

Alar Base Lift with an Alar Base Rotation Flap

Yen-Pin Lin¹  · Soo Ha Kwon^{2,3} · Peter Ruei-Feng Chen¹ · Cheng-I Yen²



Received: 30 September 2024 / Accepted: 5 March 2025

© Springer Science+Business Media, LLC, part of Springer Nature and International Society of Aesthetic Plastic Surgery 2025

Abstract

Background Hanging alae is a common aesthetic problem in Southeast Asian noses. The alar overhang gives a poor aesthetic relation between the alar and columellar base described as a “heavy hypertrophic alar” appearance. Alar lift surgery is an integral part of any rhinoplasty procedure, but is often overlooked by surgeons performing rhinoplasty. Unnatural looking scar caused by skin graft or anatomic junction disruption is often found after alar base lift surgery. Hiding the incision along the nasolabial fold with a rotation flap can reduce the tension during wound healing, decrease length discrepancy caused by vertical reduction, and close the defect after vertical lift of the alar component.

Methods After vertical reduction and lift of the lateral part of the ala, the basal defect is repaired with a small rotation flap along the nasolabial fold; the alar base rotation flap (ABRF). All the patient received alar base lift with an ABRF, and received 2D photometric evaluation before and after surgery.

Results No tip circulation compromise was noted. All patient healed well with a barely noticeable scar, and an improved alar-columellar relationship (ACR). The vertical

alar base distance index decreased 3.38% ($p < 0.005$), and alar columellar angle decreased 15.8° ($p < 0.005$).

Conclusion Alar base lift with ABRF improves the ACR, and provides an elevated alar base position with a less visible scar.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266

Keywords Aberrant alar columellar relation · Alar base rotation flap · Alarplasty · Hanging alar deformity · Rhinoplasty

Introduction

Hanging alae is a common aesthetic problem in Southeast Asian noses [1–3]. The alar overhang gives a poor aesthetic relation between the alar and columellar base, described as a “heavy hypertrophic alar” appearance. Most Asian persons with a hanging alar deformity have a hanging alar rim and also a low alar base position (Fig. 1). The ideal alar base position should be a little bit higher than the columellar base, to create a pleasant “gull’s line” in frontal view [4]. Gunter et al. described a useful classification from lateral view, and also mentioned some methods for correction of hanging alar [4]. However, rim excision cannot correct the alar base position [5].

Alar base lift surgery is an integral part of any rhinoplasty procedure, but is often overlooked by surgeons performing aesthetic rhinoplasty. It is usually necessary in cleft lip-nose deformity in which a lower-setting of the cleft-side alar is commonly noted [6, 7]. Not many articles

✉ Yen-Pin Lin
armarnie.tw@gmail.com

¹ Vendôme Aesthetic Medical Center, 4F, No.149, Sec 3, Xinyi Rd., Da'an Dist., Taipei City, Taiwan

² Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital and Chang Gung University, College of Medicine, Taoyuan, Taiwan

³ Department of Plastic and Reconstructive Surgery, Dali Branch, Jen Ai Hospital, Taichung, Taiwan

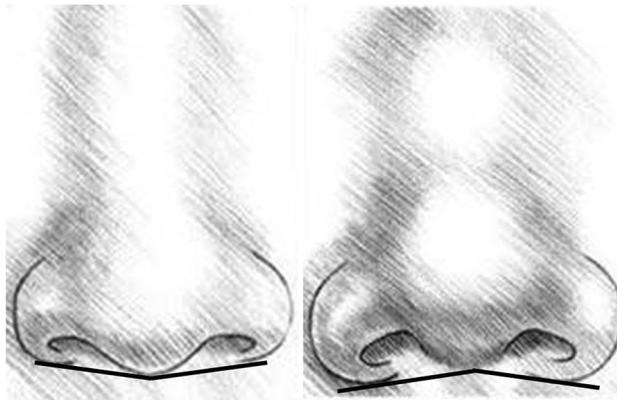


Fig. 1 The picture illustrates how a lower alar base position (right side) can cause an aesthetic problem in frontal view

have described it for aesthetic rhinoplasty, which includes sail excision, and vertical reduction and closure of the defect with a V-Y flap.

A sail excision may have some effect with respect to vertical lift of the alar base position [8, 9]. Excision of vestibular skin with primary repair may cause rim contracture due to high tension during wound healing. Holding so much weight of the upper lip and surrounding tissue with soft, elastic vestibular skin is associated with a high rate of alar base dropping. Vertical reduction and closure of the defect with a V-Y flap is alternative with a alar base lift effect that is not prone to dropping [10]. However, an unnatural looking scar caused by anatomic junction disruption is the main concern [11].

Herein, we introduced a modified method, the alar base rotation flap (ABRF). Instead of closing the defect after vertical lift of the alar component with V-Y flap, we close the defect with a less visible scar by concealing the incision along the nasolabial fold with a rotation flap. Using this flap reduces tension during wound healing, and decreases the length discrepancy caused by vertical reduction.

Materials and Methods

Study Design and Ethics Statement

This study was a retrospective analysis study. The study was approved by the Ethics Institutional Review Board of our Hospital (IRB No. 202400623B0). Preoperatively, all participants provided signed, informed consent after they were given a clear explanation of the study protocol in clear, simple language.

Patient Selection

All alar base lift procedures using the ABRF were performed by the senior author at the Vendôme Plastic Clinic, Taipei, Taiwan, between January 2019 and April 2023. Inclusion criteria were age ≥ 18 years with an aberrant alar-columellar relation who underwent primary alar surgery with regular post-operative follow for at least 6 months. Patients who received simultaneous epicantoplasty or dorsal augmentation more than 3 mm in height, were currently pregnant or had the potential to become pregnant, were breastfeeding an infant, or had a hematologic disorder, neuromotor disorder, or keloids were excluded.

Surgical Technique

In all cases, the operation was performed under IV sedation or general anesthesia with intra-tracheal intubation. Most of the patients also required alar width reduction. The alar reduction preoperative design was based on the patient's intercanthal distance (ICD) and alar width. Markings for each surgery included the midline point, lateral border of the alar base, medial border of the alar base transition area, lateral border of the footage of lower lateral cartilage (LLC), and any asymmetric part that needed correction. The incision line extended from the lateral border of the footage of the LLC, alar-lip sulcus to alar-facial sulcus, and alar groove at the upper part of the alar component. The upper incision line originated from the medial border of the alar base transition area, parallel to the first incisional line, and tapered to join the line at the alar groove point [12]. The alar groove point was adjusted according to the severity of alar base hanging. Usually 3 mm of alar groove tissue would be removed for vertical reduction of the lateral alar component. After that, the wedge-shaped mucosa lining was also marked. Then, a small triangle was marked along the nasolabial fold, 3 mm in limb length, for the rotation flap (Fig. 2). The main purpose of an alar base rotation flap is to vertically lift the alar base and to conceal the scar along the nasolabial fold. When creating a rotation flap, the upper cutting point is always marked precisely at the junction of the nasolabial fold and the alar-facial groove. Typically, an equilateral triangle with a limb length of 3 mm is designed. However, the lifting amount can be further adjusted by varying the directions and shapes of the triangle (See video 2).

A stab incision was made using a No. 15 blade to excise the marked area of skin and glandular tissue, while

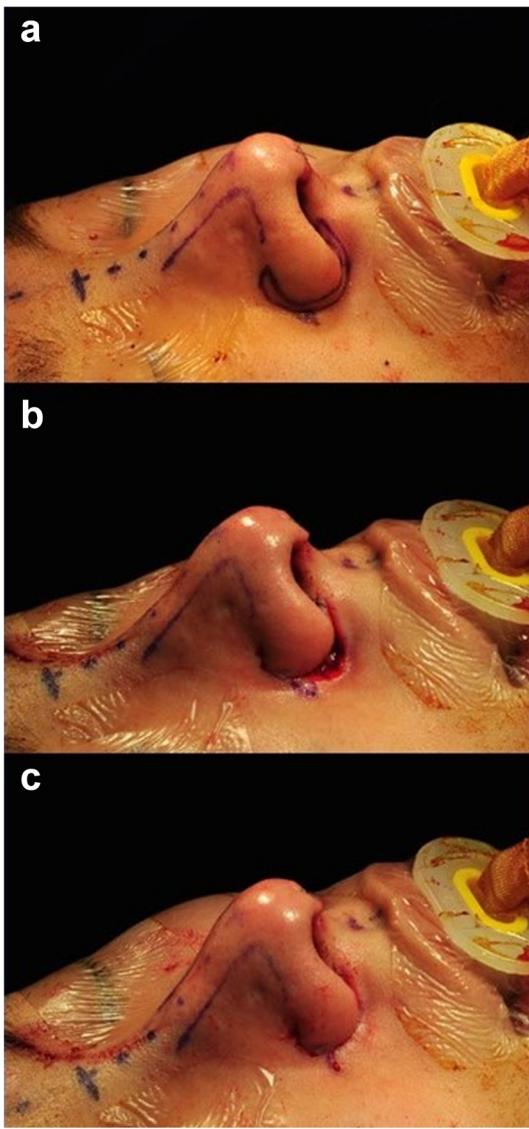


Fig. 2 **a** (Upper) Illustration of marking the operation incisions. **b** (Middle) After vertical reduction. **c** (Lower) After alar base lifted with an ABRF

attempting to preserve the perforator and nasalis muscle layer (Fig. 3a, b). Subsequently, the alar component was lifted vertically and secured with 5-0 Dexon after vertical reduction of the upper alar groove area. If the defect was not too wide and the length discrepancy of the outer and inner incision line is not too severe, primary closure is feasible.

If there is excessive tension during primary closure, or if the scar appearance is compromised due to an overly tight purse-string technique for addressing length discrepancy, an ABRF was used (Fig. 2). A small triangle skin with a limb length of 3 mm was resected at the nasolabial fold level, and closed after minimal undermining. By rotating of the outer labial soft tissue, the length of the outer incision

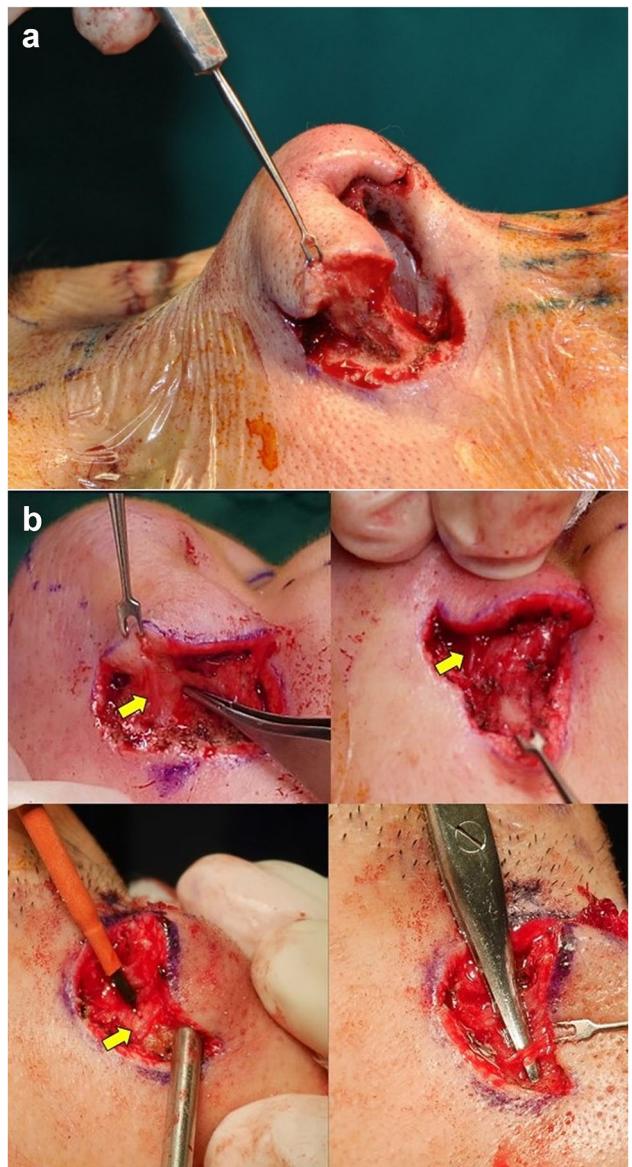


Fig. 3 **a** Preservation of nasalis muscle to avoid tip circulation compromise. **b** Occasionally perforators (arrow) can be identified during the dissection and carefully preserved

line was reduced with tension shared with the cheek tissue (video 1, video 2). After achieving hemostasis, a figure-of-eight fashion cinch suture of 3-0 Dexon was used for alar width reduction. The wound margin was closed subcutaneously in layers with 5-0 Dexon, and transcutaneously with 6-0 nylon.

Scar Management

All the stiches were removed at 1 week after surgery. After the wound healed, massage was applied starting from POD 2 weeks. Topical silicone gel (Dermatix) was applied twice daily for at least 3 months. Fraxel CO₂ laser treatment

began at POD 6 months, performed monthly for 2 to 3 sessions. The evaluation timing was set before the Fraxel laser treatment.

Main Measures and Adverse Events

Follow-up was scheduled 1 week, 2 weeks, 1 month, 2 months, 3 months, 6 months, and 1 year postoperatively. Standard photographs from the front, right, and left lateral positions, were taken at baseline and at each follow-up visit. Patient-reported adverse events and events observed by the investigator, including asymmetry, scarring requiring second revision surgery, necrosis, or infection, were recorded at each visit.

The primary outcome measure was at POD 6 m by photometric evaluation of the vertical alar base distance index (VABDI). The index was defined as the vertical distance from the alar base to the intercanthal line (AD) divided by the intercanthal distance (ICD) in the frontal view (Fig. 4a). The second outcome measurement was the alar-columellar-angle (ACA) at POD 6 m (Fig. 4b). The Vancouver Scar Scale (VSS) was used to evaluate the scar condition at that time, too (Table 1).

We additionally assessed the results using the Global Aesthetic Improvement Scale (GAIS), which was conducted by third-party plastic surgeons who were not involved in the process. The comparison was made between baseline and postoperative photographs at the 6-month or longer follow-up visit. Patients were also given a visual analog scale (VAS) questionnaire to evaluate their satisfaction rate at timely follow-up.

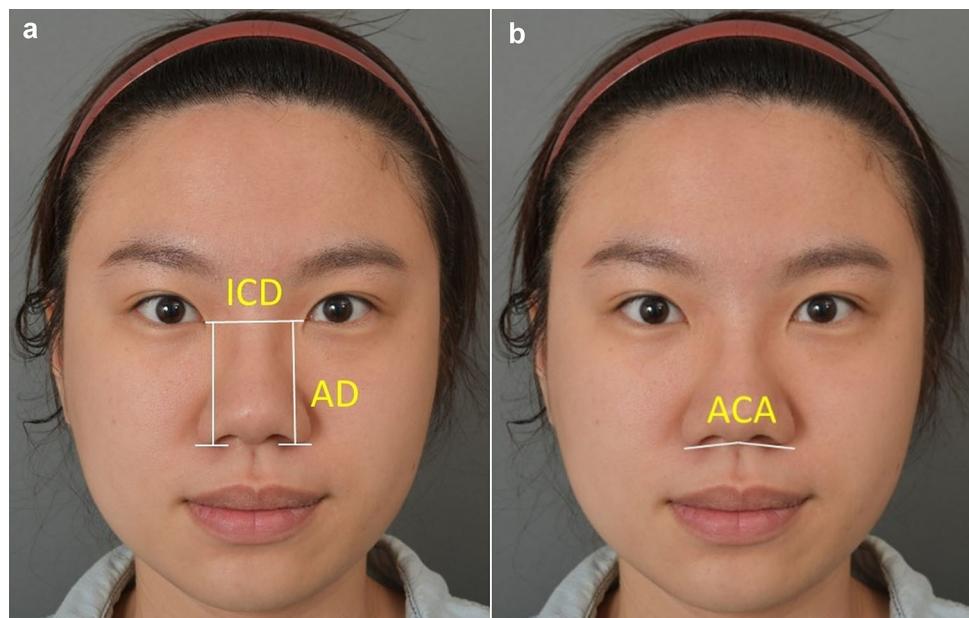
Statistical Analyses

All statistical analyses were conducted using SPSS software version 26.0 (IBM, Chicago, IL, USA). The mean changes in VABDI and ACA before and after surgery were

Table 1 The Vancouver Scar Scale (VSS)

Scar character	Score
<i>Vascularity</i>	
Normal	0
Pink	1
Red	2
Purple	3
<i>Pigmentation</i>	
Normal	0
Hypopigmentation	1
Hyperpigmentation	2
<i>Pliability</i>	
Normal	0
Supple	1
Yielding	2
Firm	3
Ropes	4
Contracture	5
<i>Height (mm)</i>	
Flat	0
< 2	1
2–5	2
>5	3
Total	13

Fig. 4 **a** ICD: intercanthal distance. AD: vertical distance from alar base to intercanthal line. Vertical alar base distance Index: AD/ICD × 100%, **b** Alar Columellar Angle: angle of ab-Sn-ab



analyzed using the paired Student t-test. A p value < 0.05 denoted a statistically significant difference.

Results

Twenty-one patients who received alar base lift using an ABRF were included in the analysis. Two patients only received correction on one side for asymmetry; thus, there were a total of 40 surgical sites. There were 15 females and 6 males with a mean age of 33.10 ± 5.38 years. All patients had Fitzpatrick skin type III–IV. No patients required a revision surgery, and there were no infections. One patient had a right side partial wound dehiscence, which healed with local wound care and no obvious scar formation after 6 months (Fig. 5).

The average VABDI decreased 3.4% (from 125.9 to 122.5%, standard deviation [SD] = 10.2%, $p < 0.001$). The average ACA decreased 15.8° (from 199.9° to 184.1° , SD = 10.0° , $p < 0.001$) (Table 2). The average Vancouver Scar Scale was 1.86 ± 0.69 (Low 1, High 3)

Photographs of representative patients immediately after surgery and at the 6 months' follow-up are shown in Figs. 6, 7, 8 and 9. All incision scars are well concealed along the anatomical crease.

The Global Aesthetic Improvement Scale (GAIS) resulted in an average score of 1.14 ± 0.35 . Specifically, 18 out of 21(85.7%) were given a rating of 1, which represents an optimal cosmetic outcome. Three patients were rated 2. Additionally, the average score for patients' perceptions on the overall improvements made to their nose was 8.38 out

of 10 points, indicating reasonably high level of satisfaction. The A summary of the results is presented in Tables 3 and 4.

Discussion

Lower setting of the alar base position can cause aesthetic problems. A harmonious alar-to-columellar relationship enhances the nasal tip and overall nose aesthetics. On a frontal view, the alar-columellar line should mimic a gull's wing in flight, where the alar rim is directed superiorly, and the ACA angle is approximately 176° . The alar base should be vertically 1–2 mm higher than the columellar base (Fig. 1). Various methods have been proposed to lift the alar base vertically; however, long-term objective measurements of the results are lacking. While rim excision can lift the alar margin, it does not change the position of the alar base. When trying to lift the alar base position vertical, using a sail excision can have a higher chance of relapse and a risk of rim contracture [8, 9]. A Q-deformity can also occur due to roll-in of the outer alar skin when simultaneous alar width reduction is performed. Additionally, a V-Y flap to close the alar base defect may disrupt the lower alar base curvature resulting in an unnatural looking scar. By closing the alar base defect after vertical lift of the alar component with an ABRF, a less visible scar is achieved because tension is shared while the wound is healing, there is diminished length discrepancy, and the incision is concealed along the anatomical junction (Figs. 5, 6, 7, 8, 9). The scores from the VSS, VAS, and

Fig. 5 The patient had a partial wound dehiscence at the right alar base. The wound healed with local wound care. The right side of the picture shows no obvious scar of right alar base area at post-operation 6 month follow up



Table 2 Results

	Pre-operation	Post-operation	<i>p</i> value
VABD index (VABDI)	$125.89\% \pm 11.91$	$122.52\% \pm 10.24$	<0.001
Alar columellar angle (ACA)	$199.9^\circ \pm 9.79$	$184.1^\circ \pm 10.0$	<0.001

Fig. 6 **a** Immediately after surgery, **b** 6 months after surgery



Fig. 7 **a** A patient in whom a left side ABRF was used to correct asymmetry of the alar base. **b** Preoperative (left) and 6 months postoperative (right) photographs of patient

Fig. 8 Another case received de-rotation of the tip using septal and ear cartilage, minimal dorsal augmentation with diced ear cartilage, and alar reduction/alar base lift with ABRF. Before and 6months after surgery



GAIS also indicate that the scars in this series of cases were minimally visible and satisfactory.

A hanging alar appearance in the frontal view, with an ACA angle greater than 180 degrees, can be caused by a lower alar base position, columellar retraction, or a combination of both. In cases of pseudo-hanging alar or minor hanging alar, with ACA angles around 180°–190°, simple plumping grafts, septal extension, or primary closure after

vertical reduction of the lateral alar component can be effective. However, pseudo-hanging alar deformities caused by columellar retraction with a normal alar base position, which only require septal extension to elongate the nose, were excluded from this series. The normal nasal length, from subnasale to nasion in the frontal view, should be similar to the upper and lower face to create harmony. On the other hand, when septal extension to lower the



Fig. 9 Left side alar retraction was well prevented and corrected with simultaneous V-Y flap. The scar of ABRF conceal well along anatomical junction. Before and 6months after surgery

Table 3 The Global Aesthetic Improvement Scale (GAIS)

Rating	Description	Numbers of the Score:
1 Very much improved	Optimal cosmetic result	18
2 Much improved	Marked improvement in appearance from the initial condition, but not completely optimal	3
3 Improved	Obvious improvement in appearance from initial condition, but a re-treatment is indicated	0
4 No change	The appearance is essentially the same as the original condition	0
5 Worse	The appearance is worse than the original condition	0

Table 4 Visual analog scale self-assessment questionnaire

Q1: The alar-columellar relationship (0=Totally Unsatisfied; 10=Totally Satisfied)	Mean: 8.76 ± 0.94 (Low 7, High 10)
Q2: The alar width 0=Totally Unsatisfied; 10=Totally Satisfied)	Mean: 8.86 ± 0.96 (Low 7, High10)
Q3: The nostril shape (0=Totally Unsatisfied; 10=Totally Satisfied)	Mean: 8.33 ± 1.16 (Low 7, High10)
Q4: The alar looks natural (0=Not at all; 10= Totally Agree)	Mean: 7.86 ± 1.47 (Low 6, High10)
Q5: The symmetry of alar (0=Not at all; 10= Totally Agree)	Mean: 8.67 ± 1.20 (Low 6, High10)
Q6: The Scars (0=Totally Unsatisfied; 10=Totally Satisfied)	Mean: 7.86 ± 1.25 (Low 6, High10)
Q7: In General, the Overall Appearance of the Nose is Significantly improved (0=Not at all; 10= Totally Agree)	Mean: 8.38 ± 1.02 (Low 7, High 10)

columellar base is not suitable for patients with a normal nasal length or insufficient to achieve a normal ACR in severe hanging alar cases, alar base lift surgery is indicated.

However, there is no quantitative classification for ACA yet. Most cases involve a combination of columellar retraction and hanging alar, the ACA exceeds 195 degrees. For those with ACA angles from 180° to 190°, it would be considered minor hanging alar looking. In this series, all cases had ACA angles around 190°–210°. In my opinion, these are all severe hanging alar cases requiring alar base lift surgery.

Type II alar retraction in the frontal view can worsen if not treated during the narrowing of the alar width, due to the inward movement of the lateral alar rim, which causes an acute angle of the alar rim margin. This complication can be effectively prevented with the simultaneous use of a V-Y flap or composite graft (Fig. 9). Additionally, by vertically lifting the alar base, the angle of the alar rim margin is enlarged, and the curve becomes smoother. This helps to reduce the appearance of retracted alar. Consequently, worsened alar retraction did not occur in this series.

In the author's opinion, a scar < 3 mm on the face is difficult to notice. Therefore, a 3 mm limb equilateral

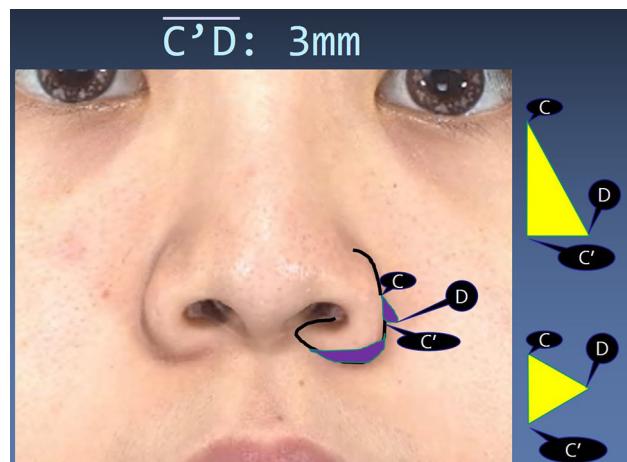


Fig. 10 The amount of alar base vertical movement is in proportional to the distance from C' to C point. Different design of CDC' triangle gives different amount of CC' distance

triangle is usually designed for the size of the ABRF. However, if more vertical lift or more length reduction over the outer incision line is needed, a right triangle or obtuse triangle with a 3 mm limb can be designed (Fig. 10). Different shapes of triangle skin resection can



Fig. 11 A case was excluded in this study due to dorsal augmentation more than 3 mm. Before and one year after surgery, the alar-columellar relationship was improved

decrease the outer incision length by different amounts, which helps to diminish the discrepancy after vertical and horizontal alar reduction. A different angle also means a different amount of upward vertical movement of the labial tissue when making the rotation flap, which is the main effect of the ABRF on the alar base lift.

Circulation to the nasal tip is another main concern when doing vertical reduction of the lateral alar component with an open tip surgery [13]. Partial tip circulation come from branches of the angular artery that might be encountered when resecting upper alar groove tissue. However, the main blood vessels run deep inside the muscular and SMAS layers [14]. By preserving the muscular layers, some random innominate vessels are preserved which prevents tip necrosis (no tip necrosis was observed in the patients in this report). Sometimes the perforator can be identified and preserved as well (Fig. 3b); however, staged surgery is recommended if preservation of the circulation is not certain.

Lengthening the nose by septal extension and lowering the columellar base help to decrease the ACA in frontal view, therefore we used VABDI to evaluate the true vertical lift amount of the alar base. The baseline reference we used was the ICD; thus, patients who received procedures that might change the ICD, such as epicanthoplasty or radix augmentation more than 3 mm, were excluded [15].

With an objective measurement of the result with a photometric method, the vertical distance from alar base to intercanthal line decrease was 3.4%. Because the average ICD in Asia is around 30–40 mm, a long-term lifting effect of 1–1.3 mm can be expected using the ABRF method.

Limitations

There are several limitations of this study that need to be acknowledged. First, the sample size is relatively small: only 21 patients with a total of 40 nasal alar sites. Additionally, measuring post-operative scars proved challenging in some patients. To evaluate outcomes, we measured the AD, ICD, and ACA using a photometric method, but this may not provide accurate measurements for patients who underwent radix augmentation exceeding 3 mm (Fig. 11). Despite these limitations, patients reported satisfactory outcomes, and there was notable improvement in the alar-columellar relation.

Conclusion

Hanging alar with a lower setting alar base position is a common problem, and current methods of correction have certain limitations and unknown long-term results. Alar base lift with an alar base rotation flap is an effective alternative to correct this problem.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00266-025-04803-1>.

Acknowledgement The authors declare that they have no conflict of interest.

Declarations

Conflict of interest Author declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

1. Boo-Chai K. Augmentation rhinoplasty in the orientals. *Plast Reconstr Surg.* 1964;34(1):81–8.
2. Matarasso, A. Alar rim excision: a method of thinning bulky nostrils. *Plast Reconstr Surg.* 1996; 97(4):828–34; discussion 835
3. Sadooghi M, Kouhi A. A new approach in open rhinoplasty: new alar rim raising technique. *J Otolaryngol Head Neck Surg.* 2011;40(1):54–7.
4. Gunter JP, Rohrich RJ, Friedman RM. Classification and correction of alar-columellar discrepancies in rhinoplasty. *Plast Reconstr Surg.* 1996;97(3):643–8.
5. Rohrich RJ, Afroz PN. Revisiting the Alar–Columellar relationship: classification and correction. *Plast Reconstr Surg.* 2019;144(2):340–6.
6. Lo LJ. Primary correction of the unilateral cleft lip nasal deformity: achieving the excellence. *Chang Gung Med J.* 2006;29(3):262–7.
7. Talmant JC, Talmant JC. Cleft rhinoplasty, from primary to secondary surgery. *Ann Chir Plast Esthet.* 2014;59(6):555–84.
8. Baladiang DEA, Olveda MB, Yap E. The “sail” excision technique: a modified alar lift procedure for southeast Asian noses. *Philipp J Otolaryngol Head Neck Surg.* 2010;25:31–7.
9. Yap EC. Rhinoplasty for South East Asian Nose. *Facial Plast Surg Clin North Am.* 2018;26(3):389–402.
10. Yu BF, Li SQ, Chen XX, Wei J, Dai CC. Correcting wide alar base and flare with combined sill and alar excision in Asian patients. *J Craniofac Surg.* 2021;32(8):e754–7.
11. Kridel RW, Castellano RD. A simplified approach to alar base reduction: a review of 124 patients over 20 years. *Arch Facial Plast Surg.* 2005;7(2):81–93.
12. Foda HM. Alar base reduction: the boomerang-shaped excision. *Facial Plast Surg.* 2011;27(2):225–33.
13. <008Nasal tip blood supply confirming the safety of the transcolumnellar incision in rhinoplasty.pdf>
14. Wu WTL. Commentary on: three-dimensional arterial distribution over the midline of the nasal bone. *Aesthet Surg J.* 2022;42(7):791–4.
15. Huang CJ, Yen CI, Chang CS, Chen HC, Hsiao YC. The relationship between inter-canthal distance and implant height in Asian rhinoplasty. *Aesthetic Plast Surg.* 2022;46(4):1809–15.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.