Facial Analysis of the Rhinoplasty Patient

Regina Rodman, MD
Faculty Mentor: Tamara Watts, MD PhD
The University of Texas Medical Branch (UTMB Health)
Department of Otolaryngology
Grand Rounds Presentation
March 29, 2012
Objectives

- Anatomic landmarks
- Photography
- Facial Analysis
- Anatomy
- Examples

Demayo, Cesar. Geometric Morphometric Analyses of Facial Shape in Twins. The Internet Journal of Biological Anthropology
Beauty is easily recognizable within a given culture, but difficult to define objectively.

The standard attractive face
- Symmetry
- Proportions
- Angles
- Relationships

Correction of what is askew determines the surgical plan
Primary points of interest

Trichion
Glabella
Nasion
Supratip
Tip
Subnasale
Stomion
Menton

Nasal aesthetic subunits
Frontal View

- Centered and symmetric
- Important that the midline be from Trichion → menton
Frankfort Plane

- Supra tragal point in line with inferior orbital rim
- Important and necessary in every view except base view
Lateral View

- Profile
- Only ½ eye
- Frankfort plane is still key
- Frankfort plane still important
- Distal medial canthus of eye aligned with distal oral commissure
- OR nasal tip in line with malar eminence
- The tip of the nose in alignment with the infrabrow line


-locateadoc.com [case_35205_before2.jpg](case_35205_before2.jpg)
Facial Analysis

- Horizontal 1/3s
  - Trichion → glabella
  - Glabella → subnasale
  - Subnasale → menton

- Lower 1/3 may be subdivided
  - Upper lip 1/3
  - Lower lip + chin 2/3

Facial Analysis

- Vertical 1/5s - intercanthal distance

Skin Thickness

- Thick at radix
- Thin at rhinion
- Thick at supratip break
- Thin at tip
Frontal View

- Twisted
- Dorsal width
- Alar base
- Tip defining points
- Asymmetry of domes
A curved, unbroken line should sweep from the medial brow to the tip defining point.

Disruption of brow-tip esthetic line

Abnormal contour involving the middle vault of the nose

http://www.drhilinski.com/rhinoplasty-tutorial/spreader-grafting/
A line from midglabella to the menton should bisect the nasal bridge and tip symmetrically.
Deviated Nose

Deviated Nose

http://exploreplasticsurgery.com/category/rhinoplasty/page/2
The width of the alar base = intercanthral distance
Alar base Reduction

The width of the bony sidewall of the nose should be 75-80% of the normal alar base.
Wide bony sidewall

Surgically corrected with lateral osteotomy

http://www.noses.co.nz/Photo%20Gallery?Service=Show&Image=4
Represent light reflection from the skin overlying the domes of lower lateral cartilages
Tip - Angle of Divergence

- Angle of divergence
- Lateral angulation from midline 50-60°
- Variations
  - Narrow
    - Elongated tip
  - Wide (Bulbous)
    - “Box and ball”
Angle of Divergence - Wide vs Narrow

Wide angle of divergence = BOX

Narrow angle

Rhinoplasty Dominic M. Castellano M.D. Castellano & Howard Specialty Center Tampa, FL, Osler Review Course
Angle of Divergence - Box vs. Ball

Box

Ball
Columella should hang just inferior to alar rims

- Infratip lobule should be a gentle “gull in flight”
  - Too much-reduction
  - Retracted-augmentation

- Nostril show should not be excessive
  - Over rotated tip

- Note asymmetries

Lateral View

- Dorsal hump
- Projection
- Rotation
  - Nasofrontal Angle
- Columella
Why measure?
- To help objectify elements of nose
- Aspects of the face other than the nose can be the cause of imbalance
  - Low radix/nasion can cause appearance of overprojection
  - Small chin can cause appearance of overprojection
Profile - Nasofrontal angle

- Connects the brow with the nasal dorsum
  - Glabella → Nasion
  - Nasion → Nasal tip

- Nasion (deepest point) should lie at supratarsal crease

- Angle is usually 115-130 degrees

- No well established parameters, use judgement to determine what is too shallow and too deep.

Tip Projection - 60% Goode method

- Line from alar crease → tip
- Nasion → tip
- Ratio should be 0.55-0.60 (alar) to 1.0 (nasion)

www.rhinoplastyspecialistsurgeon.com/
Tip Projection - Crumley 3,4,5 Method

- Crumley 3,4,5
  - 3=C alar point-to-nasal tip line
  - 4=A alar point-to-nasion line
  - 5=B nasion-to-nasal tip line
Nasal tip projection may also be measured in relation to the upper lip:
- 50-60% of the horizontal projection of the nose lies anterior to upper lip
- >60% is over projected
- <50% is under projected

Lateral View- Dorsum

- Line from Nasion to desired tip projection
- Nasal dorsum should lie at or slightly (1-2mm) posterior and parallel to this line
- Slight supratip break of dorsum gives definition and helps distinguish dorsum from tip
NasoFacial Angle

- The incline of the nasal dorsum in relation to the facial plane.
- Ideally 36 degrees (varies 30 to 40)

Tip rotation- Nasolabial Angle

- Line anterior to posterior point of nostril
- Vertical line perpendicular to Frankfurt plane, dropped along upper lip
- Men 90-95
- Women 95-115
Rotation vs Projection

Rhinoplasty DominicMCastellanoM.D.
Castellano&HowardSpecialtyCenter Tampa,Fl, Osler Review Course
Tip Support

- **Major**
  - LLC size and shape
  - LLC attachment to ULC
  - LLC attachment to caudal spine

- **Minor**
  - Interdominal ligament
  - Soft tissue envelope
  - Cartilaginous dorsum membranous septum
  - Nasal spine
Tripod theory

- First proposed by Anderson JR (1969)
- Tripod
  - Lateral cruras = two posterior legs
  - Conjoined medial cruras = anterior third leg
- Helps predict the tip rotation
  - Tilt in the direction of the shorter leg
- Cephalic rotation
  - Shortening of the lateral cruras
  - Lengthening medial cruras
Tripod Theory

Anderson's Tripod

Rotate:
- shorten lateral crura
- lengthen medial crura

Derotate:
- lengthen lateral crura
- shorten medial crura
The degree of resilience of the nasal tip supportive structures provides a reliable guide to the ability of the nasal tip to retain satisfactory support and projection following tip refinement procedures.
Alar -Columellar Relationship

- 2-4 mm columella should be visible below alar margin on profile
- >4 mm is excessive
  - Retracted alar lobule
  - Hanging caudal septum

Three possible configurations for the columella
- Normal
- Hanging
- Retracted

Three for the nostril rim or ala (normal, hanging, or retracted)

NINE possible configurations for the alar-columellar relationship
Columella- double break

- Columella is seen to have a double break
  - 1\textsuperscript{st}-tip of the nose turns posterior-inferior to infratip lobule
  - 2\textsuperscript{nd}- mid columella, where takes a horizontal course to subnasale
Base View

Size
Shape
Orientation
Width and length of columella
Height of Lobule
Figure 7: Base

1 - tip-defining point
2 - intermediate crus
3 - medial crus
4 - medial crural footplate
5 - caudal septum
6 - lateral crus
7 - naris
8 - nostril floor
9 - nostril sill
10 - alar lobule
11 - alar-facial groove or junction
12 - nasal spine
Base View

- Isosceles Triangle
- Lobule 1/3
- Columella 2/3
- Nostrils
  - Symmetric
  - Pear shaped
- Columella flare at base and at infratip lobule
Nasal – Chin Relationship

- Must address the relationship of the nose to the rest of the face.
- A deficient menton causes nose to appear disproportionately large
  - even though projection may be appropriate for nasal length
Chin Position

- Gonzales-Uloa
- Line from nasion perpendicular to Frankfort plane → chin should approximate this line

Chin Position

- Drop Frankfort perpendicular line from vermilion of lower lip ➔ evaluate chin relative to this line
  - Males should meet or come close
Chin Position

- Line that touches more projecting portion of lips → inferiorly, the menton should touch
  - Within 2-3 mm in women
Microgenia
  - Underdeveloped mental portion of mandible

Micrognathia
  - Underdeveloped mandible with class II occlusion

Retrognathia
  - Mandible is normal in size but retruded with class II occlusion

- Micrognathia or retrognathia = orthognathic surgery
- Microgenia or doesn’t desire orthognathic surgery = augmentation mentoplasty
Nasal-Brow-Forehead

- The shape of the forehead influences the perception of the nose
- Three fundamental contours

- Also prominent brow alters perception of the nasofrontal angle.
  - Appears deeper and more acute, therefore the nose appears greater projected
A forehead that slopes posteriorly from the brow to the hairline tends to exaggerate the appearance of nasal length and projection.

A flat, vertically oriented, or protruding forehead diminishes the appearance of nasal length.
Nasal-Brow Relation

http://facialfeminization.eu/procedures/forehead-recontouring/
Summary- Frontal View

- Frontal View
  - Divide the face
    - Horizontal 1/3
    - Vertical 1/5
  - Look for asymmetry
  - Dorsal width
    - 75% of alar base
  - Alar width
    - Intercanthal distance
  - Shape and asymmetry of tip
  - Note abnormalities in the dental occlusal relations
Summary-Lateral View

- Nasal length
- Tip projection
  - Goode 1: 0.6 ratio
  - Crumley 3, 4, 5
- Tip Rotation
  - Nasolabial angle 90-95 men
  - 950-115 in women
Nasal Relation

- All analysis of lips should include assessment of forehead, brow, lips, chin, dentition.
- Forehead - Nasofrontal angle
- Chin - Vermillion borders to chin (should be within 2-3 mm)
Now that I have your attention, let’s practice!
Case 1
Case 1

- hump reduction
- radix costal cartilage graft
- spreader grafts
- caudal septal extension graft
- cephalic margin tip graft
- alar rim grafts
- dome-binding sutures, open approach

www.drdayan.com
Case 2
Case 2- correction

- reduction of the length of the quadrangular cartilage

- excision of redundant vestibular skin

- shave-excision of the caudal margin of the medial and intermediate crura.
32 year old female presents for rhinoplasty

- Radix
- Osseocartilagenous vault
- Tip projection
- Chin

http://www.drsteiger.com/
Caudally positioned radix
Position of the radix accentuates a slight convexity at the rhinion
Under-projected osseocartilagenous vault
Normal tip projection
Microgenia

http://www.drsteiger.com/
Case 3 - Surgical Correction

- Augmentation of the radix and osseocartilagenous vault with a single-layer septal cartilage graft.
- The convexity of the rhinion was eliminated to provide a flat surface for placement of the dorsal augmentation graft.
- A chin implant was inserted for enhancement.
- Although the tip was cephalically rotated, projection remained unchanged.
- Dorsal augmentation accounted for the increase in the height of the nasal profile observed one and a half years post operative.
Case 4

Case 4

- Dorsal Hump Reduction
- Rotation of Tip
- Refinement of boxy tip
Case 5

- Patient with iatrogenic overprojection of the tip several years following rhinoplasty
Case 5

- exploration of the nasal tip
- retropositioning of the overprojection phenomenon
- bring the nose into better balance
THE END
- Square Jaw + Cheekbone Reduction, Rhinoplasty, Forehead Contouring

http://www.koreamedicalhub.com
Figure 32–2 Patient with iatrogenic overprojection of the tip several years following rhinoplasty surgery. (A) Inappropriate tip refinement technique was chosen, resulting in disproportion of the nose. Original operative record was unavailable. (B) Revision surgery consisted of exploration of the nasal tip with retropositioning of the overprojection phenomenon, intended to bring the nose into better balance.
Figure 32–4 (A) Patient requesting revision rhinoplasty following overaggressive procedure carried out elsewhere. (B) Revision repair utilizing autogenous cartilage grafts to augment the overdeep bony dorsum and nasofrontal angle, with reduction of the soft tissue and cartilaginous pollybeak deformity.
Figure 32–14 Two-year follow-up of patient operated utilizing a nondelivery cartilage splitting approach to the nose. Preoperative (column 1) and postoperative (column 2) condition.
She is a 30-year-old female who is requesting correction for improving the balance of her nose. She has got tension-nose deformity and microgenia. A Mersilene mesh implant medium size is placed through a submental skin incision into a precise subperiosteal pocket in addition to rhinoplasty performed through an open approach. She had lateral crural underlay grafts placed in addition to cephalic margin trim, bilateral spreader grafts, and bilateral alar rim grafts. She had an alar wedge excision performed on the left-hand side to narrow her nostrils; in addition, she had tongue-in-groove maneuver to maintain projection and rotation of the tip, bilateral domal sutures performed both intradomal and transdomal in addition to finishing off the nose with soft tissue placed on the nasal dorsum for camouflage in a smooth finish.
Tension nose deformity. She underwent hump projection/deprojection with a complete transfixion incision, cartilage in the nasal tip, alar rim grafts, and a chin implant, pure closed approach.
Increase Rotation: Transdomal suture that recruits lateral crura medially, Base-up resection of caudal septum (variable effect), Cephalic resection (variable effect), Lateral crural overlay, Columellar struct (variable effect), Plumping grafts (variable effect) Illusions of rotation: increase double break, plumping grafts (blunting nasolabial angle)

Decrease Rotation (Counter-rotate) Full -transfixion incision, Double-layer tip graft, Shorten medial crura, Caudal extension graft, Reconstruct L strut as in rib graft reconstruction (integrated dorsal graft/columellar strut) of saddle nose.
Projection

- **Increase Projection:** Lateral crural steal (increased projection, increased rotation), Tip graft, Plumping grafts, Premaxillary graft, Septocolumellar sutures (buried) Columellar strut (variable effect), Caudal extension graft,

- **Decrease Projection:** High-partial or full transfixion- incision, Lateral crural overlay (decreased projection, increased rotation), Nasal spine reduction, Vertical dome division with excision of excess medial crura with suture reattachment
Length

- **Increase Length:** Caudal extension graft, Radix graft, Double-layer tip graft, reconstruct L strut

See "increase"

**Decrease Length:** Rotation, Deepen nasofrontal angle
UnderProjection

- Lateral –
- Tip graft
Deprojection
Cephalic Trim
Trim Caudal end
Lateral Crural overlay

Controlled Nasal Tip Rotation via the Lateral Crural Overlay Technique
Russel W. H. Kridel, MD,
Raymond J. Konior, MD
DeRotate

- Medial crural overlay
- Extension spreaders
Internal Nasal Valve Collapse

- High septal deflection
- Treatment
- Spreaders
- Park suture
- Batten graft
- Suture from maxilla to ULC
Complications

- Pollybeak
- Wide dorsum (open roof)
- Notching
- Internal valve collapse
- External Valve collapse
- Chronic intermittent swelling
- TSS from packing
- Inverted V
- Septal hematoma