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ORIGINAL ARTICLE

The Onlay Folded Flap (OFF): A New Technique for Nasal Tip Surgery

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Abstract
Background In this article the onlay folded flap (OFF) is introduced as a new technique for reshaping, refining, supporting, and projecting the nasal tip by remodeling the cephalic portions of the lateral crura rather than canceling them. The surgical technique and the long-term outcomes are described. The indications, contraindications, advantages, and disadvantages are defined.
Methods Forty patients were operated on for hypoprojected nasal tips. They had been followed for from 6 to 35 months (average = 13 months). None of the patients had thin skin, and none of them had previously undergone a rhinoplasty. Two symmetric lateral flaps are taken from the cephalic portions of the lateral crura and attached to the domal segments. The flaps' internal edges are carefully sutured together to form one flap. This is then rotated anteriorly over the original domes and fixed to them, before its distal portion is turned posteriorly over the first layer and fixed to it. The nasal tip projection was calculated for all patients before and 6 months after surgery using a personal method as a means of evaluating the gain in nasal tip projection in the postoperative period.
Results Revision was necessary in only one patient to fix an unpleasant columellar scar. The average nasal tip projection gain 6 months after surgery was approximately 4 mm (range = 3–5 mm). The nasal tips were fine and stable in all patients.
Conclusion The OFF technique is recommended in primary rhinoplasty for reshaping, refining, and supporting the nasal tip and for increasing nasal tip projection (from 3 to 5 mm maximum) but only for people with normal or thick skin. It has many advantages and good postoperative results.

Keywords Rhinoplasty · Alar cartilage · Tip projection · Onlay folded flap

Introduction

One of the most difficult problems confronting the rhinoplasty surgeon is a lack of nasal tip projection. Many procedures have been developed to solve this problem. Certain teams use the transdomal suture [1] or alar cartilage scoring [2]. Others use columellar struts to gain and maintain tip projection [3, 4]. The auricular and septal cartilages are most commonly used as onlay grafts for accentuating the nasal tip [5]. An autologous inferior turbinate bone can be used for the same purpose [6]. Silicon implants are also proposed for maintaining tip projection [7].

In this article, the onlay folded flap (OFF) is introduced as a new technique for reshaping, refining, supporting, and projecting the nasal tip without either cartilage resection or cartilage grafting. This method uses and remodels the cephalic portions of the lateral crura, which are usually discarded during the reduction of the alar cartilages.

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Materials and Methods

Materials

Forty consecutive patients (21 female, 19 male) between 18 and 46 years of age (mean age = 25 years) were operated on for hypoprojected nasal tips between June 2006 and May 2009 and were included in the study. The follow-up period was between 6 and 35 months (average = 13 months). None of the patients had thin skin, and none had previously undergone a rhinoplasty.

Method 1 (OFF Surgical Technique)

The procedures were performed with the patient under general anesthesia using an open approach. The skin is infiltrated with 1% xylocaine with epinephrine to facilitate dissection. The two alar cartilages are undermined from the overlying tissue. The cephalic portions of the lateral crura are carefully dissected. Two symmetric lateral flaps are taken from the cephalic portions of the lateral crura, leaving the caudal portions intact (there must be at least 5 mm of the total width of each lateral crus remaining). These flaps are vascularized anteriorly and attached to the domal segments of the middle crura. The flaps' internal edges are carefully sutured together to form one large flap. The new flap wraps the domes and is folded into two layers. First, it is rotated anteriorly over the original domes and fixed to them with two U sutures using polydioxanon (5-0) before its distal portion is turned posteriorly over the first layer. The flap's two layers are fixed together with the domes with two U sutures using polydioxanon (5-0) creating an onlay folded flap (OFF) to form new increased and projected domal segments. If necessary, 1–2 mm is excised from each external edge of the OFF to decrease its width, depending on the new domes desired. The incisions are sutured using polyglactine 910 (5-0) for the alar margins and polypropylene (6-0) for the columella (Fig. 1, Supplementary Video 1).

Method 2 (Calculate the Distance Between the Alar Crease and the Nasal Tip [DAT])

The nasal tip projection was calculated for all patients using my personal method, with two identical digital

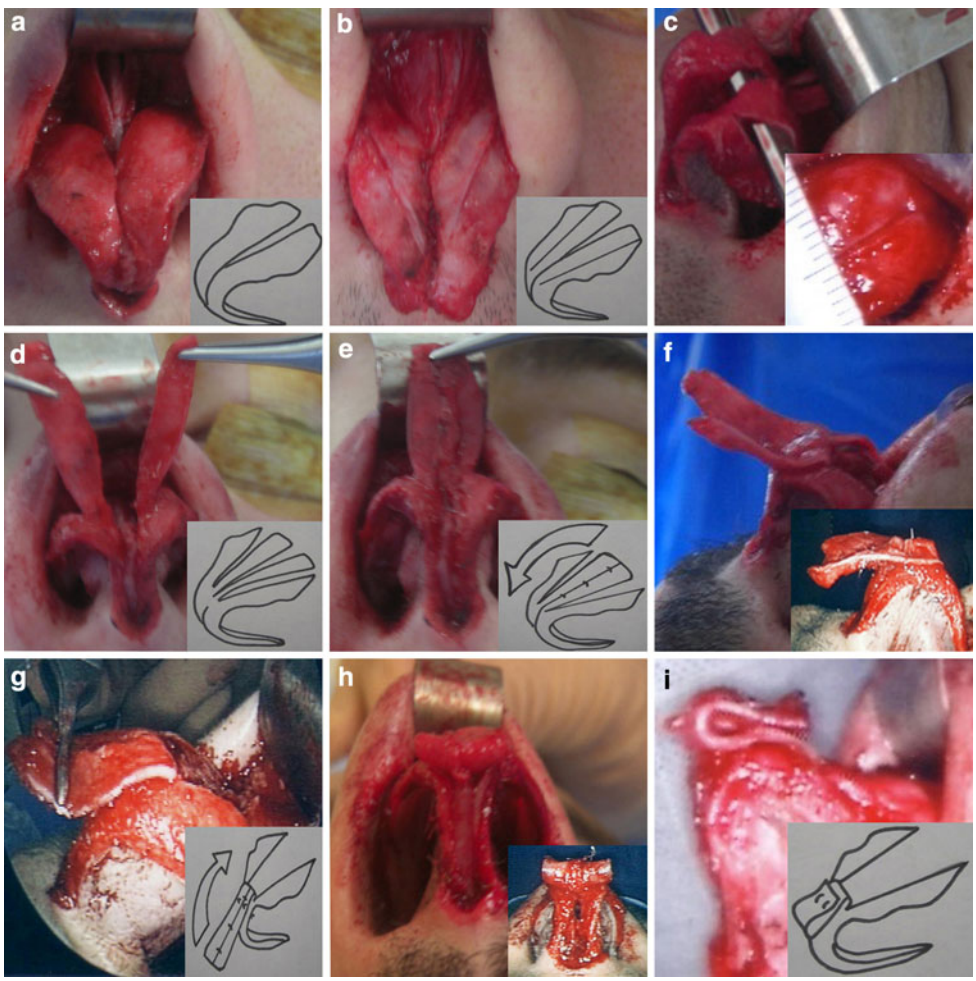

Fig. 1 Onlay fold flap (OFF) surgical technique steps. **a** The two alar cartilages are undermined from the overlying tissue. **b**, **c**, **d** Two symmetric lateral flaps are taken from the cephalic portions of the lateral crura, leaving the caudal portions intact (at least 5 mm of the total width of each lateral crus). **e** The flaps' internal edges are sutured together to form one large flap. **f** The flap is rotated anteriorly over the original domes and fixed to them using two U sutures. **g** The flap's distal portion is turned posteriorly over the first layer. **h**, **i** The flap's two layers are fixed together with the domes using two U sutures creating an OFF

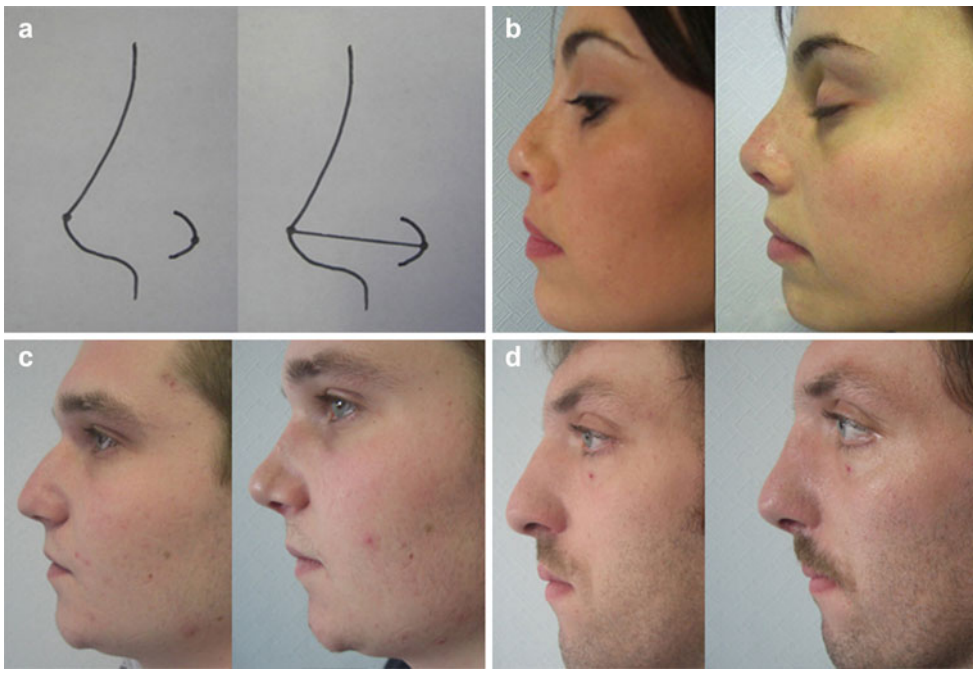

Fig. 2 Calculating nasal tip projection: "DAT." **a** A line (D) is drawn and calculated between the center of the alar crease (A), and the nasal tip (T). **b** Case 1: preoperative DAT = 20 mm, postoperative DAT = 25 mm. **c** Case 2: preoperative DAT = 21 mm, postoperative DAT = 25 mm. **d** Case 3: preoperative DAT = 24 mm, postoperative DAT = 27 mm

Table 1 Calculating nasal tip projection (clinical examples)

Case	Fig. 2	Technique used	Preoperative DAT (mm)	Postoperative DAT (mm)	Postoperative tip projection gain (mm)
1	b	OFF	20	25	5
2	c	OFF	21	25	4
3	d	OFF	24	27	3

photos of the profile before and 6 months after surgery, printed on 13 × 18-cm format matte paper. Two points are defined: A (the center of the alar crease) and T (the nasal tip). A line (D) is drawn and calculated between the two points. The pre- and 6-month postoperative DATs were compared as a means of evaluating the gain in nasal tip projection in the postoperative period (Fig. 2; Table 1).

Results

There were no complications such as infection, hematoma, necrosis, or perforation of the skin resulting from this procedure. Moreover, there were no visible tip flaps, no distortion, and no tip deviation. Revision was necessary in only one patient because of an unpleasant columellar scar. Good nasal tip projection was achieved for all patients. The average gain in nasal tip projection 6 months after surgery was approximately 4 mm (range = 3-5 mm). The nasal tips were fine and stable in all patients. Some representative patients treated with this procedure are shown in Figs. 3, 4, 5 and 6.

Case 1

A 33-year-old woman presented with a slight dorsal hump, wide nasal dorsum, thick skin, and decreased columellar-labial angle. She had a rounded, bulbous, and underprojected nasal tip. The operative plan was as follows: open rhinoplasty, 3-mm dorsal reduction, 1-mm septum caudal reduction, OFF technique, and low lateral intranasal osteotomies. Two years after surgery the dorsum is straight, the nasal tip has been projected, and the tip rotation has been enhanced (Fig. 3).

Case 2

A 45-year-old woman presented with a short, deviated nose, short columella, and underprojection of the nasal tip. The operative plan was as follows: open rhinoplasty, central dorsum realignment using external low lateral percutaneous osteotomies, dorsal augmentation with multilayered bruised and crushed septal cartilage grafts, and nasal tip plasty using the OFF technique. After 18 months, the nasal dorsum is markedly straight and augmented and the nasal tip is clearly projected (Fig. 4).

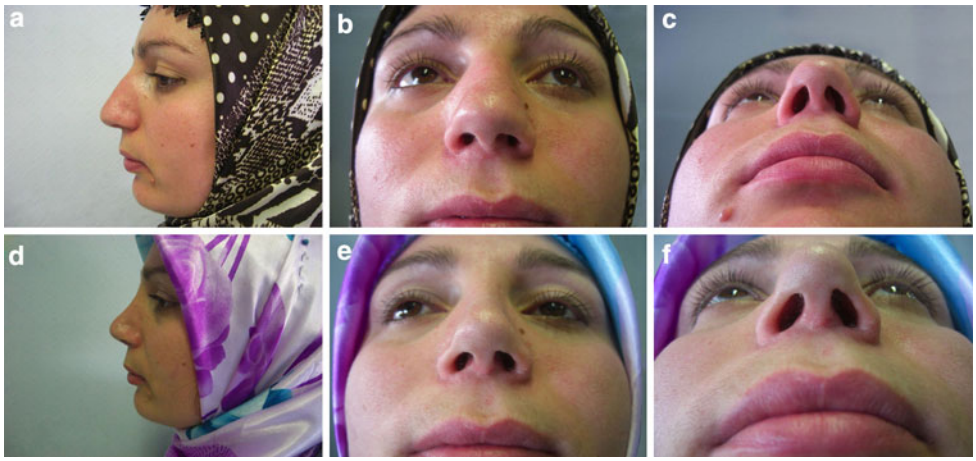

Fig. 3 Case 1:
a, **b**, **c** Preoperative views.
d, **e**, **f** Two-year postoperative views

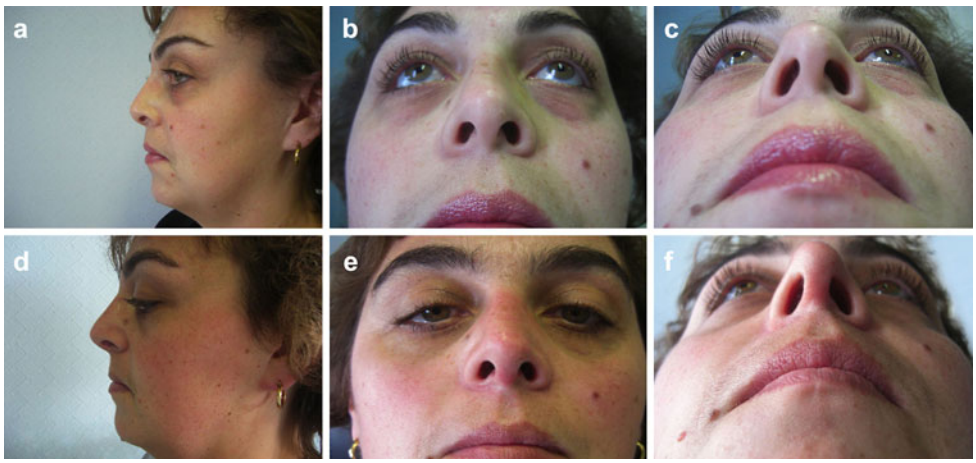

Fig. 4 Case 2:
a, **b**, **c** Preoperative views.
d, **e**, **f** Eighteen-month postoperative views

Fig. 5 Case 3:
a, **b**, **c** Preoperative views.
d, **e**, **f** Six-month postoperative views

Case 3

A 26-year-old man presented with post-traumatic dorsum and deviated septum, plus poor nasal tip rotation and projection. The operative plan was as follows: open rhinoplasty, 1-mm septum caudal reduction, septal harvest leaving a 10-mm dorsal and caudal L-strut, OFF technique, low lateral intranasal osteotomies, and dorsum bruised graft. Six months after surgery, the dorsum is markedly straight and augmented. A significant nasal tip rotation and projection has been obtained (Fig. 5).

Case 4

A 28-year-old man presented with post-traumatic dorsum and deviated septum, excessively thick skin, a broad nose,

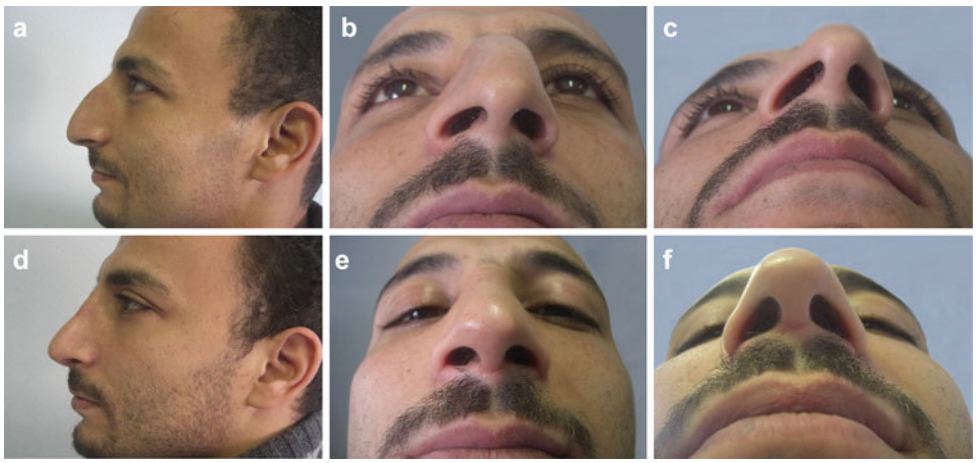

Fig. 6 Case 4: **a**, **b**, **c** Preoperative views. **d**, **e**, **f** Six-month postoperative views

and dorsal hump. The nasal tip was deviated, plunging, underprojected, ill-defined, and inadequately supported. The patient had a short columella, a decreased columellar-labial angle, and widened alar bases. The operative plan was as follows: open rhinoplasty, 5-mm dorsal reduction, 2-mm septum caudal reduction, septal harvest leaving a 10-mm dorsal and caudal L-strut, columellar strut, OFF technique, low lateral intranasal osteotomies, and finally 4-mm alar base resections. Six months after surgery, a reinforced, projected, symmetric, and refined triangular nasal tip has been obtained. A straight dorsum, lengthened columella, increased nasolabial angle, and improved alar contour can be observed (Fig. 6).

Discussion

Nasal tip projection is essential for good nasal aesthetics and important for the best appearance. Various methods and many types of autogenous implants have been described to improve it. Autogenous onlay cartilage grafts have been used in the nose since first reported by Von Mangoldt [8]. The single or double onlay graft [9] and the cap graft [10] may be used to increase nasal tip projection. Autogenous cartilaginous hump, septal cartilage, and the cephalic portions of the lateral crura could easily be obtained and shaped to represent the combined domes of the lower lateral cartilages. The conchal cartilage also can be used; it highly resembles the shape and substance of alar cartilages, but its use requires a donor site, which increases donor site morbidity and lengthens the operating time [9]. These grafts have certain potential problems including resorption, malposition, distortion, asymmetries, or palpability by the patient [11].

In 1966, Anderson [12] used a columellar cartilage strut for nasal tip projection. The disadvantage of this technique is that it may cause obvious pointing in the nasal tip. In addition, if the strut is too long and the tension is too great, the strut may perforate the skin of the nasal tip.

In 1975, Sheen [13] presented his triangular nasal tip graft to increase nasal tip projection [14]. This graft can lead to palpable and visible tip deformities and can give the nasal tip a surgical look [15]. The transdomal suture [16] or alar cartilage scoring [17] often results in a stiff, pinched, or unnatural appearance of the nasal tip by either adding bulk to an immature lobule or destroying natural soft triangles.

The interrupted alar techniques such as Ponti's butterfly or Coldman's classic method do not preserve the integrity of the lobular cartilage complex [18].

Although artificial materials such as silicon implants are easy to use [19], they are costly and give patients the sensation of a foreign body. In addition, they have been associated with serious side effects such as infection and protrusion through the skin [20].

In 1998, Garcia-Velasco et al. [21] described taking two cartilage flaps from the lateral crura and rotating them over the original domes in one layer to increase the length of the middle crura for more tip projection. However, the top of the flaps does not correspond to the horizontal position over the domes, so these flaps increase the risk of supratip swelling complications.

In the last 3 years, I have been developing the onlay folded flap (OFF). This technique is indicated (1) for reshaping, refining, and supporting the nasal tip; (2) for increasing nasal tip projection from 3 to 5 mm maximum, depending on flap flexibility (there is greater projection when there is less OFF suppleness) (Fig. 7); (3) only for cases of primary rhinoplasty because it needs intact lower lateral cartilages; and (4) only for people with normal or thick skin. It is contraindicated when there is insufficient width in the lateral crura because using the OFF technique weakens the lobular cartilage complex, and when the skin is thin: care should be taken when using the OFF technique because it might lead to a very strong and noticeable tip.

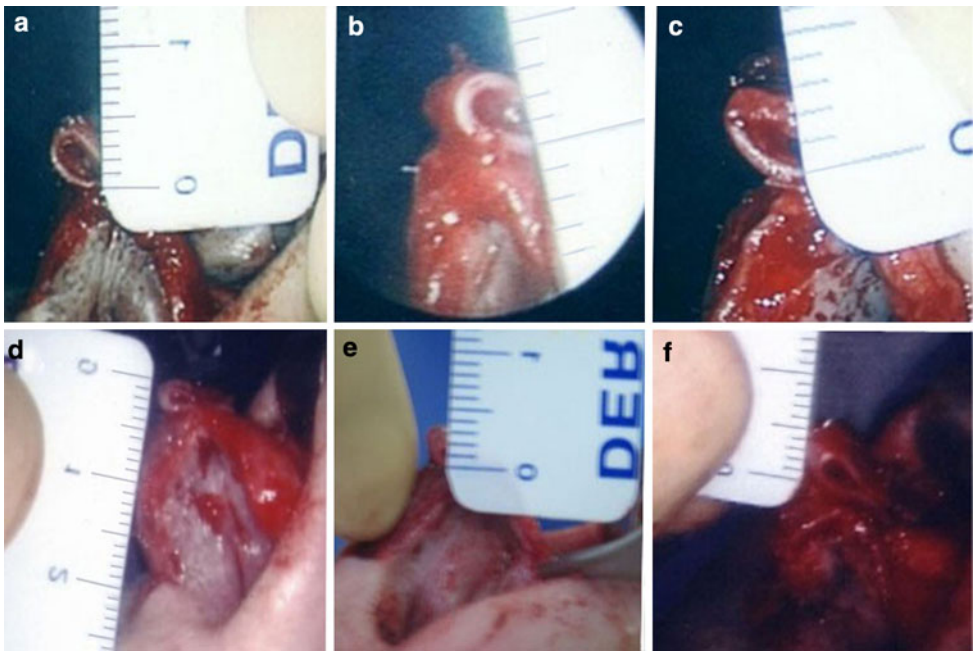

Fig. 7 OFF height. **a** Case 1: 4 mm. **b** Case 2: 3 mm. **c** Case 3: 3 mm. **d** Case 4: 3 mm. **e** Case 5: 3 mm. **f** Case 6: 5 mm

The OFF technique has many advantages:

- It maintains a more natural appearance for the nasal tip because it simulates the nasal domes, and its middle part follows the interdomal segment while maintaining the continuity of the underling lobular cartilages.
- The height of the OFF is decreased from front to back, so its distal portion gives more tip projection because it is more elevated than its proximal portion. In addition, the top of the OFF (the distal portion of the OFF) corresponds to the horizontal position over the domes, so there is no risk of supratip swelling.
- There is no need for a cartilage graft from another donor site, so the risk of donor site deformity is avoided, and the donor site cartilage is preserved for possible surgery in the future.
- The OFF is not rigid so patients do not complain of discomfort when touching it, unlike cartilage grafts.
- The flap cannot be resorbed as with cartilage grafts.
- The OFF is more resistant to malposition distortion and more stable than cartilage grafts. The symmetry of the nasal tip is preserved.

On the other hand, the OFF has two disadvantages:

- The open approach must be used to carry out this technique.
- The risk of a columella scar in dark-skinned people is high.

Finally, both the chin and the nose must be taken into consideration in order to obtain a pleasing and harmonious facial profile [22]. Chin augmentation will sometimes have to be performed to compensate for the nasal tip projection achieved using the OFF technique and to improve the nose–chin relationship.

Conclusion

The OFF technique is another alternative for achieving nasal tip refinement and projection by remodeling the existing cephalic portions of the alar cartilages rather than canceling them. It has many advantages and good postoperative results. It is effective and almost complication-free. This technique is recommended in cases of primary rhinoplasty only in people with normal or thick skin for wrapping the domes in two layers to form new increased and projected domal segments and to reshape, support, and refine the nasal tip.

Conflict of interest None.

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