The Long-term Effects of Alar Base Reduction

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Objective: To statistically analyze the long-term results of alar base reduction after rhinoplasty.

Methods: Among a consecutive series of 100 rhinoplasty cases, 19 patients required alar base reduction. The mean (SD) follow-up time was 11 (9) months (range, 2 months to 3 years). Using preoperative and postoperative photographs, comparisons were made of the change in the base width (width of base between left and right alar-facial junctions), flare width (width on base view between points of widest alar flare), base height (distance from base to nasal tip on base view), nostril height (distance from base to anterior edge of nostril), and vertical flare (vertical distance from base to the widest alar flare). Notching at the nasal sill was recorded as none, minimal, mild, moderate, and severe.

Results: Changes in vertical flare ($P<.05$) and nostril height ($P<.05$) were the only significant differences seen in the patients who required alar reduction. No significant change was seen in base width ($P=.92$), flare width ($P=.41$), or base height ($P=.22$). No notching was noted.

Conclusions: It would have been preferable to study patients undergoing alar reduction without concomitant rhinoplasty procedures, but this approach is not practical. To our knowledge, the present study represents the most extensive attempt in the literature to characterize and quantify the postoperative effects of alar base reduction.

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WEIR[1] FIRST DESCRIBED the alar base resection in 1892 in a written account of the procedure that still bears his name. He described removing a portion of the alar flare, while hiding the incision in the alar-facial groove. In 1931, Joseph[2] suggested the removal of a wedge of tissue that extended into the nasal vestibule. Since then, there have been multiple variations on Weir's alar base–narrowing theme.[3-6]

See also pages 81 and 98

The primary surgeon (M.C.) in the present study uses the alar base–narrowing technique described by Adamson et al.[4] Excision of the vestibular rim and sill of the nasal floor reduces the outer alar perimeter and narrows the nostril. A wedge resection along the rounded caudal margin of the alar lobule decreases the outer alar circumference. A combination of rim and alar lobule excisions creates a greater reduction of outer alar circumference in addition to nostril narrowing.[7]

Several studies have been published concerning the nasal base and reduction of alar flare. Farkas et al[8] performed in-depth nasal base measurements to develop an objective assessment system for nostril types. McKinney et al[9] proposed a standardized approach to alar base excision based on nostril shape and alar base width. Gilbert[10] evaluated nasal reduction with respect to scarring. Becker et al[11] proposed a grading scale for comparing the alar base and alar flare with respect to the angle of alar insertion into the face and described various methods for alar base reduction.

However, those studies did not attempt to critically analyze the preoperative and postoperative results of alar base resection. The literature is unclear on quantitative and qualitative aspects of the surgery, including the amount of change in preoperative and postoperative base width, base height, alar flare, nostril height, and vertical flare. Our goal was to evaluate the efficacy of alar base reduction surgery.

METHODS

Among a consecutive series of 100 rhinoplasty cases, 19 patients required alar base reduction. The technique that was used is similar to that described by Adamson et al.[4] At the completion of rhinoplasty, the columella midline at the nasolabial junction, the lateral-most points of each alar-facial groove, and the sill crease are marked. The natural sill crease in most patients is where the internal diameter of the nostril meets the nasal floor. A 25-gauge needle is then used to inject a solution consisting of 1% lidocaine with

Figure 1. Markings are placed in the columellar midline, in the lateral-most points of the alar-facial grooves, and in the creases equidistant from the midline. The desired narrowing of the outer diameter of the ala is determined and marked with calipers.

Figure 2. Sill incisions are performed with a No. 11 blade cutting upward from the stab. The starting point of the lateral cut will determine the outside nostril diameter, while the end point in the nasal vestibule determines the ultimate inner nostril diameter.

1:100 000 epinephrine buffered 9:1 with sodium bicarbonate. Fifteen minutes are allowed for vasoconstriction. Beginning on the side with the most alar flare, a determination is made as to how much reduction of outer alar width and inner nostril width is desired. This reduction must take into account any increase in alar flare width caused by tip deprojection. A ruler is used to measure the distance from the crease point of the sill to the midline (usually 10-12 mm). The contralateral side is marked at the same distance, resulting in symmetrical bilateral sill creases. The desired amount of narrowing of the outer diameter of the ala is determined and marked by using calipers to sharply stab the skin from the desired sill crease to the ala (**Figure 1**). Medial and then lateral sill incisions are made with a No. 11 blade cutting upward from the stab (**Figure 2**). The starting point of the lateral cut will determine the outside nostril diameter, while the angle of cut into the nasal vestibule determines the ultimate inner nostril diameter.

The caudal extent of both incisions is then connected with a No. 11 blade along a line that begins medially parallel to the sill and travels to the lateral alar-facial mark (**Figure 3**). Care is taken to stay just above the actual alar-facial crease, preserving the crease and protecting this part of the anatomy, which is so difficult to rebuild. The sill is reapproximated medially with a 5-0 nylon tacking suture. To estimate the required amount of alar flare reduction, the alar lobule edge is grasped with a Brown-Adson forceps and pulled inferiorly. A No. 11 blade is used to excise this wedge of tissue (**Figure 4**). Another tacking suture is placed at the midline of the reconstituted ala. If more alar narrowing is desired, the medial tacking suture is removed and additional alar tissue is resected. Alar sill and wedge resections are completed on the opposite side (**Figure 5**), and the wound is meticulously closed with simple interrupted 5-0 nylon sutures, which are removed on postoperative day 5.

Standard preoperative and postoperative photographs were taken. Frontal views were used to measure the intercanthal dis-

Figure 3. The caudal extent of both incisions is connected with a No. 11 blade along a line that begins medially parallel to the sill and travels to the lateral alar-facial mark.

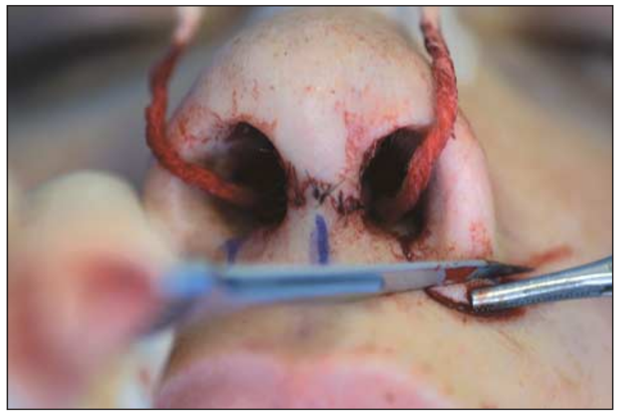

Figure 4. After the sill is tacked medially, the alar lobule edge is grasped with a Brown-Adson forceps and pulled inferiorly to estimate the amount of alar flare reduction. A No. 11 blade is used to excise this wedge of tissue.

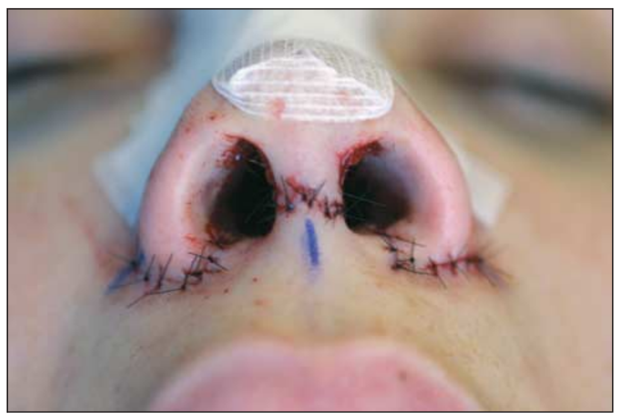

Figure 5. Alar sill and wedge resection is completed on the opposite side, and the wound is meticulously closed with simple interrupted 5-0 nylon sutures, which are removed on postoperative day 5.

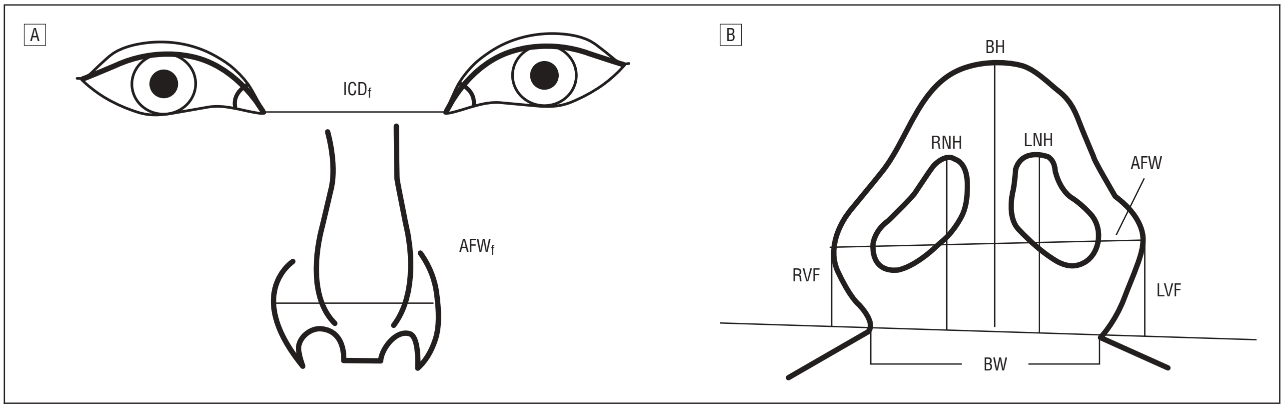

Figure 6. Alar frontal (A) and base (B) view dimensions. A, ICD_f indicates frontal intercanthal distance; AFW_f, frontal alar flare width. B, BH indicates base height; BW, base width; RVF, right vertical flare; LVF, left vertical flare; AFW, alar flare width; RNH, right nostril height; and LNH, left nostril height.

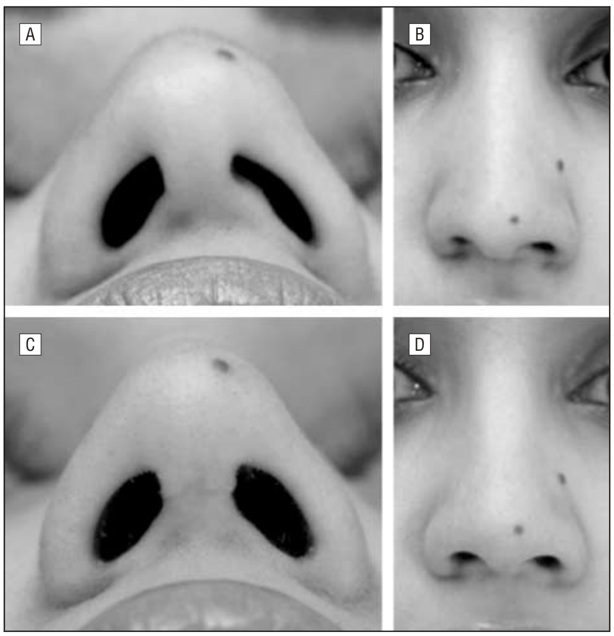

Figure 7. Preoperative (A and B) and postoperative (C and D) alar base and frontal views of a 24-year-old woman. At 9 months after surgery, the base height had decreased 10%; base width, 11%; right vertical flare, 9%; left vertical flare, 5%; alar flare width, 9%; right nostril height, 3%; and left nostril height, 3%.

tance (ICD_f) as well as the alar flare width (AFW_f) (**Figure 6**A). The base view measurements included base width, alar flare width (AFW), base height, right and left nostril height, and the right and left vertical distance from base to the widest alar flare or vertical flare (Figure 6B). The base view ICD was calculated as the product of the ratio of base view to AFW_f and ICD_f as follows: $ICD = ICD_f \times (AFW/AFW_f)$. The base view base and flare widths and base height were then expressed as a percentage of the calculated ICD. The nostril height was measured and expressed as a percentage of the base height (Figure 6). Calculations were performed for preoperative and postoperative photographs with paired, 2-tailed *t* tests using commercially available software (Microsoft Millennium Edition Excel; Microsoft Corp, Redmond, Wash). Notching was recorded as none, minimal (visible under close observation), mild, moderate, and severe.

RESULTS

The mean (SD) follow-up time was 11 (9) months (range, 2 months to 3 years). Alar sill resections were 0 to 7 mm (mean [SD], 3.2 [1.4] mm). Alar wedge resections were 0 to 4 mm (mean [SD], 1.6 [1.2] mm). Average flare width decreased from 123% to 122% ICD ($P = .41$). Average base width remained stable at 105% ICD ($P = .92$). Average vertical flare decreased from 22% to 19% ICD ($P < .05$). Average base height decreased from 97% to 90% ICD ($P = .22$). Average nostril height decreased from 60% to 57% base height ($P < .05$). No notching was noted at any incision line. Preoperative and postoperative examples are shown in **Figures 7**, **8**, and **9**.

COMMENT

When alar base narrowing is desired, a conservative excision is preferred to a radical one. It is a simple matter to resect additional alar tissue but quite complex to reconstruct a stenotic ala. Alar base reduction is best completed as the final step of rhinoplasty. A prominent alar flare may be created or worsened by alterations to the lower third of the nose during surgery. Specifically, reduction procedures that decrease tip projection may increase the amount of alar flaring. If there is any doubt at the completion of rhinoplasty that alar reduction is needed, then the alar resection is usually deferred to a later date.

The surprising result of the present study is that despite significant tissue removal, there was no significant decrease in flare width after surgery ($P = .41$). The lack of change in the flare width may be attributable to several factors: (1) An increase in flare was caused by the preceding rhinoplasty. If tip deprojection during surgery increased the flaring, the alar reduction may have reduced it back to what it was before surgery, yielding no net change. Presumably, had the flare reduction not been performed, the postoperative flare would have been excessive. (2) The alar base reduction surgery may have been overly conservative. (3) The flare was initially reduced, but then the ala stretched back to a more flared position during wound healing.

The distance of vertical flare from the nasal base decreased significantly ($P < .05$). This decrease should be an expected result from alar base resection with wedge excision of the flare. The widest portion of the alar flare is removed, and the remaining alar tissue is pulled toward the alar-facial groove.

A widely accepted standard for aesthetic beauty is that the alar width should not exceed the ICD. We noticed

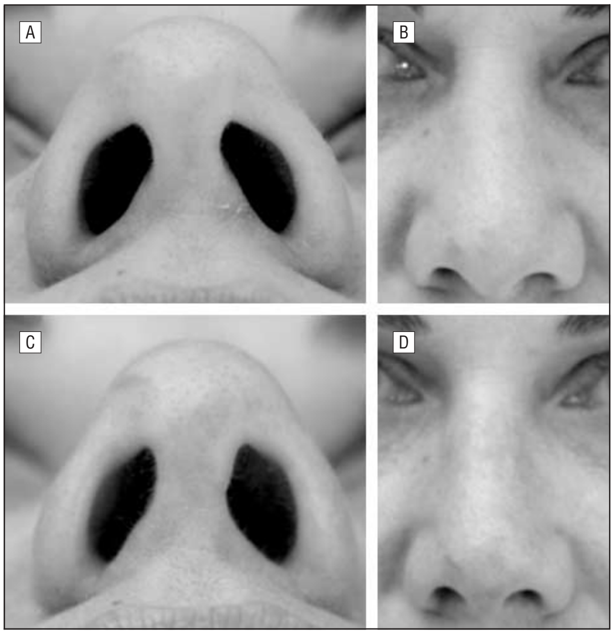

Figure 8. Preoperative (A and B) and postoperative (C and D) alar base and frontal views of a 33-year-old woman. At 12 months after surgery, the base height had decreased 1%; right vertical flare, 3%; and alar flare width, 4%; the base width had increased 6%; left vertical flare, 1%; right nostril height, 1%; and left nostril height, 2%.

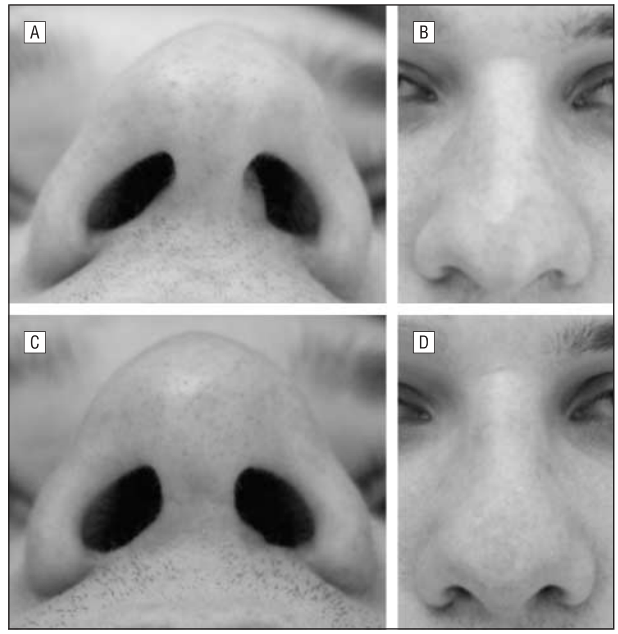

Figure 9. Preoperative (A and B) and 12-month postoperative (C and D) alar base and frontal views of a 24-year-old man. At 6 months after surgery, the base height had decreased 9%; base width, 2%; right vertical flare, 3%; left vertical flare, 17%; alar flare width, 4%; right nostril height, 1%; and left nostril height, 3%.

on base views that the medial canthi were often blocked by widened alae. These dimensions were readily visible on frontal views. We therefore calculated the base view ICD as the product of the ICD_f and the ratio of AFW to AFW_f. Frontal views are taken from a standard distance of 6 feet as opposed to base views, which are taken from approximately 2 feet away. The more distant frontal view also gives a more accurate relationship between nasal structures and ICD_f than the more closely taken base view, which might tend to distort by photographic parallax the more distant base view ICD.

Deprojection of the nasal tip during rhinoplasty will cause a concomitant flaring of the nasal alae and widening of the nostrils. Therefore, we found it difficult to determine which proportion of the change in base dimension was attributable to the rhinoplasty and which proportion was attributable to the alar base resection. The addition of intraoperative photographs before and after alar base resection, would allow comparison of the immediate effect of alar base resection with the long-term results.

A limitation of the present study is the relatively short period between surgery and follow-up. The nose will continue to remodel over time, and alar flaring may continue to change.

CONCLUSIONS

Changes in vertical flare and nostril height were the only significant changes seen in our patients with alar reduction. Ideally, the present study would best be performed on a series of patients undergoing alar reduction without concomitant procedures, but such an arrangement is not practical. Our study represents the most extensive attempt in the literature to characterize and quantify the postoperative effects of alar base reduction. Alar base reduction, with alar flare adjustments, improves the final aesthetic result and continues to be an important adjunct in rhinoplasty surgery.

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