Functional Considerations in Rhinoplasty

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Nasal Obstruction

- **Primary concern**
  
  “I can’t breathe through my nose
  ... and by the way, could you also ...”

- **Secondary concern**

  “My nose is too ...
  ... and while you’re in there ...”
History

- **Onset**
  - Sudden
  - Slow, progressive

- **Frequency**
  - Periodic (nasal cycle)
  - Seasonal (allergy)
  - Constant (anatomic)

- **Laterality**
  - Bilateral
  - Unilateral

- **Functional**

- **Severity**
Examination

- Routine external examination

- Internal examination
  - Visualization
    - Nasal speculum
    - Endoscope
  - Direct palpation
  - May require topical decongestant

- Asses four key components
  - Nostril
  - Vestibule
  - Internal valve
  - Bony valve
Nostril Valve

- **Boundaries**
  - Caudal septum
  - Medial footplates
  - Columella
  - Alar rim & lobule
  - Nostril sill

- **Problems**
  - Septal deviation
  - Alar collapse
  - Narrow nostril or wide columella
Vestibule

- **Boundaries**
  - Septum
  - Maxillary crest
  - Lateral crus

- **Problems**
  - Septal deviation
  - Premaxillary spur
  - Lateral alar collapse
  - Webbing of vestibule
Internal Valve

- **Boundaries**
  - Septum
  - Upper lateral cartilage
  - Turbinate

- **Problems**
  - Primary collapse
  - Secondary collapse
  - Turbinate hypertrophy
  - Vomer spur
Bony Valve

- Boundaries
  - Bony septum
  - Nasal Bones

- Problems
  - Traumatic deviation
  - Post-surgical collapse
Septoplasty
Septoplasty

- Functional areas
  - Central Body
  - Caudal Strut
  - Dorsal Strut

- Classification of abnormalities
  - Grade I, II
    - Deflection or spur at the septal-vomer junction
    - Bowing or angulation of central septum
  - Grade III, IV
    - Possible septal body deformities (Grade I, II) with
    - Subluxation of caudal strut from anterior nasal spine or
    - Displacement or deformity of caudal septum
  - Grade V
    - Possible caudal septum and body deformities (I – IV) with
    - Twisted dorsal strut
Grade I

- **Problem**
  - Deflection or spur at the septal-vomer junction

- **Approach**
  - Closed

- **Procedures**
  - Inferior resection with alignment at crest
  - Central septal resection
  - Osteotomies for removal of maxillary crest or vomer spur
Grade I Repair

- **Preparation**
  - Septal injection with 1% Lidocaine with Epinepherine 1:100,000
  - Nasal pledgets
    - Cocaine solution
    - Oxymetazoline
  - Useful for hemostasis, pain control, hydrodissection of subperichondrial plane

- **Incision**
  - Kilian
  - Hemitransfixion
  - Transfixion
Grade I Repair

- **Elevation**
  - Submucoperichondrial dissection to ethmoid plate
  - Submucoperiosteal dissection of perpendicular plate of the ethmoid
  - Inferior tunnel in submucoperiosteal plane on nasal floor
  - Connection of anterior and inferior pockets

- **Mobilization**
  - Dislocation of posterior septum from ethmoid plate
  - Dislocation of inferior septum from vomer
Grade I Repair

- **Cartilage repair**
  - Inferior septal deviation removal or
  - Central septum removal

- **Bony repair**
  - Removal of maxillary crest
  - Removal of vomer spur
Grade I Repair

- **Closure**
  - Drainage pathway
  - Flap closure
    - Nasal splints
    - Quilting suture
  - Incision closure
    - Chromic
    - Monocryl
Grade II

- **Problem**
  - Possible Grade I abnormalities
  - Central septal bowing or angulation

- **Approach**
  - Closed

- **Procedures**
  - Grade I correction maneuvers
  - Septal scoring
  - Inferior septal resection with realignment
  - Central septal removal with straightening and re-implantation
  - Central septal removal
Grade II Repair

- Preparation, incision, elevation, and mobilization similar to grade I

- Cartilage repair options
  - Cartilage scoring
    - Cartilage “memory” may lead to failure
Grade II Repair

- Cartilage repair options
  - Inferior cartilage excision
    - May need suture fixation to maxillary crest.
  - Central septal removal with straightening and re-implantation
    - Useful with multiple cartilaginous fractures and persistent cartilaginous memory preventing scoring
  - Central septal removal
    - Simple, fast technique
    - Perforation risk
    - Increases difficulty of revisions
Grade II Repair

- **Bony Repair**
  - Removal of maxillary crest
  - Removal of vomer spur
  - Removal of deviated Ethmoid plate

- **Closure**
  - Same as Grade I
Grade III

- **Problem**
  - Subluxation of caudal strut from anterior nasal spine

- **Approach**
  - Closed or Open

- **Procedures**
  - Relocation
  - Resection
  - Reinforcement
  - Replacement
Grade III Repair

- **Preparation**
  - Same as Grade II

- **Incision**
  - Kilian
  - Hemitransfixion
  - Transfixion

- **Elevation**
  - Elevation onto the nasal floor bilaterally
  - Exposure of anterior nasal spine
Grade III Repair

- **Mobilization**
  - Dislocation of posterior septum from ethmoid plate
  - Dislocation of inferior septum from vomer

- **Cartilage repair**
  - Inferior resection
  - Cartilage relocation
Grade III Repair

- **Cartilage repair**
  - **Caudal reinforcement**
    - Use of a caudal strut cartilage splint
    - Not frequently used due to widening effect of columella
  - **Cartilage replacement**
    - “L-strut” replacement
    - Isolated caudal strut resection and replacement
Grade III Repair

- **Bony Repair**
  - Removal of maxillary crest
  - Removal of vomer spur
  - Removal of deviated Ethmoid plate

- **Closure**
  - Same as Grade II for closed approach
  - External closure if open approach utilized
Grade IV

- **Problem**
  - Displacement or deformity of caudal septum

- **Approach**
  - Open vs. Closed

- **Procedures**
  - “Galloway” technique
  - L-strut replacement
Grade IV Repair

- Cartilage Repair
  - L-Strut repair
    - Removal of cartilaginous septum
    - Leave several mm of dorsal strut for suture fixation
    - Recreation of dorsal and caudal L-strut
    - Fixation to remaining septum and anterior nasal spine
Grade IV Repair

- **Cartilage Repair**
  - Galloway technique
    - Closed transfixion approach
    - Resection of caudal strut
    - Creation of pocket between crural footplates
    - Creation of replacement strut
    - Advancement of caudal strut into intercrural pocket
    - Suture fixation of caudal strut into position

- **Bony Repair**
  - Osteotomies for removal of inferior crest and spurs
  - Removal of posterior deflections
Grade V

- **Problem**
  - Twisted dorsal strut

- **Approach**
  - Open

- **Procedures**
  - L-Strut replacement
  - Extended L-Strut replacement
Grade V Repair

- Cartilage Repair
  - L-strut repair
    - Similar to Grade IV repair
    - Strut sutured to opposite side from original deflection
    - Opposing spreader graft placed.
    - Upper lateral cartilages re-attached
Grade V Repair

- Cartilage repair
  - Extended L-strut repair
    - Removal of entire septal cartilage
    - Bony septum exposed via previous dorsal hump excision or medial osteotomies
    - Replacement of L-strut with fixation to bony septum and anterior nasal spine.
    - Spreader grafts placed
    - Upper lats re-attached
Other Functional Considerations
Alar Collapse

- Collapse is dynamic

- May result from
  - Aging
  - Facial nerve paralysis
  - Secondary to resection of alar cartilages

- Batten Grafts
  - Commonly harvested from concha
  - Extends from maxilla with tapering towards the tip
Divergent Footplates
Wide Columella

- Obstruction may result from
  - Footplate divergence
  - Excessive intercrural soft tissue

- Methods of repair include
  - Scoring and suture fixation of footplates
  - Resection of divergent section of footplates
  - Removal of intervening soft tissue
Spreader grafts

- **Graft harvest**
  - Central septum
  - Conchal cartilage

- **Placement**
  - Align with dorsal strut
  - Place several mm under nasal bones

- **Fixation**
  - Suture to dorsum with through and through stitches
  - Re-attach upper lateral cartilages with through and through stitches
Turbinate Hypertrophy
Turbinate Procedures

- Outfracture
  - Simple
  - Minimal risk, bleeding
  - Elevator used for lateralization

- Bipolar cauterization
  - Simple
  - Minimal risk, bleeding
  - May not acutely reduce size
Turbinate Procedures

- **Anterior turbinoplasty**
  - Resection of head of inferior turbinate
  - Functional results usually good
  - Bleeding possible

- **Submucous resection**
  - Most technically difficult
  - Effects longer lasting than previous methods
  - Can still recur
  - Bleeding possible
Turbinate Procedures

- Turbinectomy
  - Most permanent procedure
  - Acute risk – severe bleeding
  - Delayed risk – atrophic rhinitis