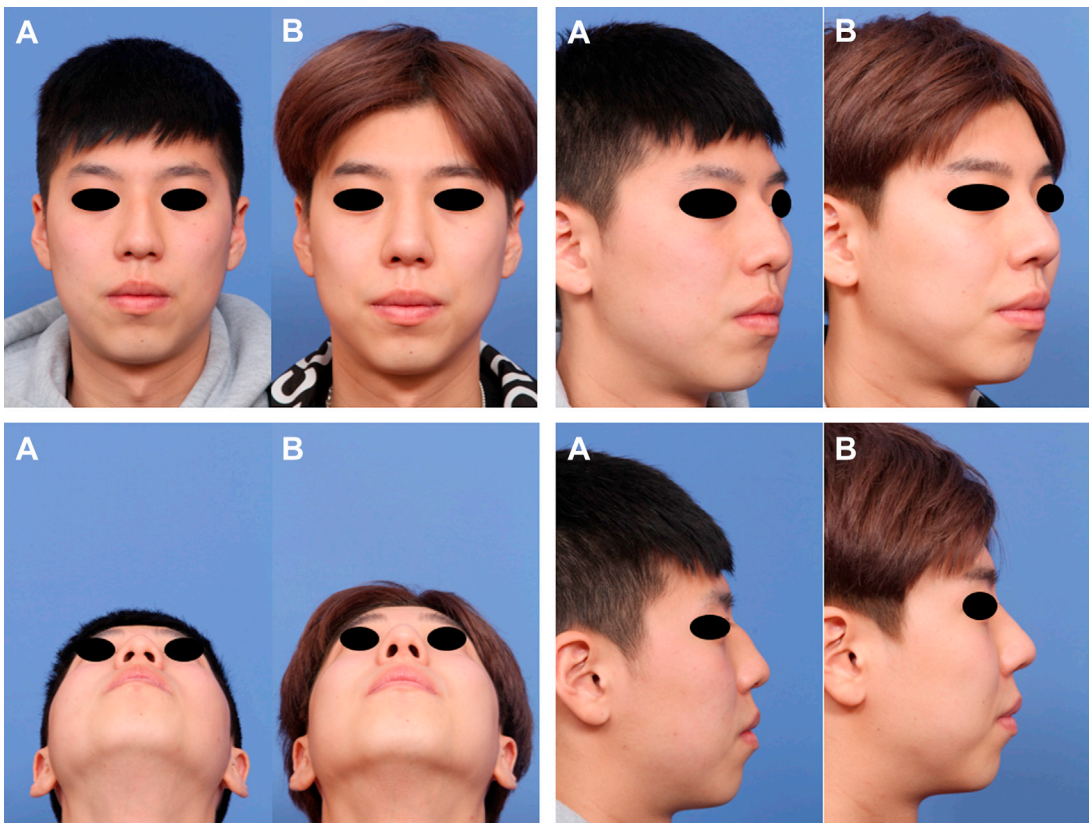

Fig. 6. (*A*) Preoperative and 1-year postoperative (*B*) photographs of a patient with deviated and hump nose. The convexity in the dorsal line is straightened with adequately augmented dorsum and projected tip, as seen in the 1-year postoperative photograph.

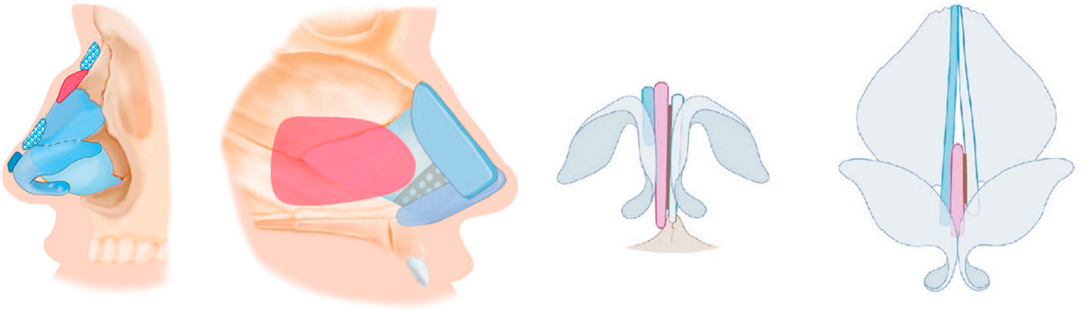

Fig. 7. Rhinoplasty on deviated and hump nose patient. (Case No.2). The hump reduction was done with cartilaginous hump removal followed by rasping of the bony cap. Bony batten graft was inserted on the right caudal septum. An extended spreader graft and a caudal septal extension graft was inserted on the right side of the native septal cartilage, centering the left-side deviated nose more to the right side. A tip onlay graft was inserted.

harvested septal bone, was placed on the right side of the caudal septum to straighten and strengthen the deviated caudal septum. In this patient, the amount, thickness, and strength of the septal cartilage were sufficient enough to be designed as the structural graft materials. Therefore, using the harvested septal cartilage, one CSEG was placed in a side-to-side relationship with the caudal septum, lateral to the already fixed bony batten graft. Then, an ESG was inserted at the right side of the dorsal septum, and the caudal end was placed at the lateral side of the CSE. Using this grafting technique, the cartilaginous axis deviation directed to the left side was corrected (**Fig. 9**). The ULCs were reapproximated to the dorsal septum, and the LLCs centered by the CSE were also reapproximated. We ascertained that a slight degree of tip projection was needed; therefore, one piece of the leftover septal cartilage was designed into a tip onlay graft and sutured to the domal area of the tip (**Fig. 10**). Finally, to soften the dorsal line, segmental dorsal augmentation with camouflage graft using the crushed leftover septal cartilages was placed over the radix and supratip.

Postoperative Outcome

The patient did not develop any postoperative complications. At the 1-year postoperative follow-up, we observed that a wider nasal dorsum with a more defined brow-tip-dorsal esthetic line was achieved and resulted in an esthetically more masculine facial appearance (see **Fig. 6**B). The tip height had increased, the columella had straightened, and symmetric nostril size was achieved. On the three-quarter and the lateral view, the dorsal convexity had disappeared and a new straight dorsal line with increased tip height had been achieved.

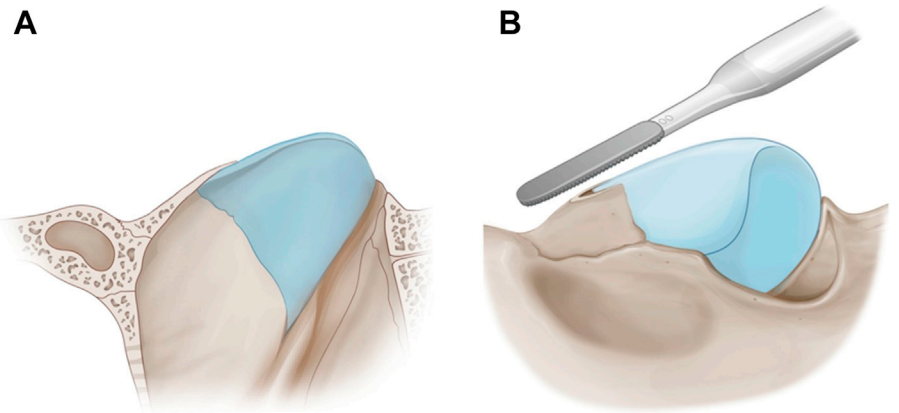

Fig. 8. (A) The nasal hump consists of cartilaginous hump with overlying thin bony cap. (B) The bony hump was reduced with manual rasping of the nasal bone and uncapping of the underlying cartilaginous hump. Next, the cartilaginous hump in line with the dorsal septum was resected incrementally, and the overriding ULCS are gently trimmed out.

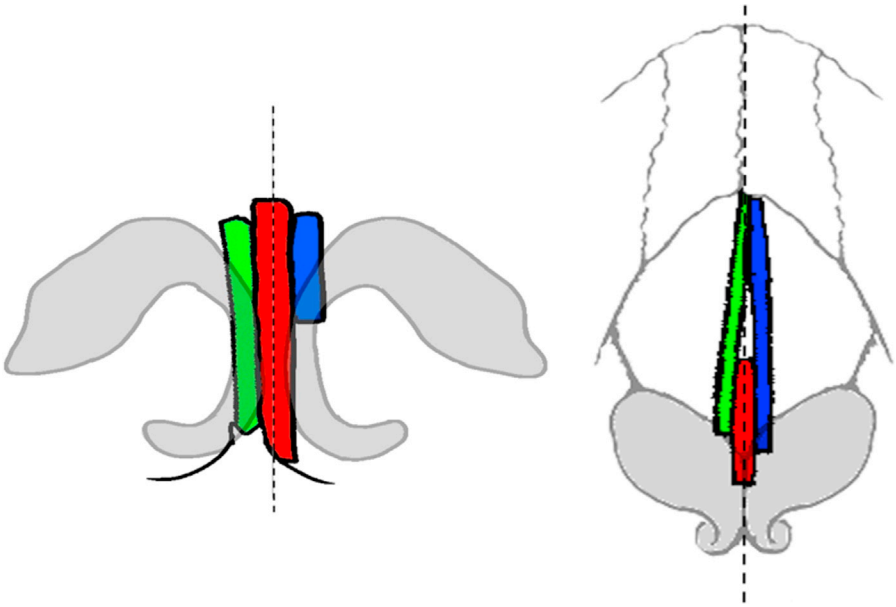

Fig. 9. Deviated nose correction of the low thirds can be achieved by redirecting the center of the nose. The right-sided cartilaginous deviation (in green) is corrected by placing the extended spreader graft (in blue) with caudal septal extension graft (in red) on the opposite side of the deviation.

Discussion

In this case, correction of dorsal convexity and the deviated nose was successfully achieved. Although not as prevalent as in rhinoplasty of Caucasian patients, the correction of a hump nose poses a significant problem in the rhinoplasty of East Asian patients. East Asians generally prefer a nose with a prominent tip and well-augmented nasal dorsum, and the concept of redistribution is important. Hump reduction should be undertaken conservatively and incrementally, including careful removal of the bony cap and the cartilaginous hump. Tip augmentation using a septal extension graft is an essential maneuver to achieve an esthetically pleasing tip height. Midvault reconstruction with a spreader graft or a spreader flap and camouflage grafts are essential maneuvers to successfully ensure esthetic outcomes. Following hump reduction, the next step is to focus on addressing the septal deviation and reinforcing septal structural strength.[13] The deviation of the caudal septum in this patient was successfully managed with a bony batten graft created from the harvested septal bones that was placed contralateral to the caudal septal deviation (**Fig. 11**). Based on our clinical experience, the authors have found that the described method above is an effective method for correcting caudal septal deviation. Patients with a hump nose frequently have a combined deformity of a deviated nose, for which placement of the caudal septal extension grafting in a side-to-side manner (batten type) may be appropriate.[14–19] A unilateral batten-type CSEG is placed on the side contralateral to the septal deviation, then situated diagonally across the caudal septum toward the nasal tip, and sutured to the septum. Subsequently, a unilateral ESG is sutured contralateral to the septal deviation with its caudal border and the native dorsal septum sandwiching the CSEG. Splaying of the ESG adds additional volume to the concave nasal sidewall and makes the nose seem straighter (see **Fig. 9**). This patient had a relatively large and strong septal cartilage, which enabled the creation of adequate grafts for the reconstruction of the

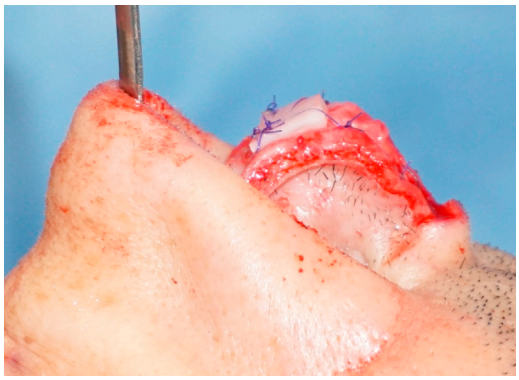

Fig. 10. Intraoperative image of a tip onlay graft. Following hump reduction, tip onlay grafting is a recommended procedure to prevent concavity in the dorsal line in hump nose rhinoplasty.

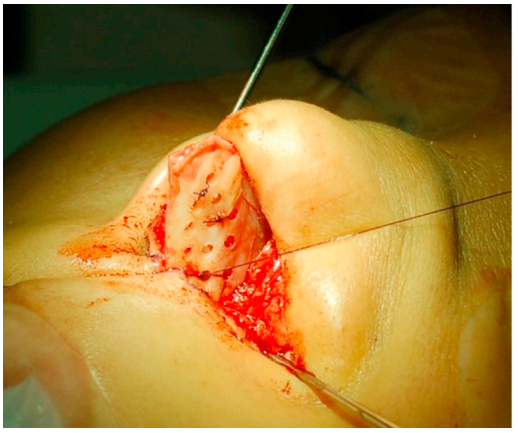

Fig. 11. The bony batten placed on the opposite side of the caudal septal deviation aided in straightening the caudal septum and structural support in the caudal septum.

septal framework. However, in cases of thinned, damaged, or undeveloped septal cartilage, the surgeon should consider using autologous costal cartilage for various grafting.

To create an esthetically pleasing dorsal line, the balance between the height of the reduced nasal bone and the tip should be achieved. Additional tip grafting is required when tip projection using a CSEG cannot achieve the desired height in moderate-to-thick-skinned individuals. The majority of convex noses seem long; therefore, it its crucial not to create a longer-looking nose because of a tip graft in hump nose patients. Shield grafts are an excellent tip-projection method but tend to increase the length of the nose by providing additional volume on the nasal lobule. Therefore, tip onlay grafting on the nasal dome is a preferred method because it provides additional tip projection with a slightly rotated appearance of the tip, which is more favorable for patients with dorsal convexity (see **Fig. 10**).

CASE 3. REVISION RHINOPLASTY IN THE DEVIATED NOSE DUE TO DISPLACED SILICONE DORSAL IMPLANT

Case Presentation

A 27-year-old woman visited the clinic with a complaint of deviated nose. The patient had undergone rhinoplasty, using a septal cartilage graft and prefabricated silicone implant, at another clinic 13 years before the visit to our clinic. The patient reported that her nose gradually seemed deviated after the rhinoplasty, and she developed symptoms of nasal obstruction especially on the right side, following orthognatic 2-jaw surgery. The patient was relatively satisfied with the current dorsal height and tip height but wanted to correct the deviated appearance of the nose.

Nasal endoscopy revealed caudal septal deviation to the right. In the preoperative frontal photograph (**Fig. 12**), the axis of the nose is deviated to the right side, with a slight retraction of the columella, which results in decreased nostril show. On basal view, the tip height was relatively low, along with an asymmetric nostril. On lateral and three-quarter view, the height of the dorsum was relatively balanced with regard to the tip, and a straight dorsal line was observed. Notably, the axial image in the patient's preoperative facial computed tomographic scan revealed that the dorsal silicone implant had displaced more to the left of the nasal dorsum (**Fig. 13**).

Operative procedures

Under general anesthesia, the skin–soft tissue envelope was elevated through an inverted V-shaped transcolumellar and marginal incision (**Fig. 14**). During flap elevation, a prefabricated silicone implant over the nasal dorsum was identified and removed), which revealed a defect in the bony dorsum. Bilateral medial and lateral osteotomy and subsequent medialization of the triangular bony segment on both sides were undertaken to correct the deviated bony axis and to close the open roof caused by the previous surgery. On elevation of the septal mucoperichondrial flap, a columellar strut graft, which was inserted during the previous rhinoplasty, was seen and removed; the caudal septal deviation was noticeable in the nasal septum. Using the cutting and suture technique, the most angulated portion of the caudal septal cartilage was cut and sutured again after slightly overlapping the upper and lower segments (**Fig. 15**). A cartilaginous batten graft was placed on the left side of the caudal septum for further support. To straighten and augment the cartilaginous septum, the patient's sixth costal cartilage was harvested. Bilateral ESGs were placed on both sides of the dorsal septal cartilage, and caudal septal cartilage extension graft was positioned between 2 ESGs, in an end-to-end manner. After closuring the ULC and LLC using sutures, a tip graft made of diced costal cartilage wrapped in harvested costal perichondrium was placed at the tip. Similarly as in Case 1, using a cartilage mold (4 cm length and 2 mm thickness), a dorsal implant with diced costal cartilage that was glued and capped with fascia lata was created and inserted in the nasal dorsum (see **Fig. 5**). With the remaining diced costal cartilage, a camouflage graft was inserted over the right supratip for the correction of the subtle remaining deviation.

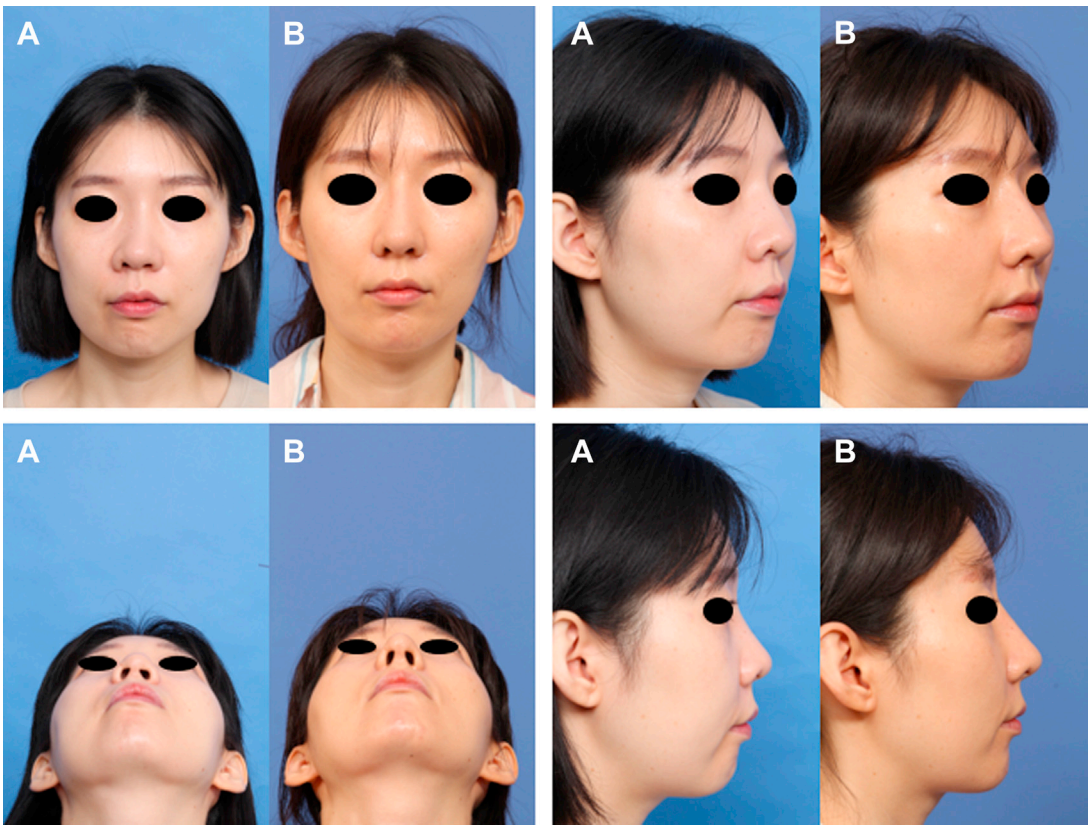

Fig. 12. (**A**) Preoperative and one year postoperative (**B**) photographs of a patient with a previous history of silicone rhinoplasty. The dorsal center is slightly shifted to the left side, and cartilaginous dorsum is deviated to the right side. The patient underwent revision rhinoplasty for the deviated nose. A 1-year postoperative photo reveals successful correction of the nasal deviation. The dorsal silicone implant removed, and replaced with glued-diced costal cartilage dorsal implant.

Postoperative Outcome

The postoperative course was uneventful. At the 1-year postoperative follow-up visit, correction of the deviated nose with an esthetically pleasing brow-tip-dorsal line was successfully achieved (see **Fig. 12**B). On basal view, the tip projection resulted in esthetically satisfying tip definition and symmetry in the nostril size and shape. The

Fig. 13. In an axial cut in the computed tomograph image, dorsal silicone implant positioned more to the left side on the dorsum is noticeable.

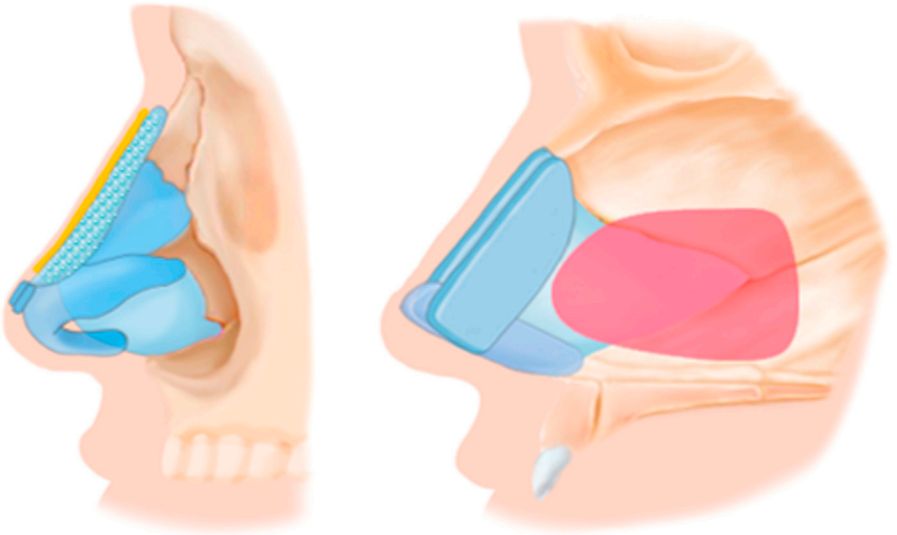

Fig. 14. The surgical procedures performed in revision rhinoplasty for the deviated nose (case No. 3). Following the removal of the dorsal silicone implant, the deviation of the nasal bone with open roof deformity caused by previous rhinoplasty was noticed. Bilateral medial and lateral osteotomy were made to medialize the bony pyramid and to correct the bony axis. Caudal septal cartilage extension graft was positioned between 2 extended spreader grafts in an end-to-end manner. Diced costal cartilage wrapped with costal perichondrium was placed at the tip, and tip camouflage graft with crushed cartilage was inserted on supratip. Glued diced costal cartilage dorsal implant was inserted for the dorsal augmentation.

three-quarter and lateral view showed a straight dorsal line with minimal augmentation in dorsal height compared with the appearance evident in the preoperative photograph, and the outcome matched the patient's preoperative cosmetic requirement. The slight elongation in the columella helped in increasing the nostril show as well as decreasing the nasolabial angle, resulting in a cosmetically desirable outcome.

Discussion

One of the common issues with a dorsal implant, such as a silicone implant, is its unpredictability. There is a possibility that dorsal implants may migrate in the dorsal pocket during wound healing, which creates an unexpected shifting, resulting in nasal deviation in the long-term postoperative period.[20–24] In cases of revision rhinoplasty in which a silicone implant was previously inserted, it is important to address the nasal deformity after complete removal of the silicone implant. After properly managing the nasal deformity, dorsal augmentation with the previously inserted silicone implant or other autologous tissue implants (ie, diced costal cartilage) can be simultaneously achieved if there are no signs of infection. We prefer to replace the previously implanted silicone

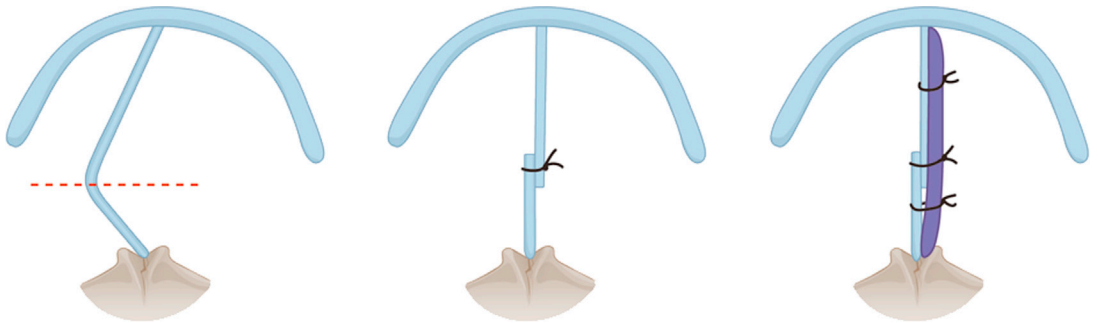

Fig. 15. Placement of the bypass L-strut graft (integrated costal cartilage columella-dorsal implant) using the autologous costal cartilage.

implant with autologous tissue. In cases with evident infection around the dorsal implant, a staged operation is required because a single-stage operation confers a higher risk of postoperative infection, with disastrous outcomes. In this case, we did not notice any signs of infection around the previously inserted silicone implant and accordingly performed single-stage rhinoplasty. The removal of the silicone implant revealed an open-roof deformity in the nasal bony cap, with a right-sided deviation in the bony and cartilaginous axis, that may have been caused by the previous surgical hump removal or due to resorption of the nasal bone due to the longstanding pressure exerted by the silicone implant on the underlying nasal bone. Therefore, appropriate osteotomies and manual narrowing of the nasal bone were used to correct the open-roof deformity. Many patients present with a deviated nose with a silicone graft in their nasal dorsum; the deviation is usually due to the displacement of the silicone implant or because of an underlying nasal skeletal deviation. In this case, even after the removal of the silicone implant, the nose looked deviated, which necessitated specific maneuvers to correct the deviated nose. Correction of cartilaginous deviation is a challenging task wherein several different maneuvers are needed for perfecting the surgical outcome. Correction of the cartilaginous deviation should begin by straightening and strengthening the deviated caudal septum. In this case, the caudal septal deviation was corrected by adopting the cutting and suture technique that was originally developed by the corresponding author (see **Fig. 15**). The rationale for this technique is that the excess length of the caudal septal cartilage is the main abnormality in this type of deviation. Thus, cutting and overlapping of the most convex part of the caudal septal L-strut could reduce the excess length, thereby creating a straight caudal septal segment but without affecting the original tip height. The placement of bilateral spreader grafts is the most popular and reliable method of straightening the dorsal L-strut (see **Fig. 4**). In this case, we placed bilateral spreader grafts with thick costal cartilage, which ensured sound support of the lower two-thirds of the nose. In this case, tip augmentation was achieved by a CSEG and additional grafting with perichondrium-wrapped diced cartilage. Fascia or perichondrium-wrapped diced cartilage constitutes a good option for tip augmentation that decreases the risk of tip graft showing and confers better capability of creating a natural-looking tip shape that softly blends with the thinner tip skin.

CASE 4. REVISION RHINOPLASTY IN THE SHORTENED, DEFORMED NOSE WITH A PREVIOUS SILICONE RHINOPLASTY

Case Presentation

A 29-year-old man visited the clinic with an upturned nasal deformity and a history of having undergone 2 rhinoplasties. The patient underwent a primary rhinoplasty, using autologous ear cartilage, in another clinic 10 years ago and subsequently underwent revision rhinoplasty with a silicone implant 7 years ago in another clinic. A few months before the initial visit, due to repeated inflammation, the patient underwent removal of the silicone implant in the other clinic.

On frontal view, an upturned and shortened nose with increased nostril show was noticeable along with pinched and asymmetric nostrils (**Fig. 16**A). The brow-tip-dorsal esthetic line was very wide and indistinct. On basal view, the columella was tilted to the right side, and the discrepancy in the size and shape of bilateral nostrils were noticeable. On three-quarter and lateral view, a severely upturned nasal tip with a wide nasolabial angle was seen, and the radix and dorsal height were very low, which resulted in the severe concavity of the nasal dorsum. There was a polly beak-like prominence on the supratip cartilaginous dorsum. During the preoperative consultation, the patient expressed a very high esthetic goal, which he desired to have a completely normal looking new nose, without any stigmata of the contracted nose.

Operative Procedure

Under general anesthesia, the skin–soft tissue envelope was elevated via an inverted V-shaped transcolumellar and marginal incision (**Fig. 17**). The elevation of the skin flap was extremely difficult due to severe scarring. On flap elevation, the nasal bone showed an open-roof deformity, which was especially prominent on the left side. The absence of the quadrangular cartilage was suspected on palpation, and the severe adhesion in the septal mucosa hindered the complete mucoperichondrial flap dissection of the nasal septum; therefore, partial dissection of the right dorsal septum was performed. Because the patient had a high septal deviation due to a PPE deviation, an endonasal septal incision immediately before the deviated portion was made under endoscopic guidance, and the deviated septal bone was resected and the partially raised flap was redraped. The harvested septal bone was designed for the bony batten graft and placed to the right of the caudal septum. The sixth costal cartilage was harvested through a 2-cm incision.

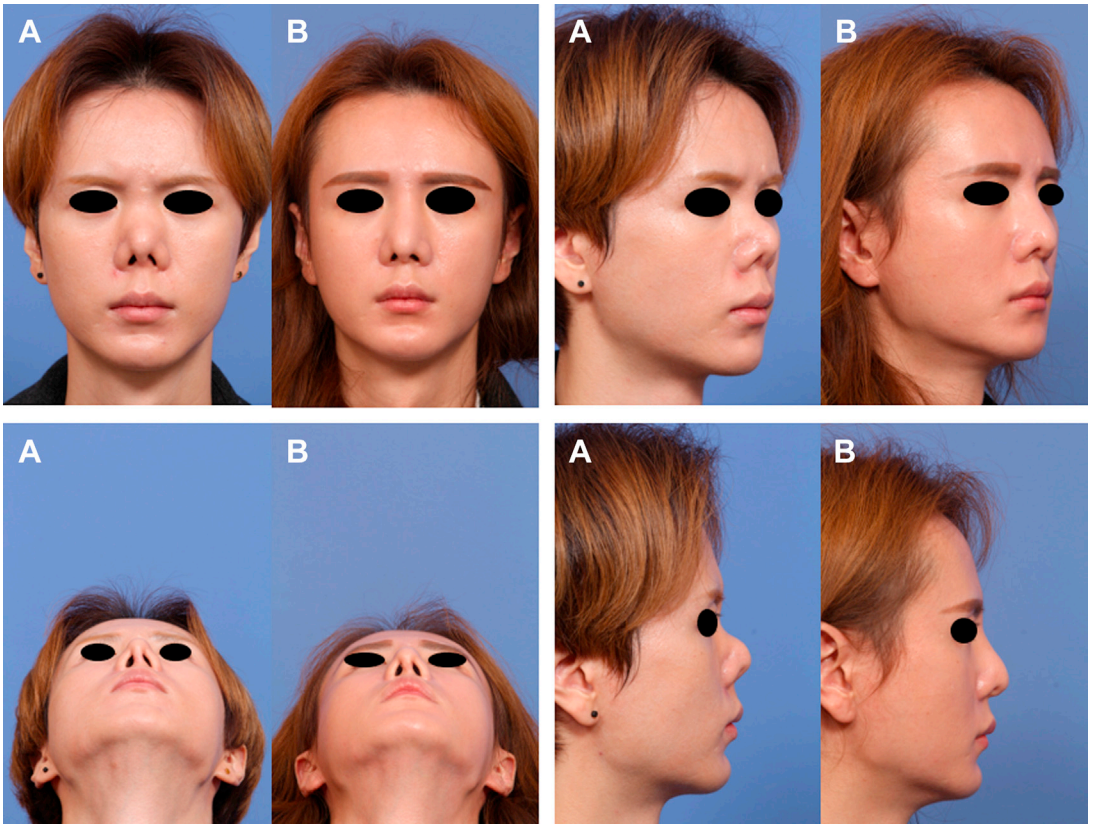

Fig. 16. (**A**) Preoperative and one year postoperative (**B**) photographs of a patient with in a patient with previous history of multiple rhinoplasty using the prefabricated silicone dorsal implant. The severely deformed, shortened, and up-turned nose is noticeable. A 1-year postoperative photo reveals successful reconstruction of the nasal deformity in this patient. In the frontal view, the starting point of the nose had moved much higher, and the excessive nostril show seen in the preoperative photograph was considerably decreased. In the basal view, the tilted columella was corrected and the tip height had increased. The shape and size of the nostril was markedly symmetric. On three-quarter and lateral view, a well-balanced profile line is achieved as a result of dorsal augmentation, tip derotation, and elongation of the retracted columella.

Preoperatively, we planned to derotate the lower third by releasing the fibrotic tissue between the upper lateral and LLC followed by strong reinforcement with ESG and CSEG complex to anchor the released alar cartilages. However, in this case, excessive scarring of the septal mucosa and an inability to create a complete septal mucoperichondrial pocket, which hampered the placement of the bilateral ESGs and CSEG. Thus, instead of reinforcing and elongating the native septum with bilateral ESG and CSE, a bypass L-strut graft made of the costal cartilage (integrated costal cartilage columella-dorsal implant) was designed to provide strong structural support to the lower two-thirds of the nose, whereby the released LLCs were anchored (**Fig. 18**).[25] The defect in the nasal bone was reconstructed with the perichondrium of the harvested costal cartilage as well as multiple layers of additional homologous fascia. A shield graft was placed on the tip, and dorsal augmentation was achieved using glued-and-diced costal cartilage dorsal implant created by using the same mold as described earlier, followed by covering with the costal cartilage perichondrium. Finally, remnant diced costal cartilage was inserted into the radix, supratip, and tip for camouflage grafting.

Postoperative Outcome

The patient recovered without any postoperative complications. At the 1-year postoperative follow-up visit, we observed that the shortened and upturned nasal deformity was successfully corrected and a more defined and esthetically pleasing brow-tip-dorsal line was achieved (**Fig. 12**B). In the frontal view, the starting point of the nose had moved much higher, and the

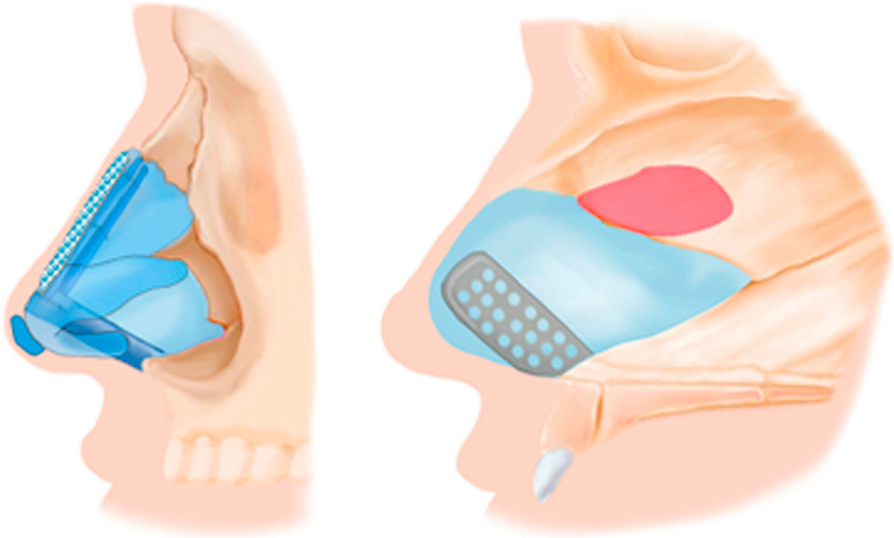

Fig. 17. The surgical procedures performed in case No. 4. A bony batten graft was inserted using the harvested bone of the PPE. A bypass L-strut graft (Integrated costal cartilage columella-dorsal implant) made with costal cartilage was inserted, followed by shield graft insertion on the tip. Dorsal augmentation with remaining diced costal cartilage grafting was done on the radix, supratip, and tip.

excessive nostril show seen in the preoperative photograph was considerably decreased. In the basal view, the tilted columella was corrected and the tip height had increased. The shape and size of the nostril was markedly symmetric. On three-quarter and lateral view, we noted that dorsal augmentation, derotation of the nasal tip, and elongation of the retracted columella were achieved to form a well-balanced profile line.

Discussion

This patient presented with a severe upturning and shortening of the nose due to multiple previous rhinoplasties using silicone implants, and this deformity was nicely corrected with a bypass-L graft using the autologous costal cartilage. A short nose is one of the most difficult deformities to correct, and the aim of corrective surgery is the actual extension of the nasal length with the simultaneous creation of an illusion of a longer-looking nose. Short noses should be corrected by adhering to the surgical principles of lengthening the central and lateral segments, tip grafting to lengthen the nose, and dorsal augmentation. In most cases, to elongate the central compartment, the authors prefer placing the end-to-end type CSEG sandwiched between bilateral ESGs (see **Fig. 4**). However, in cases which dissection of the septal mucoperichondrium is impossible due to severe scarring, any attempt to dissect the septal mucosa carries an increased risk of further injury to the already damaged septal mucosa, as in this case. In this difficult scenario, using an integrated dorsal implant and columellar strut allows surgeons to bypass the problematic cartilaginous septum and enables reconstruction in the lower two-thirds of the nose. To create an integrated dorsal implant and columellar strut from costal cartilage, one monoblock dorsal implant is sutured to a columellar strut to form the new cartilaginous L strut (see **Fig. 18**A). The dorsal implant part can be inserted directly into the subperiosteal pocket above the nasal bone and spans the nasal dorsum. The columellar strut should be sutured in front of the anterior nasal spine or simply be inserted into the space between the divided medial crura (see **Fig. 18**B). If lengthening of the central compartment is not combined with adequate lengthening of the lateral compartment, the nose may look pinched and unnatural. It is therefore important to address the lateral compartment of the nose

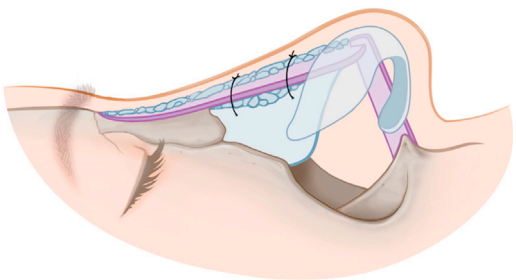

Fig. 18. Placement of the bypass L-strut graft (integrated costal cartilage columella-dorsal implant) using the autologous costal cartilage.

accordingly to attain an esthetically harmonious surgical outcome. As a short nose is usually accompanied by a concave nasal dorsum, dorsal augmentation is a crucial surgical procedure because the nose seems longer after the correction of the dorsal concavity.

SUMMARY

When performing rhinoplasty in East Asians, it is important to bear in mind that augmentation is a key factor for managing different types of nasal deformities. Septal extension grafting and spreader grafts are crucial maneuvers for building up the lower two-thirds of the nose, especially for the successful correction of a flat, deviated, or short nose. Dorsal augmentation is universally applied in almost all Asian rhinoplasties, wherein the use of glue-diced autologous costal cartilage dorsal implant has played an increasingly important role. For successful correction of the Asian hump nose, conservative hump reduction coupled with appropriate midvault reconstruction, radix augmentation, and tip augmentation should be performed.

DISCLOSURE

The authors have nothing to disclose.

ACKNOWLEDGMENTS

None.

REFERENCES

1. Jang YJ, Yi JS. Perspectives in asian rhinoplasty. Facial Plast Surg 2014;30(2):123–30.
2. Jang YJ, Yu MS. Rhinoplasty for the Asian nose. Facial Plast Surg 2010;26(2):93–101.
3. Wang JH, Jang YJ, Park SK, et al. Measurement of aesthetic proportions in the profile view of Koreans. Ann Plast Surg 2009;62(2):109–13.
4. Kim JS, Khan NA, Song HM, et al. Intraoperative measurements of harvestable septal cartilage in rhinoplasty. Ann Plast Surg 2010;65(6):519–23.
5. Jang YJ, Kim SH. Tip Grafting for the Asian Nose. Facial Plast Surg Clin North Am 2018;26(3):343–56.
6. Jang YJ, Moon H. Special Consideration in the Management of Hump Noses in Asians. Facial Plast Surg 2020;36(5):554–62.
7. Bracaglia R, Tambasco D, D'Ettorre M, et al. Nougat graft": diced cartilage graft plus human fibrin glue for contouring and shaping of the nasal dorsum. Plast Reconstr Surg 2012;130(5):741e–3e.
8. Daniel RK. Diced cartilage grafts in rhinoplasty surgery: current techniques and applications. Plast Reconstr Surg 2008;122(6):1883–91.
9. Daniel RK, Calvert JW. Diced cartilage grafts in rhinoplasty surgery. Plast Reconstr Surg 2004;113(7):2156–71.
10. Gordon CR, Alghoul M, Goldberg JS, et al. Diced cartilage grafts wrapped in AlloDerm for dorsal nasal augmentation. J Craniofac Surg 2011;22(4):1196–9.
11. Tasman AJ. Replacement of the Nasal Dorsum with a Diced Cartilage Glue Graft. Facial Plast Surg 2019;35(1):53–7.
12. Jang YJ, Moon H. Special Consideration in Rhinoplasty for Deformed Nose of East Asians. Facial Plast Surg Clin North Am 2021;29(4):611–24.
13. Sykes JM, Kim JE, Shaye D, et al. The importance of the nasal septum in the deviated nose. Facial Plast Surg 2011;27(5):413–21.
14. Kim DY, Nam SH, Alharethy SE, et al. Surgical Outcomes of Bony Batten Grafting to Correct Caudal Septal Deviation in Septoplasty. JAMA Facial Plast Surg 2017;19(6):470–5.
15. Chen YY, Kim SA, Jang YJ. Centering a Deviated Nose by Caudal Septal Extension Graft and Unilaterally Extended Spreader Grafts. Ann otology, rhinology, Laryngol 2020;129(5):448–55.
16. Jang YJ, Sinha V. Spreader graft in septo-rhinoplasty. Indian J Otolaryngol head neck Surg 2007;59(2):100–2.
17. Park JH, Jin HR. Use of autologous costal cartilage in Asian rhinoplasty. Plast Reconstr Surg 2012;130(6):1338–48.
18. Won TB. Hump Nose Correction in Asians. Facial Plast Surg Clin North Am 2018;26(3):357–66.
19. Jang YJ, Yeo NK, Wang JH. Cutting and suture technique of the caudal septal cartilage for the management of caudal septal deviation. Arch Otolaryngology–Head Neck Surg 2009;135(12):1256–60.
20. Jang YJ, Kim SA, Alharethy S. Failure of Synthetic Implants: Strategies and Management. Facial Plast Surg 2018;34(3):245–54.
21. Kim SH, Kim JW, Jang YJ. Radiologic Findings of Complicated Alloplastic Implants in the Nasal Dorsum. Clin Exp Otorhinolaryngol 2021;14(3):321–7.
22. Yu MS, Jang YJ. Preoperative computer simulation for Asian rhinoplasty patients: analysis of accuracy and patient preference. Aesthet Surg J 2014;34(8):1162–71.
23. Jang YJ, Moon BJ. State of the art in augmentation rhinoplasty: implant or graft? Curr Opin Otolaryngol Head Neck Surg 2012;20(4):280–6.
24. Swanepoel PF, Fysh R. Laminated dorsal beam graft to eliminate postoperative twisting complications. Arch Facial Plast Surg 2007;9(4):285–9.
25. Choi WR, Jang YJ. Reconstruction of a Severely Damaged Cartilaginous Septum with a Bypass L-Strut Graft using Costal Cartilage. Facial Plast Surg : FPS 2021;37(1):92–7.