

A Reinforced Auricular Cartilage Framework Construction Technique In Asian Rhinoplasty To Prevent Long-term Nasal Tip Drooping

Shuang-Bai Zhou, M.D., Ph.D.; Poh-Ching Tan, M.D., Ph.D.; Cheng-An Chiang, MD., Ph.D.

Shanghai Ninth People's Hospital, Shanghai Jiao Tong University, Shanghai, China; Shanghai BestWay Medical Cosmetic Corporation

BACKGROUND

Background: Dorsum and tip enhancement rhinoplasty is a very popular facial contour surgery in Asia. The current facial esthetic trend advocates a well-projected nasal dorsum and tip, with a length, width, and angle proportional to the face. Autologous cartilage is the common choice for augmentation rhinoplasty. Auricular cartilage presents more elastic features than costal cartilage. It provides moderate and elastic support to the nasal tip, producing a natural contour. However, in some cases, the auricular cartilage framework can retract under long-term muscle/ skin tension. Nasal tip drooping and a decrease in nasolabial angle can cause the framework to collapse (Figure 1). Here, the authors describe an improved auricular cartilage framework construction technique that aimed to overcome the postoperative nasal drooping and nasolabial angle decrease. In addition, the long-term stability of the result was evaluated.

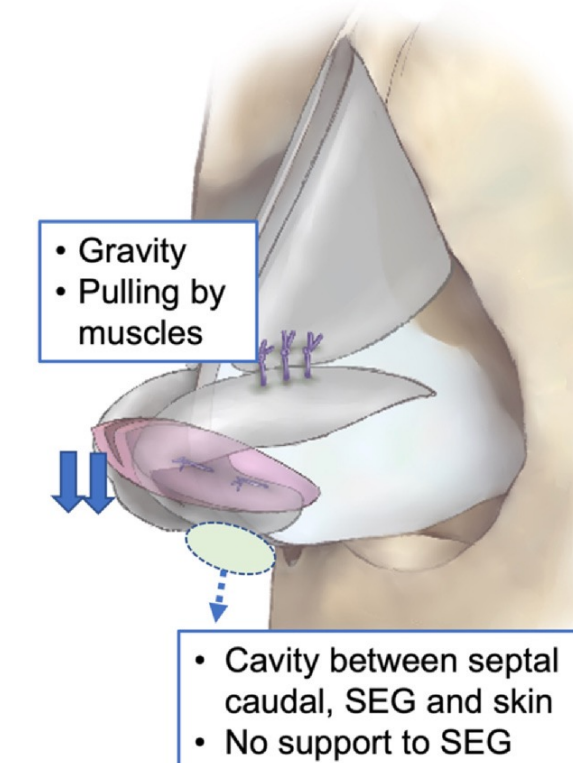


Figure 1 Illustration of the cause of post-op nasal drooping. The cavity needs to be filled to strengthen foundational support and improve the nasolabial angle.

KEY WORDS

Augmentation rhinoplasty; Auricular cartilage framework; Columellar base; Nasal tip

DISCLOSURE

We indicate no potential conflicts of interest.

CONTACT

Shuang-Bai Zhou, M.D., Ph.D.

Email: shuangbaizhou@yahoo.com

METHODS

Patients and study design

Between January 2016 and December 2019, a total of 81 patients with varying severity of short/flat dorsum, short columellar, and retruded nasal tip/columellar base were enrolled to treat with augmentation rhinoplasty. All patients were followed up for longer than 12 months. This study was approved by the Ethics Committee of Shanghai Ninth People's Hospital and complied with the principles of the Declaration of Helsinki.

Surgical procedures (Figure 2 and 3)

(A) Cymba conchae sculptured to form CSEG. Solid line: full-thickness incision. Dotted line: 50% thickness incision. The incision on the dotted line is merely meant to aid the folding of the cartilage, not severing it. (B) An integrated cap/shield was carved with cavum conchae. The thicker portion of the cavum conchae was placed on the supratip lobe, whereas the thinner portion of the cartilage was placed on the columellar lobe. (C) Any remaining cartilage can be diced and placed into the columellar base for foundational support to prevent long-term nasal tip and columellar base retraction.

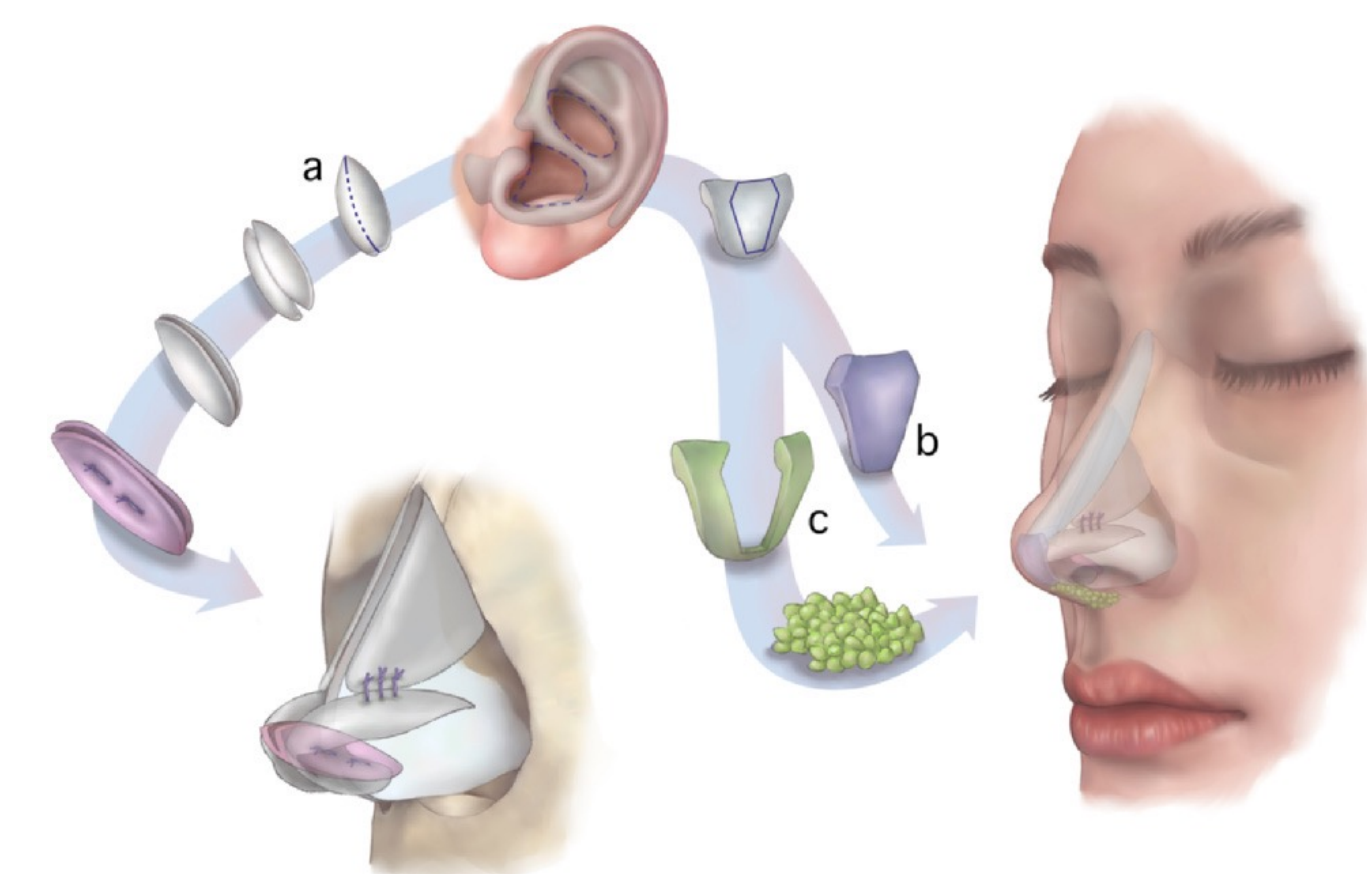


Figure 2 Illustration of surgical procedures. (A) Cymba conchae sculptured to form CSEG.

Subjective evaluation of outcome

The results were evaluated according to patient satisfaction scores 12 months after surgery. The nasal esthetics and donor-site appearance were graded as very satisfied, satisfied, or unsatisfied.

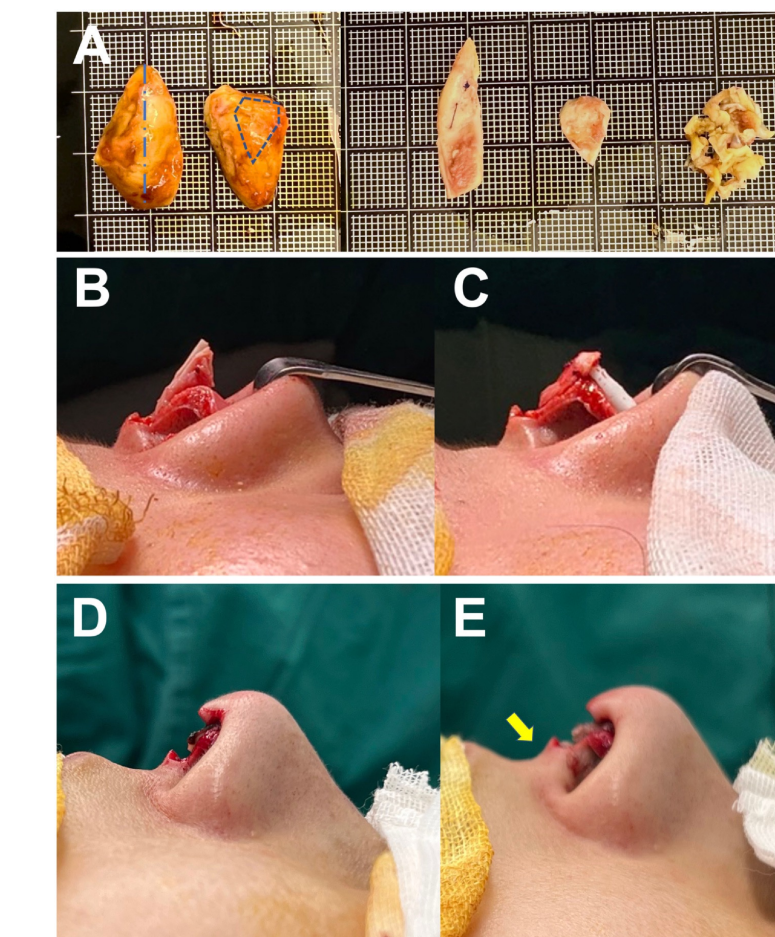


Figure 3 Auricular cartilage harvest and framework design. (A) Design of cymba and cavum conchae. Approximately 0.5-cm-long full-thickness incisions were made on both ends of the blue marking along the middle line of cymba conchae. A 50% thickness incision was made on the center of the blue marking to assist in the folding of the cartilage. The cymba conchae were then folded along the incisions to create the CSEG. The integrated shield/cap graft was designed with a blue marking on cavum conchae. The remaining cartilage was minced into 1 mm³ particles. (B) Insertion of the CSEG. One end of the CSEG was inserted and sutured to the caudal end of the septal cartilage. (C) After suturing the lower lateral cartilage to CSEG and inserting the implant, an integrated cap/shield graft was sutured with the middle crus of the lower lateral cartilage, wrapping the end of the implant. (D) The columella base was concave before filling with minced cartilage. (E) After the columella base filling graft placing, the columella base was.

RESULTS

Improvement in nasal tip projection, nasolabial angle and nostril tip proportion

Patients were followed up for 12–36 months. The nasal tip projection from both the lateral and basal views was significantly improved. The columella–labial angle was increased from 83.15° (6.20°) to 96.50° (7.40°) ($p < 0.05$). The nostril tip proportion increased from 0.83 (0.14) to 1.17(0.16) ($p < 0.01$) (Table 1).

Patient satisfaction

Postoperative patient evaluation showed that 75 (92.5%) of 81 patients were very satisfied with the results (Table 2). There were no severe complications, such as airway obstruction, bleeding, infection, or flap necrosis. No patient reported recurrence of nasal tip drooping at the 12–36 month follow-up.



Figure 4 Photographs of a 25-year-old female patient before and after surgery.



Figure 5 Photographs of a 23-year-old female patient before and after surgery.

DISCUSSIONS

To adjust the projection/rotation of the nasal tip, a new cartilaginous framework needs to be established. The ideal framework should provide strong yet elastic support to the nasal tip without creating a “stiff appearance,” meeting both the esthetic and functional requirements of the nose. We folded the cavum conchae, with one edge connected, to create a CSEG and fixated CSEG to the anterior part of the caudal septum, to ensure framework stability. When the CSEG is fixated and columellar base skin/lower lateral cartilage mobilizes anteriorly, a triangular hollow gap inferior to the CSEG, anterior to the nasal spine, forms between the medial crus of the lower lateral cartilage (Figure 1). This structural weakness combined with the retruded anterior nasal spine, which is seen in many Asian patients, the elastic texture of auricular cartilage, and constant pulling of perinasal and perioral muscles, can result in long-term nasal tip drooping and columellar base retraction. To avoid the above phenomenon, approximately 0.1–0.2 ml of minced cartilage fragments were grafted into the space inferior to the CSEG, anterior to the nasal spine, and between the medial crus of the lower lateral cartilage to strengthen the columellar base and the overall framework structural integrity. The graft can not only support the overlying framework but also compensate for the retruded anterior nasal spine, establishing a stable foundation.

Table 1 Changes of nasal profiles.			
Nasal Profiles	Preoperative	Postoperative	p Value
D/NH	0.47 ± 0.04	0.56 ± 0.07	0.003
NTH/AW	0.38 ± 0.04	0.60 ± 0.05	< 0.001
CLA (degree)	83.15 ± 6.20	96.50 ± 7.40	< 0.001
CH/TH	1.24 ± 0.22	0.87 ± 0.14	< 0.001

D, the shortest distance from prn to the alar plane; NH, nasal height; NTH, nasal tip height; AW, alar base width; CLA, columella-labial angle; CH, columella height; TH, tip height.

CONCLUSIONS

Our research demonstrated that, under long term of stretch, skin lose regenerative capacity and became aged. Intradermal transplantation of autologous stem cells is an effective strategy to promote in vivo mechanical stretch induced skin regeneration.