Incidence of Alarplasty in Primary and Revision Rhinoplasty in a Private Practice Setting

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Objective: To evaluate the incidence of alarplasty in primary and revision rhinoplasty during a 3-year period.

Methods: We conducted a retrospective medical record review of patients undergoing primary and revision rhinoplasty between January 1, 2004, and December 31, 2006. Patients were divided into the following categories: primary or revision rhinoplasty, alarplasty, and ethnicity. The incidence of alarplasty was calculated and compared for primary vs revision rhinoplasty and for ethnicity. Statistically significant differences were confirmed using the χ² test.

Results: A total of 168 patients underwent rhinoplasty with minimum follow-up of 6 months; 116 patients had primary rhinoplasty and 52 revision rhinoplasty. All alarplasties were bilateral. Of 50 alarplasties performed, 35 were in the primary group and 15 in the revision group. The incidence of alarplasty was 30.2% in the primary group and 28.8% in the revision group. Nonwhite patients had a higher overall incidence of alarplasty (63.0%) than did white patients (25.4%). Each ethnic category identified had a higher incidence of alarplasty than the white group.

Conclusions: Alarplasty is an important technique in rhinoplasty. The high incidence of alarplasty in revision rhinoplasty procedures suggests that alarplasty is underused by many surgeons currently performing rhinoplasty. One should consider alarplasty for all patients' noses, not just those of nonwhite ethnic rhinoplasty patients.

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Since first being described by Weir¹ more than a century ago, alar base reduction, or alarplasty, has been one of myriad techniques in the plastic surgeon's armamentarium for enhancing the nasal aesthetic qualities. Various modifications of this technique and novel techniques for modifying the alar base have been devised since publication of the article by Weir.² The important anatomical relationships of the alar base also have been well described.

Rhinoplasty surgeons usually use subjective information and accepted anatomical relationships concerning the alar base when deciding whether to perform alarplasty. Standard anatomical guidelines for alar base surgery are briefly summarized herein. From a frontal view, the interalar distance should be equal to one-fifth of the total width of the face and should approximate the intercanthal distance.³ From a lateral view, the columella should be one-fifth of the interalar distance.³ These measurements are the guidelines for the white nose; there are nonwhite variations.

Although much of the plastic surgery literature has focused on other aspects of the nose, such as the nasal tip or the dorsal hump, there has been relatively little attention given to the alar base since alarplasty was developed. In the past 5 years, a few articles have addressed current procedures for alar base reduction and their long-term effects.⁴ However, to our knowledge, no one has addressed the incidence of alar base reduction in primary and revision cases and in different ethnic groups.

A retrospective medical record review study was performed. All cosmetic rhinoplasties performed by the lead surgeon (S.J.P.) between January 1, 2004, and December 31, 2006, were included in the study. Patients presenting for reconstruction after ablation or trauma were excluded. Each surgery was documented as a primary or a revision procedure. The operative record of each patient was carefully reviewed for documentation of alar base reduction. The race/ethnicity of each patient was

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recorded in 4 categories: white, Hispanic, Asian (including South Asian), and black. Other ethnicities not accounted for by the above terms were included under the “white” group.

All tabulations, tables, and graphs were created using Microsoft Excel (Microsoft Corporation, Redmond, Washington). Statistical calculations were performed using Excel and the Georgetown Web Chi Square Calculator.

All patients who presented to the lead surgeon for primary and revision rhinoplasty underwent a systematic preoperative evaluation of the nose. Included in this analysis is evaluation of alar shape and width. Standard teaching says that the alae should be no wider than the medial canthi and teardrop shaped. However, for nonwhite ethnic rhinoplasty, wider alar widths were often considered appropriate. Patients who require significant reduction in tip projection may also require alarplasty. This factor is explained in advance to the patients in question. When deprojection is one of the surgical goals, we sometimes defer alarplasty for 6 months or more to allow for tip definition and settling.

Computer imaging was used with all patients to simulate potential alterations of the nose. This tool is especially helpful in determining the efficacy of alarplasty. Potential results can be demonstrated with and without alarplasty from the frontal and submental views along with the illustration of planned incisions.

Alarplasty is performed at the end of the surgical procedure after all other rhinoplasty incisions have been closed. During the preoperative evaluation, it is determined whether the alae are to be reduced by width, flare, or both. To ensure symmetry, the center of the columella is marked, and the alar incisions are carefully and equally measured from this point. To reduce width only, a rectangular section of skin and soft tissue is removed from the floor, or sill, of the ala. For alar flare alone, a classic Weir excision is performed. The lower incision is made in the alar-facial crease. The upper incision is placed in a superior position on the ala, excising a curved, pyramid-shaped segment of skin. To reduce width and flare, the central incision is vertically oriented into the floor of the ala. A second incision is carried laterally into the alar crease. The third incision is placed on the alar wall. After excision, the alar skin is advanced medially to reduce width and flare. These incisions are made using a No. 11 surgical blade. The alar wounds are closed using a single buried 4-0 chromic suture to align the alae, followed by interrupted 6-0 nylon sutures for the skin. Care must be taken to evert the skin during wound closure.

**RESULTS**

The primary surgeon (S.J.P.), who was also the senior author, performed 168 rhinoplasties with at least 6 months of follow-up during this 3-year period, including 116 primary and 52 revision procedures. Of 50 alarplasties performed, 35 were in the primary group and 15 in the revision group. When his own revision cases were subtracted from the total, the...
rate of alarplasty in revision surgery increased to 33.3%. A χ² analysis was performed to determine whether there was a significant difference in the incidence of alarplasty in primary vs revision rhinoplasty cases. The χ² test showed no significant difference between the 2 percentages (P = .47).

Of the 168 rhinoplasties included in this study, 26 were performed on nonwhite patients (Table 2). Nine rhinoplasties were performed on African Americans, 5 on Asian Americans (including patients of East Indian descent), and 12 on patients of Hispanic descent. The percentage of alarplasty in each ethnic group was higher than the average and higher than that of whites (33.3% of Hispanics, 100.0% of Asians, and 55.6% of African Americans) (Figure 6).

Table 1. Alarplasty Procedures by Primary or Revision Surgery

<table>
<thead>
<tr>
<th></th>
<th>Rhinoplasty, No.</th>
<th>Rhinoplasty and Alarplasty, No.</th>
<th>Total, No.</th>
<th>Alarplasty, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>81</td>
<td>35</td>
<td>116</td>
<td>30.2</td>
</tr>
<tr>
<td>Revision</td>
<td>37</td>
<td>15</td>
<td>52</td>
<td>28.8</td>
</tr>
<tr>
<td>Total</td>
<td>118</td>
<td>50</td>
<td>168</td>
<td>29.8</td>
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</tbody>
</table>
Evaluation of recent facial plastic surgery statistics shows an increasing demand for plastic surgery in the United States and the rest of the world. It is no surprise that the number of rhinoplasties performed annually has followed this trend. Rhinoplasty is the second most common major cosmetic surgical procedure performed on the face.\textsuperscript{6} The latest numbers from 2005 show that more than 200,000 rhinoplasties were performed in the United States alone, which makes it the fourth most common plastic surgery procedure. This also represents a 21% increase over the numbers from 2004.\textsuperscript{7} Even with this substantial increase in rhinoplasty, there has been little in the literature regarding alarplasty. Although a few recent articles\textsuperscript{2,3,4} have detailed various techniques used for this procedure, there has been little in the literature regarding its incidence. It was our theory that alarplasty is performed too infrequently and that we would, therefore, see a high frequency of alar base reduction in revision rhinoplasty (when the senior author was not the original surgeon).

Our observations proved correct as we found no statistically significant difference between the number of alarplasties performed in revision vs primary rhinoplasty. Although we theorize that this result reflects a lack of intent or understanding concerning alar base reduction, the true reason could be multifactorial. Although the anatomical aesthetics of the alar base have been outlined concretely in numerous articles and books, there is a subjective component to cosmetic surgery that varies geographically and ethnically.

Of the 52 patients undergoing revision rhinoplasty, 28.8% required alarplasty. Upon removal of the lead surgeon’s 7 revisions of his own procedures, none of which required alarplasty, this rate increased to 33%. This sta-

### Table 2. Rhinoplasty and Alarplasty Procedures by Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Rhinoplasty, No.</th>
<th>Alarplasty, No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary</td>
<td>Revision</td>
</tr>
<tr>
<td>White</td>
<td>98</td>
<td>44</td>
</tr>
<tr>
<td>Black</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Asian</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

### Figure 5. Revision rhinoplasty with alarplasty, type III (width and flare). A, Frontal view; B, submental view.

### Figure 6. Percentage of alarplasty in rhinoplasty by ethnicity.
tistic indicates that alarplasty should have been considered at the time of the initial procedure.

A variety of reasons can be considered for the need for alarplasty in revision rhinoplasty. The first is a lack of recognition that alarplasty is necessary for a balanced result. Second, primary rhinoplasty with tip reduction is frequently accompanied by a decrease in tip projection. Reducing tip projection will set the nasal tip closer to the face and, therefore, may be accompanied by flaring of the alae. If the alae are normal to slightly wide, the increased flare may become more evident. Most of these cases can be anticipated before surgery. However, when the amount of excess flare cannot be predicted or patients are reluctant to consent to alarplasty, given minimal to no flare at the time of the initial consultation, we may delay the alarplasty. Subsequent alarplasty can be performed under local anesthesia as soon as 6 months after the initial surgery. No delayed alarplasties were performed in this study group.

Another potential reason for the unexpectedly high incidence of alarplasty in revision surgery may result from patients with poor alar support. From the submental view, the alae appear indented and visibly lack a strong rounded shape. In addition to internal alar support grafts, such as alar strut grafts, alarplasty can reduce the acquired rounding of the lateral alae.

Finally, there were ethnic differences in the incidence of alar base reduction. This series, with only 26 patients (15.5%) from the nonwhite categories we studied, showed a dramatic increase in alarplasty performed in these categories vs the incidence in white patients. These categories had an average alar base reduction rate of 63.0% compared with 25.9% for the white population. It is well documented that the alar base proportions vary according to ethnicity. A few facial plastic surgeons have studied alar base anatomy in specific ethnic groups and subgroups, including African Americans, Chinese women, and Korean women. If a generalization can be made regarding the nonwhite nose, it may be that it has a wider interalar distance. Thus, one can explain the increased trend of alarplasty in the nonwhite nose in an ethnocentric manner. Patients will likely desire a nose similar to their common demigods of beauty, who are often white or who typically have white features. However, in our experience, most nonwhite patients who seek rhinoplasty with alarplasty wish to appear anatomically correct for their ethnicity. Their aesthetic desires tend to be to soften dramatic features, such as excessive flaring or wide alae. Thus, alarplasty will be an important procedure in pursuit of this goal.

Alar base reduction comes with risks. Previous studies have shown that dermabrasion may be necessary in 10% to 15% of patients to correct suture marks or wedge excision scars. Two of the 50 patients (4.0%) who had alarplasty were offered dermabrasion for prominent alar scars. One patient had a visible suture scar and the other had a visible wedge scar. Both patients declined further treatment. Other important complications of alar base reduction include notching and obliteration of the alar facial crease. In an evaluation of the long-term effects of alar base reduction, Bennett et al found that their alarplasty patients had no long-term change in their horizontal flare. They proposed that this may be a result of deprojection of the nose after nasal tip surgery causing a compensatory increase in nasal flare. The 2 procedures, thus, cancel each other out.

The medical literature generally addresses the procedure of alarplasty but does not evaluate its incidence and variation by ethnic group. Although alarplasty is more common in nonwhite patients, a significant percentage of white patients would also benefit from this procedure. An alarplasty incidence of 33% in patients undergoing revision rhinoplasty highlights the conclusion that too few alarplasties are likely being performed during the initial procedure. This study stresses the indications that point to the need for alarplasty, including wide alae, excessive alar flare, and acquired alar flare when nasal tip projection is to be reduced.

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