The Nasal Septum

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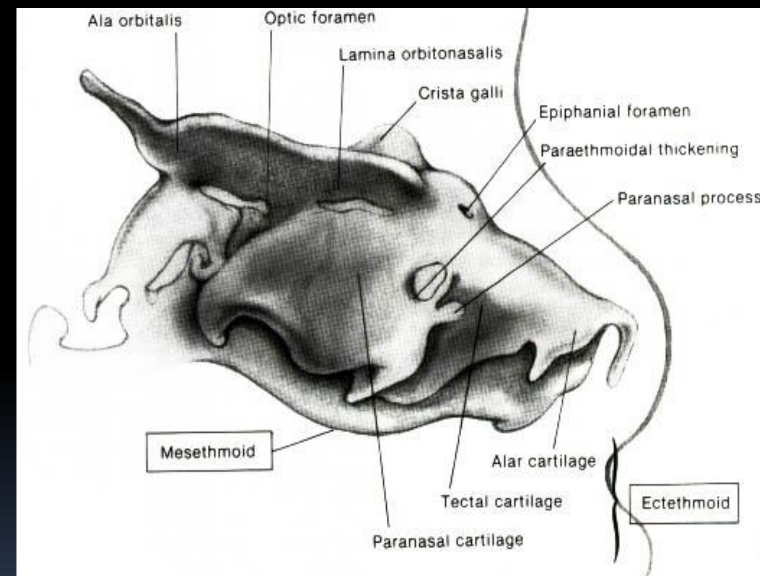
The Nasal Septum Development

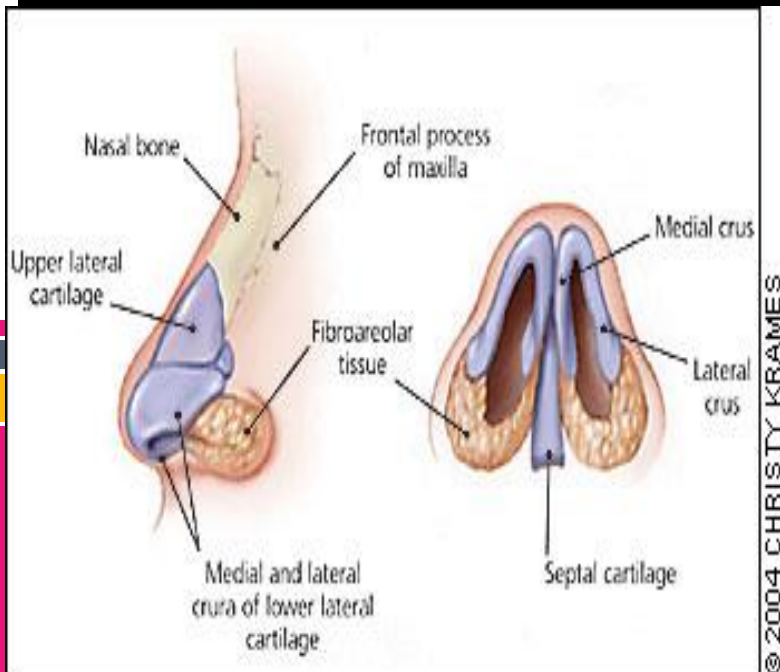
I. Cartilaginous Vault

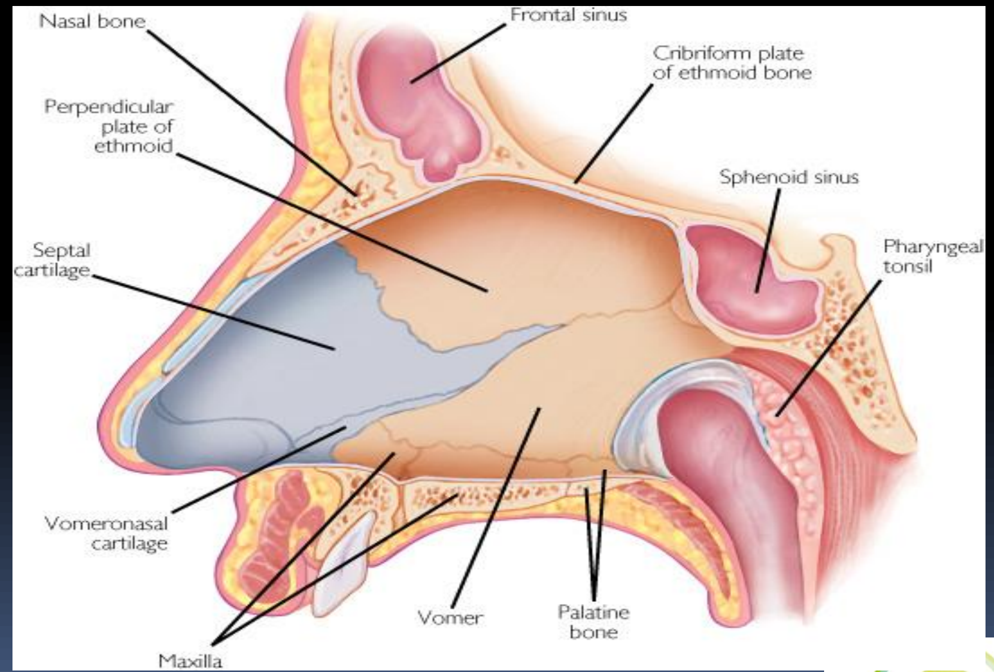
II. Bony Vault



Cartilaginous Septum

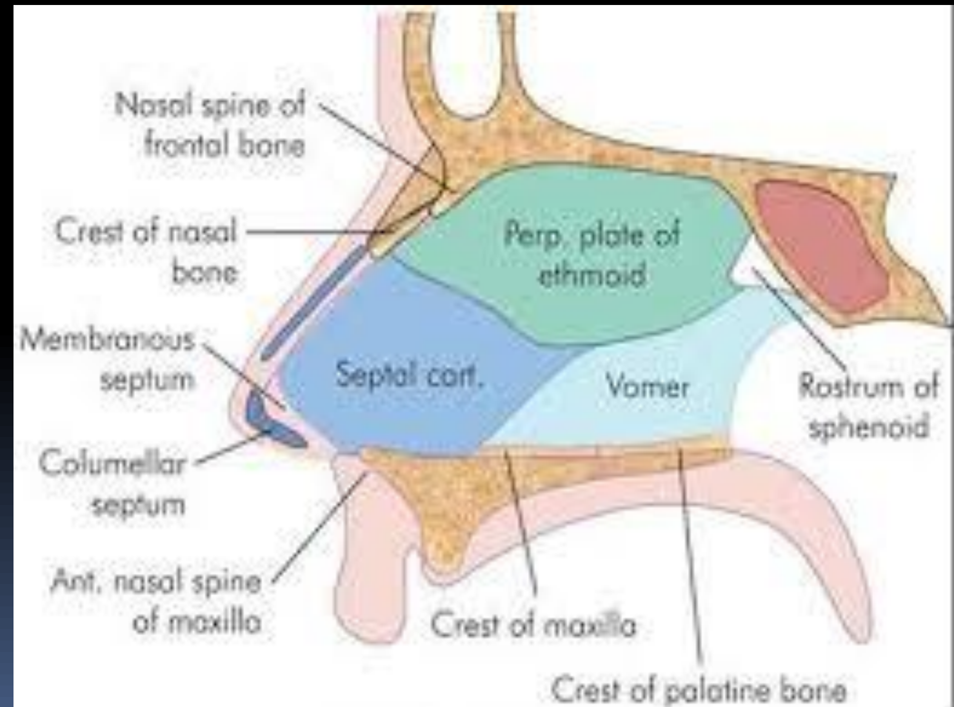
- Septal (quadrilateral) cartilage
- The vomeronasal cartilages
- Medial crura of the alar (lower lateral) cartilages





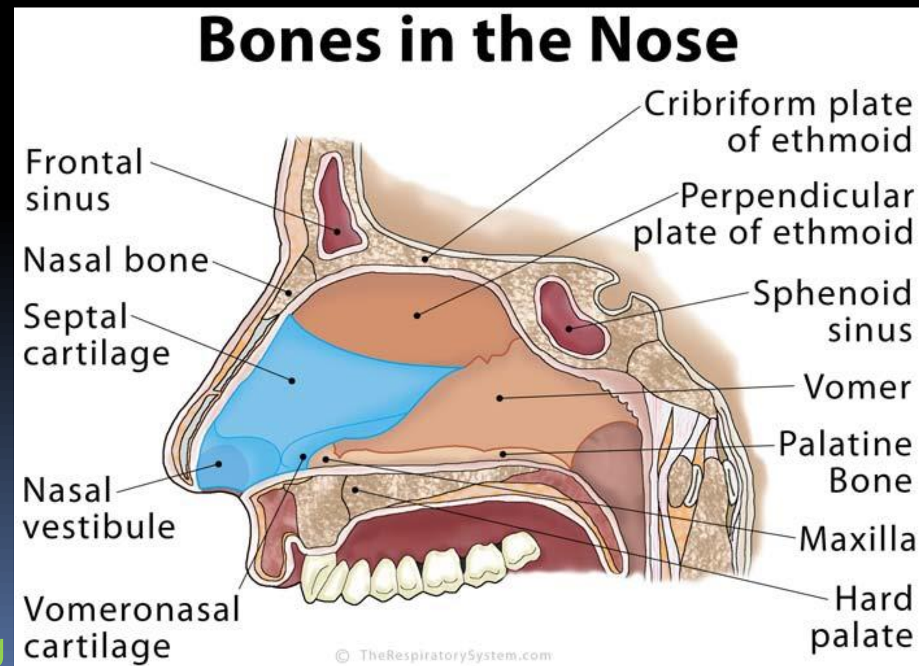
The Membranous Septum (Mobile Septum)

- Anterior to the end of the septal cartilage.
- It is formed by skin and subcutaneous tissue of the nasal columella.



Bony Septum

- Composed of two major elements:
  - The Vomer
  - The Perpendicular plate of the Ethmoid



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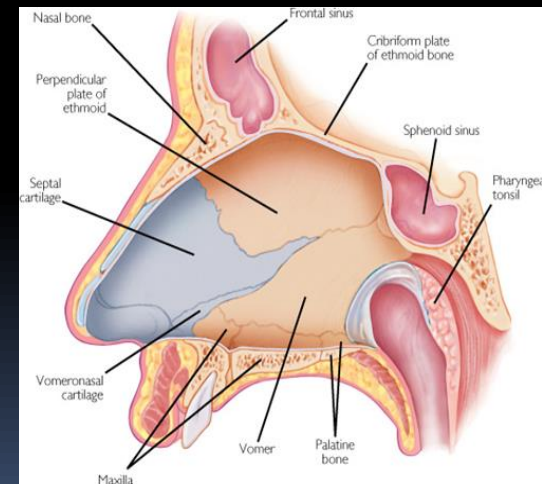
The perpendicular Plate of the Ethmoid (Mesoethmoid)

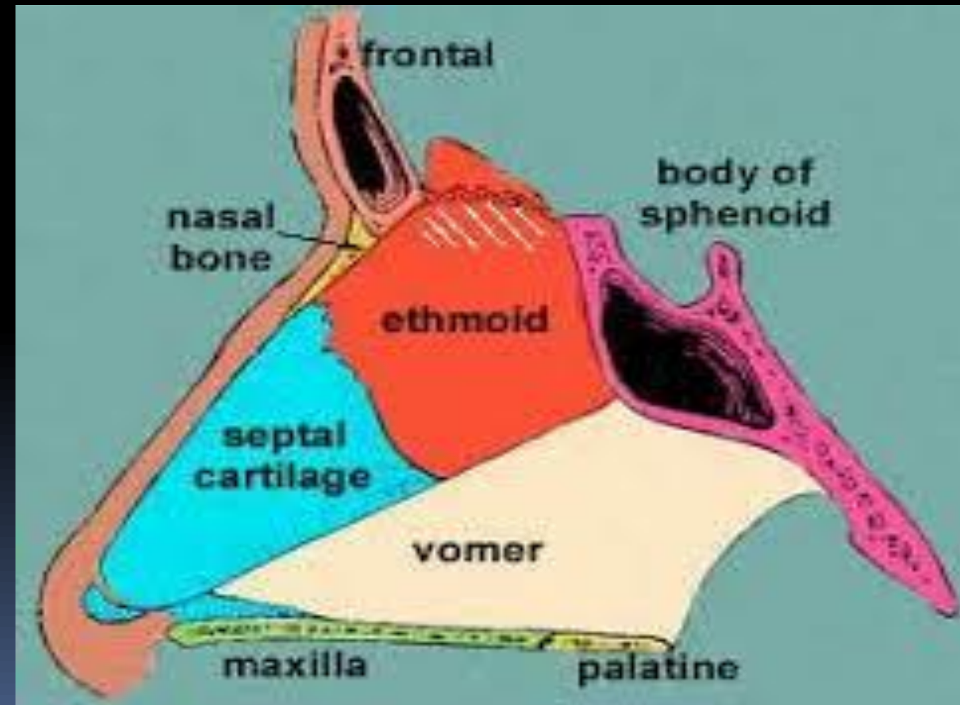
- Ossification completed by 17th year of age.
- Replacement of cartilaginous septum with thin bone.

- At the nasal roof it articulates with the cribriform plate and extends as the crista galli



The Vomer

- Develops from connective tissue membrane on each side of the septal cartilage.
- The intervening cartilage absorbed completed by mid adult hood.

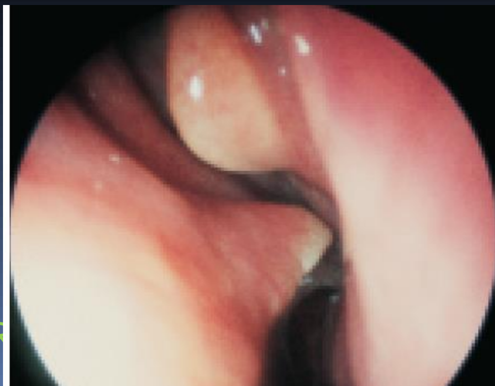


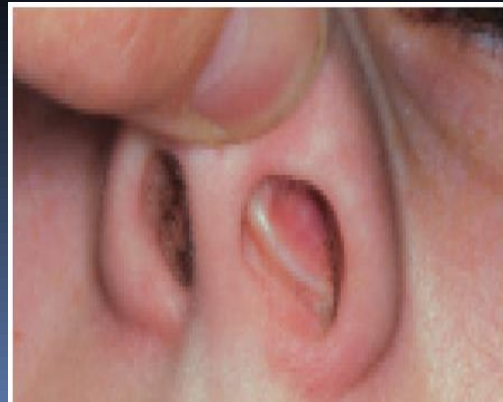
Inequality of Growth

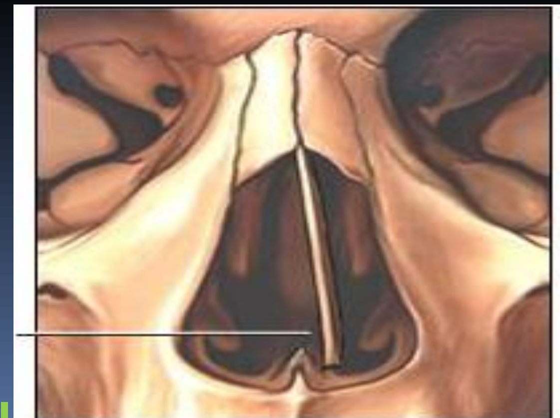
- Creating septal spur.
- Elevations and ridgelike protuberances

Asymmetry of the Nasal Septum

- Approximately 80 % of humans have DNS
- Any or all parts of the septum except for the posterior free border at the choanae.
- A common area of deflection is along the articulation between the vomer and the perpendicular plate of the ethmoid
- DNS to one side or S shape to both side
- spurs, crests, dislocation of quadrangular septal cartilage, buckling







Septal Deviations

- SSx: unilateral nasal obstruction (may be bilateral), hyposmia, epistaxis, recurrent sinusitis
- Dx: anterior rhinoscopy

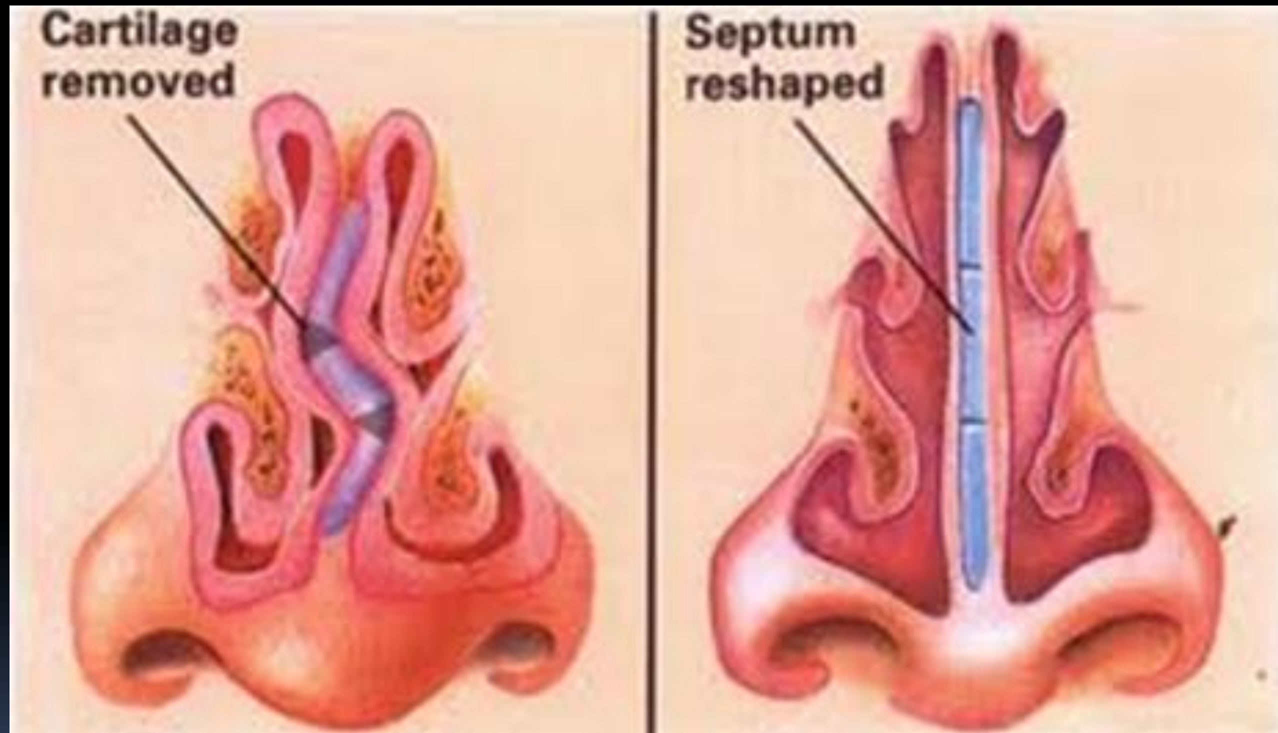
Surgical Management

- **Submucous Resection(SMR): obstructing cartilaginous and bony portion**
- **Septoplasty: removal of deviated cartilaginous and bony septum** with **reinsertion** after remodeling and **repositioning** (preserves support system, less risk of perforation)

INDICATIONS

- nasal obstruction (deviated nasal septum),
- epistaxis, chronic sinusitis (when septum is obstructing),
- access for transseptal sphenoidotomy,
- headache from an impacted spur
- septal neoplasia (rare)

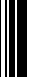
Goals

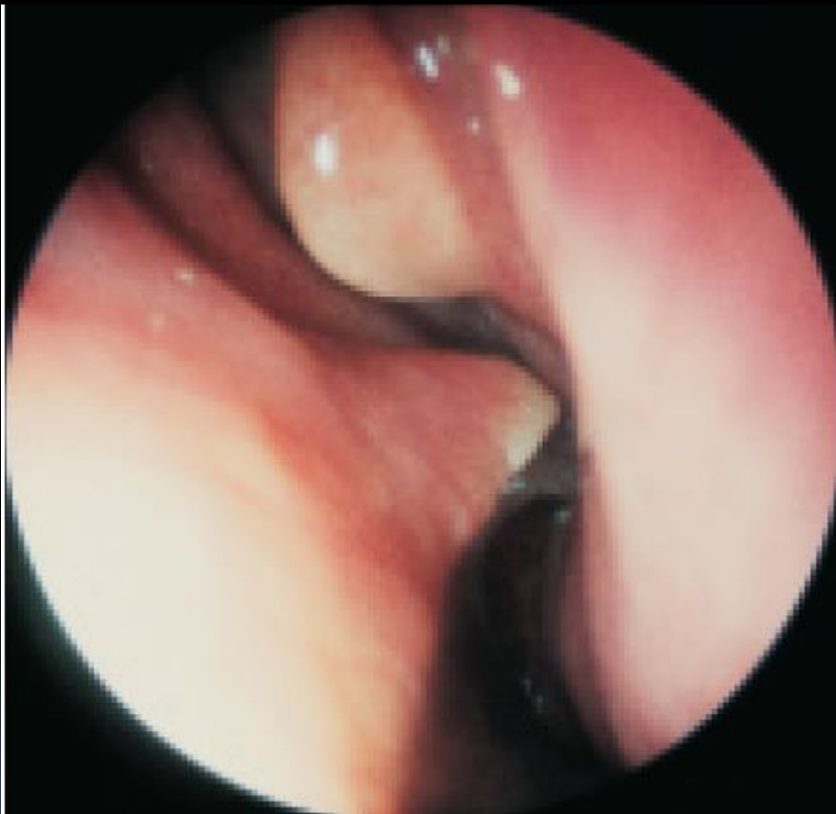


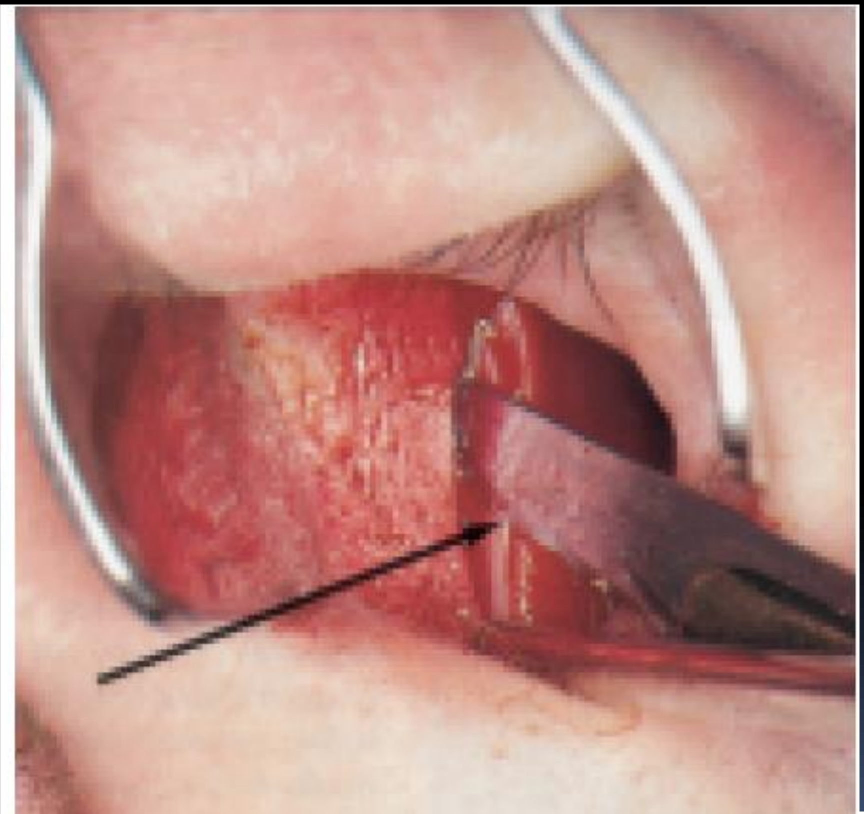
EMERGENCIES NASAL OBSTRUCTION

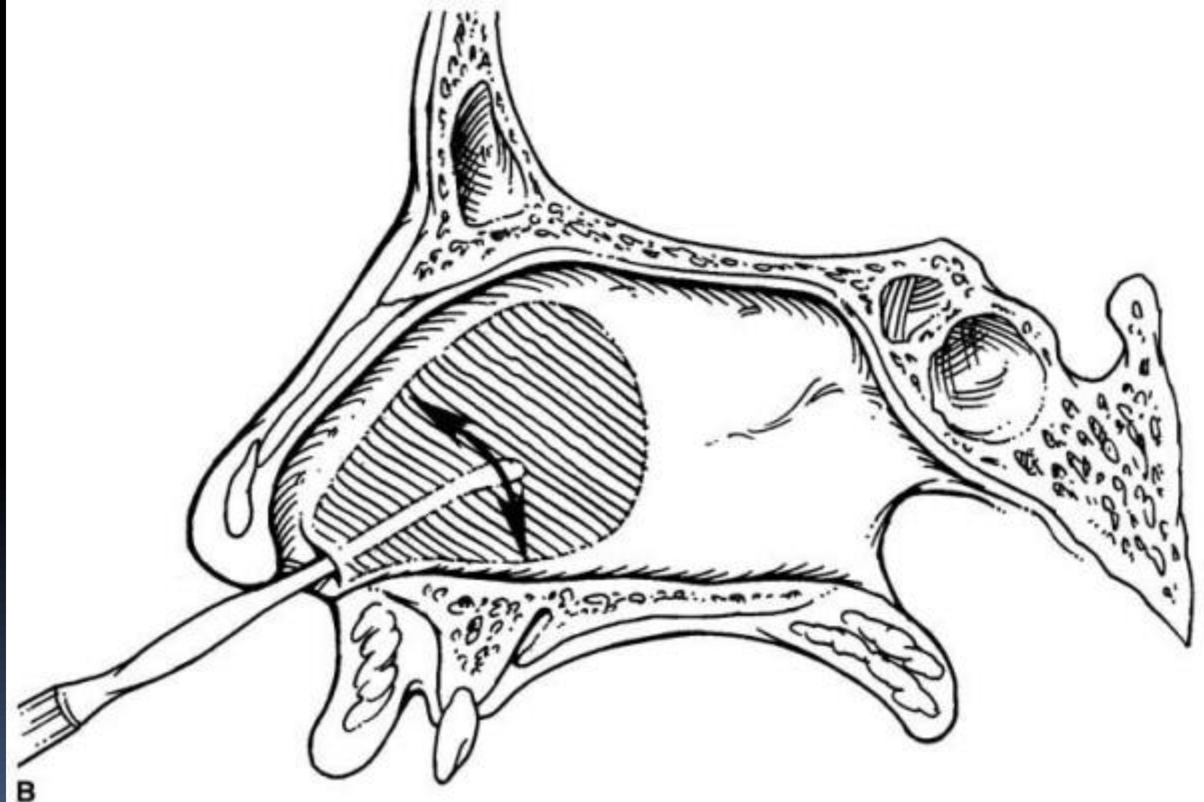
Diagnosis	Emergency	Complications
Septal hematoma	Elevation of mucosal perichondrium with cartilage devascularization	Septal cartilage necrosis, development of a saddle-nose deformity
Septal abscess	Intracranial extension of infection	Septal cartilage necrosis, development of a saddle-nose deformity, cavernous sinus thrombosis, intracranial infection
Mucormycosis	Tissue destruction	Extension to brain or orbit

Septoplasty







FREER
COTTLE

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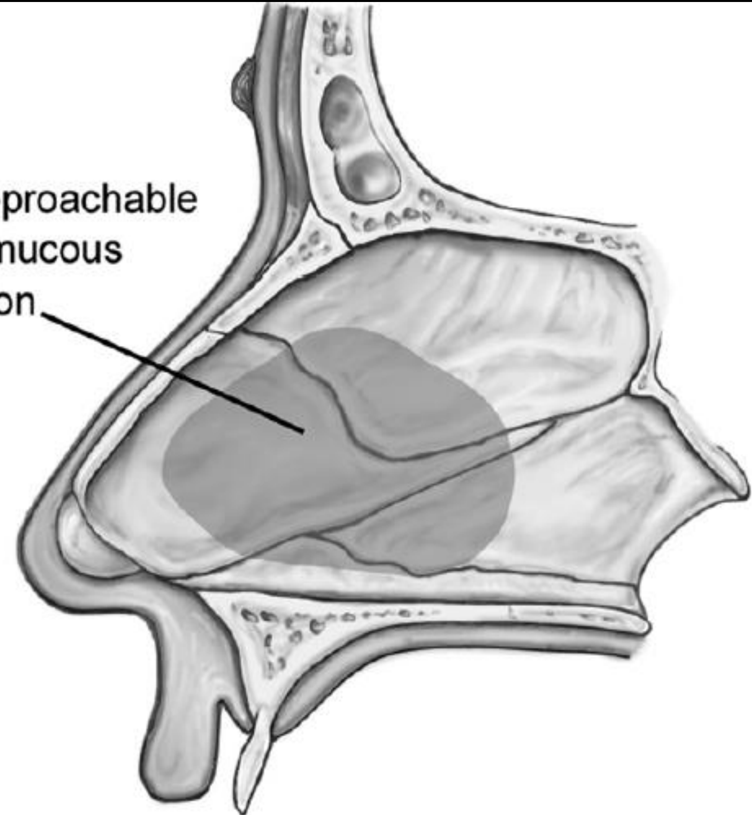
Submucous Resection

Surgical correction of nasal valve deformities
Widening the valve apex
Spreader grafts
Osteotomies
Widening the valve angle
Flaring sutures
Suspension sutures
Butterfly grafts
Stiffening the lateral crura
Alar batten grafts
Lateral crural J-flap



Dorsal Strut

Reshape &
Reposition

Resect

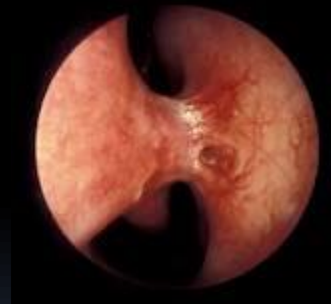
Caudal Strut

Complications

- Psynechia
- perforation,
- saddle nose deformity (over resecting cartilage anteriorly),
- cribriform plate fracture,
- septal hematomas,
- anosmia,
- septal abscess,
- bleeding

Psynechia

- Cause
- Manifestation
- Treatment

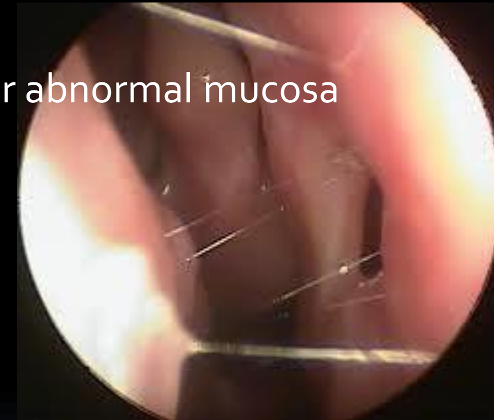


Septal Perforation

- Cause
  - Septoplasties (Most Common Cause, >50%),
  - Infections
  - (Tertiary Syphilis),
  - Trauma (Nose Picking),
  - Neoplasms,
  - Granulomatous
  - Disease,
  - Vasculitis,
  - Cocaine Abuse,
  - Corticosteroid nasal spray

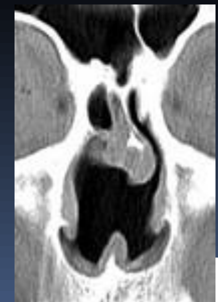
Diagnosis :

- Anterior rhinoscopy
- Biopsy of granulation tissue or abnormal mucosa



- Manifestation
  - Obstructive Sensation From Turbulent Flow, May Be Asymptomatic
  - Crusting,
  - Epistaxis,
  - Whistling,
- Treatment

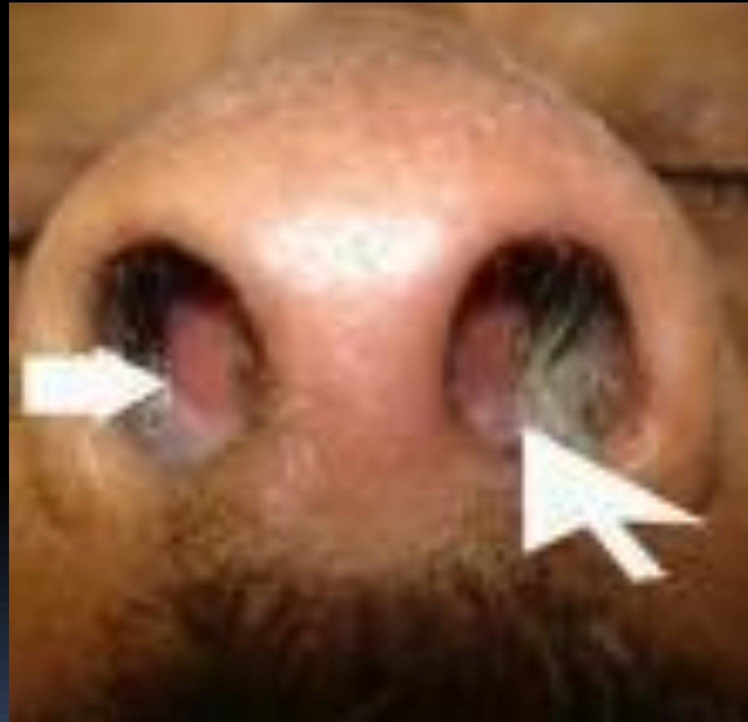
1. Saline irrigation, emollients
2. Consider sliding or rotating mucoperichondrial flaps with or without a fascial graft; contraindicated for large perforations (approximately >2 cm of vertical height), cocaine abusers, malignancy, granulomatous or vascular diseases
3. Silastic Button



Sadel nasal deformity

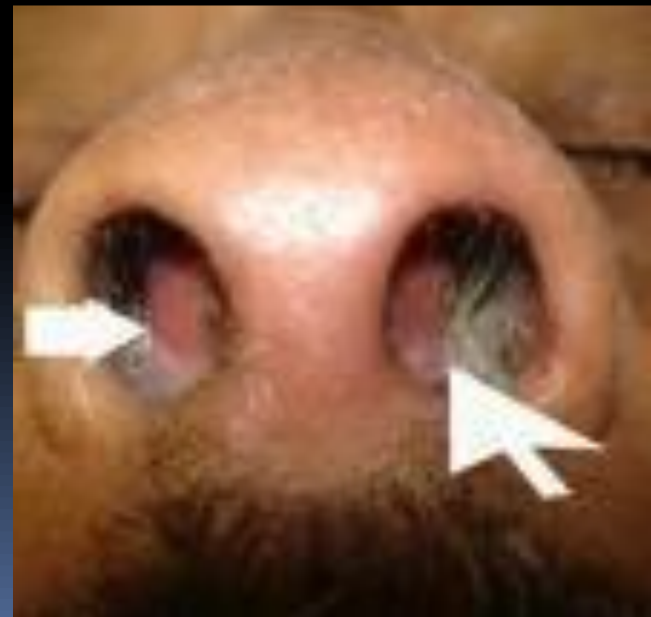
- Cause
- Manifestation
- Treatment

Septal Hematoma



Symptoms and Signs

- Unilateral obstruction (may be bilateral),
- septal swelling
-



Complications

- septal abscess,
- cavernous sinus thrombosis,
- saddle nose deformity

Treatment

- Immediate evacuation of hematoma
- Nasal packing
- Antibiotic prophylaxis

Functional Endoscopic Sinus Surgery

Functional Endoscopic Sinus Surgery

- Medialize middle turbinate
- Excise uncinate process
- Anterior then posterior ethmoidectomies
- Sphenoidotomy
- Frontal recess sinusectomy
- Create maxillary antrostomy

FESS Land Marks (CLOSE)

Indications for ESS

- Chronic sinusitis,
- Complicated sinusitis,
- Rrecurrent acute sinusitis,
- Failed medical management of acute sinusitis,
- Fungal sinusitis
- Obstructive nasal polyposis
- Sinus mucoceles
- Remove foreign bodies
- Tumor excision,

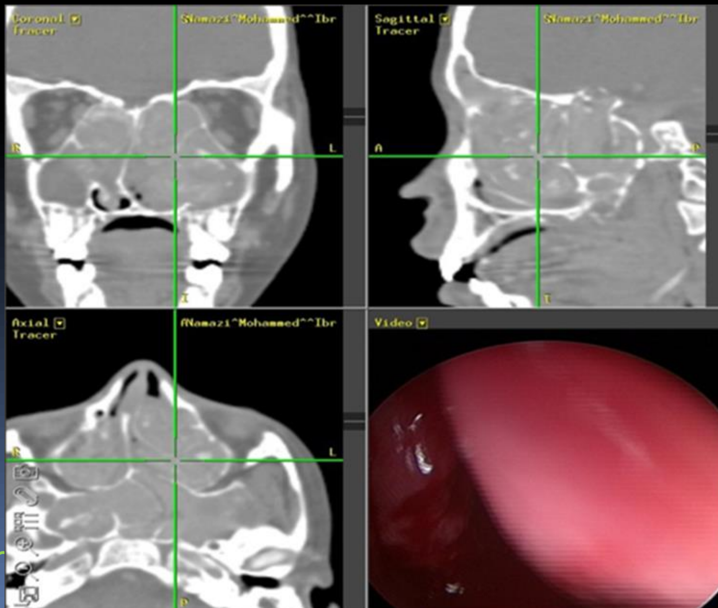
- Transsphenoidal hypophysectomy
- Orbital decompression,
- Dacryocystorhinotomy,
- Orbital nerve decompression
- Grave's ophthalmopathy
- Choanal atresia repair
- CSF leak repair
- Control epistaxis
- Septoplasty,
- Turbinectomy

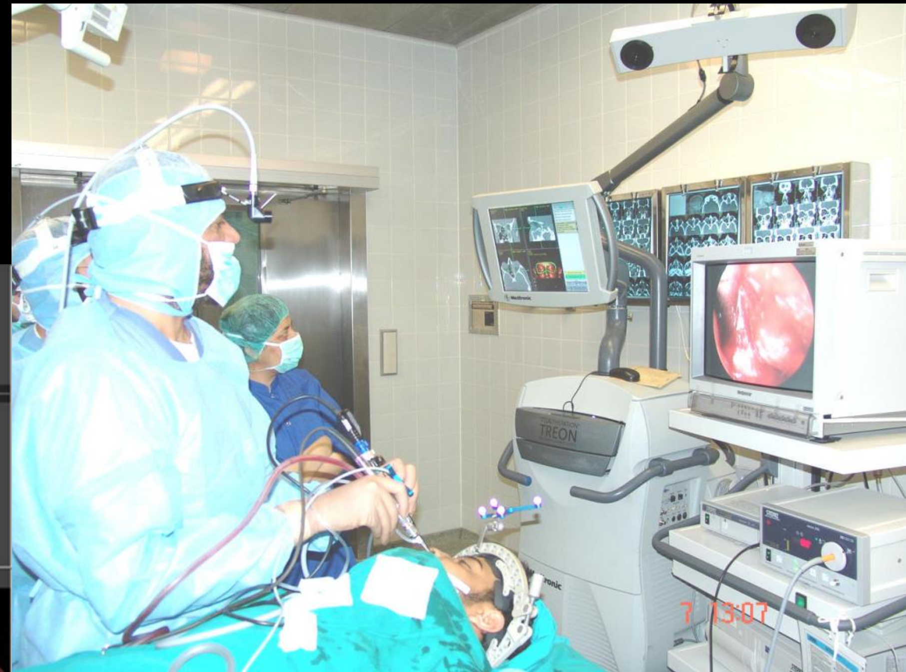
FESS Goals

- Complete extirpation of all the disase
- Permanent drainage and ventilation of the affected sinuses
- Postoperative access to the previously diseased areas.

Extended FESS

- CT Guided FESS
- Power Instrument
- Mini FESS





Polypectomy

Ethemoidectomy

• Postoperative Care:

- Sinus Packing
- Oral Antibiotics for a minimum of 2 weeks
- Aggressive nasal hygiene to prevent adhesions (saline irrigations)
- Nasal steroids
- Nasal debridement at 1, 3, and 6 weeks

Excellent results

- 71% normal at one year
- Meta analysis 89% success
  - with 0.6% complications

FESS Orbital Complications

- **Blindness**
  - **Indirect injury (retrobulbar** Hematoma)
  - **Direct injury to the optic nerve**

Orbital Fat Penetration:

increases risk of retrobulbar hematoma

Rx: recognize orbital fat (orbital fat floats);

avoid further trauma; may complete the FESS;

avoid tight nasal packing;

Observe for vision changes, proptosis, or restricted ocular gaze

- **Diplopia: orbital muscle injury, most commonly from medial rectus**

and superior oblique muscles

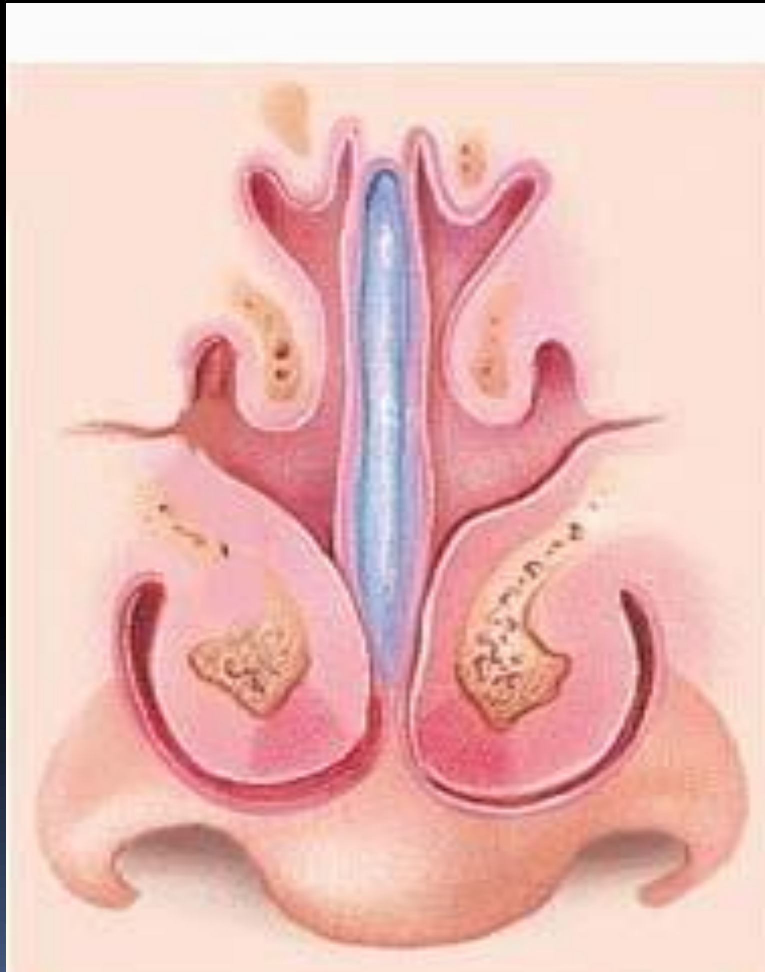
- **Epiphora: injury to lacrimal duct system, avoid operating anterior** to the attachment of the uncinate;

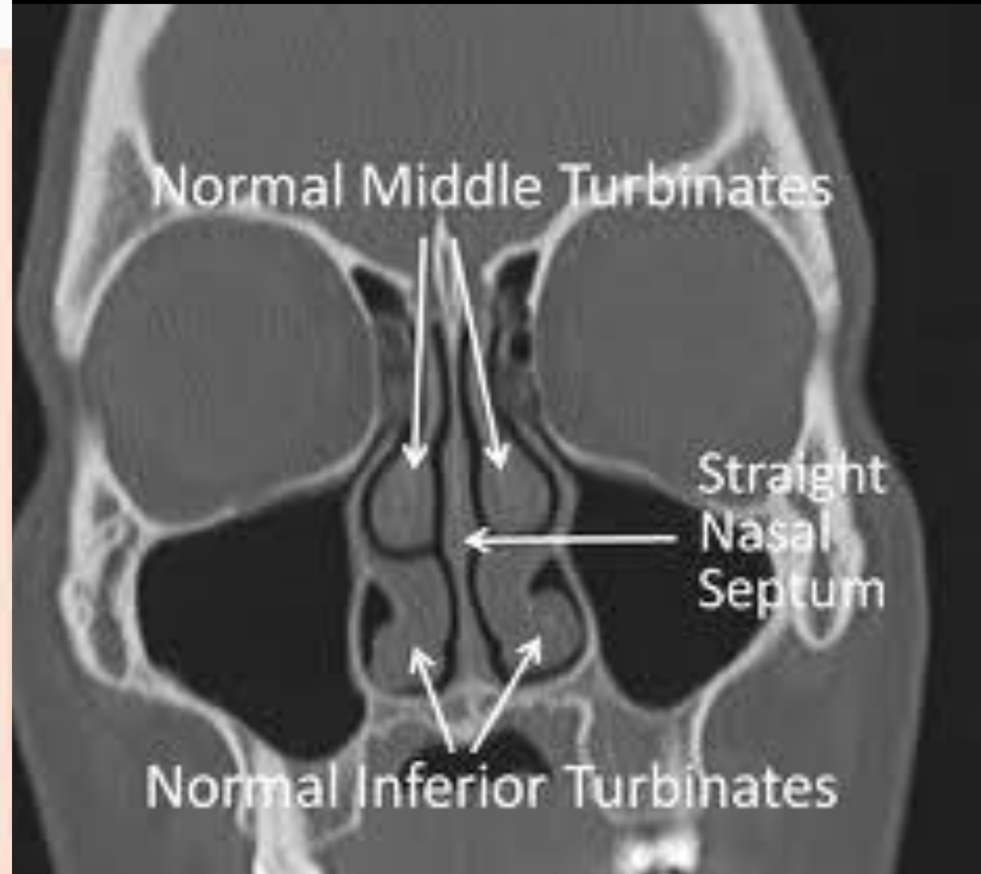
  Rx: observation initially, if no resolution then dacryocystorhinostomy

Retrobulbar Hematoma

- Pathophysiology: most commonly from retraction injury of the anterior ethmoid artery which causes increased orbital pressure that compresses the vascular supply to the optic nerve, also may occur from venous injury near the lamina papyracea
- Avoidance: maintain orientation and operate under direct vision, examine CT for dehiscence, correct coagulopathies

Turbinate Hypertrophy





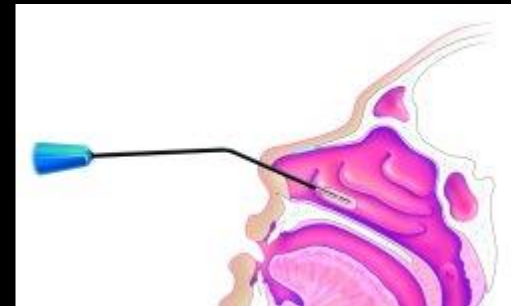
Turbinate Hypertrophy

- **Causes**
  - Infection
  - Compensation
  - Dysfunctional
  - Allergies
- Manifestation
  - Nasal obstrauction
  - Mouth Breathing
  - Cause manifestation

During sleep apnea, air flow is completely blocked.

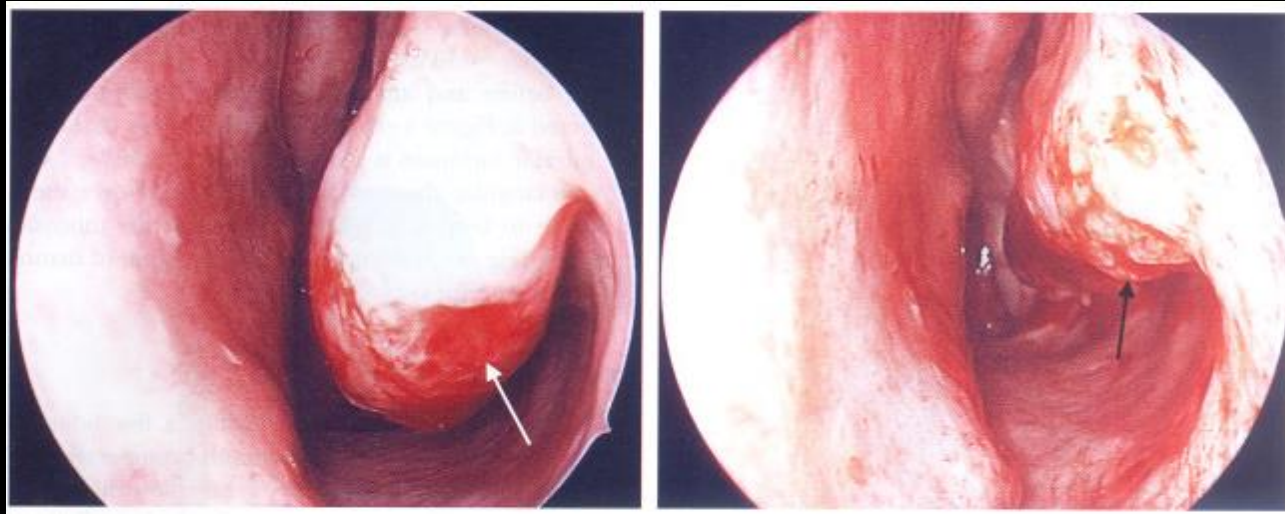
Turbinate Traetment

- Treat underlaying cause
- Surgical treatment
  - SMR
  - Turbinoplasty
  - SMD
  - Somnoplasty RF
  - Turbenectomy
  - Ultrasonic reduction



TURBINATE REDUCTION GOALS

- Mucosal preservation
- Controlled reduction
- Submucous scarring to reduce the erectile nature of the mucosa
- Bony reduction when necessary
- Minimal complications



Preoperative Postoperative