

Asian Rhinoplasty

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KEYWORDS

- Asian rhinoplasty • Revision rhinoplasty
- Augmentation rhinoplasty

Cosmetic rhinoplasty in the Asian patient population differs from traditional rhinoplasty approaches in many aspects, including preoperative analysis, patient expectations, nasal anatomy, and surgical techniques used. Platyrrhine nasal characteristics are common, with low dorsum, weak lower lateral cartilages, and thick sebaceous skin often noted. Typically, patients seek augmentation of these existing structures rather than reductive procedures. Patient desires and expectations are unique to this population, with patients often seeking improvement and refinement of their Asian features, not radical changes toward more characteristic White features. Use of alloplastic or autologous materials is necessary to achieve the desired results; the use of each material carries inherent risks and benefits that should be discussed with the patient. Autologous cartilage, in particular use of costal cartilage, has shown to be a reliable, low-risk technique, which, when executed properly, produces excellent long-term results. An understanding of cultural perspectives, knowledge of the nasal anatomy unique to Asian patients, and proficiency with augmentation techniques are prerequisites in attaining the desired results for patient and surgeon.

PREOPERATIVE EVALUATION

Preoperative counseling of the Asian rhinoplasty patient demands attention to cultural concerns in addition to cosmetic concerns and functional complaints. Commonly, patients describe their desire to achieve elevation of the nasal dorsum, refinement of the nasal tip, narrowing of the nasal base and correction of their columellar or premaxillary retraction.

Characteristics of the Asian nose include: low nasal dorsum with caudally placed nasal starting point, thick, sebaceous skin overlying the nasal tip and supratip, weak lower lateral cartilages, small amount of cartilaginous septum, foreshortened nose, retracted columella, and thickened alar lobules (**Fig. 1**).

Each patient's desire to balance augmenting their Asian nasal features with maintenance of the appearance of an Asian nose is unique for each individual and should be elucidated during the initial consultation and preoperative visits. Demonstration of the proposed changes to the patient with a computer-imaging program can aid communication between patient and surgeon of the proposed changes (**Fig. 2A, C**). Fulfillment of the patient's stated wishes may produce a modification of the patient's ethnic identity, and computer imaging helps the patient to better understand the possible outcome. When available, preoperative and postoperative results of previous patients may help demonstrate the spectrum of changes possible and aid the patient in deciding on the desired postoperative result.

Discussion of incision placement (including base reduction and auricular and rib cartilage harvest), possible complications, postoperative care, and follow-up schedule are discussed at the initial consultation and preoperative visit. If rib cartilage is likely to be used, the patients are instructed to expect their nose to be stiffer initially and to soften with time. If a significant amount of nasal lengthening or premaxillary augmentation is expected, the patient is counseled that there may be an initial tightness or fullness to the upper lip. Occasionally, a crease in the lip may be seen.

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Fig. 1. Preoperative photograph of patient seeking primary rhinoplasty. Note low dorsum, thick skin, inadequate projection of nasal tip, and suboptimal alar-columellar relationship.

The risk of this sequela must be balanced against the desire for lengthening and premaxillary augmentation.

SURGICAL PLANNING

The senior author (DMT) performs the procedure on patients under a general anesthetic on an outpatient basis. Preoperative photography includes full face and close-up frontal, both lateral, and three-quarter oblique views, and a close-up base view with and without inspiration to demonstrate dynamic collapse. Computerized imaging is performed on every preoperative rhinoplasty patient. The preoperative photographs and the computer imaging are displayed during surgery and referred to throughout the operation to help achieve the desired results. Preoperative injections of the nose and donor cartilage site(s) are made with 1% lidocaine with 1:100,000 epinephrine. Infiltration of the columella, area between the intermediate crura, the subperichondrial planes over the upper and lower lateral cartilages, and the subperiosteal plane over the nasal bones along the nasal dorsum and sidewalls is performed. The nasal septum is injected in a subperichondrial plane using hydrostatic dissection to elevate the mucoperichondrial flap from the underlying cartilage. A preliminary assessment of the relative size of the cartilaginous septum can be made by probing with the injection needle to

identify the boundaries of the septal cartilage. Most Asian patients have a small cartilaginous component to their septum and frequently require additional cartilage for augmentation.

If additional cartilage is needed, the appropriate donor site(s) are also injected. If auricular cartilage is to be used, the planned incision is marked on the posterior auricular surface 3 to 4 mm lateral to the postauricular sulcus and infiltrated with local anesthetic. One or both ears may be used. The authors rarely use auricular cartilage as it is not a good option for augmenting the nasal dorsum because the ends of the cartilage can curl and deform over time.

If costal cartilage harvest is planned, a 1.1- to 1.5-cm incision is marked overlying the right sixth rib and injected with local anesthetic. The right chest is chosen because of ease of access for the right-handed surgeon and to avoid confusion with cardiac pain postoperatively. Neurosurgical pledgets saturated with 0.05% oxymetazoline are placed in the nose and a sterile preparation and drape are performed. Separate instruments for auricular or costal cartilage harvest are segregated from those for the nasal surgery. In addition to traditional rhinoplasty instrumentation, a Castro-Viejo caliper is used intraoperatively to document parameters, which aid in assessing likely outcomes (eg, graft dimensions, supratip break, middle vault, and dorsal graft width).

Surgical Technique

The procedure is initiated with a midcolumellar inverted-V incision made with a number 11 blade scalpel. A number 15 blade scalpel is used to make bilateral marginal incisions with extensions in the vestibular skin 2 to 3 mm posterior to the columellar incision and extending toward the soft-tissue facet. Sharp Converse scissors are used to carefully dissect the tissue over the medial crura and extend the medial aspect of the marginal incisions into the soft-tissue triangle area, connecting with the remaining marginal incision laterally, thereby exposing the lower lateral cartilages. Sharp dissection, with minimal spreading, limits tissue damage, aids in hemostasis, and minimizes postoperative edema. Dissection is carried over the nasal dorsum to expose the dorsal cartilaginous septum to the level of the nasal bones. A Joseph elevator is used to elevate the periosteum over the nasal bones in the midline. It is imperative that the periosteum is elevated laterally only to the extent that will allow the dorsal graft to fit snugly over the dorsum. Failure to maintain this tight pocket is a major contributor to postoperative migration of the dorsal graft. If changes to nasal

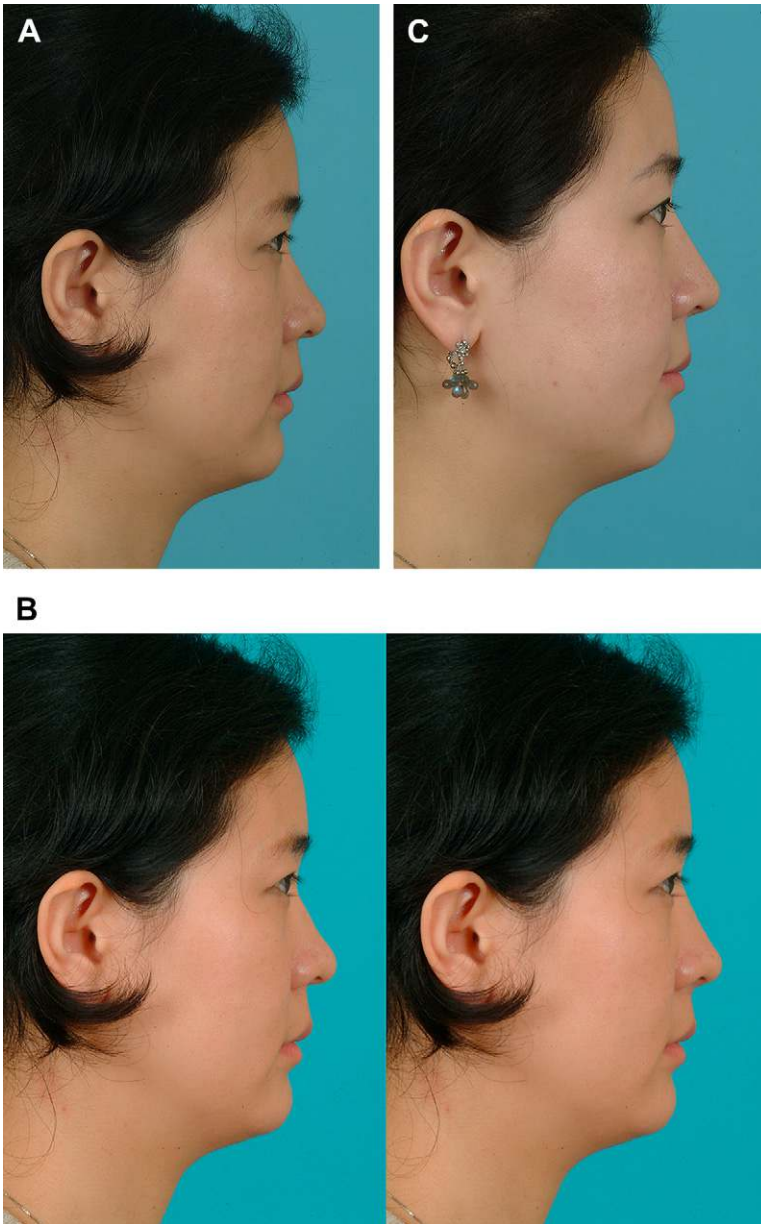


Fig. 2. Preoperative images. (A) Clinical photograph, preoperative lateral view. (B) Computer imaging showing proposed outcome. (C) One-year postoperative lateral view.

length, projection, or premaxillary augmentation are planned, or the caudal septum is deviated, the lower lateral cartilages are dissected apart in the midline to expose the anterior septal angle and the caudal septum. Care is taken to elevate the mucoperichondrial layer from the septum in the appropriate bloodless plane, thereby minimizing the risk of postoperative septal perforation. Harvesting of the septal cartilage involves preservation of 1.5-cm caudal and dorsal struts to allow for adequate support postoperatively.

In rare cases the caudal septum may have been resected, damaged, or deviated and requires

replacement. In these patients, a 1.5-cm dorsal strut may be left and the caudal strut is replaced with a caudal septal replacement graft (**Fig. 3A, B**). The caudal septal strut is notched to allow the graft to fit into a notch in the nasal spine without slipping cephalically (**Fig. 4**). This maneuver aids in nasal lengthening and correction of columellar retraction and allows for rotational changes to the nasal tip. It can also be used for correction of the deviated caudal septum. The caudal septum is dissected posteriorly to the anterior nasal spine and the entire caudal septum is exposed. In the situations mentioned earlier, the excess septal

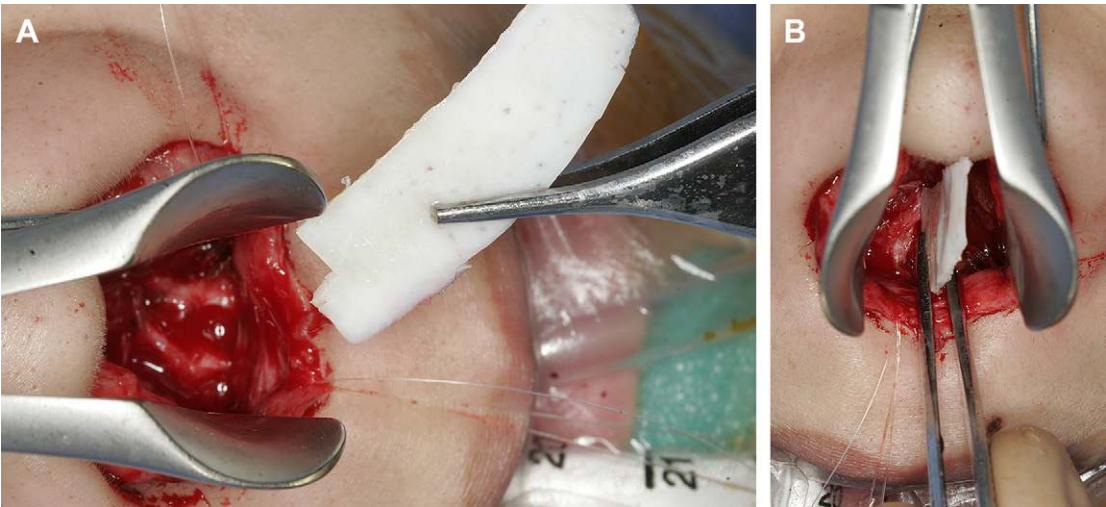


Fig. 3. Intraoperative photograph of caudal septal replacement graft (A) before insertion and (B) graft positioned before stabilization.

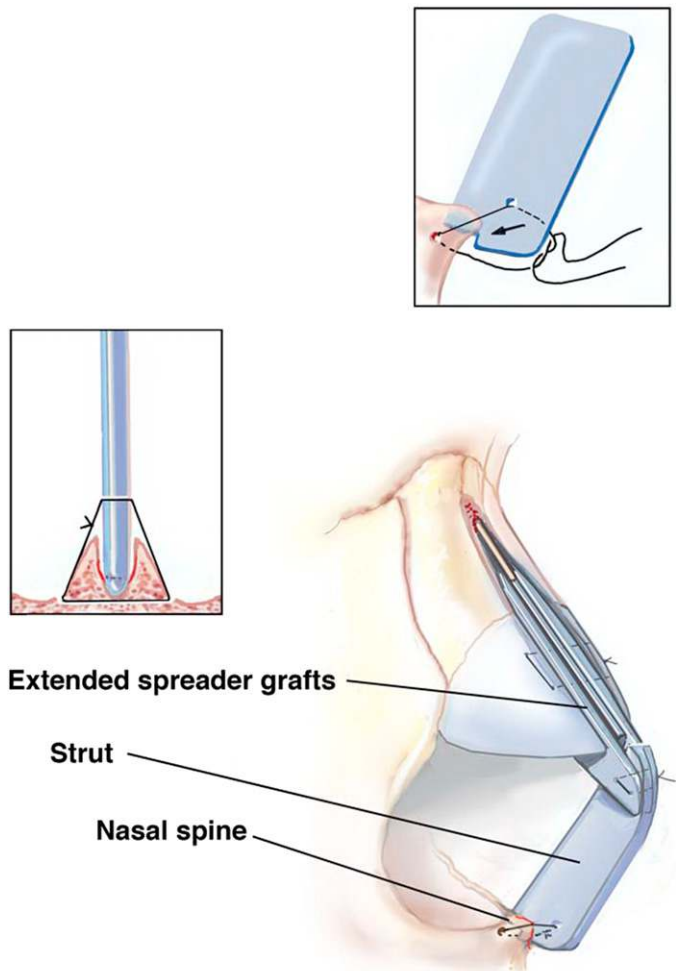


Fig. 4. Caudal septal replacement graft with notch sutured and fixated into notch in nasal spine. The graft is stabilized with extended spreader grafts.

cartilage is removed in continuity with the caudal strut. Any deviated bony septum or septal spurs are also removed, with care taken to preserve the mucoperichondrial flaps. Following resection of the septal cartilage, the need for further cartilage material for grafting is assessed. If a significant dorsal augmentation is planned (>5 mm), the authors' preference is to harvest costal cartilage at this time. If minimal extra cartilage is deemed necessary following septal cartilage harvest, auricular cartilage may be harvested at this time. The authors rarely use auricular cartilage in Asian patients as most patients require significant cartilage grafting to augment their nose.

COSTAL CARTILAGE HARVEST

When performing costal cartilage harvest, the authors typically use the lateral aspect of the sixth rib that abuts the bony/cartilaginous junction. The chest wall is palpated to determine the shape of each rib and the 3.75-cm (1.5-in) 27-gauge needle used during local anesthetic injection is used to locate the bony-cartilaginous junction and any sites of calcification. The sixth rib is more commonly used as it lies at the inferior aspect of the breast. This allows placing the incision in the region of the inframammary crease to allow better camouflage of the incision. Asian women patients typically have small breasts and do not have a well-defined inframammary crease. The authors use a small incision measuring 1.2 cm to minimize scarring. If the authors need to perform dorsal augmentation and premaxillary augmentation 2 costal cartilage segments may be needed. In this case the authors may harvest the seventh rib in addition to the sixth rib. Selection of the rib depends on which rib has the best contour for the desired grafts.

The incision is initially 1.2 cm in length and is planned over the inferior aspect of the right breast; it is usually stretched to approximately 1.6 cm with the retraction. Sharp dissection is performed through the dermal and subcutaneous tissues. The muscle fascia is incised in a cruciate fashion and blunt dissection is used to expose the perichondrium over the cartilage. Troublesome bleeding is uncommon and judicious use of bipolar cautery is used to minimize postoperative pain. A rectangular strip of perichondrium is incised with a number 15c scalpel and dissection carried lateral to medial to elevate the perichondrium from the anterior surface of the cartilage. The incision is manipulated laterally and medially as needed to maximize exposure with a minimum incision length. Wider exposure is important for the occasional or novice rib graft surgeon and a 3.0- to

5.0-cm incision is advised in these circumstances. Following removal, the perichondrium is placed in saline impregnated with antibiotic (400 mg ciprofloxacin/500 mL normal saline). The perichondrium along the superior and inferior aspects of the cartilage is then elevated with a Freer elevator to the deep aspect of the rib (**Fig. 5**). Following adequate elevation, a number 15c scalpel is used to incise the cartilage halfway through the thickness laterally, then medially. Typically the authors harvest 3 cm to 4 cm of costal cartilage depending on what is needed. There is commonly a significant connection between the sixth and seventh ribs that is also partially incised with a number 15c scalpel. A Freer elevator is used to complete the incisions carefully without disrupting the deep perichondrial layer. The cartilage is then elevated off the underlying perichondrium. Adequate severing of the connections to the seventh rib and complete transection of the medial and lateral aspects of the rib will aid elevation of the rib without fracturing the rib cartilage. Following removal, the cut edges of the remaining rib cartilage are trimmed using Takahashi forceps to minimize palpability. The wound is irrigated and a Valsalva maneuver performed to verify that the pleura has not been violated. The procedure is performed on an outpatient basis, although overnight observation with postoperative radiographs is advised for the surgeon less experienced with costal cartilage grafting. Closure is performed at the end of the operation to maintain accessibility should further material be required. Closure is performed in a layered fashion, closing the muscle and its fascia with 3-0 polydioxanone suture (PDS), the breast tissue and deeper subcutaneous tissue with 4-0 PDS, the superficial subcutaneous tissue and deep dermal sutures with 5-0 PDS and a running, locking vertical mattress 6-0 nylon suture for the skin.

RIB CARVING

Success with the use of costal cartilage depends on the method of carving the cartilage and decisions made in use of the grafting material. The cartilage is carved into 3 segments with a number 10 blade scalpel. The outer layers represent the anterior (superficial) and posterior (deep) surfaces of the rib in anatomic position (**Fig. 6**). If a large dorsal graft is anticipated, care must be taken to leave the central portion of the graft an appropriate thickness for augmentation with possible sacrifice of 1 or more of the outer layers. The rib cartilage is carved throughout the operation and kept in antibiotic-impregnated saline. It is observed throughout the operation for any tendency for

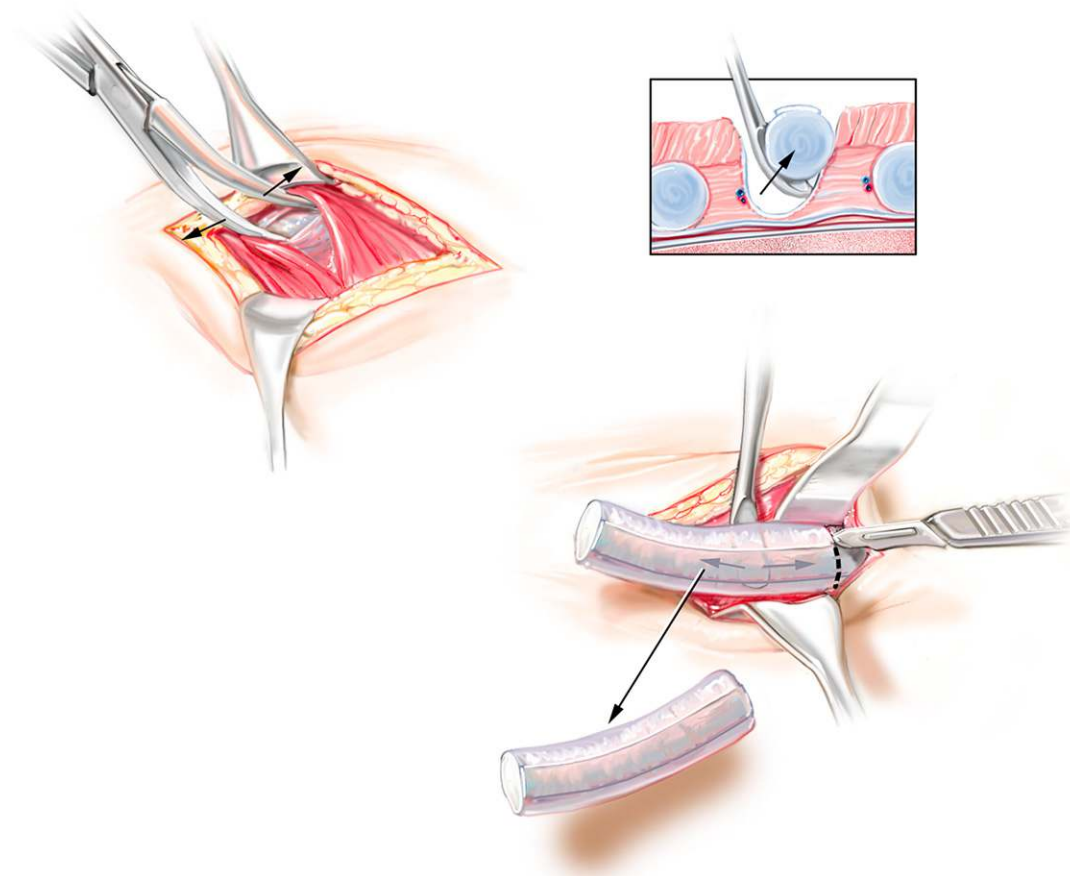


Fig. 5. Rib cartilage harvest. (A) Blunt dissection to separate muscle fibers and expose anterior perichondrium. (B) Elevation of rib from underlying (deep) perichondrium using Freer elevator. (C) Continuing elevation of rib and incision of medial portion of rib (half-thickness with scalpel and remainder with Freer elevator to avoid damaging underlying structures) allows removal.



Fig. 6. Careful carving of rib cartilage produces anterior, middle, and posterior segments, which demonstrate differing degrees of warping intraoperatively.

warping. This tendency can be determined within 30 minutes and can be used in selecting the appropriate pieces for grafts and orientation so that the curvature is advantageous for the graft purpose.

Rarely, a second rib harvest may be needed to obtain sufficient grafting material, more commonly in revision operations with a need for implant removal/replacement and previous septal cartilage harvest.

BONY VAULT MANAGEMENT

In most Asian patients who are undergoing dorsal augmentation, medial and lateral osteotomies are not necessary. When augmenting the nasal dorsum it is desirable that the platform for the dorsal graft (bony dorsum) is wider than the actual dorsal graft itself to create the proper pyramidal contour of the dorsum, with the base being wider and the dorsal graft being narrower (**Fig. 7**). This

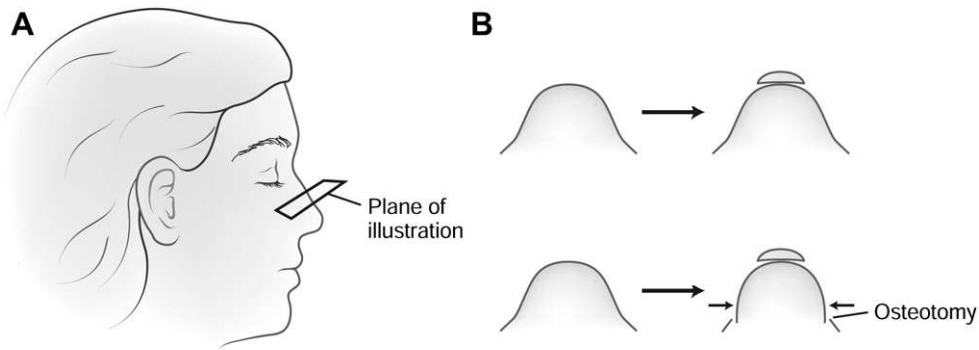


Fig. 7. Dorsal augmentation using costal cartilage graft. (A) Plane of illustration. (B) Ideally the dorsal graft is applied to a wider base to create a smooth transition from nasal bones to the dorsal graft. In most Asian patients osteotomies are not needed when performing dorsal augmentation. Previous incorrectly performed lateral osteotomies can cause an unnatural vertical transition from nasal dorsum and sidewalls to the maxilla.

contour creates a natural look to the nasal dorsum, with the leading edge of the dorsal graft creating symmetric brow tip aesthetic lines. If the bony dorsum is narrowed with osteotomies then the bony dorsum may be too narrow and create a tubular appearance to the nasal dorsum with vertically oriented sidewalls. The surgeon may choose to perform lateral osteotomies if the nasal dorsum is excessively wide and no dorsal augmentation is necessary. If the bony dorsum is deviated then osteotomies may be necessary to straighten the dorsum. In some patients if a nasal bone is in-fractured because of previous trauma it may be advisable to out-fracture the abnormally positioned nasal bone. If the lower third of the nose is wide, narrowing the upper third of the nose may create imbalance between the upper and lower segments of the nose. If significant deviation or inappropriate width exists, manipulation of the bones is performed before addressing the nasal base. However, the nasal base should be assessed before any bony vault manipulation.

If there is no deviation, nasal width is then assessed. Most primary Asian rhinoplasty patients have a wide nasal dorsum but may not need narrowing because of planned dorsal augmentation. The surgeon should take care not to narrow the nasal bones near the ascending process of the maxilla excessively as this may lead to an unnatural appearance characterized by lack of a smooth transition from the nasal dorsum to the sidewalls and cheek (**Fig. 8**). The transition from the maxilla to the nasal sidewalls and dorsum should be pyramidal in shape, not rectangular. Commonly seen in revision patients, asymmetries from previously poorly performed osteotomies or excessive narrowing from previous surgery must be corrected by widening of the bony nasal vault. For this

reason, many Asian patients undergoing revision rhinoplasty may require out-fracture of the nasal bones with use of a Boies elevator to achieve sufficient width to allow for a smooth transition following placement of the dorsal graft. This transition provides for an aesthetically appropriate shadow along the nasal sidewall and avoids the unnatural appearance caused by excessive medialization of the nasal bones.

Correction of bony nasal deviation or excessive width can be accomplished with the judicious use of medial and lateral osteotomies, which must often be combined with out-fracture of 1 nasal bone to achieve straightening in crooked noses. Medial osteotomies are best avoided to prevent instability of the nasal bones, but may be required if thick cortical bone is present in the midline, preventing appropriate back-fracture from the lateral osteotomy sites. The medial osteotomies are performed first, with a 3-mm straight osteotome placed at the junction of the cartilaginous and bony septum and performed with a 10° to 15° laterally fading movement. Lateral osteotomies are then performed as needed. A number 15 scalpel is used to make a stab incision above the inferior turbinate insertion onto the piriform aperture. Local anesthetic is used to infiltrate and hydrodissect the planned osteotomy site. A 3-mm straight osteotome is used to perform the lateral osteotomy in a high-low-high fashion.

Care should be taken to evaluate the three-dimensional orientation of the nasal bone. Often, medialization of the entire bony segment above the osteotomy site is inappropriate. Commonly, the bony segment nearest the dorsum requires a different degree of medialization than does the base of the segment near the maxilla. In-fracture is performed with the osteotome, with attention



Fig. 8. Preoperative photograph of patient seeking revision rhinoplasty with previously performed inappropriate osteotomies with poor transition of dorsum to nasal sidewalls and maxilla.

to this three-dimensional aspect of the bone movement.

NASAL BASE

Following correction of any bony deformities, attention is turned to the nasal base. An assessment of any problems with deviation of the caudal septum, facial asymmetry, or anterior nasal spine positioning is performed by photographic analysis and intraoperative diagnosis. Viewing the nose from above the patient's head is invaluable to assess for deviations and asymmetries.

If the nasal base is midline, augmentation, lengthening, and strengthening may be obtained using a columellar strut, extended columellar strut, or caudal septal extension graft. If the nasal base is deviated, a swinging-door maneuver, caudal septal extension graft, or caudal septal replacement graft may be required to achieve correction. The anterior nasal spine may need to be shifted to set the base in the midline. Premaxillary augmentation may be performed by a separate premaxillary graft with possible incorporation of an extended columellar strut or by augmentation with a caudal septal extension or caudal replacement graft.

If significant caudal septal deflection exists, the caudal septum may need to be moved or resected and replaced. For minor caudal septal deflections off the spine, a swinging-door maneuver may be

performed. Dissection of the caudal septum from the anterior nasal spine and anterior maxillary crest is performed. The septum is secured in the midline or on the opposite side of the nasal spine using 4-0 PDS secured to fibrous tissue on either side of the anterior nasal spine. If this is inadequate for stability, a 16-gauge needle is used to drill a hole in the spine. The suture needle may then be passed through the area and through the relocated septum to secure it in the desired position. Splinting grafts may also be used to secure the base of the graft to soft tissue around the spine.

Commonly, lengthening or blunting of the nasolabial angle is desired in Asian rhinoplasty. Changing the nasolabial angle in the Asian patient can change the upper lip position and create stiffness in the upper lip. This change must be discussed with the patient beforehand to ensure the patient understands the potential consequences of changing the nasolabial angle. The caudal septum must also be strong enough to support the large dorsal graft without collapse. The weaker cartilage found in Asian patients may not withstand collapse over time, which may lead to tip ptosis, loss of projection, and polly-beak deformity. In these patients, a caudal septal extension graft or caudal septal replacement graft is indicated. The caudal septal extension graft is used if the caudal septum and anterior nasal spine are located in the midline or for minor deviations of these areas. The caudal septal extension graft is secured to the existing caudal septum by an overlapping technique, which may correct minor caudal deviations, or by an end-to-end configuration with the use of extended spreader grafts and splinting grafts to secure the graft to the caudal septum (**Fig. 9**). Using a noted curvature of the donor cartilage in a manner to combat any tendency toward deviation of the columella and tip aids correction of the deformity.

On rare occasions when the caudal septum is severely deviated or damaged from previous surgery or trauma, the caudal septum may need to be resected and replaced with a caudal septal replacement graft. In these patients, the caudal septum is resected, leaving a dorsal strut of 1.5 cm extending from the nasal bones and bony septum. The native tip deviation and position of the anterior nasal spine are noted. On rare occasions, the nasal spine is off midline and contributes to the deviation. In these patients, a 5-mm straight osteotome placed on the spine is used to determine the optimum position of the spine to align it with the nasal bones while observing from the head of the bed. The osteotome is then driven into the spine at a slight angle toward the desired position. The osteotome is then used as a lever to move the

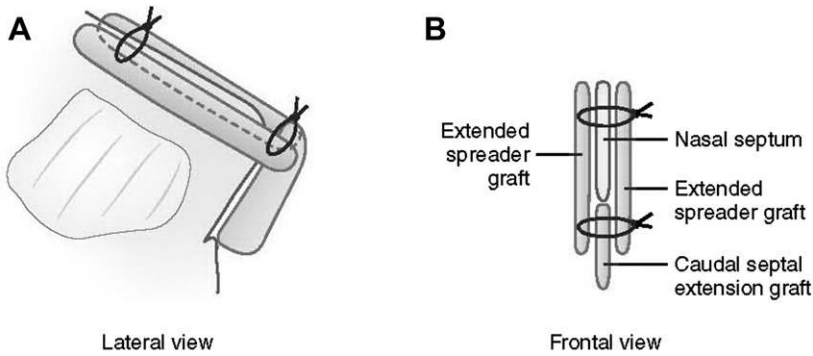


Fig. 9. Caudal septal extension graft, bilateral spreader grafts, and splinting grafts. (A) Lateral view. (B) Cross section.

spine to the desired position, thereby widening and displacing the notch toward the midline (**Fig. 10A, B**). Two 4-0 PDS are secured to fibrous tissue on either side of the anterior nasal spine or into holes drilled in the spine using a 16-gauge needle.

The caudal septal replacement graft is carved with care to note any subtle deviation of the graft, which can be used to combat the native tip deviation. One of the lateral pieces of costal cartilage with a straight orientation should be selected. If a sufficiently straight piece is unavailable, thin pieces of curved costal cartilage can be used to splint and counteract any deviation of the caudal septal replacement graft. The graft should be kept longer at this stage (often 35–40 mm) to allow for

setting adequate tip projection following application of the spreader grafts and reapproximation of the lower lateral cartilages. The graft may be trimmed before the final tip work is completed. A notch is carved in the graft to allow for appropriate premaxillary augmentation. The size of the premaxillary portion of the notched segment must be carefully considered. A larger premaxillary segment aids lengthening and blunting of a retracted nasolabial angle, but risks the production of tension and creasing of the upper lip. The graft is placed in the notch and sutured securely in place.

If more significant premaxillary augmentation is required, a separate premaxillary graft can be incorporated into the nasal base stabilization. An extended columellar strut or caudal septal

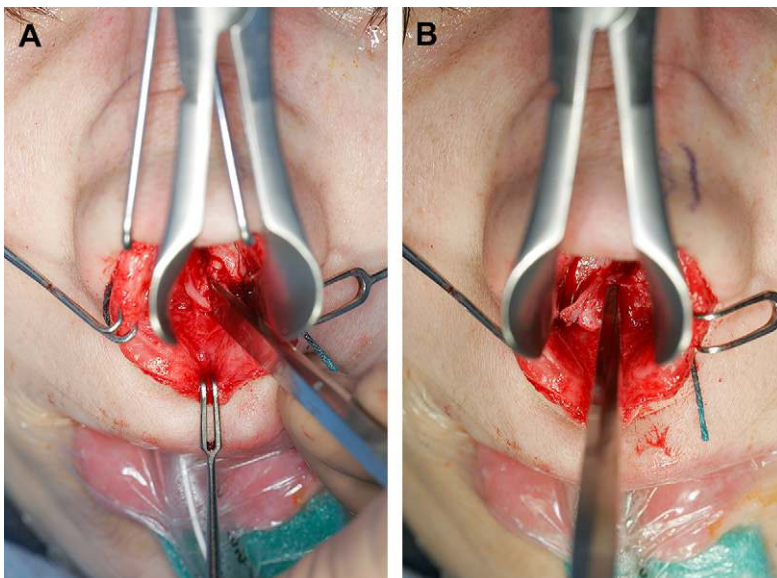


Fig. 10. Repositioning of the nasal base. (A) Osteotome placed in anterior nasal spine at an angle. (B) Osteotome manipulated to partially fracture anterior nasal spine laterally. This relocates notch to the midline and allows placement of caudal septal replacement graft (as in **Fig. 4**).

replacement graft can be carved to fit into the notch created in the anterior nasal spine, as described earlier. The notched portion of the graft extending anterior to the anterior nasal spine is then incorporated into a horizontally oriented premaxillary graft. This graft is carved to fit anterior to the spine in a carefully dissected pocket along the premaxilla.

SPREADER GRAFT PLACEMENT

Following nasal base stabilization, attention is turned to placement of spreader grafts. In Asian rhinoplasty, the use of spreader grafts serves several purposes. The incorporation of the grafts with a strong nasal base provides a firm structural foundation for dorsal grafting, aids in setting and preserving nasal length and projection, and helps to open the nasal valve. In addition, the strength of the grafts resists the cephalic movement of the tip complex, thereby preventing the overrotation and nasal shortening that may be seen as tip projection is increased (**Fig. 11**).

Typically, spreader grafts are carved from the central portion of the previously carved costal cartilage. They are tapered at each end and the caudalmost portion should be trimmed along its inferior margin slightly so as not to block the nasal valve. Any deviations of the grafts should be noted and used appropriately to combat any native

dorsal septal or tip deviation. Opposing curvatures may be used to minimize any deflection. Dimensions of the grafts vary but are typically 20 to 40 mm long, 4 to 6 mm wide and 1.5 to 3 mm thick. Differences in dimensions are used to account for middle vault collapse, middle vault width, need for nasal lengthening, and so forth. If the nasal bony width has been increased by out-fracture, a portion of 1 or both spreader grafts may be placed underneath the caudal nasal bones to prevent the bone from collapsing medially. The grafts are sutured to the remaining dorsal septum or dorsal septal strut. They are then sutured to the caudal septal extension graft or caudal septal replacement graft (**Fig. 12A, C**). Manipulation of this complex in multiple dimensions enables the surgeon to alter tip projection, nasal length, dorsal height, and tip rotation. These parameters must be set with great care otherwise one can easily create deformity such as overprojection, excess length, or short or overrotated tip. Once the proper position and middle nasal vault width have been obtained, the upper lateral cartilages are sutured to the spreader grafts and nasal septum. Care must be taken to prevent entrapping the nasal mucosa when suturing the spreader grafts in place. Also, sagging mucosa into the nasal valve area may produce blunting of valve and impaired airflow. Prevention of this is accomplished with careful mattress approximation of the septal mucoperichondrial flaps in this area.

DORSAL GRAFT

Septal cartilage is the first choice of material for dorsal grafting, followed by costal and auricular cartilage, in that order. The senior author does not use alloplastic materials in rhinoplasty. In Asian patients, especially in revision operations, there is often inadequate septal cartilage (in length, thickness, or both) to augment the dorsum to the desired height with 1 piece. If only minor augmentation is desired, a single layer of septal cartilage is carved into a canoe-shaped graft, with care taken to taper all sides to maximize camouflage. If needed, the septal cartilage may be stacked and sutured together to increase dorsal height.

Auricular cartilage, stacked or in single layers, can be used as a dorsal graft but can be problematic because of its inherent irregular contour tendency to curl or deform, and potential resorption if stacked.

Costal cartilage dorsal grafts should be carved in similar fashion as the septal cartilage, with care taken to note any tendency toward warping. The bending of the cartilage tends to be in an anterior/posterior direction with respect to its



Fig. 11. Preoperative photograph of patient seeking revision rhinoplasty. Note overrotated tip and short nose deformity, caused by an L-shaped Silastic implant that projected the nasal tip. As tip projection is increased rotation must be restricted to avoid the overrotation as seen in this patient.

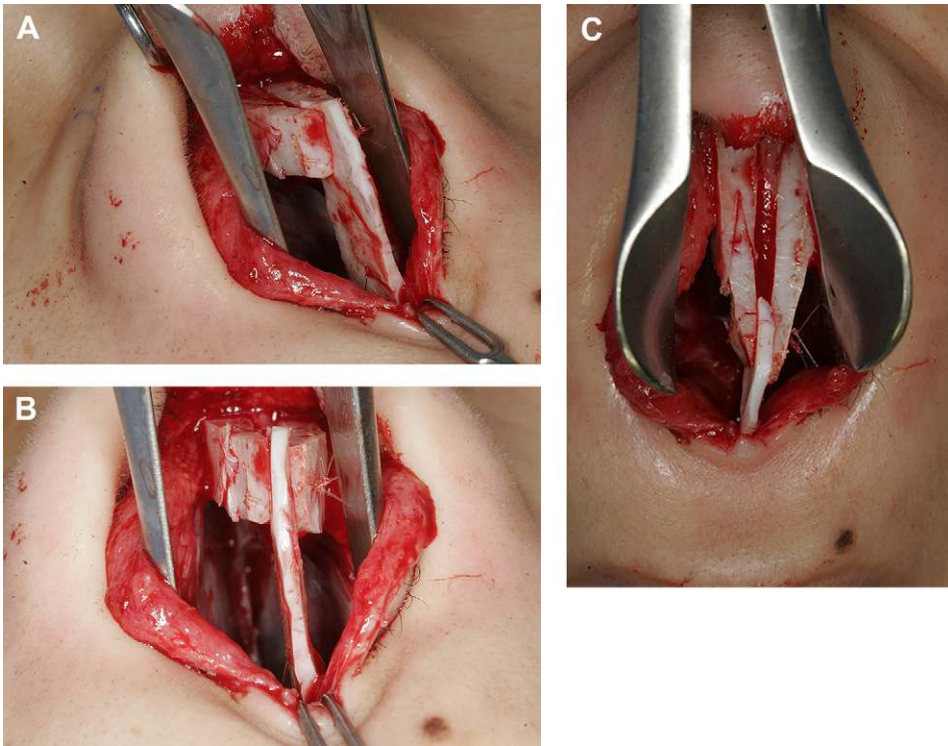


Fig. 12. Intraoperative photograph demonstrating placement of bilateral extended spreader grafts to secure caudal septal replacement graft. (A) Surgeon's view. (B) Base view. (C) Frontal view.

native position in the chest (before harvest).¹ It is uncommon to see warping in a lateral direction when carved as described and fixated properly. The cartilage is generally carved into a canoe-shaped graft, with tapered edges to aid camouflage. It is imperative that any native curvature of the graft be noted. It is recommended that the graft have some curvature so the tendency of the cartilage to bend is known. The concave side should be placed against the nasal dorsum to avoid unsightly irregularity from the cephalic and caudal ends becoming visible with minor warping (**Fig. 13**). By positioning the dorsal graft with the concave surface oriented downward against the dorsum, suturing the graft to the upper lateral cartilages will resist any additional curvature. The subtle convexity produced from the properly placed dorsal graft following minor warping may be barely detectable and may be corrected by nasal compression exercises performed by the patient.

Proper fixation of the graft begins with the initial elevation of the skin and soft-tissue envelope. Care to restrict the elevation of the periosteum over the nasal bones to preserve a tight pocket enables the surgeon to securely fixate the cephalic end of the dorsal graft into a tight pocket over the

upper bony dorsum. The tight pocket helps to minimize any displacement of the upper aspect of the dorsal graft.

Following stabilization of the nasal base and spreader grafts, the dorsal graft is placed along the dorsum to assess for appropriate augmentation. The graft is removed and refined as needed to achieve the appropriate effect. The dorsal graft is carved sequentially for hours to allow close monitoring of the tendency of the costal cartilage



Fig. 13. Dorsal graft before refinement and camouflage. Note slight curvature of graft. The concave surface is placed in contact with the dorsum.

dorsal graft to warp. Final placement and fixation are delayed until tip manipulation is complete.

Perichondrium is used around the edges of the graft to camouflage the transition from graft to dorsum and prevent graft visibility (**Fig. 14A, C**). This technique produces 1 mm of additional augmentation when placed along the dorsal surface and should be taken into account when carving the graft. A small piece of perichondrium is also sutured in place to the undersurface of the graft, which prevents postoperative graft migration. Before final placement of the graft, the nasal dorsum is roughened with a fine rasp (**Fig. 15**). The graft is then placed into the cephalic subperiosteal pocket and sutured to the upper lateral cartilages or underlying spreader grafts using 5-0 PDS along both sides of the caudal aspect of the graft. If needed, a transcutaneous suture may be placed through the cephalic end

of the dorsal graft to further prevent graft migration. Rarely, if the dorsal graft is noted to be mobile following attempts to secure it, a transcutaneous threaded Kirschner wire is placed through the graft into the nasal bones. The wire is removed on post-operative day 7, with care taken to prevent elevation of the graft on removal.

TIP WORK

The medial crura are reapproximated to the columellar strut or caudal septal extension or replacement graft using 4-0 plain gut suture on a Keith needle. This maneuver preliminarily sets tip projection and rotation. A 5-0 PDS is used to reapproximate the medial and intermediate crura to the level of the domes. The native tip deformity is then assessed by examining the native cartilages and the preoperative photographs. Measurements of

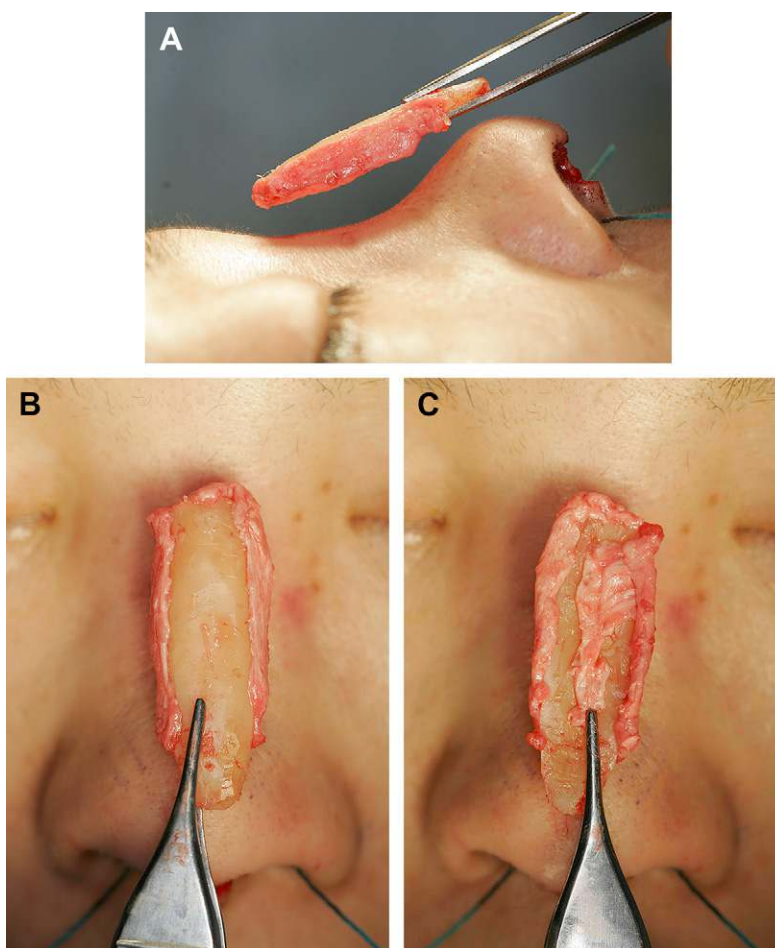


Fig. 14. Dorsal graft following final carving and camouflage with perichondrium. (A) Lateral view. (B) Frontal view of graft. (C) Undersurface of graft. Note perichondrium used for camouflage along lateral edges and undersurface of graft to aid in graft fixation.

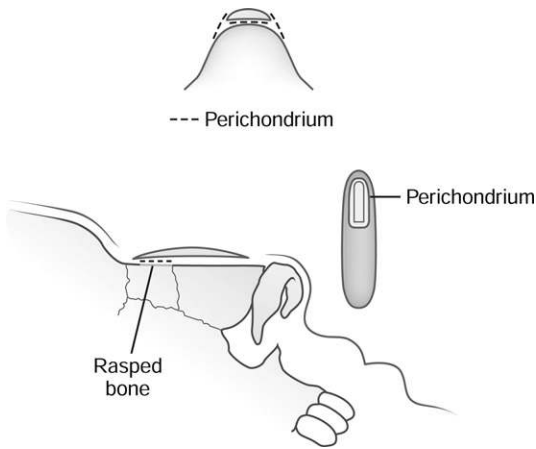


Fig. 15. Correct placement of costal cartilage graft with perichondrium used for camouflage along lateral edges of graft, and for improved adherence along undersurface of graft with perichondrium abutting previously rasped bone.

cephalic positioning, supratip break, and tip width are made using a finger goniometer and Castro-Viejo calipers.

Commonly, some degree of tip narrowing is required. Conservative bilateral cephalic trims are performed. Even if the lateral crura are cephalically positioned, repositioning with lateral strut grafting is rarely necessary in Asian patients as their skin is thick and the tip cartilage orientation does not affect tip shape to the same extent as patients with thinner skin. If the ala are retracted or arched cephalically, repositioning of the lateral crura into a more caudal position can be performed to bring the alae down and correct the alar notching. If repositioning is necessary the lateral crura are dissected carefully from the underlying vestibular skin. Lateral crural strut grafts are carved and sutured to the undersurface of the lateral crura. Depending on the amount of projection desired and inherent strength of the lateral crura, typical lateral crural strut grafts measure 30 mm × 4 mm × 1.5 mm. Care is taken to place the grafts with the concavity facing the vestibular skin to aid stenting of the external nasal valve. They are sutured to the remaining lateral crura with 5-0 PDS with the knot placed on top of the lateral crura to avoid extrusion through the vestibular skin. The grafts are then placed in a carefully dissected pocket oriented in a vector paralleling the nostril margin toward, but not reaching, the piriform aperture. These pockets should not be positioned too far caudally as this can result in accentuation of a hanging alar lobule, which is frequently a problem with Asian patients.

Asymmetric pockets may be dissected to account for asymmetric alar positions. Correction of asymmetrically retracted or arched nasal ala can be accounted for by appropriately positioned pockets.

Tip bulbosity is corrected with the flattening of the lateral crus produced by lateral crural strut graft placement. If repositioning is not performed, bulbosity can be addressed by lateral strut grafting without repositioning or simply by placing bilateral dome binding sutures. If lateral crural strut grafts are placed, the vestibular skin is dissected from the undersurface of the lateral crura, with the lateral end of the lateral crus maintained in the soft tissue near the piriform aperture. Smaller lateral strut grafts 20 mm to 25 mm long are used and sutured to the undersurface of the lateral crura. In many Asian patients placement of a simple dome binding suture is adequate to decrease nasal tip bulbosity. After placing the dome sutures additional tip projection can be achieved using either onlay tip grafts or shield tip grafts.

Patients with thick, sebaceous skin or those in need of a more significant increase in tip projection require significant grafting to project and achieve refinement in the tip. A shield graft combined with lateral crural grafts may be used in this situation. The graft is carved in the shape of a shield and sutured in place to provide increased tip projection and augmentation of the infratip lobule. Lateral crural grafts are sutured to the posterior surface of the shield graft set at approximately a 45° angle and then fixated to the existing lateral crura. The lateral crural grafts act to stabilize the tip graft, provide graft camouflage and prevent unwanted rotation of the shield graft caused by cephalically oriented force applied by the thick skin envelope (**Fig. 16A, B**). Before closure crushed cartilage or soft tissue (perichondrium or temporalis fascia) are used to camouflage the leading edge of the shield graft.

If shield grafting is not used, tip grafting using softer pieces of rectangular cartilage and soft tissue can be used. In these patients such grafts are positioned horizontally over the domes and sutured with 6-0 Monacryl sutures (**Fig. 17A, B**). Manipulation of these grafts helps to set the supratip break, projection, and overall refinement to the nasal tip.

The dorsal graft is removed and replaced repeatedly to assess the relationship between the projection and dorsal height during the process of tip refinement. Following the achievement of appropriate projection, the dorsal graft is positioned and fixated to the upper lateral cartilages with at least 2 6-0 Monacryl sutures.

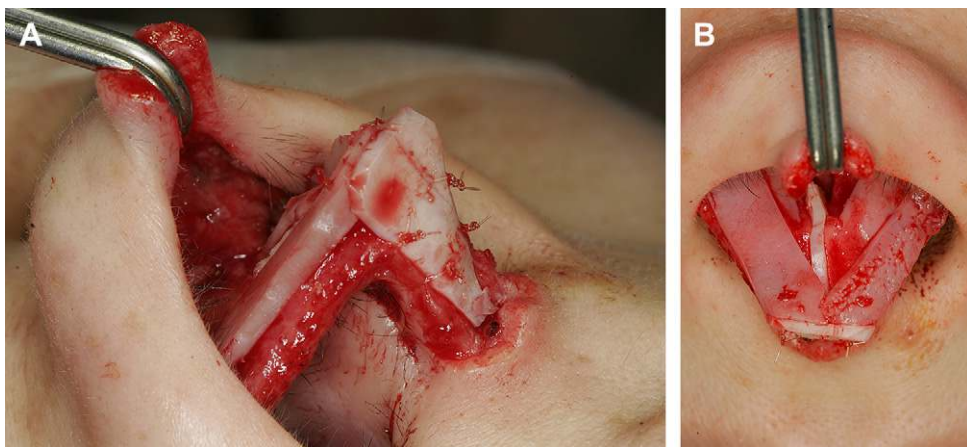


Fig. 16. Shield-shaped tip graft with lateral crural grafts. Intraoperative view of tip graft with lateral crural grafts. (A) Surgeon's view. (B) Frontal view.

The skin and soft-tissue envelope is then re-draped and the nose assessed for any other deficiencies or persistent abnormalities. Onlay grafts to the columellar and plumping grafts to the premaxilla are placed as needed. Observation and palpation from the head of the bed are performed to determine the need for onlay grafting along the dorsal graft or middle vault to prevent future asymmetries.

ALAR BATTEN AND ALAR RIM GRAFTS

The need for alar batten grafts is determined by the nasal bone length, skin thickness, repositioning of

the lateral crura, and preoperative valve collapse.² These grafts are rarely needed in Asian patients as their airway tends to be wider, with thicker lateral sidewalls. Alar battens are placed in precisely dissected pockets in the lateral soft tissue or sutured to the existing cartilaginous framework.

The need for alar rim grafts is assessed by the degree of bulbosity, pinching of the tip, external nasal valve collapse, and need to smooth the transition from the tip lobule to the alar lobule. Alar rim grafts are placed along the nostril margin in a carefully dissected pocket and should end medially behind the tip complex. Alar rim grafts are rarely needed in Asian patients as their alar lobules

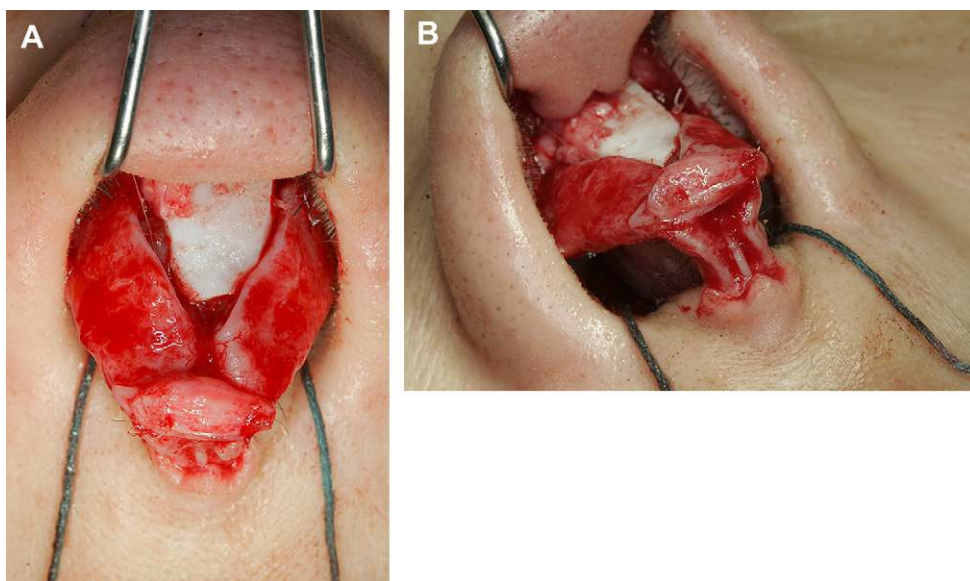


Fig. 17. Horizontally oriented onlay tip graft using soft cartilage. (A) View from above. (B) Surgeon's view.

tend to be thicker and are rarely pinched or collapsed.

CLOSURE

Closure is accomplished using a single 6-0 PDS in the midline to reapproximate the skin envelope. A 4-0 plain gut suture on a Keith needle is used to reapproximate the mucoperichondrial flaps in a mattress fashion. A 5-0 chromic gut suture is used to close the marginal incisions. 7-0 black nylon interrupted vertical mattress sutures are used for the columellar skin closure. A 6-0 fast-absorbing gut suture is used to close the medial extent of the marginal incision near the soft-tissue triangle.

Folded pieces of nonadherent gauze coated with a thin layer of bacitracin are used as nasal packing. Lateral wall splints are used if lateral crural strut grafts have been used. These are radioopaque 0.25-mm-thick nasal splints trimmed to fit over the supra alar groove. They are sewn into place over and through the lateral crural strut grafts to aid healing in the immediate postoperative period. They are removed on postoperative day 7. Vestibular splints are used if the nostrils are asymmetric or the internal diameter of the

airway is compromised. Bacitracin is applied to the suture lines and a drip pad is placed.

BASE REDUCTIONS

Nasal base width is assessed following closure of the marginal and midcolumellar incisions. Asian rhinoplasty patients occasionally require nasal base reductions, although the need for these should be balanced against the tendency for Asian patients to form hyperpigmented scars. The need for base reduction is increased because of the flare produced from lateral crural repositioning and alar rim grafting. The internal versus external component of flare is assessed and marked with a marking pen (**Fig. 18A**). Alar base reduction is performed with a number 11 blade with a diamond-shaped excision to promote eversion of the skin edges. A single 5-0 PDS is used to approximate the deep tissues and 7-0 nylon sutures in an interrupted vertical mattress fashion used to close the skin (**Fig. 18B, C**).

Postoperative Care

Patients are seen on the first postoperative day, the packing is removed, the nose is cleansed with hydrogen peroxide, and bacitracin ointment

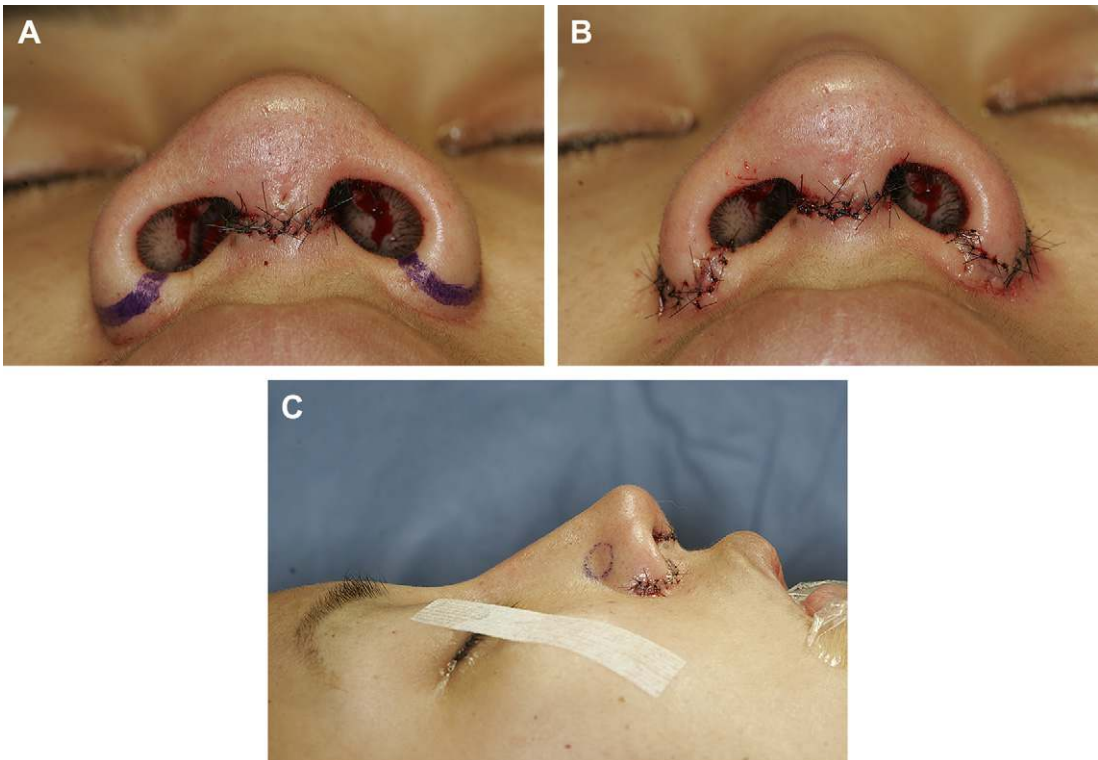


Fig. 18. Intraoperative view of base reduction (internal and external). (A) Markings before excision. (B) Following excision and closure, base view. (C) Lateral view.

is placed. The cast and midcolumellar sutures are removed on postoperative day 7. The base reduction sutures are removed on postoperative day 14. Patients are given a second-generation cephalosporin and mild narcotic postoperatively. Revision rhinoplasty patients are also given an oral fluoroquinolone and antibiotic rinses to perform postoperatively.

Complications

Complications with Asian rhinoplasty are similar to conventional rhinoplasty and include bleeding, infection, scarring, visible cartilage grafts, dorsal graft visibility, asymmetries, asymmetric nostrils, and nasal obstruction. Auricular cartilage can result in pain, bleeding, infection, hypertrophic scars, keloids, deformation of auricle, scar bands, and necrosis of anterior conchal skin. Risks associated with costal cartilage harvest include pain, bleeding, infection, hyperpigmented scarring, hypertrophic scarring, pneumothorax, and cartilage warping. Patients rarely complain of significant pain and are able to return home on the day of surgery.

Discussion

Asian rhinoplasty differs from traditional rhinoplasty in preoperative counseling and in operative technique. Augmentation of the existing nasal structural framework is the primary goal of the operation, in contrast to traditionally reductive techniques. In Asian rhinoplasty 1 of the most common goals is to increase projection of the nasal dorsum. Creating a natural nasal dorsum requires great attention to detail and proper grafting materials (**Fig. 19**).

The need for augmentation dictates the need for grafting material. Many surgeons use alloplastic materials for augmentation because of ease of use, minimal operative time required, and lack of donor site morbidity. Alloplastic graft materials include silicone, Gore-Tex (WL Gore and Associates, Newark, DE, USA), and porous polyethylene.^{3,4} Opponents of alloplastic materials cite increased rates of infection, extrusion, thinning of skin over Silastic implants, displacement, translucency of the implant, and pain with alloplasts.^{5,6} Autologous materials include nasal septal cartilage,



Fig. 19. Asian patient who underwent dorsal augmentation using costal cartilage. (A, C, E, G) Preoperative views. (B, D, F, H) One-year postoperative views.

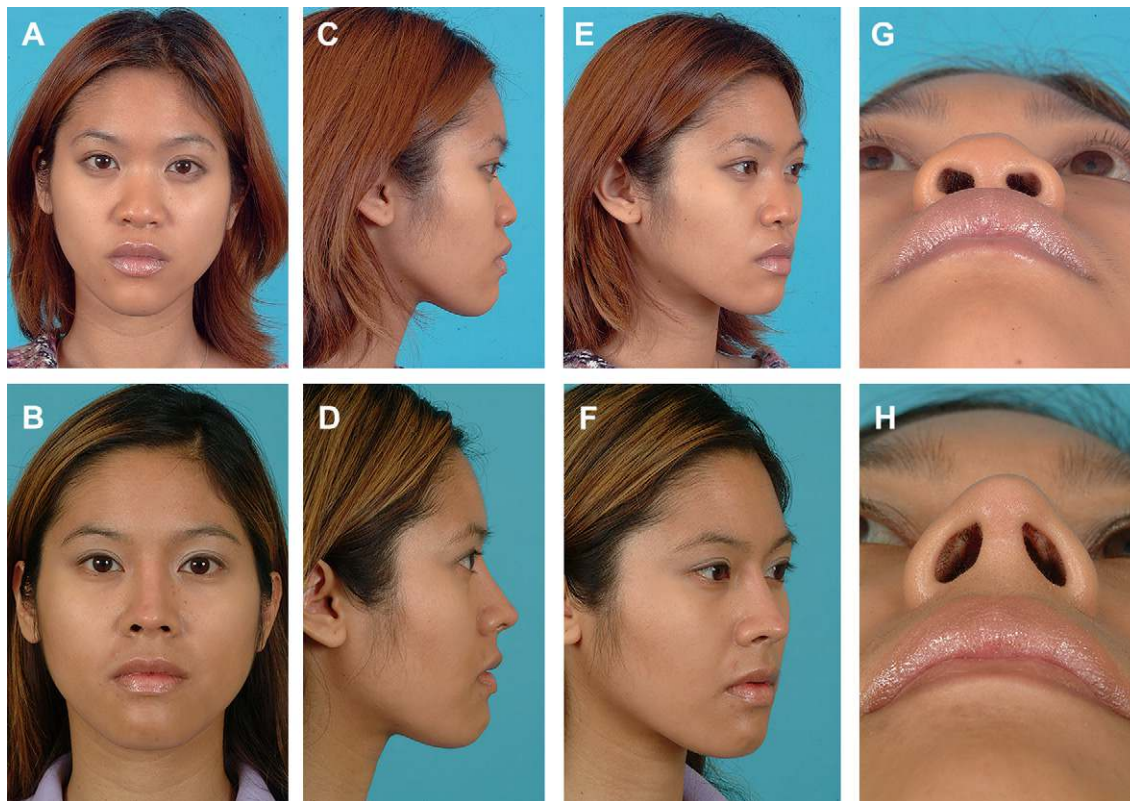


Fig. 20. Patient underwent previous augmentation with Silastic implant that extruded through her nasal tip, leaving a scar on her nasal tip. She underwent reconstruction with costal cartilage with placement of a dorsal graft, septal replacement graft, and shield tip graft with lateral crural grafts. (A, C, E, G) Preoperative views. (B, D, F, H) Two-year postoperative views.

auricular cartilage, costal cartilage, iliac bone, and split calvarial bone grafts. Autologous materials are preferred because of their decreased rates of infection, extrusion, foreign body reaction, and preferred handling characteristics. Septal cartilage is preferred for dorsal augmentation up to 3 mm in thickness because of ease of harvest and carving and favorable shape. Costal cartilage is the material of choice for augmentation of the dorsum more than 3 mm in thickness (**Fig. 20**). It does not demonstrate resorption,⁷ and produces predictable results in experienced hands, with low incidence of warping or visibility of the grafts. A significant learning curve is associated with use of costal cartilage; special care should be taken when starting to use this material as there are many potential pitfalls if it is not used properly.

SUMMARY

Asian rhinoplasty requires knowledge of the anatomy and aesthetic ideals unique to the Asian rhinoplasty patient. Use of autologous cartilage in a structured approach is the preferred grafting

method to achieve the desired long-term results in this patient population.

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