Refinement of the Nasal Tip

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Introduction

- Most difficult aspect in nasal tip surgery is producing a predictable outcome.
- Nasal tip is approached as a separate part of the rhinoplasty procedure because of its mobility and animation.
- Objective is to create a clearly defined stable, and properly projecting tip that appears symmetric on frontal and basal views, triangular on basal view, and that flows and blends well with the rest of the face.
- No single technique for refinement of the nasal tip suffices for the endless anatomical variations encountered.
Anatomy

- Anatomic dome of the nasal tip in reality is a domal segment whose configuration varies from concave to smooth to convex.
- Alar cartilages can be thought of as three crura (medial, middle, and lateral), each composed of two segments with distinct junction points.
Anatomy of Alar Cartilages

- Medial crura are the pillar on which the nasal tip rests, primary component of the columella.
- Subdivided into: lower footplate segment and superior columellar segment (scs).
- SCS represents narrow waist of columella and its length has correlation with visual length of the nostril.
- Columella-lobular junction marks the transition from nasal base to lobule, serves as the breakpoint in the columella’s double break and is the basis for the columella-lobular angle.
Alar Cartilage Anatomy

- Middle crus begins at the columella-lobular junction and ends at the lateral crus.
- Divided into a lobular segment and a domal segment.
- Lobular segment has extreme variability in width and length.
- Domal segment has a distinct domal notch that corresponds to the shape of the soft tissue triangle of the lobule.
- Domal junction is the critical landmark in the refined tip, the tip defining points fall on the domal junction line.
Alar Cartilage Anatomy

- Lateral crura are the primary component of the nasal lobule that influences its size, shape, and position.
- They begin at the domal junction and end in a chain of cartilages.
- A distinct scroll formation with the caudal border of the upper lateral cartilages is seen.
- Interdomal sling is formed from the caudal condensation of the transverse fascial tissues which ensheath the midline abutment of the lateral crura.

Fig. 1. Anatomy of the alar cartilages can be divided into three crura, each with two components, that join at two important aesthetic junction points.
Analysis and Diagnosis

- Surgeon's responsibility to balance the patient desires with what is realistically possible.
- Evaluation begins with inspection and palpation of the patient's nasal skin.
- Quality of the skin is an essential indicator of the surgical outcome, there needs to be enough subcutaneous tissue to provide adequate cushioning over the nasal skeleton, but still allow critical definition to the nasal tip.
- The size, shape, resilience, and attitude of the alar cartilages should be assessed by palpation, any asymmetry should be noted and discussed with the patient.
Tip Recoil

- Tip Recoil is defined as the inherent strength and support of the nasal tip.
- It can be evaluated by depressing the tip towards the upper lip and watching for the tip's supportive structure to spring back into position.
- If the recoil is good, and the tip cartilages resist the deforming influence, then tip surgery can usually be performed without fear of substantial support loss.

FIG. 178-8. Demonstration of finger palpation of the recoil mechanism of the nasal tip. The relative resistance to deformity demonstrated by the nasal tip provides a useful indication of the integrity of nasal tip support mechanisms.
Analysis and Diagnosis

- Palpate the internal vestibules of the nose for nasal septal twists and angulations; determine width and length of columella and medial crura.
- Evaluate the size and position of the nasal spine and its related caudal septal angle.
- Surgeon should look at position and inclination of the nasolabial and nasofrontal angles, the size and shape of the alae, the overall width of the upper and middle thirds of the nose, and the relationship of the nose to the rest of the facial features.
- Evaluate for facial asymmetries and the relationship of the chin projection to the nose.
Nasal Tip

- It represents the most anterior projecting point on the nose.
- Tip projection refers to the posterior to anterior distance that the tip extends from the facial plane at the alar crease.
- Nasal tip rotation is defined as movement of the tip along a circular arc consisting of a radius centered at the nasolabial angle that extends to the defining point.
- Lower lateral cartilages may be compared to a tripod: conjoined medial crura form one leg and the lateral crura represent the other two legs. Shortening or loss of integrity of any limb changes the spatial position of the apex (the nasal tip).
Figure 1. Tripod theory for nasal tip projection and rotation. Any procedure modifying the superior lateral legs of the tripod affects predominantly rotation whereas modifying the central columellar leg of the complex affects primarily projection and to a lesser extent rotation.
Preoperative Planning

- Standardized photodocumentation is essential.
- Realistic expectations and thorough informed consent should be discussed.
- Any asymmetries should be pointed out to the patient.
- Surgeon should identify what is good and what is less than ideal about the tip, planning to preserve the normal, favorable anatomy while correcting the abnormal anatomy.
Facial Analysis

Diagram showing various measurements and analyses of facial structures.
Surgical Considerations

Fig. 51-22. Considerations in tip surgery.
Surgical Techniques

- Ultimate goal is to satisfy the patient’s functional, esthetic, and psychological expectations for the procedure.
- Nasal lobule should be refined, symmetric, and harmonious with the other nasal features.
- Columella should be symmetric and have an appropriate relationship with the alar margins.
- There should be a satisfactory nasal base width and nostrils of appropriate size and shape.
- Loss of tip support and projection in the postoperative healing period is one of the most common surgical errors and is usually the result of the sacrifice of tip supports.
Tip Support Mechanisms

- **Major:**
  - size, shape, and resiliency of the medial and lateral crura.
  - wrap-around attachment of the medial crural footplates to the caudal septum.
  - attachment of the caudal margin of the upper lateral cartilages to the cephalic margin of the alar cartilage.

- **Minor:**
  - dorsal cartilaginous septum, interdomal ligaments, membranous septum, nasal spine, surrounding skin and soft tissues, and alar sidewalls.

Tip Support

- Appropriate tip incisions and approaches should be planned to preserve as many tip support mechanisms as possible.
- Alar cartilage sculpturing should respect this principle by conserving the volume and integrity of the lateral crus and avoiding radical excision and sacrifice of tip cartilage.
- Preferred method is to preserve a majority of the lateral crus while maintaining a complete, uninterrupted strip of alar cartilage.
Uninterrupted Cartilage Technique

FIG. 178-32. The maintenance of a residual complete strip following nasal tip sculpture tends to resist upward rotation during healing. As more and more of the cephalic margin of the lateral crus is excised, a larger tissue void develops, which fosters a slightly increased rotational influence.
Surgical Techniques

- Incisions
  - transcortilaginous
  - intercartilaginous
  - marginal

- Approaches
  - delivery of tip cartilages
  - non-delivery of tip cartilages
  - open approach
Non-Delivery Approach

- Good for patients who require minimal tip cartilage modeling, have satisfactory preoperative projection, and minimal interdomal distance.
- Single incision through the vestibular skin made several mm cephalic to the caudal margin of the lower lateral cartilage, vestibular skin is elevated, resection of few mm of medial-cephalic portion of lateral crus.
- Mimics nature, disturbs little normal anatomy, heals predictably and symmetrically.
Non-Delivery Approach
Delivery Approach

- Allows for visual presentation of the alar cartilages as a bipedicle chondrocutaneous flap.
- Intercartilaginous incision is made, elevation of skin and soft tissue in supraperichondrial plane from the cartilaginous pyramid and septal angle, marginal incision made at caudal margin of lower lateral cartilages, excision of medial portion of lateral crus leaving at least 8-10 mm strip.
- Vital supports preserved and healing is predictable.
Delivery Approach
Transdomal Sutures

- Transdomal suturing allows narrowing refinement to the tip in patients undergoing the delivery approach.
- Strengthen tip support and used to enhance tip support slightly.
- Good for patients with extremely thin skin, delicate alar side walls, bulbous cartilage.
Transdomal Suture

Fig. 51-33. Two-year surgical result in patient suitable for transdomal closure narrowing of nasal tip. Minimally redundant reduction carried out, maintaining nasolabial complete stop. New terminal change from triangular tip to more desirable triangular configuration. A and C, Preoperative views. B and D, Postoperative views.
Interrupted Strip Techniques

- Used in severe tip deformities and when more cephalic tip rotation is indicated.
- The complete strip is divided somewhere along its course and excessive portions of the medial and lateral crura are removed.
- Asymmetric healing and scarring are possible anytime the strip is interrupted, and some tip support is always sacrificed.
- Technique tends to foster cephalic tip rotation.
Open Approach

- Helpful in patients with cleft lip and nose abnormalities, asymmetric tips, and overprojecting tips with variant anatomy.
- More operative edema and scarring.
- Precise direct vision diagnosis and bimanual surgery.
- Soft tissues of the nose are elevated off the underlying cartilaginous and bony skeleton, reduction and augmentation procedures can be effected precisely with suture control.

Fig. 51-36. A, Incision utilized for open (external) approach to nasal tip. B, Exposure of nasal tip anatomy through open approach. C, Dorsal view of nose characterized by asymmetric nasal tip demonstrating convex left lateral crura and concave right lateral crus. D, View, through open approach, of asymmetric, twisted, and unequal lateral cartilages.
Tip Projection

- Complete strip techniques are recommended whenever possible to aid in maintaining projection. Additional projection may be obtained in a number of ways.
- Cartilage struts positioned below or between the medial crura are effective in establishing permanent projection.
- They should be shaped with a gentle curve to match the anatomy of the curved columella, but should never extend to the apex of the tip skin.
- If medial crural footplates diverge in a widely splayed fashion, further tip projection can be gained by resection of excessive intercrural soft tissue and suturing the medial crura together.
Cartilage Struts

Fig. 51-39. Position of cartilaginous strut between medial crura, creating supportive influence on nasal tip support and projection.
Tip Grafts

- Autogenous tip grafts can be used to add height and contour to the tip of the nose.
- Tip grafts may accentuate favorable tip-defining points and highlights and can give a more normal appearance to the tips with congenital or postsurgical inadequacies.
- Shaped a variety of ways including triangular, trapezoidal, or shield-like.

Fig. 51-42. A, Onlay tip cartilage grafts, frequently employed to enhance tip projection and contour nasal tip. B, Cartilage grafts, precisely positioned in infratip lobule area, enhance tip projection and aid in contouring tip anatomy. Size, shape, and length of tip may be altered to achieve a variety of favorable aesthetic contours. Grafts may be sutured in place for greater stability when employing either the open or delivery approach.
Tip Projection

- Goldman technique: complete vertical division of the alar cartilage and the underlying vestibular skin at the dome. The amount of tip projection is varied by the location of the cartilage cuts.
- Although this is not used much anymore, several surgeons have devised modifications to this technique that are still used.
- Cephalic rotation of the tip may increase projection by advancing the lateral crura medially and suturing them to lie above the cut ends of the medial crura.
- Transdomal sutures positioned between two complete alar cartilage strips can create additional projection of the tip.
Overprojected Tip

- Aim of procedures is to recess the tip to a degree that will produce a desirable profile angle.
- Vertical division is made in the region of the angle and the lateral crura are advanced and overlapped on the superior aspect of the medial crura.
- The overlap is usually 2-5 mm and the crura are resutured to hold them in this position.
- Projection of the lower lateral cartilages can also be reduced through a marginal incision.

Figure 6. Vertical dome division. Vertical division of the dome provides a technique to address such deformities as overprojection, counter-rotation, a hanging infratip lobule, wide domal arch, and lobule asymmetries. Overlapping and suturing the cut ends of the cartilage gives added strength and permanency to the correction.
Tip Rotation

- The dynamics of healing play a critical role in tip rotation principles.
- Planned degree of rotation depends on: length of nose, face, and upper lip; facial balance and proportions; patient’s aesthetic desires; and the surgeon’s aesthetic judgement.
- Tip rotation and projection are complementary and interrelated.
- Nasal tip rotation results from planned surgical modifications of the alar cartilages.
- There are 6 basic tip rotation techniques: three complete strip and three interrupted strip techniques.
- Complete strip techniques are preferred when the nasal anatomy permits because projection is preserved, better supported tip, and asymmetrical healing is less likely. They preserve the normal anatomy of the nasal tip.
Complete Strip Techniques

- Volume reduction of the alar cartilages results in tissue deficit of minimal, moderate, or maximal proportions.
- Greater tissue void resulting from moderate to maximal volume reduction tends to create progressively greater degrees of tip rotation.
- Substantial tip rotation depends on the addition of adjunctive procedures to achieve cephalic elevation of the tip complex.

FIG. 178-32. The maintenance of a residual complete strip following nasal tip sculpture tends to resist upward rotation during healing. As more and more of the cephalic margin of the lateral crus is excised, a larger tissue void develops, which fosters a slightly increased rotational influence.
Interrupted Strip Techniques

- Break the integrity and spring of the alar cartilages and cephalic rotation results from the upward scar contracture forces acting on the alar cartilage segments that are more frail and less well supported.
- Caution must be exercised when using interrupted strip techniques in patients with thin skin or delicate alar cartilages because the loss of good tip support sets the stage for loss of projection, alar collapse, notching, pinching, and asymmetry.
- Lateral interruption allows for more symmetry and less postoperative complications because the dividing cut is more lateral and covered with soft tissue.
- Medial interruption techniques are reserved for patients with thicker skin and supporting structures to minimize the undesirable consequences of asymmetric healing and even overrotation.
Modified Lateral Interrupted Strip

- Calibrated triangular excision of cartilage laterally and stabilized with suture.
- Allows the degree of rotation to be controlled by the surgeon.
- Essentially eliminates most of the undesirable sequelae of interrupted strip techniques.
- Changes in a predictable and permanent way the attitude of the alar cartilages.
Adjunctive Tip Rotation Techniques

- Used to enhance the previous techniques
- Shortening of the caudal septum by resection of geometrical triangle based upward.
- Excision of redundant scrolls of upper lateral cartilage.
- Vertical excision of a calibrated triangle of septal cartilage removed through a high transfixion incision.
- Reduction contouring of the caudal margins of the medial crura when overly convex.
Operative Planning

Fig. 51-21. Operative algorithm useful in selecting the incisions, approaches, and techniques employed in nasal tip surgery. In every case, the patient’s anatomy dictates the selection. As the anatomic deformity worsens or becomes more abnormal, a graduated approach is taken in a stepwise fashion to correct the deformity.
Conclusions

- Patient must be educated about what is realistic and what is not.
- Perfection is a dangerous expectation and will lead to disappointment.
- Multiple techniques are available and must be incorporated with the understanding of the structural and aesthetic impact on adjacent components of the nasal tip and its relationship to the remainder of the nose.