

# Quantitative Measurements of the Bulbous Tip in Ethnic Rhinoplasty

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**Background:** Refinement of the bulbous nasal tip continues to be one of the more challenging aspects of ethnic rhinoplasty. Better objective measures are necessary to quantitatively assess changes in surgery of the bulbous tip. We propose the use of a new nasal anatomic landmark in the subnasal vertex view, designated  $c^1$ , in conjunction with previously described landmarks to offer an improved means of characterizing the bulbous tip. Together, these landmarks form a pentagon, allowing for measurement of its angles and distances to quantitatively evaluate the nasal tip in the subnasal vertex view. We hypothesize that this method will provide a means of demonstrating a decrease in tip bulbosity postoperatively. **Methods:** An institutional review board–approved retrospective analysis of 44 nonwhite patients undergoing ethnic rhinoplasty was undertaken and preoperative and postoperative photographs in the subnasal vertex view were subjected to the proposed analysis. All patients underwent an open approach rhinoplasty with a combination of tip defatting and cartilage graft placement. Using the polygonal construct, several angles, distances, and areal indices were measured from the preoperative and postoperative photographs and comparison was made for statistical significance.

**Results:** All but 1 of the 8 parameters examined demonstrated statistical significance comparing preoperative and postoperative values. These measures, thus, allow the surgeon to objectively assess and ascertain a reduction in tip bulbosity of postoperative ethnic rhinoplasty patients.

between achieving aesthetic appearance and facial balance while trying to maintain the ethnically defining features of the patient.

common tip of nonwhite populations who seek rhinoplasty, has been described as depressed and flattened with hypertrophy of both the nasal skin covering and its underlying cartilaginous framework.<sup>8</sup> Several well-defined anatomic characteristics of the bulbous nasal tip include: a wide interdomal distance, a thick, sebaceous epidermal-dermal layer, an interdomal fibrofatty tissue, weak and thin lower lateral cartilages, and a weak tip support of the caudal septal attachments and intracanal ligaments. The basic repair of the bulbous tip works to rectify the stated problems. Corrections that are made during rhinoplasty are thinning of the nasal tip fat, strengthening of the lateral cartilage, and placing a strut tip graft. This allows for a more refined, sculpted, aquiline nasal tip, which is what most nonwhite rhinoplasty patients desire.

In 1986, Farkas et al<sup>3</sup> described, in detail, nasal anatomic landmarks (Fig. 1A). In the subnasal vertex view, they described the landmarks of the soft nose. One landmark of particular importance was a horizontal line at the upper limit of the columella ( $c$ ), which they defined as the base of the nasal tip. They also defined the pronasale ( $prn$ ) as the most protruded point of the tip of the nose, which is located in the midaxis of the apex nasi. In combination with these landmarks of the soft nose, a new anatomical landmark  $c^1$ , is defined in this paper.  $c^1$  is the most lateral extent of the dome of the lower lateral cartilages, as seen from the submental vertex view. The combination of the base of the nasal tip  $c$ ,  $c^1$ , and  $prn$ , forms a pentagon that defines the area of the tip lobule in the subnasal vertex view (Fig. 1B). Angles of the pentagon can be measured, preoperatively and postoperatively, to see

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## <sup>2</sup> Previous

studies have established the morphological differences between non-white noses and that of the white nose.<sup>6</sup> Of these differences, diminished nasal bones and cartilage, along with a prominent fibrofatty subcutaneous tissue pad are common in the ethnic nose.<sup>7</sup> The bulbous tip, a

. A pentagonal area (Fig. 1B), using the alar base,  $c^1$ , and  $prn$  was constructed, and angular changes were measured preoperatively and postoperatively (Fig. 3A–C). The following measurements were also taken from each patient to measure the change in nasal tip measurements: columella width (Fig. 2A), the base of the pentagon to the tip (Fig. 2B), the alar to alar distance (Fig. 2C), and the base of the columella ( $sn$ ) to the tip ( $prn$ ) (Fig. 2D).

All measurements were made using a computer measuring software device (Iconico.com), which measures geometric shapes on a computer screen. SPSS statistical methods were used to calculate  $P$  values for the changes in angles and tip projection (Fig. 3A–C).

All patients had open rhinoplasty septal strut and shield grafting and intradomal/subcutaneous fat excision. Each patient had a combination

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FIGURE 2. Preoperative and postoperative measurements taken of the bulbous tip. A, Columellar width from sn' to sn'. B, Base of the pentagon to the most protruded point, prn. C, Nasal width from alar to alar. D, Base of the columella, sn, to the most protruded point, prn.

relative to tip projection in the white population. They also went on to challenge Farkas et al, stating that the African American patient does not commonly fit into any of the 7 nostril types they described. Porter and Olson<sup>6</sup> categorized African American patients into 3 different nostril types: inverted, vertical, and horizontal. Most of their subjects fell into the vertical subcategory. As with most of the other studies that have been done trying to create an objective method, Porter and Olson<sup>6</sup> found significant variability within their subject population. They have

attributed this variability to the different ethnic origins of the African American population in the United States.

Other studies have tried to categorize and objectify the Hispanic nose. Higuera et al<sup>5</sup> conducted a 10-year retrospective study and classified the Hispanic patient into 3 different archetypes. This group of research also described surgeries that work well to correct these archetypes. Archetype 3, of particular importance, described the bulbous nose in Hispanic patients. It was characterized by decreased nasal



FIGURE 6. Intraoperative and postoperative images of an open approach rhinoplasty removal of the interdromal fat pad.

following components that effect projection, and therefore must be considered, are the skin, subcutaneous tissue, superficial musculoaponeurotic system, ligaments, and the lower lateral cartilage.<sup>9</sup> An important anatomic feature, which has effects on nasal tip projection, is the interdromal fat pad (Fig. 4). The interdromal fat pad is more commonly present in patients with thick-skinned noses, and a prominent feature of bulbous noses (Figs. 5 and 6).<sup>9,10</sup> To correct this, an open technique is of greater benefit, because it increases the ease of thinning the nasal tip fat (Fig 7). Another important feature of correcting the nasal tip projection is strengthening the lower lateral cartilage and putting a shield tip graft in to make a more defined tip.<sup>9</sup>

In our study, an objective, quantitative method was designed to show significant contouring and reduction of the ethnic bulbous tip. This method was created by using an open approach rhinoplasty and

FIGURE 7. Intraoperative photos of an open rhinoplasty technique on a bulbous nose. A, The photo shows an open technique on a bulbous nose before the thinning of the excessive fat (top circle) in the soft nose and the strengthening of the lower lateral cartilage (bottom circle). B, This photo shows the results after the thinning of the excessive fat in the soft nose and the strengthening of the lower lateral cartilage.

FIGURE 8. Before and after photos of patients with bulbous noses who underwent open rhinoplasty.

a combination of tip defatting and cartilage graft placement (Fig. 7B). A new anatomical landmark was created, c<sup>1</sup>. This was combined with previously defined anatomical landmarks, c<sup>1</sup> and prn, as described by Farkas et al<sup>3</sup> to create a polygon. Using the distances between the anatomical landmarks of this polygon and the angles of the same polygon, it is possible to create a reduction of ethnic bulbous tip with statistical significance in size reduction, polygonal elevation and recontouring of the tip (Fig. 8). Although the achievement of a statistically significant reduction in tip bulbosity does not necessarily signify aesthetic success, the author's surgical methods demonstrate how this polygonal construct may be applied to objectively ascertain a decrease in tip bulbosity of postoperative ethnic rhinoplasty patients. The full photos for 3 representative patients undergoing surgical correction of a bulbous tip are shown in Figure 9.

The causes of the wide nasal tip are, an enlarged lateral crura, wide arching between the medial and lateral crura, thick skin, an enlarged interdromal distance, or a combination of these.<sup>10,11</sup> An enlarged interdromal distance is caused by angle of divergence of the intermedia crura.<sup>11</sup> During surgical procedures of the bulbous nose, it is necessary to treat the alar cartilage and also the fatty tissue found over the dome, and the lateral crura need to be altered.<sup>12</sup> It has been shown that many surgeons still use tip maneuvers that can work well for thin-skinned whites, but are not adequate for thick epidermal, dermal, and subdermal ethnic tips. To that note, it is essential to distinguish 2 different types of bulbous tips: thick-skinned (primarily ethnic) and thin-skinned (primarily white).

For slightly bulbous or thin-skinned noses, a closed approach may be sufficient.<sup>13</sup> Thin-skinned bulbous tips are primarily bulbous because of overdeveloped lower lateral cartilages. For these individuals, nasal tip maneuvers, such as dome division, cephalic strip, interdromal

FIGURE 9. A, Preoperative and 3-year postoperative photos of 35-year-old woman who underwent an open rhinoplasty approach, defatting of the supratip fat, dome division, septal cartilage strut graft, shield graft, custom carved dorsal silastic implant, and horizontal nasal sill narrowing. B, Preoperative and 4-year postoperative photos of 54-year old woman who underwent an open rhinoplasty approach, defatting of the supratip fat, dome division, septal cartilage strut graft, shield graft, custom carved dorsal silastic implant, osteotomies, and horizontal nasal sill narrowing. C, Preoperative and 4-year postoperative photos of a 36-year old woman who underwent an open rhinoplasty approach with defatting of the supratip fat, dome division, septal cartilage strut graft, shield graft, custom carved dorsal silastic implant, osteotomies, and horizontal nasal sill narrowing.

