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## A Novel Technique: Scored Conchal Cartilage to Simulate Natural Dome of Lower Lateral Cartilage in the Asian Nose

### ABSTRACT

**Objective:** To introduce a novel technique for tip grafting, using scored conchal cartilage with a curled morphology and provide an alternative approach to tip refinement procedures.

#### Methods:

**Design:** Surgical Innovation  
**Setting:** Ambulatory Aesthetic Surgical Center  
**Participants:** 12 private patients

**Results:** This technique produces a natural looking tip with aesthetically pleasing projection and definition. The simulation of the natural curvature of the lower lateral cartilage (LLC) by curling the SCC gives a more lobular and softer looking tip. The corners of the graft are also hidden underneath the SSTE providing camouflage of irregularities. There were no complications or sequelae (e.g. palpable cartilage and cartilage visibility) observed with the use of this technique.

**Conclusion:** This simple yet novel technique can be applied to Asian patients for a natural looking tip. This technique is applicable to patients with thin skin and gives surgeons an alternative option as they perform tip surgeries. This technique together with other approaches in rhinoplasty may help surgeons achieve a more balanced look for Asian patients.

**Keywords:** *scored conchal cartilage; tip plasty; rhinoplasty; tip graft; cartilage grafts; shield graft; asian rhinoplasty*

**Structural rhinoplasty** is usually an open procedure performed by facial plastic surgeons, where the anatomical structures of the nose are examined, modified and tailored to the functional and aesthetic needs of the patient.<sup>1,2</sup> One of the most challenging parts of open rhinoplasty is tip refinement. For Asian noses, the goal of tip surgery focuses on counter-rotation, projection and definition.<sup>3</sup> Several techniques are applied for surgical refinement of the nasal tip which include resection of the lower lateral cartilage (LLC), suturing of the LLC and cartilage grafting. In cases where ideal tip refinement is not achieved by suturing methods, the next best option is to do cartilage grafting.<sup>4</sup> Ideal sources of tip grafts include autologous materials such as the septal

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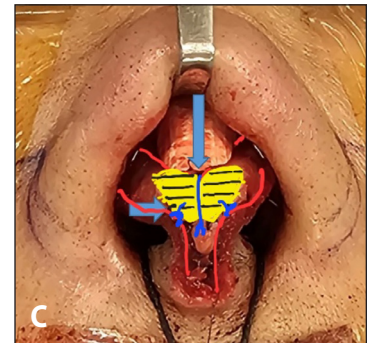
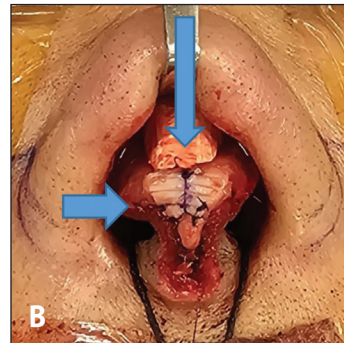
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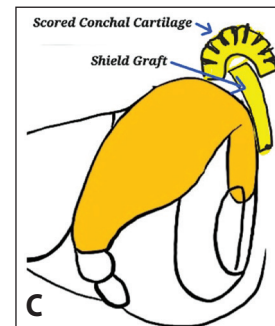
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**Figure 1.** Dimensions of the Scored Conchal Cartilage shaped into an inverted trapezoid measuring approximately 10-12mm (top width) x 10mm (height) x 7mm (bottom width)



**Figure 2.** A. Frontal view of the patient with SCC. B. Close-up frontal view of the nose with SCC. Long arrow is the central axis suture. Short arrow is the lateral fixation suture. C. Illustration of the SCC creating a more elevated tip dome and demonstrating a more natural looking tip lobule



**Figure 3.** A. Lateral view of the patient with SCC. B. Close-up lateral view of the nose with SCC. Note the curvature of the SCC simulating the dome of the LLC. C. Illustration of the SCC on top of the shield graft demonstrating the simulation of the natural domal curvature of the LLC

cartilage, conchal cartilage and costal cartilage. These cartilages are then fashioned and utilized accordingly as tip grafts.<sup>5</sup> The advantages of tip grafts include adding volume and structure to the nasal tip.<sup>4</sup>

The commonly used tip grafts in rhinoplasty are Floating graft (Goldman), Tip Only Graft, Columellar Strut Graft, Caudal Septal Extension Graft, Shield Graft, Alar batten onlay graft, Lateral Crural Strut Grafts, and Alar rim grafts.<sup>5</sup> After stabilizing the base of the tip with a Septal Extension Graft, a shield graft is commonly used in Asian noses for counter rotation and projection. However, in thin-skinned individuals, a significant complication of the shield graft is visibility of the graft or an overly sharp nasal tip creating an unnatural look. Covering with temporalis or other fascia or perichondrium onlay graft may obscure the evident graft edges and corners. Another alternative is to morselize the cartilage graft to give it more pliability and create a softer look. However, the soft tissue layer or morselized cartilage tend to resorb with time which may lead to visibility of the cartilage graft or tip ptosis. Another possible complication of the shield graft is migration and resultant tip deformity.<sup>4</sup>

Thus, our main objective is to introduce a novel alternative technique for tip grafting, which produces a natural looking Asian tip by using a scored conchal cartilage (SCC) graft tied over the edge of a shield graft

to simulate the natural contour of the dome of the LLC. According to the experience of the senior author (ECY), this technique is best used in thin-skinned noses. It is not recommended for thick fibrofatty tip skin, as it may make the tip even more bulbous.

## METHODS

This technique is designed for open approach structural rhinoplasty as there is limited access with the closed approach. The technique is performed after structural stabilization of the tip. After fashioning the shield graft and reviewing the final look of the nose by redraping the skin soft tissue envelope (SSTE), a piece of conchal cartilage with intact perichondrium on both sides is scored and placed on top of the shield graft to simulate the dome. (Figure 1) The conchal cartilage is shaped into an inverted trapezoid. The top of the graft is broad approximately 10mm to 12mm in width, tapering to approximately 5mm to 7mm at the bottom part. The SCC is sutured at the midline axis on top of the shield graft and tightened to give a curled morphology, (Figure 2) which simulates the tip defining points of the LLC. The purpose of this curled morphology is to achieve a more globular tip, by increasing tip projection to 1.5 to 2mm. (Figure 3) The lateral margins are then trimmed following the caudal margin of the LLC and fixed with at least



**Figure 4.** A typical Asian nose before and after open structural rhinoplasty with SCC tip graft. Note the improved tip projection with natural contour of the tip graft.



**Figure 5A.** This patient is a 34-year-old female health care provider who underwent open structural augmentation rhinoplasty using e-PTFE and tip projection surgery using SCC. She also had alar morphology surgery using Sail excision. Note the naturally projected tip lobule at 24 months post-op.



**Figure 5B.** This case is a 42-year-old businesswoman who underwent open structural rhinoplasty to correct her bulbous tip, hanging ala and upturned nose. Notice that the supratip skin is still thick despite defatting and scoring the dermis. Since the skin at the tip area is thinner, a SCC graft was used as the final tip graft to ensure the smoothness of the tip projection and to avoid cartilage visibility in the future, as noted at 18 months postop.



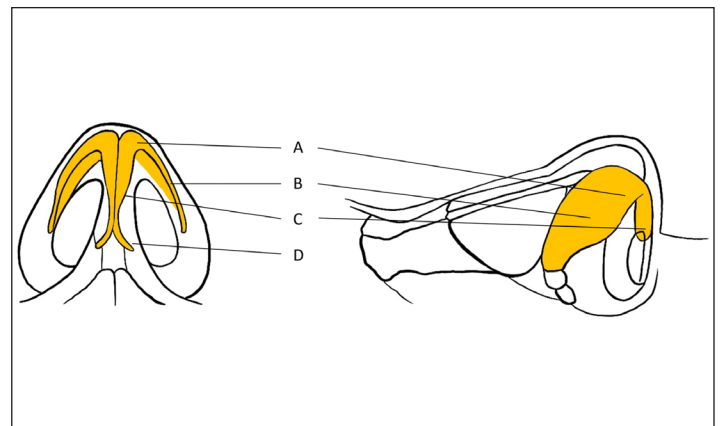
**Figure 5C.** This patient is a 31-year-old female healthcare provider who requested dorsal augmentation and correction of her small nose. She underwent open structural rhinoplasty. Because of the extensive lengthening procedure, the dorsal skin and soft tissue were stretched and put to tension during closure. Hence, SCC was used as the final tip graft to avoid visibility of the cartilage, as noted at 12 months follow-up.



**Figure 5D.** A 21-year-old female online blogger complained of her bulbous tip, which was corrected by performing open structural rhinoplasty and SCC as tip graft. Note the natural looking tip at 20 months follow-up.



**Figure 5E.** A 31-year-old female healthcare worker wanted augmentation and tip counter rotation for her small, upturned nose. She underwent open structural rhinoplasty with dorsal augmentation using e-PTFE and tip projection using SCC graft. Note the subtle smooth projection of her tip lobule at 15 months postop.



**Figure 6.** Illustration of the LLC. A. Dome B. Lateral Crura C. Medial Crura D. Footplate



one suture per side to the margin of the shield graft. (Figure 2) Upon re-draping of the SSTE, the natural contour of the dome of the LLC is replicated, giving the tip a more natural look. (Figure 4)

## RESULTS

In the senior author's experience (ECY), the application of scored conchal cartilage (SCC) graft on the tip creates a more natural looking tip lobule. The simulation of the natural curvature of the lower lateral cartilage (LLC) by curling the SCC gives a more lobular tip eliminating the sharp look of other tip grafts. The curled portion becomes the tip defining point. Since it is curled up, the SCC also adds more height with less amount of cartilage used. It adds approximately 1.5 mm to 2mm in height which is equal to the thickness of 2 onlay grafts. Because the cartilage graft has been scored and curled, it gives a softer lobular look on the tip. The corners of the graft are also concealed underneath the SSTE, providing camouflage of irregularities. With post-op follow-up of 6 to 24 months, the senior author has not observed any complications or sequelae (e.g. palpable cartilage and cartilage visibility) with the use of this technique in 12 patients. Figures 5A to 5E illustrate this technique in selected representative pre-op and 12 to 24 months post-op pictures of patients who had scored conchal cartilage grafts for tip definition.

## DISCUSSION

South East Asian noses are usually small and short with thick fibrofatty skin and soft tissue envelope (SSTE).<sup>7</sup> The lower lateral cartilages (LLC) are often weak and pliable, giving rise to a need for a strong support system for the construction of the nasal tip, hence, the term "Structural Rhinoplasty." The open technique is often applied. The purpose of the surgery is to re-position the tip for projection and lengthening. In this procedure, the most challenging part is tip definition surgery. Moreover, it is the tip that is most noticeable and makes majority of noses attractive.<sup>1,3,8</sup> The nasal tip forms the lower third of the nose and contains the paired lower lateral (alar) cartilages (LLC), muscle, subcutaneous connective tissue, and skin.<sup>5</sup> The complex shape, contour and strength of the LLC determines the tip.<sup>5,7</sup> The LLC is comprised of 3 parts: the medial crura, intermediate crura or domes, and lateral crura. (Figure 6) The structural relationship of these 3 parts with each other result to the external appearance of the nasal tip aesthetically.<sup>5</sup> To determine whether a tip has good definition and projection, the tip should demonstrate antero-caudal projection of the LLC with slight angulation of the dome in profile analysis. Since each individual has unique tip cartilage configuration and skin thickness, the tip surgery for each patient must be tailored and designed based on the patient's anatomy and aesthetic goal.<sup>4</sup>

There are different techniques to enhance the tip, depending on

the surgeon's preferences. Some techniques are more aggressive and include resection of the LLC. More recent techniques are less aggressive and include suturing of the LLC and cartilage grafting.<sup>6,9</sup> In cases where suturing of the LLC is inadequate for tip refinement, surgeons commonly apply cartilage grafting. Cartilages used for reinforcing the struts are called structural grafts while cartilages used for tip remodelling and projection are called contour grafts. Examples of structural grafts include columellar strut graft, septal extension graft, spreader graft or extended spreader graft. On the other hand, contour grafts include the dorsal graft and tip grafts.<sup>1,8</sup> For tip grafts, autologous materials such as septal, conchal and costal cartilage are preferred due to their high biocompatibility and low risk of infection and extrusion.<sup>5,10,11</sup> The advantages of tip grafts are adding volume and structure to the nasal tip.<sup>4</sup> With open approach, accurate positioning, sculpturing, and suturing of the tip graft to the LLC has a very low risk of displacement.<sup>10</sup>

Some of the most commonly used tip grafts are Floating graft (Goldman), Tip Onlay Graft, Shield Graft, Alar batten onlay graft, Lateral Crural Strut Grafts, and Alar rim grafts.<sup>5</sup> Among these grafts, the more popular ones are shield graft and onlay graft. Shield graft, also known as Sheen or infralobular graft, are usually fashioned in a shield or gingko leaf shape. It is placed beside the caudal edges of the anterior medial crura continuing to the tip in a vertical orientation.<sup>4,6</sup> The top of the graft is broad so that both ends of the top side can serve as tip defining points.<sup>4</sup> This graft aids in increasing tip projection, defining the tip, and improving the contour of the infratip-lobule.<sup>6</sup> Nonetheless, there can be complications with the use of this graft such as visibility of the graft contour through the skin particularly in thin-skinned patients. This complication is often resolved by covering the graft with soft tissues such as fascia or perichondrium. Other possible complications of shield graft is migration and subsequent tip ptosis or deformity.<sup>4</sup>

Unlike the shield graft that is positioned vertically, onlay graft, whether single or multiple, is positioned horizontally over the alar domes and fixed on the caudal margin of the domes. This graft is usually rectangular in shape, with the width being greater than its length and height.<sup>4</sup> It increases tip projection and enhances definition but is customarily applied to camouflage tip irregularities.<sup>4,6</sup> However, if the tip onlay graft is too smoothed and flattened, onlay grafting may not achieve an aesthetically pleasing result.<sup>4</sup>

Frequently, in Asian noses, placing a shield graft or single onlay graft will not result to the ideal tip shape and definition. This is due to the round tip shape of under projected tips that is emphasized when a single tip graft is placed. Hence, to create the ideal tip contour with the desired projection, several layers of cartilage are often used, such as in stacked onlay grafting or multilayer cartilaginous grafting techniques.



The number of graft layers applied depends on how much projection is needed and relies on the availability of cartilage. Usually, most surgeons prefer to place only 2 graft layers. According to Jang, “the first layer provides the desired tip projection and the second layer provides additional projection and a natural-looking infratip break.” He also mentioned that the second layer of graft should have a wide top and a narrower bottom. More so in thinned skin patients, a larger horizontal width is needed to produce a smooth tip definition.<sup>4</sup>

In this article, the authors propose a novel alternative technique for tip grafting, which produces a natural looking Asian tip by using a Scored Conchal Cartilage (SCC) graft. (Figure 2) The graft is tied over the edge of a shield graft to simulate the natural contour of the dome of the LLC. (Figure 1) To the authors' knowledge, this technique has not yet been reported based on our review of literature. This technique is best used in thin skinned noses and is not recommended for thick fibrofatty tip skin. According to Zijlker and Vuyk, a well-shaped and positioned graft will produce a well-defined shape for the nasal tip.<sup>10</sup> Using the SCC graft, the natural width between the domes and its lobular shape can be simulated, while improving the extent of tip definition. The SCC is similar to an onlay graft in that it is placed on top of the shield graft. Unlike the vertically oriented shield graft, the SCC, similar to an onlay graft, is horizontally oriented at the dome of the tip. The width of the top part is greater than its length and height, then tapering at the bottom to have an inverted trapezoidal shape. This graft must be sutured in the midline axis and tightened to give a curled morphology. The curled portion becomes the tip defining point, simulating the curvature of the dome. Since it is curled up, the SCC also adds more bulk with less amount of cartilage used. It adds approximately 1.5 mm to 2mm in height, which is equal to the thickness of 2 onlay grafts, contributing to tip projection. Because the cartilage graft has been scored and curled, it gives a softer globular look on the tip creating a natural look. The corners of the graft are also concealed underneath, providing camouflage of irregularities. The SCC is then fixed to the shield graft for stabilization.

The SCC graft technique has some obvious advantages. As mentioned, it gives a softer and more natural look on the surgically modified tip. It can also conceal sharp edges and corners, owing to its curled morphology and prevent tip graft visibility. It can be tailored to the structures of the LLC, following the contour and shape of the LLC. It produces an aesthetically appealing tip shape with natural looking tip defining points. It provides an alternative technique for thin skinned individuals who need good tip definition and projection.

Complications of tip grafting may happen and should be well contemplated prior to choosing the appropriate tip refinement technique for the patient. Some complications that may happen include deprojection or over projection, tip ptosis, infection, graft visibility and

migration.<sup>4</sup> The most common long term complication, especially when a tip graft is projected more than 3mm above the anatomical domes, is graft visibility. Tip grafts are even more prone to graft visibility when the caudal margin of the lateral crura is not adjacent to the lateral edge of the tip graft. Initially, the nasal tip may look well projected and defined. However, after some time, the graft may become evident and edgy. This is due to the long-term effects of scar contracture over the top edge of the tip graft and gradual thinning of the nasal tip skin, which may also be due to pressure from the graft.<sup>6</sup> Hence, the senior author devised this novel technique to ensure that the side of the SCC graft facing the skin is similar to the natural dome, in that it is curled and rounded, not sharp and edgy. Furthermore, the top edge of the SCC graft is curled underneath the graft, so no sharp edges are protruding on the skin. So far, the senior author has not observed any complications with the use of this technique in 12 patients with follow-up of 6 to 12 months.

In conclusion, this simple yet novel technique can be applied to patients for a natural looking tip. This technique gives surgeons an alternative option as they perform tip surgeries especially in patients with thin skin. One can easily combine this technique with other approaches to achieve a more balanced look for Asian patients.

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