Rhinoplasty

# Preventing Elevated Radix Deformity in Asian Rhinoplasty with a Chimeric Dorsal-Glabellar Construct

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## Abstract

**Background:** Asian facial aesthetic surgery should enhance, but not change, natural features. Augmentation rhinoplasty is a hallmark of Asian cosmetic surgery. In the authors' experience, I-shaped implants can elevate and efface the radix, leading to an unnatural appearance (elevated radix deformity).

**Objectives:** The Chimeric technique was developed to control final radix position and preserve the nasal profile. We aim to demonstrate that the Chimeric technique promotes forward projection, not elevation, of the radix.

**Methods:** Between 2013 and 2015, 49 patients underwent rhinoplasty with I-shaped implants. Nineteen patients had Chimeric dorsal-glabellar implants, 30 did not. Standardized photographs were obtained at every visit. Novel and established photogrammetric parameters were used to describe radix position and position change. A retrospective chart review provided additional procedural details and outcomes data.

**Results:** Patients were followed for 10.8 months (range, 2-36 months). Nasal height increase (113% vs 107%) and bridge length increase (118% vs 105%) were significantly greater when the Chimeric technique was not performed ($P < .0001$). The nasofrontal angle increased 6° in both groups; there was no difference between groups. The vector of radix position change was 26.1° in the Chimeric group and 63.4° in the traditional group ($P < .0001$).

**Conclusions:** The Chimeric technique preserves the nasal profile with a favorable (horizontal) radix transposition vector. There was not a significant difference in final radix position when Chimeric rhinoplasty was performed because that is controlled by implant thickness and position. The technique did not blunt the radix significantly.

**Level of Evidence: 4**

4
Therapeutic

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There is an increasing demand for aesthetic surgery that emphasizes enhancement of natural beauty, rather than Westernization. A new set of aesthetic standards specific to the ethnic Asian nose are emerging.[1] As standards evolve, so do the methods of achieving them; this is evidenced by a rapidly expanding literature. Features that typify the Asian nose include thick skin, a low bridge, and a rounded, weak tip. A consequence of a posteriorly placed glabella is that the eyes appear to protrude. When features become disharmonic, patients seek augmentative procedures that augment the radix, dorsum, and tip. Within this realm, it is possible that size is prioritized over shape.

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Correction of the low radix and a foreshortened nose are important elements of Asian rhinoplasty. The radix is the interface between the nose and face. Changes in its morphology influence the appearance of both.[2-5] The effect of the radix on perceived nasal height is exploited in dorsal nasal and radix augmentation surgery. The authors recognize postoperative stigmata of these procedures, including an elevated and blunted nasofrontal angle (NFA), and pronounced dorsal nasal lines. The senior author devised the Chimeric technique to place a hinged "break" at the point of the desired radix position. Although many modern implants are tapered and gently curved, the authors devised the technique to minimize NFA effacement and best control radix position. Although some patients seek the "operated" look, the influence of augmentation procedures on the remainder of the face should not be overlooked.

Yu and Jang reported that Asians undergoing rhinoplasty prefer an NFA of 138°.[5] The senior author revised a patient initially treated elsewhere, who complained of a high radix. To prevent or treat the elevated radix deformity, that is, a broad radix and blunted NFA, a dorsal-glabellar (Chimeric) rhinoplasty should be considered (Figure 1). This technique involves dorsal augmentation with a glabellar component made of expanded polytetrafluoroethylene (ePTFE, Gore-Tex; W.L. Gore & Associates, Phoenix, AZ) or cartilage. The purpose of this report is to introduce the Chimeric technique and to identify the influence of the glabellar component in Asians who undergo augmentation rhinoplasty.

## METHODS

Between March 2013 and June 2015, 49 Asian patients were treated at this center by a single surgeon augmentation rhinoplasty using a composite ePTFE-lined silicone dorsal implant (Implantech, Ventura, CA) with a glabellar component (Chimeric technique) or without a glabellar component. All patients provided informed consent prior to undergoing surgery and the study was approved by the Hospital's ethics board. Institutional review board approval was not required in our institution since the products used were commercially available, marketed, and labeled for use in cosmetic facial plastic surgery. However, all patients provided photographic consent and understood their photos could be used in the medical literature for instructive purposes. The same photographer captured digital photographs preoperatively and at every visit at one of two outpatient settings using a single camera.

Primary rhinoplasty was performed in 34 patients (69.4%). Secondary (revision) rhinoplasty was performed in 15 patients (31.6%, Table 1). Surgery was performed under

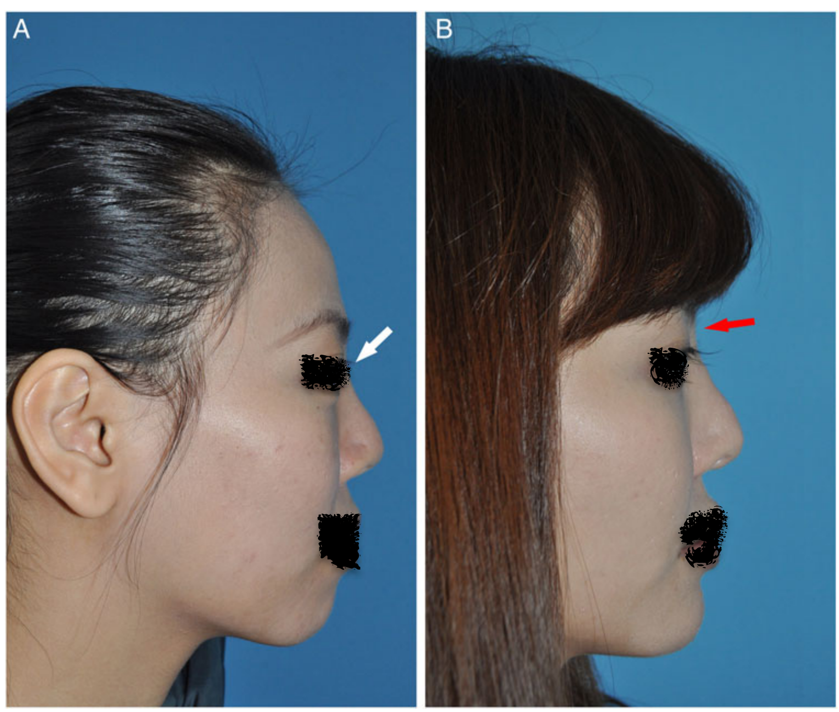


**Figure 1.** The elevated radix deformity. (A) A 27-year-old woman underwent cosmetic rhinoplasty with an I-shaped implant for a de-projected tip, low radix, and weak dorsum. Conchal and septal cartilage were used for tip projection and refinement. (B) Postoperative photograph taken 30 months later, the nasal bridge was 114% of its preoperative length and the radix was projected. However the radix, shallow to begin with (white arrow), was elevated and effaced (red arrow) as a result of surgery. Hsiao's ratio was 3.75, meaning there was nearly 4 times as much vertical as horizontal change, and the angle of translation was 75°.

general anesthesia. Indications were cosmetic in 41 cases (83.7%), post-traumatic ($n$ = 3), combined with orthognathic surgery (OGS, $n$ = 4), and cleft lip deformity ($n$ = 1). There were no differences for patients undergoing Chimeric vs traditional rhinoplasty, except that a greater percentage of patients undergoing traditional rhinoplasty did so for purely cosmetic purposes (93.3% vs 68.4%; $P$ = .02).

## Indications

This technique was offered to all patients seeking primary and secondary augmentation rhinoplasty. Patients were guided but ultimately determined the technique used. Although the technique was offered to every patient, it was better suited for patients with a normal or high existing radix position, or those wishing to change the position of the radix. For example, patients undergoing secondary rhinoplasty for correction of an elevated radix were good candidates. Relative contraindications were a desire for elevation or effacement of the nasal radix, patients desiring traditional rhinoplasty methods, and patients desiring closed rhinoplasty.

## Rhinoplasty Technique

All procedures were performed at this institution under general anesthesia. An external (open) approach was used. In primary cases, the desired site of augmentation and radix position was marked before instillation of anesthetic. A mid-columellar inverted-V incision was made and the alar cartilages were exposed through a marginal approach.

**Table 1.** Patient Demographics

| | All patients | Chimeric | Traditional | $P$-value[a] |
|---|---|---|---|---|
| $n$ | 49 | 19 | 30 | |
| M:F, $n$ | 5:44 | 2:17 | 3:27 | .954 |
| Mean age (years) | 31.8 ± 12.3 | 28.3 ± 11.7 | 34.0 ± 12.4 | .111 |
| Type | | | | |
| Primary, $n$ (%) | 34 (69.4) | 15 (78.9) | 19 (63.3) | .257 |
| Secondary, $n$ (%) | 15 (30.6) | 4 (21.1) | 11 (26.7) | |
| Previous implant, n (%) | 8 (16.3) | 3 (15.8) | 5 (16.7) | .717 |
| Indication | | | | |
| Cosmetic, $n$ (%) | 41 (83.7) | 13 (68.4) | 28 (93.3) | .021 |
| OGS, $n$ (%) | 4 (8.2) | 3 (15.8) | 1 (3.3) | |
| Trauma, $n$ (%) | 3 (6.1) | 2 (10.5) | 1 (3.3) | |
| Cleft lip, $n$ (%) | 1 (2.0) | 1 (5.3) | 0 | |

NS, not significant; OGS, combined with orthognathic surgery. [a]Comparing Chimeric and traditional groups, $P$ < .05 considered significant.

Supraperichondrial dissection proceeded along the lower (LLC) and upper lateral cartilages (ULC) and transitioned to subperiosteal dissection at the nasal bone. Minor dorsal humps were addressed by rasping in most cases; the base of the implant was carved for optimal apposition only when necessary. The LLCs were released from the ULCs at the scroll area and the medial crura were teased apart to expose the septum via submucoperichondrial dissection when septal cartilage was harvested. The nasal tip was addressed first using autologous conchal or septal cartilage.

## Nasal Dorsum

To augment the dorsum, a subperiosteal pocket was dissected for a "hand-in-glove" fit with an appropriately sized I-shaped (straight) composite implant. One of four sizes was chosen as guided by sizers. Implant thickness was determined by skin characteristics and desires. After removal from sterile packaging, implants were handled with clean instruments, fresh gloves, and minimal handling. Prior to insertion, a 50 cc syringe was filled with a first-generation cephalosporin solution and the implant was placed in the syringe. The stopper and a cap were replaced after letting the air escape, and the plunger was withdrawn to create a vacuum and facilitate antibiotic solution to bathe every pore of the PTFE lining. The implant was inserted into the pocket after the recipient site and implant were rinsed with antibiotics.

The implant was positioned so that the lower pole of the implant abutted the cephalic margin of the lateral crura just lateral to the tip-defining points. The cephalic implant margin was determined by patient preference, somewhere between the interpupillary line and supratarsal crease. For example, if a patient requested a higher radix, the upper border was positioned at the level of the supratarsal crease. Two 5-0 monofilament non-absorbable sutures were used to loosely fix the PTFE layer of the implant to the lateral crura of the LLCs to maintain position. After appropriate contour was achieved, hemostasis was obtained, and the mucosa and skin were closed in one layer. When applicable, quilting transfixion sutures were used to obliterate dead space between the mucoperichondrial flaps to prevent hematoma. Closure with 4-0 chromic suture, tape, and splints were used in every case. Patients were typically discharged on the day of surgery; tape and splints were removed after one week. All patients completed a one week course of oral antibiotics postoperatively.

## Chimeric Modification

The Chimeric technique is so named for two reasons: the implant is a composite of glabellar and dorsal components, and various materials are used (Figure 2). The construct was built from a composite silicone-PTFE graft, and a polygonal glabellar component fixed with one or two interrupted 5-0 non–absorbable mattress sutures. The glabellar component was made of autologous conchal cartilage (Figure 3A,B) or PTFE (Figure 3C,D). This decision was made on an individual basis and depended on patient budget, desires, and donor resources. Patients with small ears or previous rhinoplasty may not have had adequate donor cartilage. Glabellar pocket shape and size were determined by the anatomy. The glabellar implant was carefully delivered into position using a fine hemostat and assessed in the lateral view for contour. The position of the glabellar-dorsal junction was placed at the desired final radix position. There was no need to secure the cephalic end of the glabellar component, as the conservatively dissected pocket generated posterior, not inferior, forces that were sufficient to securely hold the construct in position. A video demonstrating the Chimeric technique is available as Supplementary Material at www.aestheticsurgeryjournal.com.

## Photogrammetric Evaluation

Preoperative and postoperative photographs were analyzed with previously described photogrammetric methodology using the Adobe Photoshop CS6 measure tool (Adobe Systems, Inc., San Jose, CA).[6] Efforts were made to ensure true profile views were obtained by the use of paper tape at 0-, 45-, 90-, 135-, and 180°, with the camera lens at 90° from a rotating stool. Patients were asked to look straight ahead with eyes in neutral position. Landmarks used in the lateral view were the pronasale (*prn*), subnasale (*sn*), and sellion (*se*). These are summarized in Table 2 and Figure 4. Bridge length was the distance between the *se* and *prn*, and nasal height was the distance between the *se* and *sn.* Bridge length index (BLI), and nasal height index (NHI) accounted for pogonion-glabella distance to allow for standardized comparisons between images. The NFA was the angle between the glabella, *se*, and pogonion.

## Radix Position

Radix position was described using a novel set of parameters. With the patient looking straight ahead, eyes open, her canthus (Ca) and the most anterior point of the cornea (Co) were marked and a line was drawn between them using Photoshop. The terms horizontal ($x$, parallel to) and vertical ($y$, perpendicular to) were relative to the Co-Ca axis, which had a slight positive inclination in most cases. The *se* (radix position) was the posterior–most point along the radix convexity; it was marked and a line was drawn from the *se* orthogonal to the Co-Ca axis. The horizontal component, $x$, and vertical component, $y$ were recorded preoperatively and postoperatively. Index values ($x$I, $y$I) were designed to standardize these data relative to the Co-Ca length. Radix position was summarized as a vertical–to–horizontal ratio (VHR, $= xI/yI$) of these values. The higher the value, the more relatively cephalad the radix.

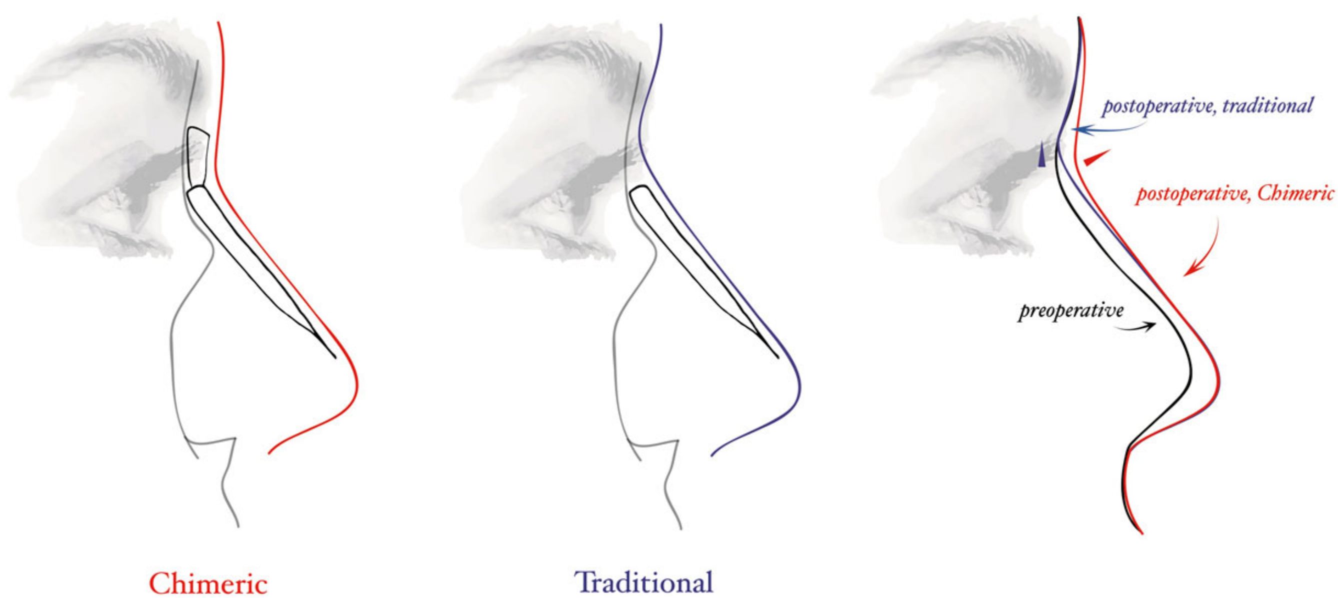


**Figure 2.** Schematic of Chimeric implant (left) and traditional implant (center). In both cases, the cephalic margin of the implant is placed just above the interpupillary line. The predicted soft tissue changes using the Chimeric method (red curve) and traditional method (blue curve) are suggested. (right) The curves are superimposed to reflect the proposed influence on the nasal profile. The nasofrontal angle may not change significantly, but the radix is lowered, representing forward transposition of the existing profile. The red arrow represents the vector of radix transposition using the Chimeric technique. The blue arrow represents the same for traditional technique.

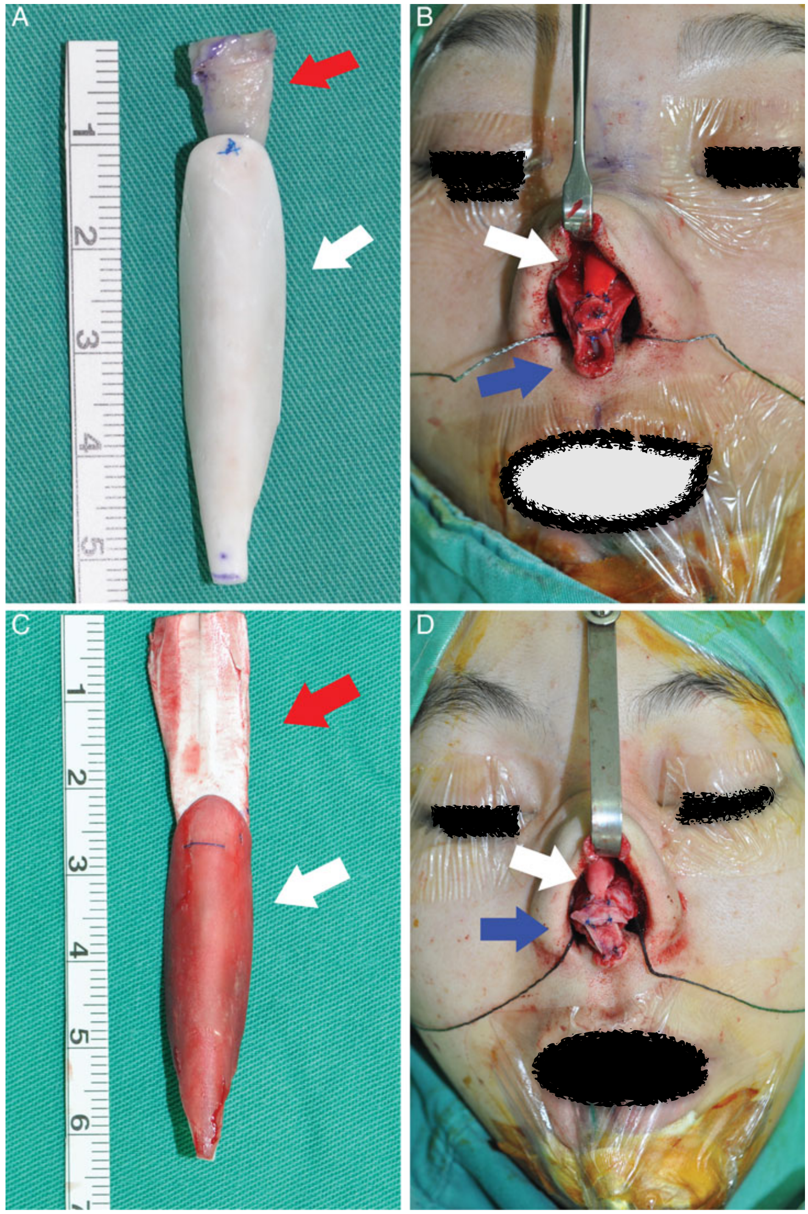


**Figure 3.** (A) A 30-year-old woman underwent primary rhinoplasty with the Chimeric technique using conchal cartilage (red arrow) for a low, shallow radix and upturned tip. (B) A 4.5 mm thick, 4.5 cm long I-shaped composite implant (white arrow) and tip grafting with septal and conchal cartilage (blue arrow). (C) A 23-year-old woman underwent Chimeric rhinoplasty for post-traumatic nasal deformity and shallow radix with alar reduction; the glabellar component was Gore-Tex (red arrow). (D) A 5 mm thick, 5 cm long I-shaped composite implant (white arrow) was used. Tip grafting was achieved using septal and conchal cartilage (blue arrow).

## Hsiao's Ratio

To better analyze the influence of the Chimeric technique on radix position, the authors devised a novel photogrammetric parameter. Hsiao's ratio (HR) is similar to the VHR accounts for both preoperative and postoperative parameters and reflects the change in vertical position and horizontal position. The objective of the Chimeric implant is to project existing landmarks, but not to alter them otherwise. Anterior translation therefore would have a low ratio; vertical translation would have a high ratio. HR and the photogrammetric methods are illustrated in Figure 5A. HR is a measure of the vector of positional transposition, not the magnitude of change. To make the value more intuitive, it can be converted to a transposition angle (in degrees) using the equation: *arctangent* [HR] ( × 57.3°).

Table 2. Photogrammetric Parameters

| Parameter | Abbreviation | Formula | What it tells us |
|---|---|---|---|
| Profile | | | |
| Nasofrontal angle | NFA | angle between G′, *se*, *prn* | Depth of radix (180 degrees = no radix) |
| Nasal height index | NHI | (*se-sn*)÷(G′-Pg′) | Length of nasal dorsum |
| Bridge length index | BLI | (*se-prn*)÷(G′-Pg′) | Height of nose |
| Radix | | | |
| Horizontal position index (postoperative) | xI (xI′) | xI÷(Co-Ca) | How far anterior radix is |
| Vertical position index (postoperative) | yI (yI′) | yI÷(Co-Ca) | How superior the radix is |
| Vertical:horizontal ratio | VHR | yI′÷xI′ | Reflects radix position |
| Hsiao's ratio | HR | *abs*[(yI′-yI)÷(xI′-xI)] | How the position of the radix has *changed* see Figure 5A |

abs, absolute value; Ca, canthus; Co, most anterior point of cornea; G, glabella; Pg′, pogonion; *prn*, pronasale; *se*, sellion; *sn*, subnasale.

## Outcomes and Comparisons

Demographic data and outcomes were summarized by descriptive statistics. Group demographics were compared using the independent samples t test. A one-way analysis of variance (ANOVA) was calculated on photogrammetric parameters. All data were evaluated using SPSS software (SPSS, Inc., Chicago, Ill. Version 22.0). Statistical significance was established with values of $P < .05$.

# RESULTS

In 19 patients (38.8%), the Chimeric technique was used, and in 30 patients (61.2%) an I-shaped nasal implant was used without a glabellar component. There were 5 men and 44 women (mean age, 31.8 years; range, 18-59 years). Charts were reviewed for patient history, procedural details, complications, and outcomes. Patients were followed up for 10.9 months (range, 2 months to 3 years). Follow-up was not different between Chimeric and traditional groups (9.7 months vs 11.6 months, respectively, $P = .372$). No patient was lost to follow-up. There were a total of 5 complications, 2 (10.5%) in the Chimeric cohort and 3 (10%) in the traditional cohort. In the Chimeric cohort, one patient had persistent erythema that did not resolve after three months, and one patient complained that the changes were inadequate. The latter underwent revision to enhance the result. In the traditional group, three patients had some degree tip deviation. One underwent revision, and the other two were sufficiently satisfied with minor asymmetry that they decided not to undergo further surgery.

Table 3 summarizes photogrammetric outcomes. In 10 of 34 primary cases (29.4%, both treatment groups), the preoperative vertical position (yI) was below the Co-Ca axis. In 5 of 34 primary cases (14.7%) the preoperative horizontal position (xI) was posterior to Co. In those cases, the oblique view was used to predict a hidden radix (Figure 5B,C). In 100% of preoperative revision cases and postoperative primary and revision cases, xI′ and yI′ were positive (ie, the radix was anterosuperior to the cornea). The postoperative VHR was greater in patients with traditionally placed implants (1.51 ± 1.25) than those with Chimeric implants (0.95 ± 0.71), but the difference was not significant ($P = .09$). Patients with traditional implants had a greater increase in nasal height (113% vs 107%, $P = .005$) and bridge length index (118% vs 105%, $P < .001$) than those with Chimeric implants. When only primary cases were analyzed, the NHI increase was still greater for traditional implants, though the difference was not significant ($P = .13$). The NFA was 5° to 6° more obtuse after surgery in both groups; there was no difference between groups.

HR was significantly greater (3.4 vs 0.6, $P < .0001$) when traditional implants were used; this relationship did not change when only primary cases were analyzed. This corresponded to a 26.1° transposition angle relative to the Co-Ca axis in the Chimeric group, and a 63.4° angle in the traditional group.

# DISCUSSION

The nasal dorsum is the most commonly addressed structure in Asian rhinoplasty. It is understood that precise positioning of the cephalic end of a nasal implant at or above the interpupillary line dictates the radix position. Men tend to prefer a higher radix and women a lower one.[7,8] Placing an implant too low or narrow may cause a visible step-off. In the authors' experience, traditional dorsal nasal augmentation predisposes to radix elevation. In some cases, radix elevation effaces or eliminates the radix and an elevated radix deformity can result. The Chimeric technique better conforms to the bony nasion and promotes forward translation of the radix, otherwise preserving the dorsal profile. This is equally relevant in primary and revision rhinoplasty in patients who seek either a higher or lower radix.

We follow an algorithmic approach to rhinoplasty,[9] and reserve Chimeric rhinoplasty for a particular cohort of patients. Photogrammetric analysis demonstrated that the VHR of the radix was greater in patients who did not have a glabellar component, whether or not only primary cases were analyzed. However, the difference was not significant ($P = .292$). This was not surprising as radix position depends

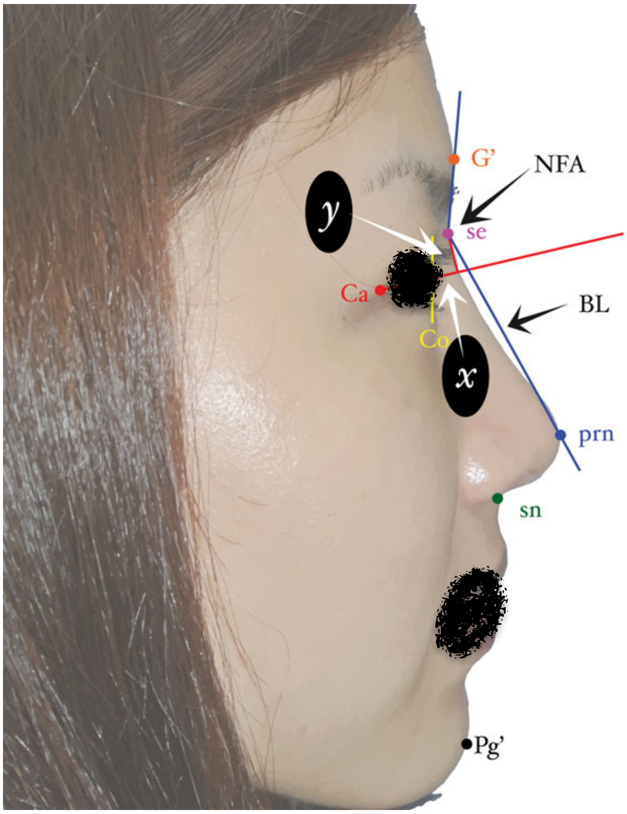


**Figure 4.** Standardized profile views were studied preoperatively and postoperatively. The sellion (*se*), the posterior-most point along the radix concavity was the radix position. The subnasale (*sn*), glabella (G′), pogonion (Pg′), pronasale (*prn*), were also used. Measurements were standardized using Pg′-G′ distance and Ca-Co distance. The horizontal (*x*) and vertical position (*y*) was relative to Co along the Co-Ca axis. BL, bridge length; Ca, canthus; Co, anterior-most point of cornea; NFA, nasofrontal angle.

**Table 3.** Outcomes

| Parameter | Chimeric | Traditional | *P*-value* |
|---|---|---|---|
| *n* = | 19 | 30 | |
| Follow-up (months) | 9.7 ± 6.8 | 11.6 ± 7.7 | .372 |
| VHR (postoperative) | 0.95 ± 0.71 | 1.51 ± 1.25 | .09 |
| Change, all cases[a] | | | |
| NHI, increase (%) | 107.3 ± 8.4 | 112.7 ± 9.1 | .005 |
| BLI, increase (%) | 104.8 ± 7.6 | 117.6 ± 13.3 | <.001 |
| NFA change (degrees) | 5.6 ± 4.7 | 5.8 ± 3.9 | .88 |
| Hsiao's ratio | 0.59 ± 0.56 | 3.35 ± 2.81 | <.001 |
| Vector of translation (degrees)[b] | 26.1 ± 19.1 | 63.4 ± 18.5 | <.001 |
| Change, primary cases only | | | |
| *n*= | 15 | 19 | |
| NHI, increase (%) | 108.5 ± 9.1 | 113.2 ± 8.6 | .13 |
| BLI, increase (%) | 106.3 ± 7.9 | 116.9 ± 9.8 | .002 |
| NFA change (degrees) | 5.4 ± 4.9 | 5.4 ± 4.4 | .98 |
| Hsiao's ratio | 0.68 ± 0.60 | 3.69 ± 3.26 | .001 |
| Vector of translation (degrees) | 29.2 ± 20.2 | 64.4 ± 17.0 | <.001 |

BLI, bridge length index; NFA, nasofrontal angle; NHI, nasal height index; VHR, vertical: horizontal ratio. [a]Compared to preoperative measurements. [b]Angle of radix position translation = *arctan* (Hsiao's ratio) × 57.3°.
*$P < .05$ considered significant.

on many factors including pre-existing bony anatomy, patient desires, type of operation/implant, length of implant, and soft-tissue envelope. More importantly, because the Chimeric technique permits control of the vertical position, surgeon and patient preference dictated final position. Therefore, VHR is not appropriate measure of the Chimeric technique we describe.

The VHR is a novel and reproducible way of describing radix position relative to the pupil, because it corrects for slight variations in head position and can be standardized across patients. Generally speaking, negative VHRs equate to a radix at or below the level of the pupil, and positive VHRs correspond to a radix position above the pupil. In the authors' opinions, it is more precise to objectively describe a patient as having a negative VHR than "having a low radix." In the algorithm we use, patients with a negative VHR were treated with traditional rhinoplasty. In this series, the VHR was always positive postoperatively, because the radix was both cephalad and anterior to the pupil. As long as patients were instructed to look forward with their eyes open, the Co was easy to identify and the Co-Ca axis was reproducible. The Co-Ca axis was a smaller denominator than other soft tissue landmarks, such as the pogonion-glabella distance, and it was less conducive to user error.

Hsiao's ratio described the vector of radix transposition. If HR was high, it means the radix moved up more than forward. If HR was low, the radix was projected more forward than vertically. Chimeric rhinoplasty technique was designed to minimize HR, to maximize forward translation of the radix, and to minimize vertical translation so that radix height was easier to control. Because HR may not be intuitive to all, the arctangent of HR calculates the angle of projection (in radians; degrees multiplied by 57.3). HR with the standard rhinoplasty technique resulted in a 63.4° vector of radix position change relative to the Co-Ca axis. When the Chimeric method was used, the vector was only 26.1°. Of course, true angle of projection must also add the angle of the Co-Ca axis with respect to true horizontal. Even though there is an

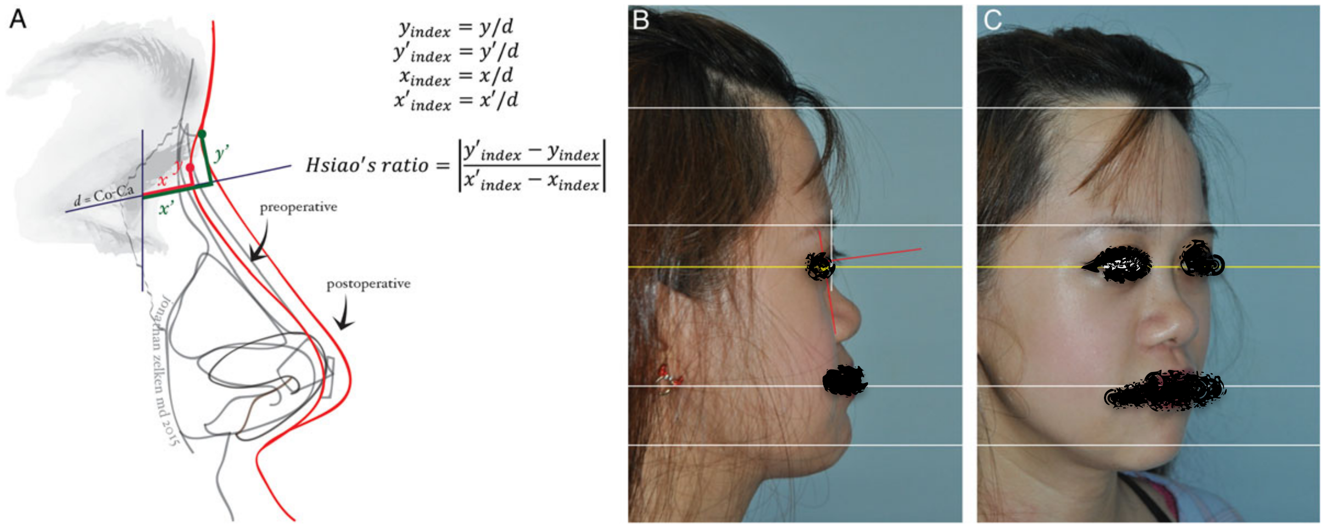


**Figure 5.** (A) Calculation of Hsiao's ratio to evaluate the influence of surgery on radix (*se*) position. Chimeric rhinoplasty is designed to keep this value close to zero so vertical position, determined by the glabella-dorsum interface, is easier to control and predict. (B) In some cases, the dorsum was so low and underprojected that an oblique view was needed to better estimate radix position (yellow dot). To accomplish this, anatomic landmarks were aligned (white lines) and the vertical radix position (yellow line) was estimated from the oblique view (C). The horizontal position was estimated by drawing an imaginary curve with its vertex at the level of the radix. The red lines were used to measure the x and y position of the radix with respect to the Ca-Co axis. The 21-year-old woman featured in (B,C) represents the most extreme example in this series.

inevitable vertical component, the authors advise positioning the glabellar-dorsal junction at the level of desired final position since it eliminates guesswork and the vertical component is thought to be insignificant.

The Chimeric technique was also designed to preserve the NFA. A monobloc, elongated I-shaped strut that approaches the glabella would efface or eliminate the radix and predispose a visible step-off. We did not observe a difference in NFA in either group. Qualitatively, the curvature of the radix was noted to be better preserved when the Chimeric technique was used, although we did not photogrammetrically explore this parameter. To conceal the cephalic edge of the glabellar implant, borders were carefully beveled and delivered into position. The glabellar component was delicately sutured to the dorsal strut to avoid wrinkling or buckling.

The Chimeric construct empowers both patient and surgeon, allowing for better and more predictable control of radix position. The patient is in control of the choice of material used for the glabellar component, granted they have adequate donor tissue. All dorsal struts were prosthetic. Although universal use of prosthetics may not be acceptable in other regions of the nose, the soft tissues of the dorsum and glabella are very forgiving, and extrusion was not observed in the follow-up period.

Patients who are willing to accept the possibility of effacing the NFA and who specify a desired radix height would benefit from the technique. However, they must be informed that a lower radix, regardless of anterior projection, will result in shorter bridge length measurement (recall: bridge length = *se-prn*). In our series, the bridge length was increased by 106% in patients undergoing the Chimeric technique and 116% in patients who underwent traditional rhinoplasty. Of course, bridge length is merely a measurement; because the *se* is intentionally lowered, BLI may be irrelevant in this context (Figure 6).

A potential source of bias was a nearly homogenous Taiwanese patient population that might not accurately reflect people of northern and southern Asian extractions. Patients with excessively low or flattened nasal bridges may have ill–defined radices or one that is concealed by soft tissue. This was the case in five patients in this series (10.2%) but may be more common in other Oriental populations (Filipino, Thai, Vietnamese). Although we developed a strategy to overcome this challenge, it does entail guesswork and may be prone to human variation or error. The decision to use the oblique view was justified by an assumption that the radix position was the same in the oblique and lateral views, although we did not endeavor to prove it. Therefore, this analysis may not be appropriate for persons with a "hidden radix."

Follow-up was 11 months in this series. When evaluating rhinoplasty, and particularly when dealing with thick skin, as is the case in Asian rhinoplasty, follow-up of one year or more may be desirable. At this center, clients, especially those who live far from the city, tend not to schedule follow-up appointments if they are satisfied with their result. Four patients in the Chimeric group were followed for less


**Figure 6.** (A, C, E) Preoperative and (B, D, F) 14 month postoperative photographs of a 55-year-old woman who underwent primary Chimeric rhinoplasty and alar reduction with tip refinement for treatment of a foreshortened nose, flat tip, and wide nostrils. Hsiao's ratio was 0.64; the radix was projected twice as anteriorly as vertically (33.3°). Despite a significantly longer appearance on frontal view, the postoperative bridge length (radix-*prn* distance) was the same as the preoperative length, bringing to question the relevance of that parameter in Chimeric rhinoplasty.

than 6 months, and postoperative edema would be anticipated in those patients. Although there was little clinical evidence of residual swelling in patients in this series, this is an important limitation. Kim et al reported durable photogrammetric change with a tip–modifying technique in Koreans that did not change in patients followed to 11 months, 12 to 23 months, and at >24 months.[10] Accordingly, we do not expect additional follow-up time to influence the data obtained, but the follow-up time is too short to establish meaningful conclusions.

Another limitation is the lack of a patient satisfaction analysis using a validated instrument. In cosmetic surgery, patient satisfaction is the ultimate goal and it would be beneficial to gauge the patients' experiences. Although most plastic surgeons recognize that a rift may exist between patient satisfaction and photogrammetric parameters, it would be helpful to know that patients are happier when the Chimeric technique is used.

The Co-Ca axis was seldom horizontal. Although a frame of reference could be established for a single patient, slight variations in gaze and canthal inclination do influence measurements of horizontal and vertical position. Fortunately, the HR accounts for differences between patients by measuring change and not absolute values. Finally, there was a HR discrepancy of 2.8 units, which translates to nearly 40°. Although the difference was large and statistically significant, we cannot say whether that discrepancy is aesthetically relevant. In future studies, we intend to better define or quantify "beauty" and the influence of photogrammetric parameters on regional and global perceptions of beauty. We also intend to include patient satisfaction as part of the outcomes analysis.

Ultimately, the authors present a novel technique that has not been previously reported as a large series. The information presented serves two purposes: it formally identifies an important physical consequence of traditional augmentative rhinoplasty in Asians and it provides a solution to prevent or treat the deformity. The Chimeric technique is described and supported with a novel analytic method, and should be considered for prevention and correction of the elevated radix.

# CONCLUSIONS

In the authors' experience, dorsal augmentation tends to elevate and efface the radix. In extreme cases, excessive superior position or effacement of the radix can result. The Chimeric technique preserves the nasal profile but transposes it forward, and is effective for primary and revision rhinoplasty. This technique empowers patient and surgeon, allowing the patient to guide radix position and giving the surgeon the means to dependably fulfill patient desires. There was not a significant difference in radix position when the Chimeric technique was performed; rather, the vector of translation was more anterior than superior. The construct did not blunt the radix significantly compared to traditional methods. Bridge length was decreased as a result of a lowered radix, but this did not result in the appearance of a shorter nose. The Chimeric technique embodies the spirit of modern Asian facial aesthetic surgery: to enhance, not alter, natural beauty.

## Supplementary Material

This article contains supplementary material located online at www.aestheticsurgeryjournal.com.

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