Dynamics in Rhinoplasty

Bahman Guyuron, M.D.
Cleveland, Ohio

Nasal dynamics were studied on 87 patients undergoing rhinoplasty of one zone or two distant nasal zones. Statistical analysis of the results revealed that reduction of the nasion area, besides setting the soft tissue back, gave the appearance of increased intercanthal distance and lengthened the nose. Reduction of the nasal bridge resulted in a wider appearance on frontal view and a cephalically rotated tip on profile. Augmentation of the bridge affected the nose reversely. Tip cephalad rotation was achieved by resecting one of the three areas: the cephalad portion of the lower lateral cartilages (affecting the rims more), the caudal septum (affecting the central portion more), and the caudal portion of the medial crura of the lower lateral cartilages (affecting the central portion only). Resection of the alar base not only narrowed the nostrils but also moved the alar rim caudally. Furthermore, it reduced tip projection when a large alar base reduction was done. Reduction of the nasal spine increased the upper lip length on profile and reduced tip projection when a large reduction took place. Significant reduction in caudal nose projection resulted in widening of the alar base. (Plast. Reconstr. Surg. 105: 2257, 2000.)

What makes rhinoplasty the most perplexing procedure in plastic surgery are the intricate, countless, and fascinating interplays that take place between the nasal frame and the overlying skin and between the different zones of the nose. It is the understanding, application, and perhaps discovery of new knowledge pertaining to these dynamic changes that will result in more predictable outcomes. In the December 1991 issue of Plastic and Reconstructive Surgery, we discussed some of these dynamics; in this issue, we will briefly review those findings and add some new observations.

Reduction of Radix

Because it moves the deepest point of the dorsum cephalically, reduction of the nasion might look shorter. Augmentation of the radix might make the nose shorter if the graft is placed cephalad and will render the nose longer if it is intended to make a deep radix more shallow.

The consequence of augmentation of the radix is an appearance of decreased intercanthal distance, which is not beneficial to a patient who has optimal or reduced intercanthal distance, whereas a patient with telecanthus would benefit from this change. The radix can be augmented on these patients who exhibit decreased intercanthal distance as long as a wide graft is selected, which will reduce the undesirable effect that could be engendered by application of a narrower graft.

The Dorsum

Dorsal augmentation will result in a nose that appears narrower, depending on the width of the graft, whereas reduction of dorsal projection will result in a wider appearance. Osteotomy and narrowing of the distance between the nasal bones will result in the appearance of reduced intercanthal distance.

Functionally, the nasal osteotomy and medial repositioning will reduce the airway if the nasal bones are too long in the cephalocaudal direction, advanced medially significantly, or when the inferior turbinate extend anteriorly to the level of the osteotomy. To minimize this functional disturbance, one has to either begin the osteotomy anteriorly (high to low), reduce the size of the inferior turbinate, or even eschew an osteotomy altogether.

Nasal Tip Projection

There are many options for increasing nasal tip projection. The transdomal suture is the most common maneuver that increases tip pro-

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jection. The gain will be minimal, not exceeding 1 to 2 mm, depending on the excess width of the domes. This will increase the lobule length and pinch the lateral crura, which may then necessitate an alar rim graft. The transdomal suture is useful on a patient who has a wide, underprojected tip with a short lobule and minimal tip deficiency.

An onlay tip graft could increase the projection up to 3 mm and results in increased lobule volume and a narrower tip, depending on the size of the graft. The columna and lip angle will widen. This type of tip graft is indicated when the underprojected tip has a short lobule and the nasolabial angle is narrow.

A subdomal graft will increase the tip projection minimally, control the interdomal distance, and create a better definition for the tip. It is specifically indicated for a patient who has a weak, narrow tip with poor definition and minimal underprojection.

Use of a columna strut is another means to gain more tip projection. This will widen and lengthen the columna, widen the nasolabial angle, and advance the subnasale. It is indicated when the columna is short with an ideal tip lobule and the patient has a dependent tip, narrow nasolabial angle, and retracted subnasale.

Approximation of the footplates will also result in a minimal gain in tip projection. The tip projection can also be increased by using an anchor suture to suspend the medial crura from the anterocaudal septum. The gain in tip projection can be very significant. This maneuver will retract and elongate the columna, widen the nasolabial angle, and make the tip somewhat stiff. It is indicated for patients who have a narrow nasolabial angle, a longer upper lip, a minimally underprojected tip, and a short columna.

Overlapping of the medial crura on the anterocaudal septum can also be used for gaining tip projection and will also retract the columna. It is indicated for patients who have a short, hanging columna, a narrow nasolabial angle, and a very significant tip projection deficiency. The only drawback to this approach is stiffness of the nose.

Augmentation of the nasal spine will also increase the tip projection; however, the degree of gain is unpredictable.

REDUCTION OF NASAL TIP PROJECTION

Reduction of nasal tip projection can be achieved in several ways. Resection of the cephalic portion of the lower lateral cartilages on individuals with cephalically oriented and convex lower lateral cartilages will result in minimal reduction of nasal tip projection. Resection of the domes will reduce nasal tip projection, but this maneuver is very destructive and is indicated only for patients who have very wide and overprojected tips.

Removal of the lateral and medial crura can aid in reduction of tip projection; however, this is somewhat unpredictable. If the patient has a caudally rotated tip, then one can shorten the lateral crura, which will also rotate the tip cephalically. The reverse effect can be achieved by removal of the footplates. If the nasolabial angle is optimal, then both the footplates and the lateral crura can be resected equally.

Reduction of the nasal spine will also decrease the tip projection by reducing the support of the medial crura. A large alar base resection, particularly laterally, can result in a slight reduction of the nasal tip projection. As much as one can gain increased tip projection by anchoring the medial crura to the caudal septum anteriorly, the reverse effect can be achieved by anchoring the medial crura posteriorly. This, however, will also result in a caudal rotation of the tip and narrowing of the columna-labial angle.

Reduction of caudal dorsal projection also will result in loss of tip projection, because the support for the lower lateral cartilages is reduced. This might be the most common reason for postoperative inadequate tip projection and development of supratip deformity.

NARROWING THE TIP

The tip width can be narrowed by several means. Interrupting the domes will result in approximation of the lateral crura to the medial crura and a narrower tip; however, this is very destructive. One has to approximate the lateral crura to the medial crura and apply a small cartilage graft to emulate the normal tip anatomy.

A small tip graft will also give the optical illusion of a narrower tip. An interdomal suture, by narrowing the angle of divergence of the medial crura, is highly effective and appropriate for patients with divergent medial crura. Another option is a transdomal suture, which is useful for patients with a wide domal arch.
ALTERATION OF THE NASOLABIAL ANGLE

The tip can be rotated cephalically using one of several maneuvers. Resection of the caudal septum in a wedge shape, based anteriorly, along with resection of a proportional amount of membranous septum, will be the most effective way to rotate the tip cephalically. This also will minimally retract the columella, which might or might not be beneficial to the patient.

Resection of the cephalic margin of the lower lateral cartilages will also result in minimal rotation of the tip cephalically. Removal of the caudal border of the medial crura, specifically when it is done anteriorly, will result in widening of the columella-labial angle. Application of a columella strut may also alter the columella-labial angle and rotate the tip cephalically. Anchoring the footplates and medial crura to the anterior septum to gain tip projection will rotate the tip cephalically. Finally, a nasal spine graft will create an optical illusion of cephalic rotation of the tip.

ALTERATION OF THE NASAL SPINE

Reduction of the nasal spine will result in recession of the subnasale, lengthening of the upper lip, and reduction of the tip projection and will create the illusion of reduction in the columella-labial angle. Augmentation of the nasal spine will have a reverse effect.

FOOTPLATES

The footplates support the nasal tip and control the width of the columella and the shape of the nostrils. Approximating the footplates by using transdomal sutures will result in augmentation of the tip projection and narrowing of the columella. Removing soft tissue in between the footplates might be necessary for patients who have a wide distance between the footplates, yet a wide columella-labial angle. However, most patients who have divergent footplates do possess a narrow columella-labial angle. If the tip projection is excessive, but the footplates are divergent and the columella base is wide, one may choose to resect the footplates.

ALAR BASE

Major reduction of the nasal base projection will result in widening of the alar base, necessitating an alar base resection that might not be apparent before the surgery. Resection of the alar base will result in narrowing of the nostrils and caudal transposition of the alar rim in relation to the medial crura.

SUMMARY

As our knowledge of nasal dynamics increases, we will be able to obtain more predictable results and use these maneuvers more discriminately. The best example is the use of a tip graft versus a columella strut. These two achieve totally different goals. A tip graft increases the lobule size and volume, which may be detrimental to the patient with a large lobule and short columella, whereas a strut will be an ideal choice for elongation of the columella along with an increase in the tip projection. Understanding these nuances could help to achieve a more harmonious nasal appearance.

Bahman Guyuron, M.D.
29017 Cedar Road
Cleveland, Ohio 44124
bguyuron@aol.com

REFERENCES