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Preservation of nostril morphology in nasal base reduction

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Abstract
Background Asian patients often desire reduction of the base and alar lobules of the Asian mesorrhine nose. Sill excision is commonly used, but may result in an angular or notched nostril rim.
Methods We developed an internal method of alar base reduction involving triangle flaps for sill resection. This method avoids alar rim notching and teardrop deformity. Cinching sutures and double-layer closure avoid tension on the wound. We categorized the results in 50 patients (4 men, 46 women) who underwent surgery between November 2012 and August 2015 and who could be followed up for more than 3 months. The mean age of the subjects was 26.3 years and the mean follow-up period was 8.9 months.
Results Forty patients underwent base reduction with the internal method, while ten with alar flare were treated with additional external resection. The mean reduction of the nostril sill width was 4.8 mm for both methods. In the subjects receiving flare resection, the mean reduction of the lateral alar width was 4.4 mm. There was no notching at the suture site. Complications included a short scar running obliquely under the sill in 13 patients and a trap door deformity in one patient.
Conclusions Nasal base reduction is widely performed, but subject to outcomes with abnormal nostril contour. We used triangle flaps to narrow the sill, and cinching sutures to prevent tension on the wound. Our methods prevent nostril notching and/or teardrop deformity. Scarring can occur, but can be reduced using cinching sutures for wound relaxation.

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Keywords Surgery · Plastic/MT · Asian Continental Ancestry Group · Nasal surgical procedures · Wound healing

Introduction

Many Asian patients desire a narrower nasal base with less flaring of the alar lobules [1, 2]. The Asian, or mesorrhine [1] nose, is different from the Caucasian leptorrhine nose in several respects, including a lower bridge, more flared alae, a more horizontal orientation of the nostrils, a less well-defined tip, and different alar–columellar relationships [3]. In 1931, Joseph described narrowing of the alar base by excising tissue internally from the nostril base and vestibular floor [4]. Although this method results in narrowing of the nostrils and a true decrease in the width of the nasal base, a common complication is notching of the nasal sill rim at the site of the sill excision (Fig. 1) [5–8].

Here, we present our experience in narrowing the nasal base in cases with a wide base and alar flaring using a triangle flap method that employs an internal sill excision, plus an external alar wedge resection if necessary.

Materials and Methods

Between November 2012 and August 2015 we operated on 85 patients. The inclusion criterion for this study was a patient's ability to return at least three months after surgery

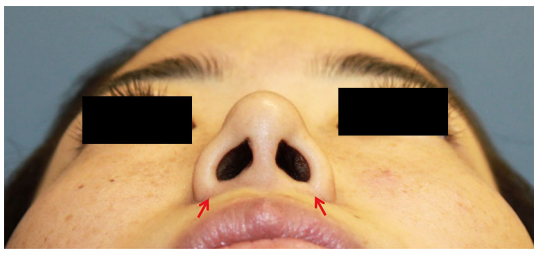

Fig. 1 Photograph of internal method shows notching of the alar rim (*red arrows*)

for follow-up. Fifty patients (4 men, 46 women) fulfilled this criterion. Mean patient age was 26.3 years (range, 18–62), and mean follow-up period was 8.9 months (range, 3–27.5). All patients provided written informed consent prior to their inclusion in this study.

We developed methods of sill excision that avoided alar deformity. Based on techniques pioneered by Kridel and Castellano (wedge and sill excision) [5] and Gruber et al. (more lateral alar reduction with cinching sutures along the sill/columella) [9], we sought to minimize the risk of nostril notching by combining techniques of raising triangular flaps and using cinching sutures to avoid any tension on the tissues.

Sill Excision Methodology

We began by marking the lateral limits of the sill resection that would preserve the natural alar rim contour and measured the amount of planned sill resection with calipers (Fig. 2a). We then traced out laterally pedicled triangular flaps inside the resection area (Fig. 2b) and traced the

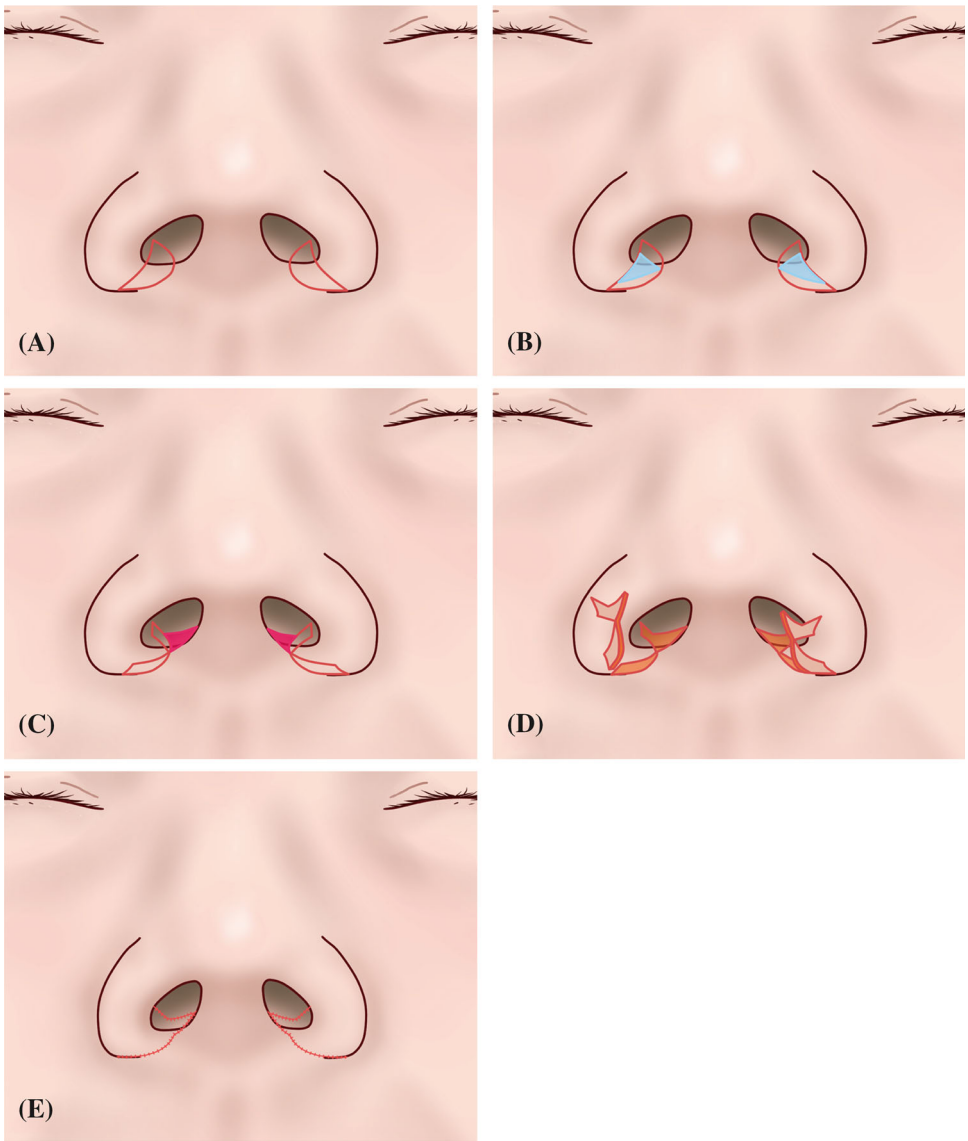

Fig. 2 Schematic illustrations of the triangle flap method. **a** Markings for incisions. **b** Tracings for triangle flaps. **c** Tracing the recipient sites near the footplates of the medial crura. **d** Incisions and raising the flaps. **e** Closure with cinching sutures and double-layer sutures

Fig. 3 Preoperative photographs **a** and **c** of a patient with a wide nasal base associated with excessive flaring. The 6-month postoperative photographs **b** and **d** of the same patient after internal method with triangle flap and external excision show effective narrowing of the nasal base with elimination of the excessive alar flare

recipient sites near the footplates of the medial crura (Fig. 2c). Following marking, we anesthetized the surgical site with 1 % lidocaine hydrochloride in 1:100000 IU epinephrine, kept to minimal volumes to avoid any tissue distortion. We used a #15 blade to make the incisions and raise the flaps, cauterizing with a fine microdissection needle to maintain hemostasis (Fig. 2d). We placed two deep cinching sutures of 3-0 polydioxanone to draw the sill incision together and reduce tension on the skin edges. We closed the sill excision in two subcutaneous layers using 5-0 polydioxanone sutures, and closed the skin with 7-0 black nylon sutures for the incision outside the nostril rim and 6-0 blue nylon to close that inside the nostril (Fig. 2e).

Results

A total of 21 patients underwent sill excision with triangle flaps only. Ten additional patients underwent simultaneous sill excision and alar wedge reduction. Other patients underwent additional procedures including nasal tip reshaping (19), septal extension (9), and osteotomy (rhinoplasty) (4).

Reduction of the width of the nose was achieved in all patients. The mean unilateral width reduction in the patients undergoing sill excision with triangle flaps was 4.8 mm at the level of the sill. In patients with both excessive flare and a wide nasal base, the combination of the internal method with triangle flap and external alar excision resulted in effective narrowing of the nasal base with elimination of the excessive alar flare (Fig. 3). The mean unilateral lateral alar width reduction was 4.4 mm.

In cases with a wide nasal base and bulbous nasal tip, the internal method with triangle flaps plus nasal tip reshaping resulted in effective narrowing of the nasal base with elimination of the bulbous nasal tip.

No notching was observed at the suture site in any patient. There were no cases of postoperative hemorrhage, infection, or keloid formation. Complications included an oblique scar running just below the sill (13 patients) (red arrows, Fig. 4) and a trap door deformity in one patient.

Fig. 4 Preoperative photographs **a** and **c** of a patient with a wide nasal base. The 25-month postoperative photographs **b** and **d** of the same patient after the internal method with triangle flap shows effective narrowing of the nasal base with a visible oblique scar in the sill (*red arrows*)

Discussion

Narrowing of the nasal base, often with narrowing of the alae, is a common procedure. However, cosmetic nasal surgery can be complicated by problems with the alar rim contour [11, 12].

Many authors have reported a range of internal methods of narrowing the alar base. Internal methods are effective [5, 9], but are often complicated by a scar oriented perpendicular to the nostril sill, which may sometimes cause prominent notching [5]. Although many surgeons use external cutaneous excision to avoid the risk of notching of the alar rims, this may result in a decrease in alar flare with no true decrease in the width of the alar base [8]. It is important to select internal methods to decrease nostril width while preventing notching at the sill.

Several reports have described procedures that avoid notching of the nostril sill [6–8]. One common method is the addition of deep layer sutures when closing the wound. These deep sutures help to elevate the suture line and take tension off the skin edges, thus decreasing the risk of postoperative notching [7, 8]. Suboptimal incision location is the primary reason for notching. Incisions should be placed in the horizontal portion of the sill, preserving the lateral corner of the nostril [5]. Other causes of nostril notching include excessive resection and tense closure [10]. Despite taking measures to preserve the shape of the nostril corner and using deep layer sutures, we still sometimes observed notching at the suture site. We developed our present internal method with triangle flaps to narrow the alar base while avoiding notching. This procedure can change the suture line from a perpendicularly oriented straight line to a zigzag line, and effectively prevents notching. The triangle flap allows for maximum preservation of the natural curvature of the nostril sill shape.

Although the resulting scars of the triangle flap method are usually inconspicuous, a scar may be recognizable in some cases. This is due to the oblique direction of the scar in the sill where no available normal groove or shadows exist. This problem can be prevented by double-layer closure and precise suture techniques. We also used cinching sutures to reduce tension on the wound [7, 10].

Our method addresses the problem of notching of the alar rim by using triangle flaps, avoiding cutting of the

internal alar rim, and avoiding tension on the tissues. Cosmetic results have been very successful.

Compliance with Ethical Standards

Conflicts of Interest The authors declare that they have no conflicts of interest to disclose.

Informed Consent All procedures performed in this study were in accordance with the ethical standards of the 1964 Helsinki declaration and its later amendments. All patients provided written informed consent prior to their inclusion in this study.

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