RHINOSINUSITIS

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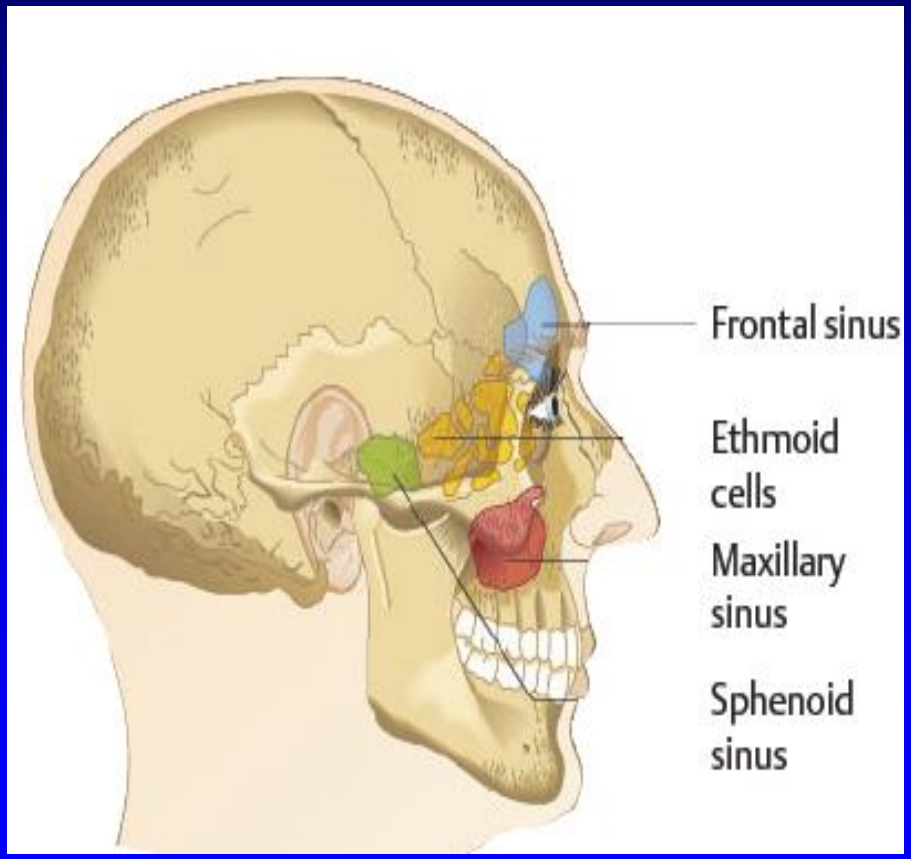
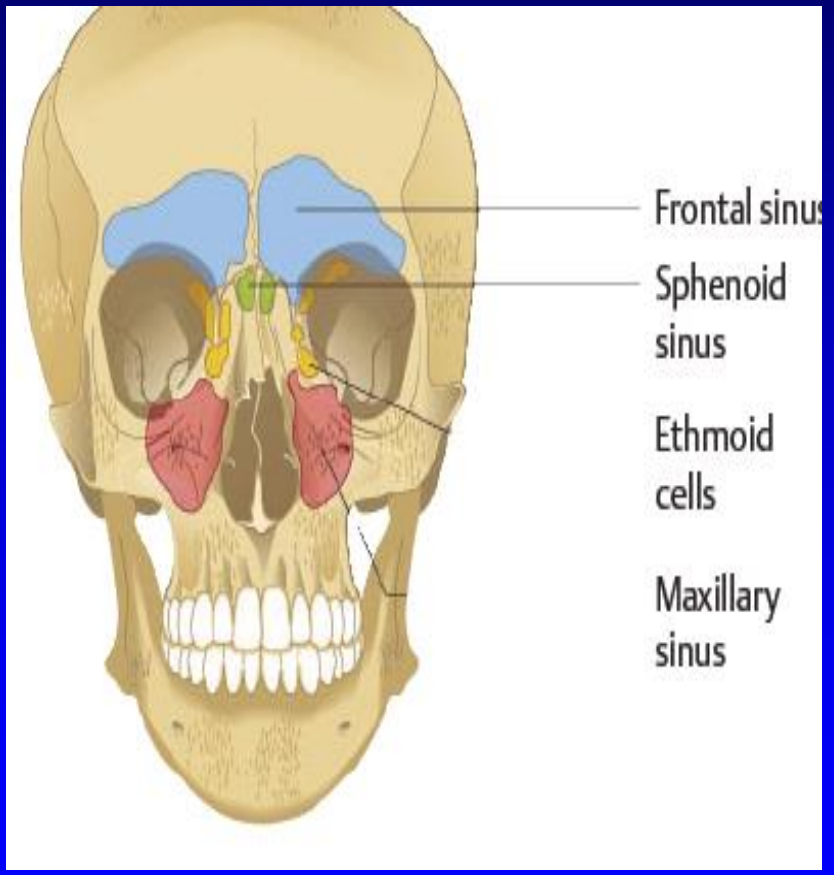
Today Lecture: Nose III

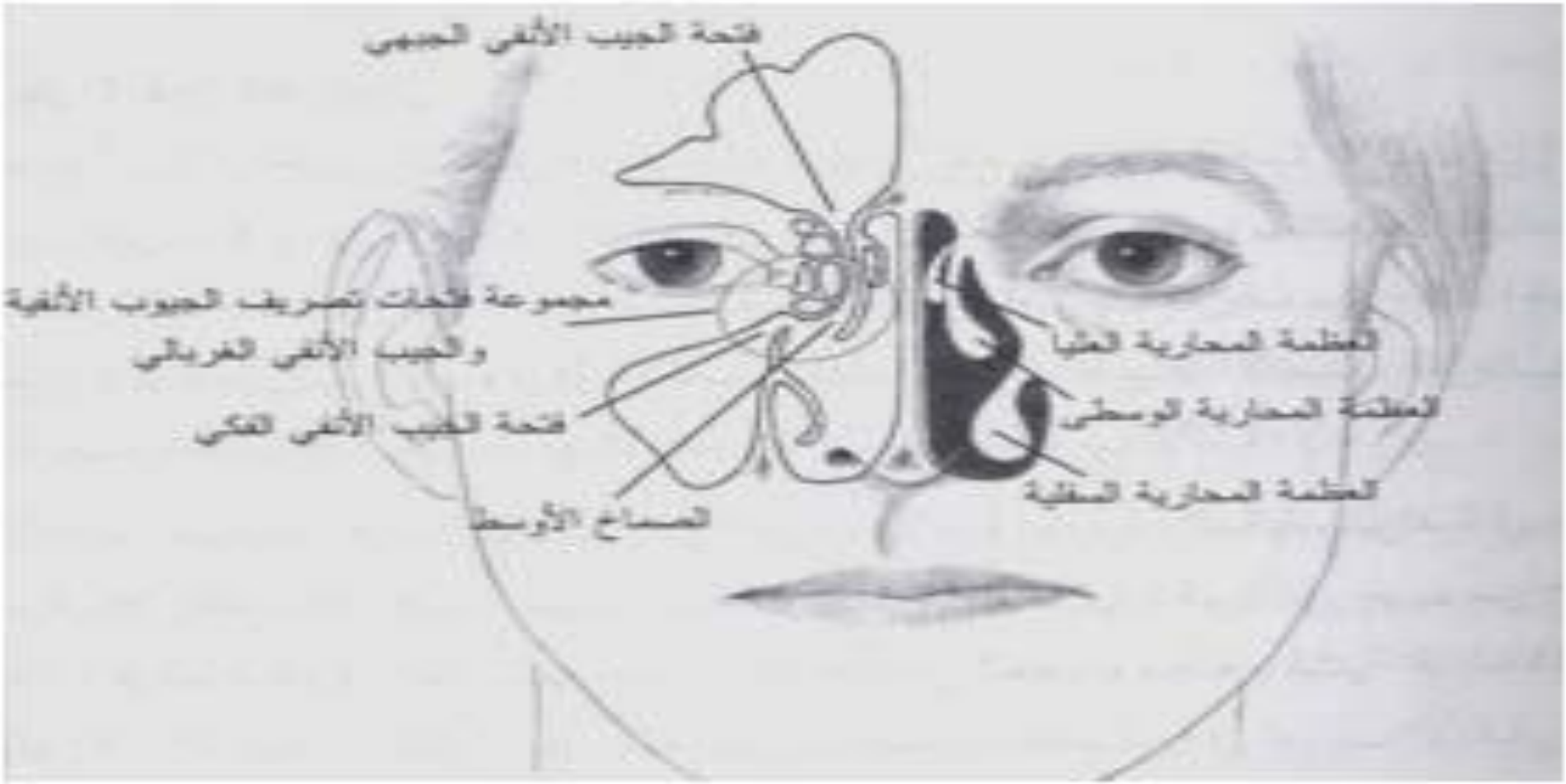
- Acute & chronic sinusitis(causes,clinical & management),
- Fungal sinusitis (in brief)
- Complication -sinusitis (classification, management & with special attention to orbital complications, investigation & general treatment)
- Radiology illustration

Four Pairs PNS

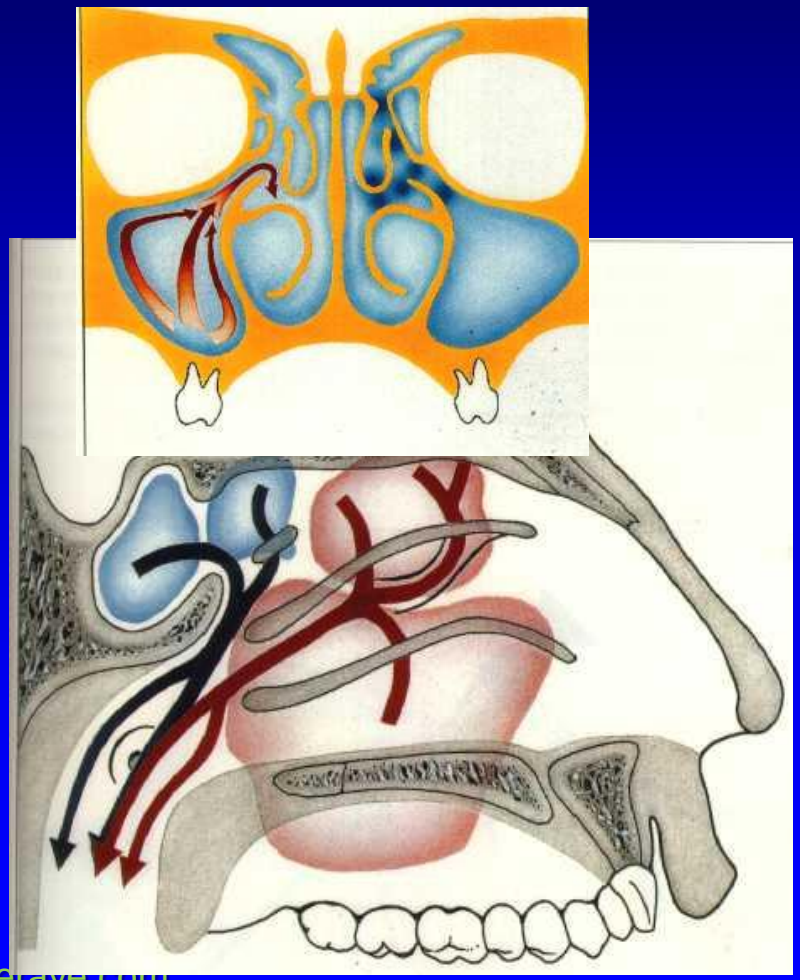


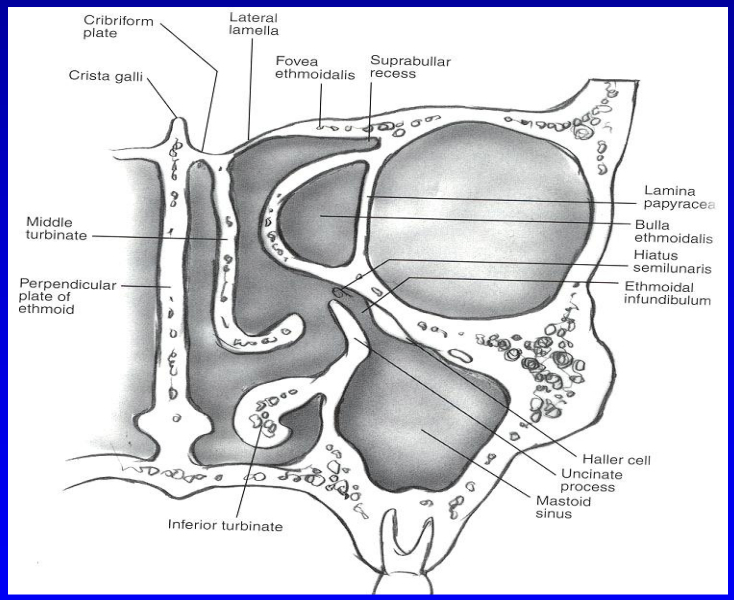


Lateral Nasal Wall



Sinuses Drainage





Acute Rhinosinusitis

- Disease lasting **less than three weeks**

Chronic Rhinosinusitis

- Disease lasting **more than three months**
  - **CRS with Nasal Polyps**
  - **CRS without Nasal Polyps**

Rhinosinusitis Etiology

- **Inflamatory:**
  - **URTI**
  - **Allergy**
- **Mechanical:**
  - Naso/Septal Deformity
  - OMC Obstruction
  - Turbinate Hypertorophy
  - **Polyps**
  - Tumours
  - **Large Adenoid**
  - **Foreign Bodies**
  - Cleft Palate
  - Choanal Atresia
- **Systemic Disease**
  - Cyctic Fibrosis
  - Immotile cilia Syndrome
  - Kartegener's Syndrome
- **Miscellaneous:**
  - Swimming
  - Flying
  - Diving

Pathophysiology of Rhinosinusitis,

- Most important pathologic process in disease is **obstruction of natural ostia**
- Obstruction leads to hypooxygenation
- Hypooxygenation leads to **ciliary dysfunction** and **poor mucous quality**
- Ciliary dysfunction leads to retention of % Bacterial

Diagnosis of CRS

Major Factors

Facial pain/pressure
Facial congestion/fullness
Nasal obstruction/blockage
Nasal discharge/purulence/discolored
Postnasal drainage
Hyposmia/anosmia
Purulence in nasal cavity on examination
Fever

Minor Factors

Headache
Fatigue
Halitosis
Dental pain
Cough
Ear pain/pressure/fullness

Nasal Exam

Fig. 2.1 Anterior rhinoscopy

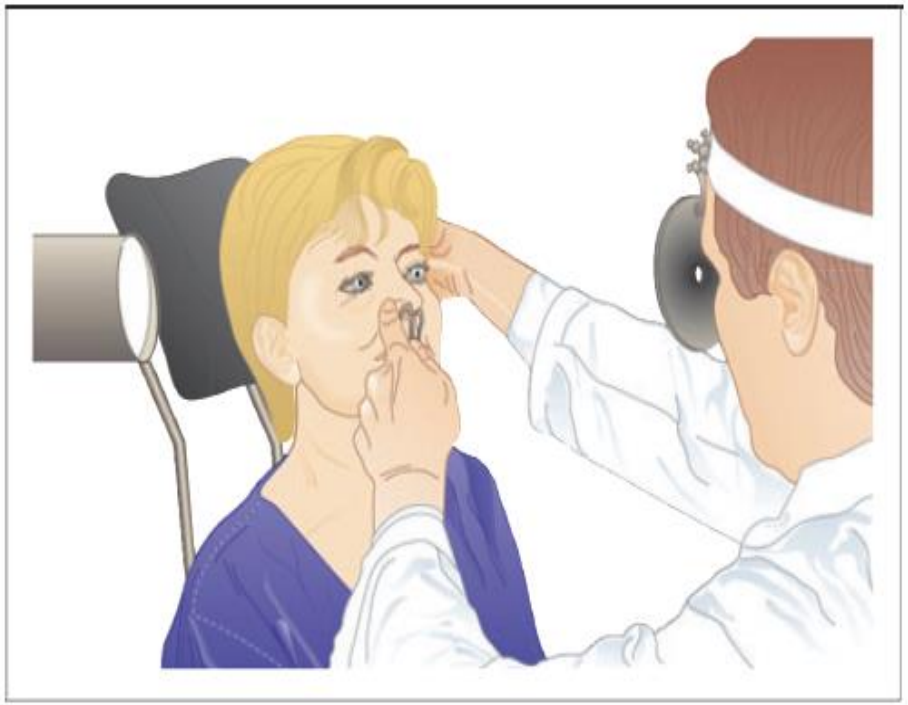
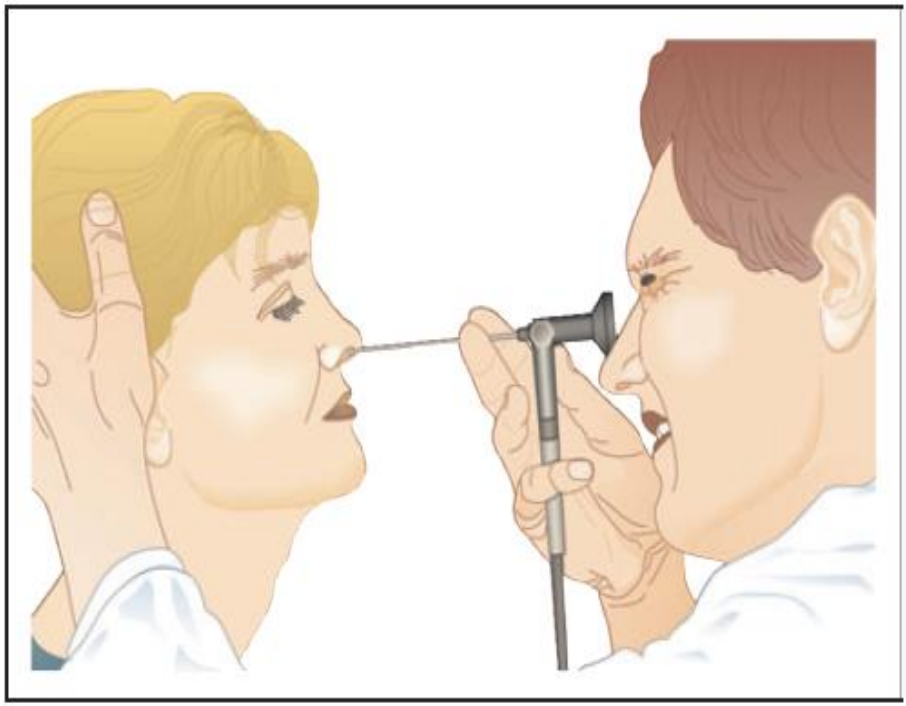
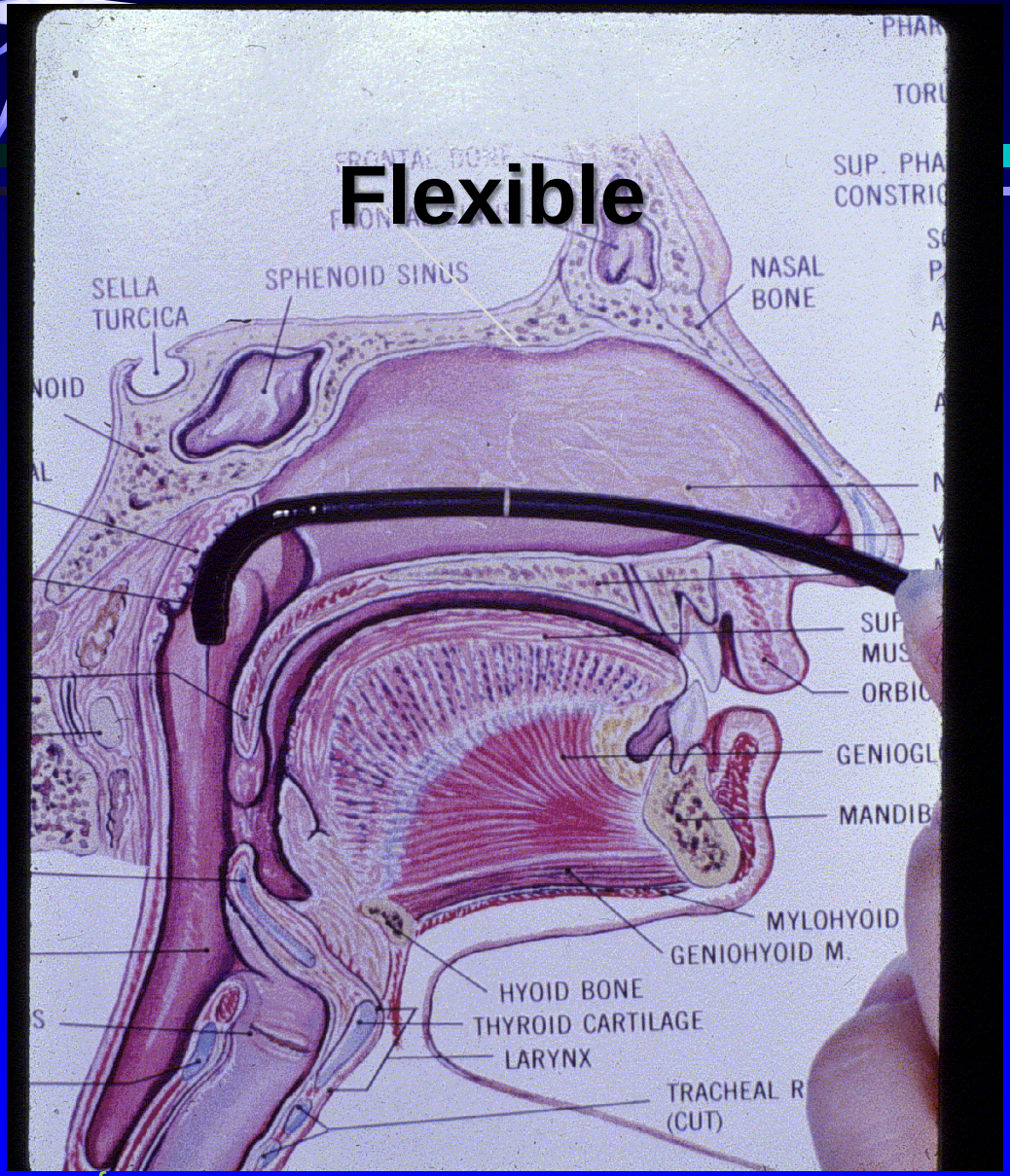
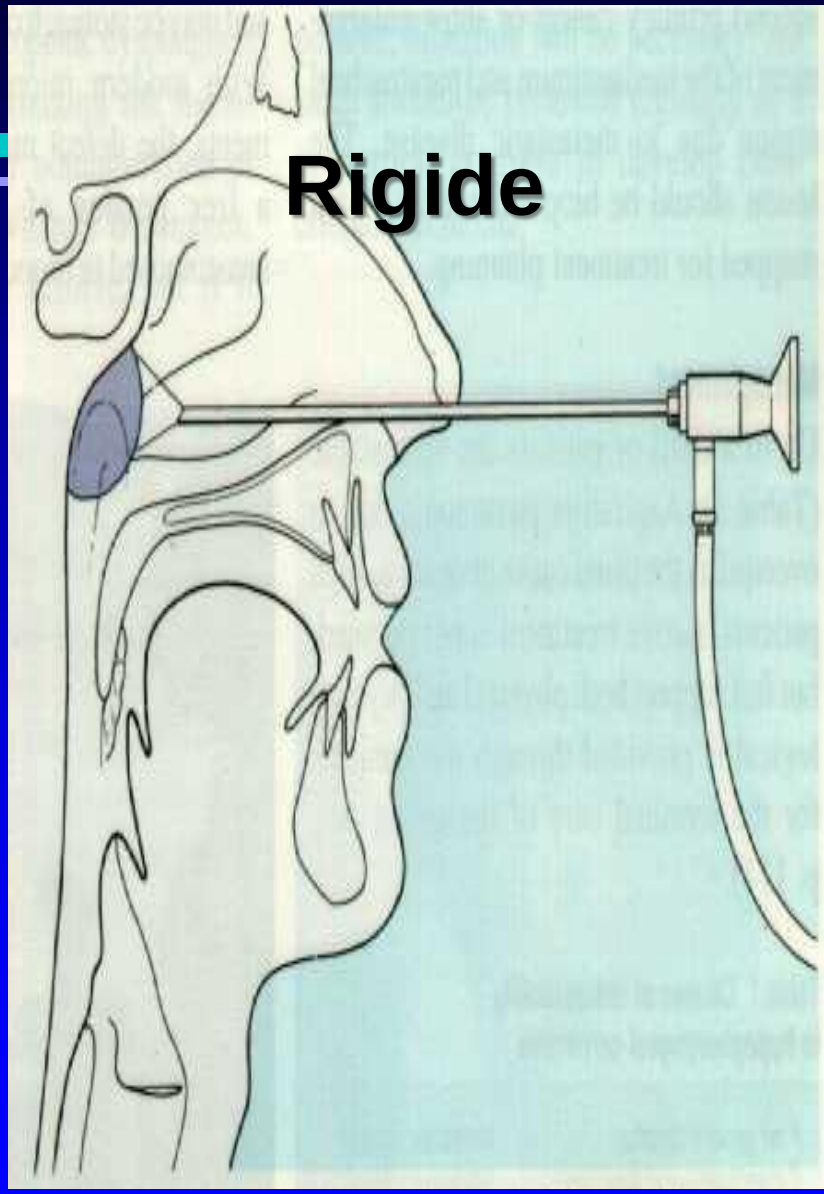


Fig. 2.2 Nasal endoscopy

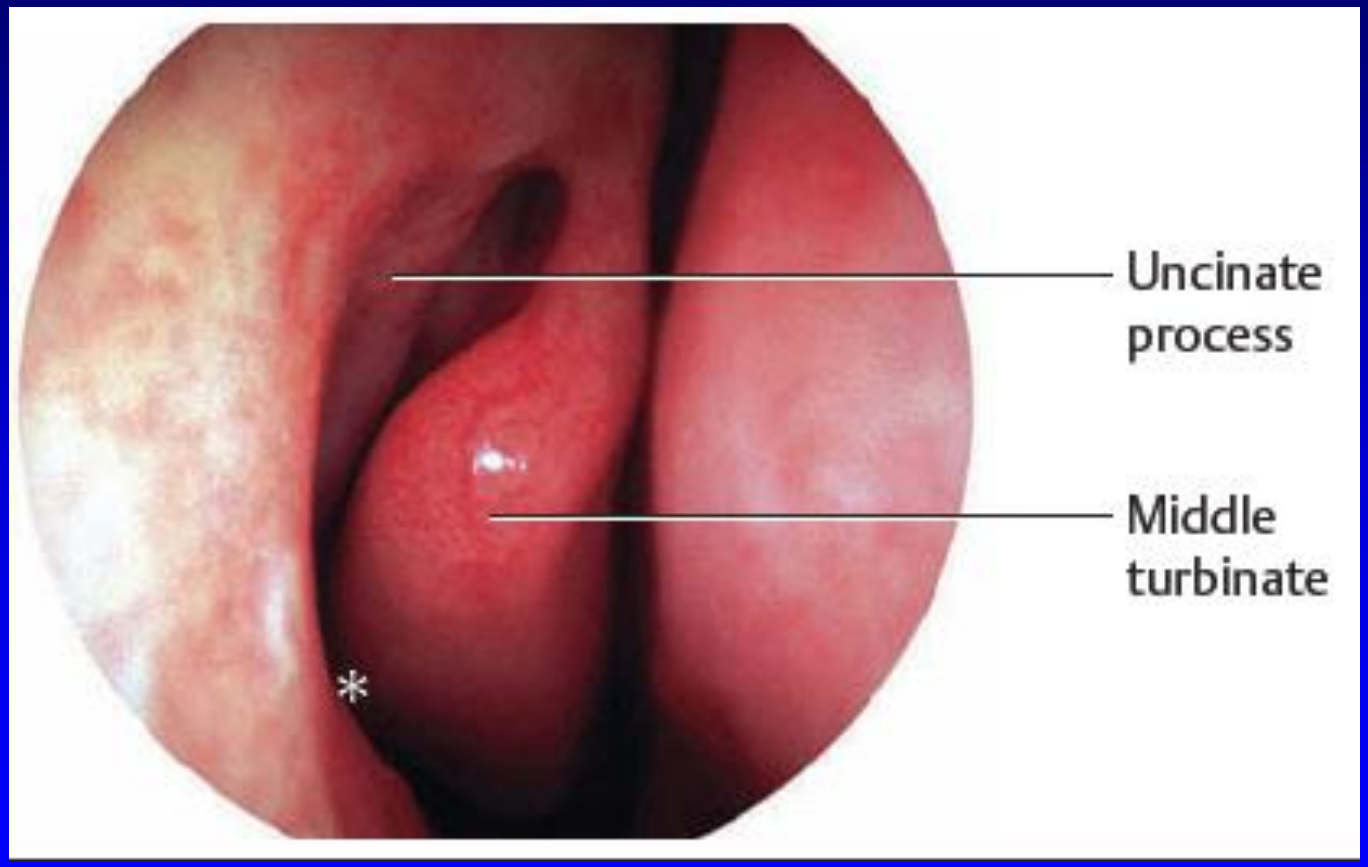


Nasal Endoscopy

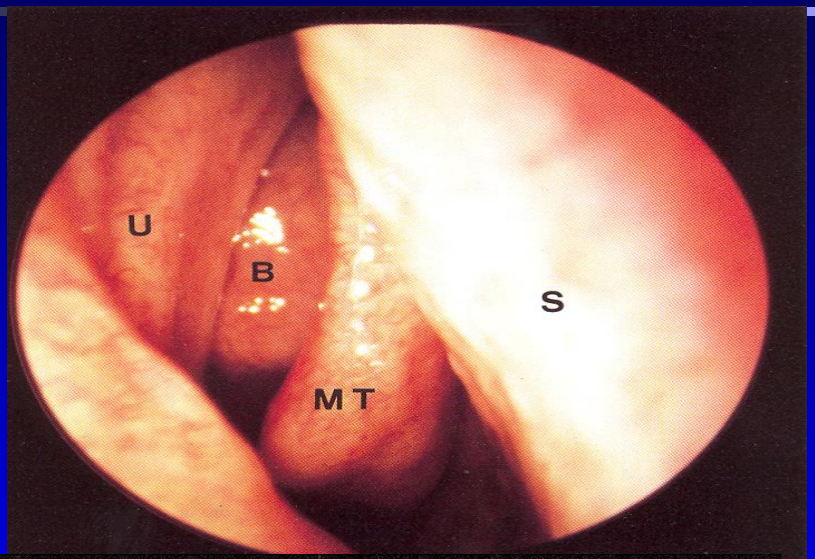


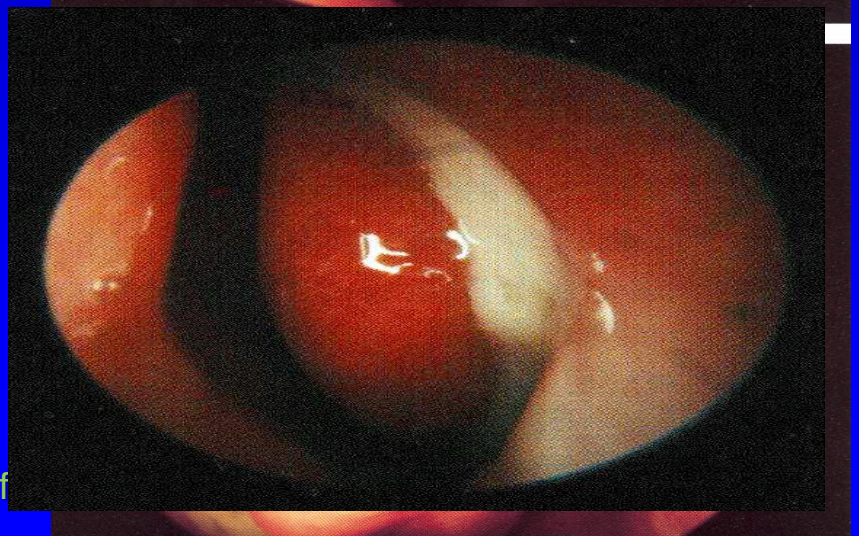


Endoscopy Landmarks



Endoscopy Finding



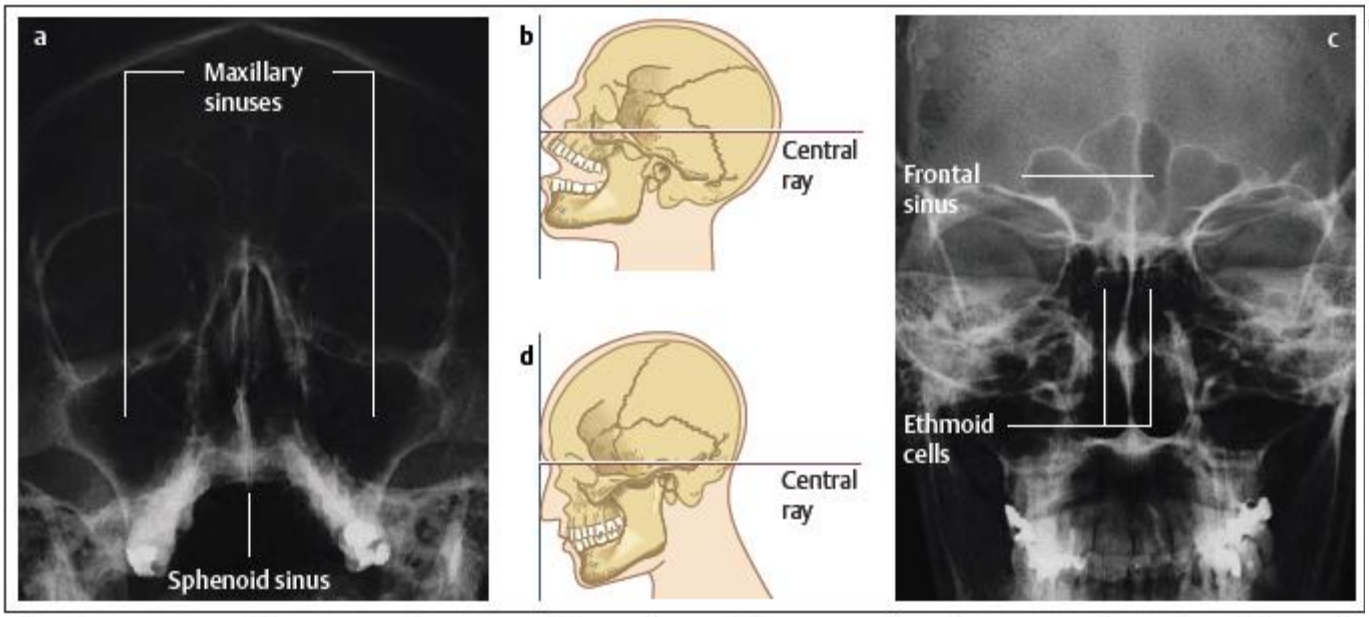


Radiology Assesment

- Identify which sinus involved and extnt of the disease
- Road map for surgery

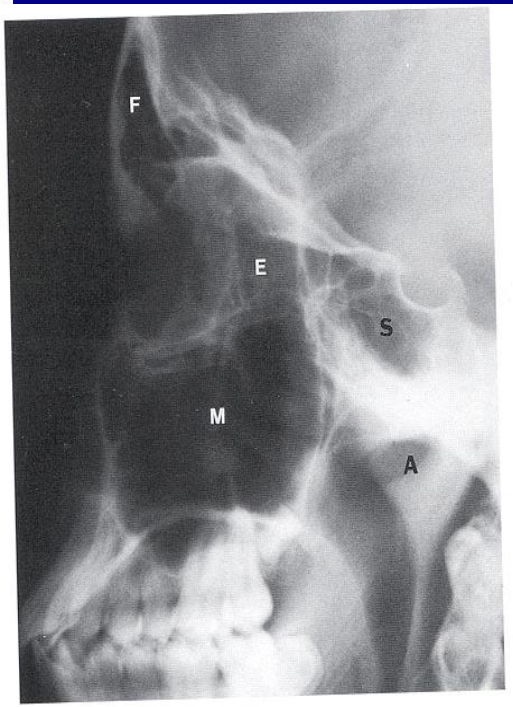
- Plain X Rays
  - Traditional views
    - Water's
    - Caldwell
    - Lateral
    - Submentovertex
- CT Scan
- MRI

PNS Plain X Rays



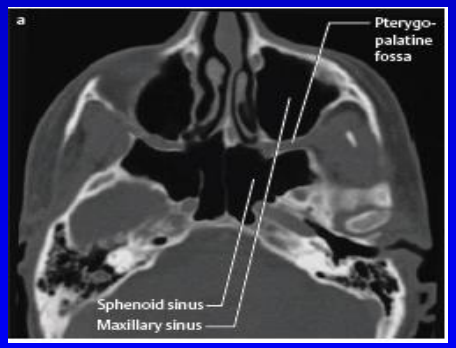
a,b The occipitomental projection demonstrates the maxillary sinus and gives a limited view of the sphenoid sinus.

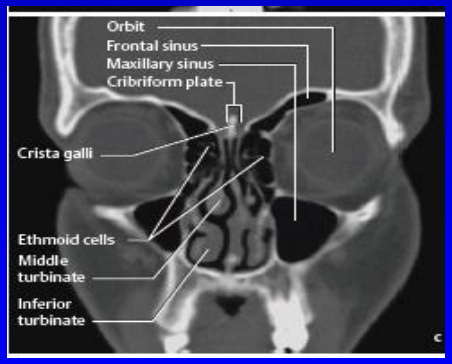
c,d The occipitofrontal projection is better for evaluating the ethmoid cells and frontal sinus.



PNS Computed Tomography

- Study Type
  1. Coronal — Perpendicular 2 Hard Palate
  2. Axial — Paralell 2 Hard Palate
  3. Reformatted Sagital

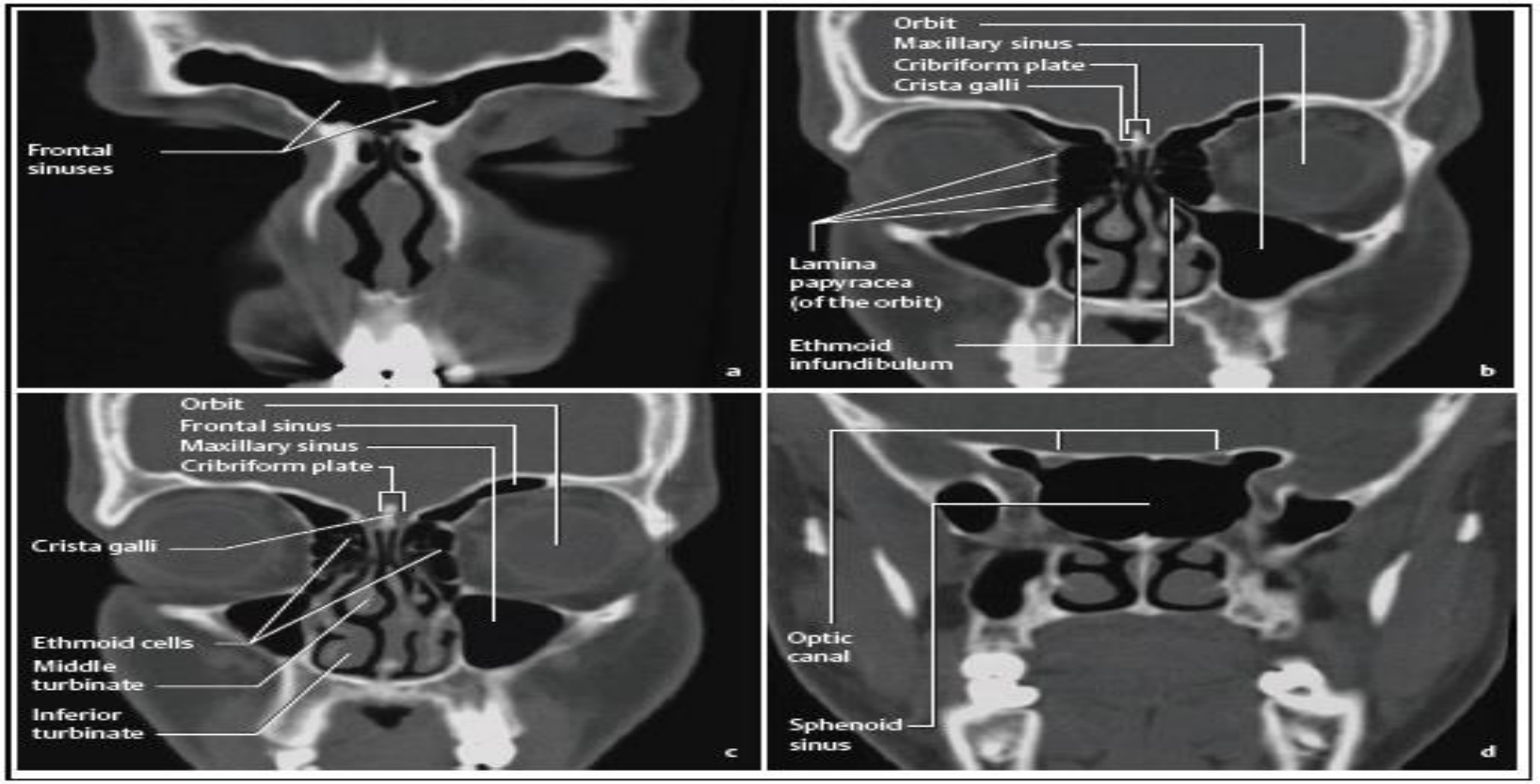




- Multiplannr CT Scan
  - Axail Cut
  - Reformatted Coronal and Sagital cuts

Coronal CT Scan (Perpendicular 2 HP)

Fig. 2.8 Computed tomography of the paranasal sinuses



Four representative coronal CT scans are shown.

Scan Acquisition

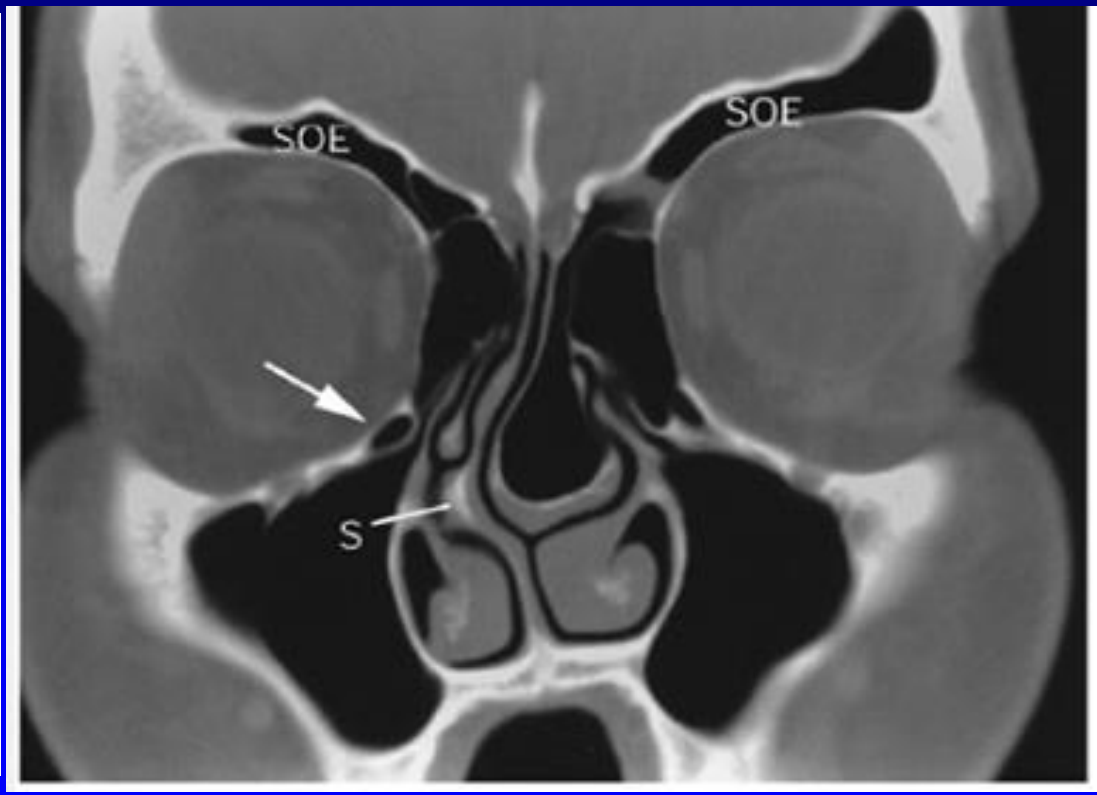
Scans can be acquired using the sequential, single-slice technique *(conventional CT)* or a continuous spi-

Interpretation

Normally aerated paranasal sinuses exhibit air density on CT scans—i.e., they appear black. The normal

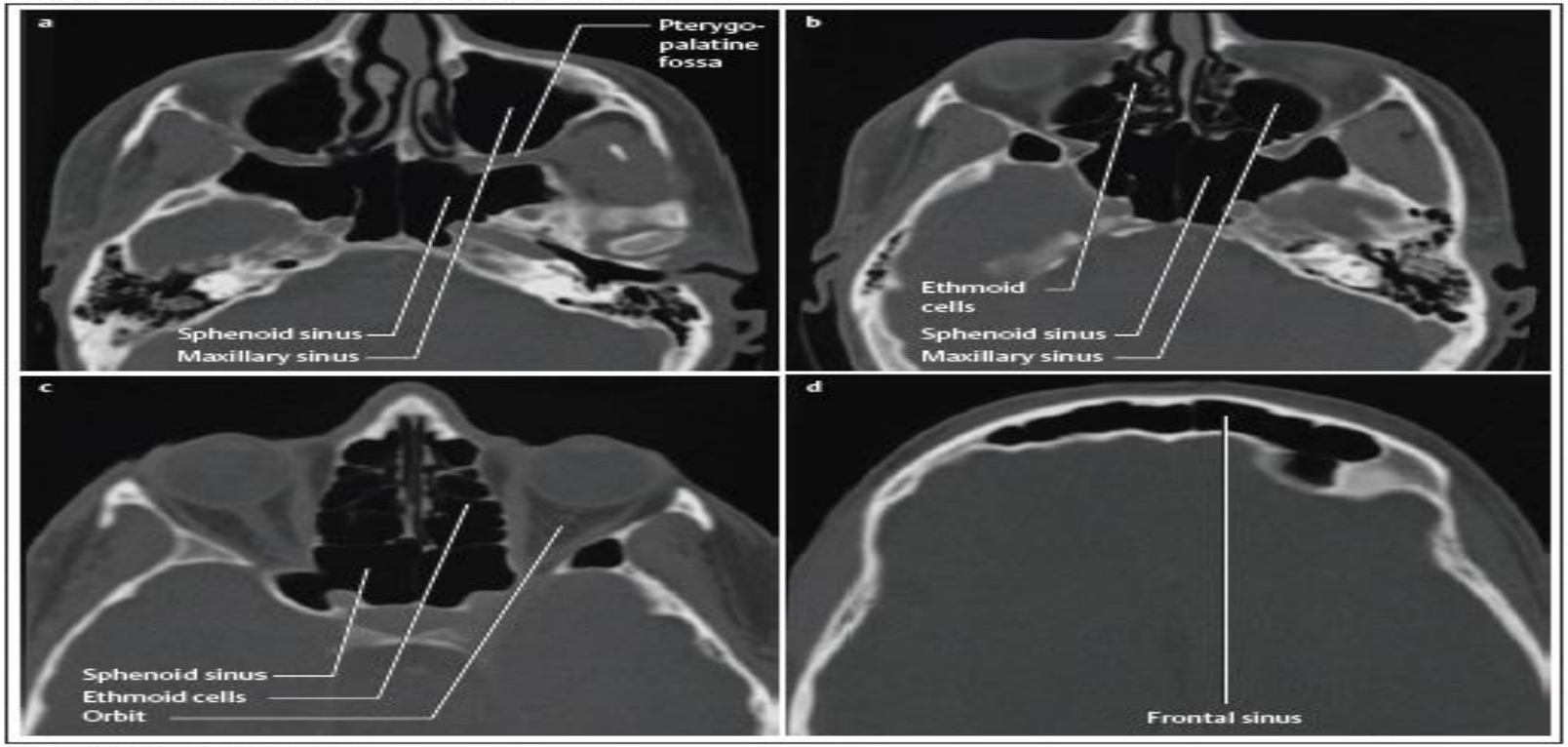
Anatomic Variation

Concha Bullosa & Paradixical Turbinate



PNS Axail CT Scan

Fig. 2.9 Computed tomography of the paranasal sinuses

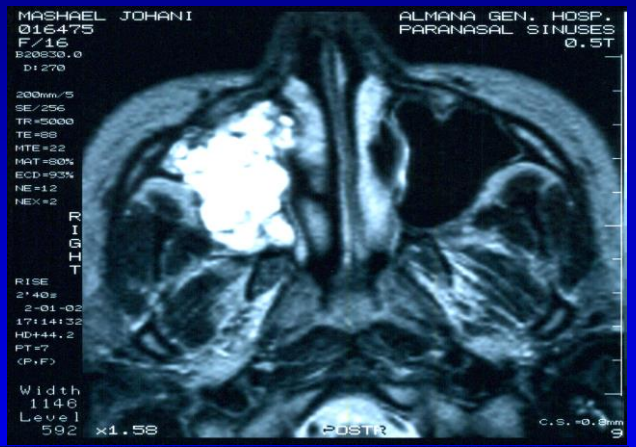


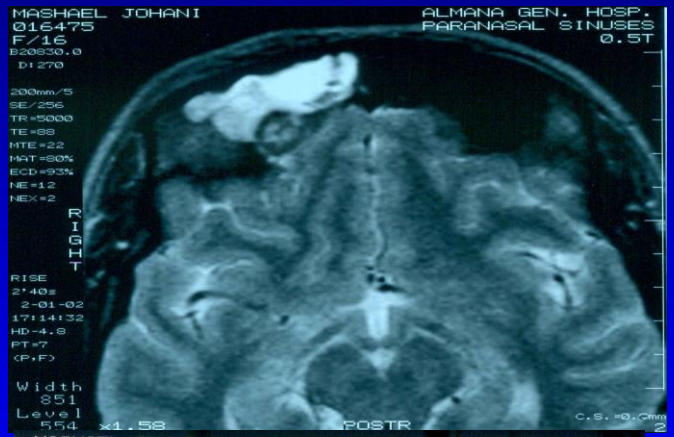
Four axial CT scans are shown.

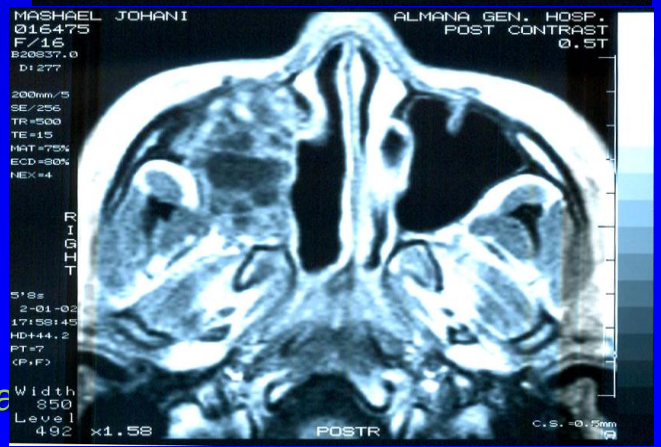
that involve the paranasal sinuses in addition to the cranial cavity or orbit (e.g., tumors and congenital malformations such as encephaloceles). It can also supply information that is useful in differentiating

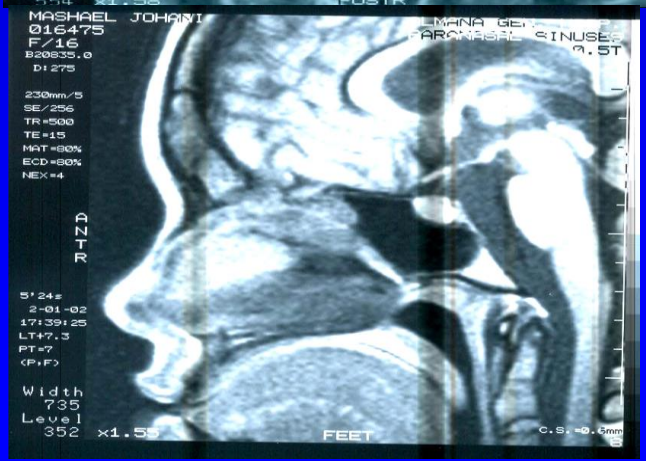
At present, MRI is contraindicated in most patients with electrically controlled devices such as a cardiac pacemaker, insulin pump, cytostatic pump, or cochlear implant. By contrast, modern internal fixation ma-

MRI Indicated for Disease Extension









Microbiology in Acute sinusitis

MM Swab & Aspirate

- *Streptococcus pneumoniae* *20-30%*
- *Moraxella catarralis* *15-20 %*
- *Hemophilus influenzae* *16-20 %*
- *Streptococcus Pyogens* *2-5 %*
- *Sterile* *20-35%*
- *Anearobs* *2-5%*
- Rare viruses, anaerobes, Staphylococcus
- Normal flora in the sinus-- controversy

Microbiology in Chronic Sinusitis

- Gram Negative
  - Bacteroid
  - Klebcilla
- Anearobs
- Staph aureus
- Usually Polymicrobial

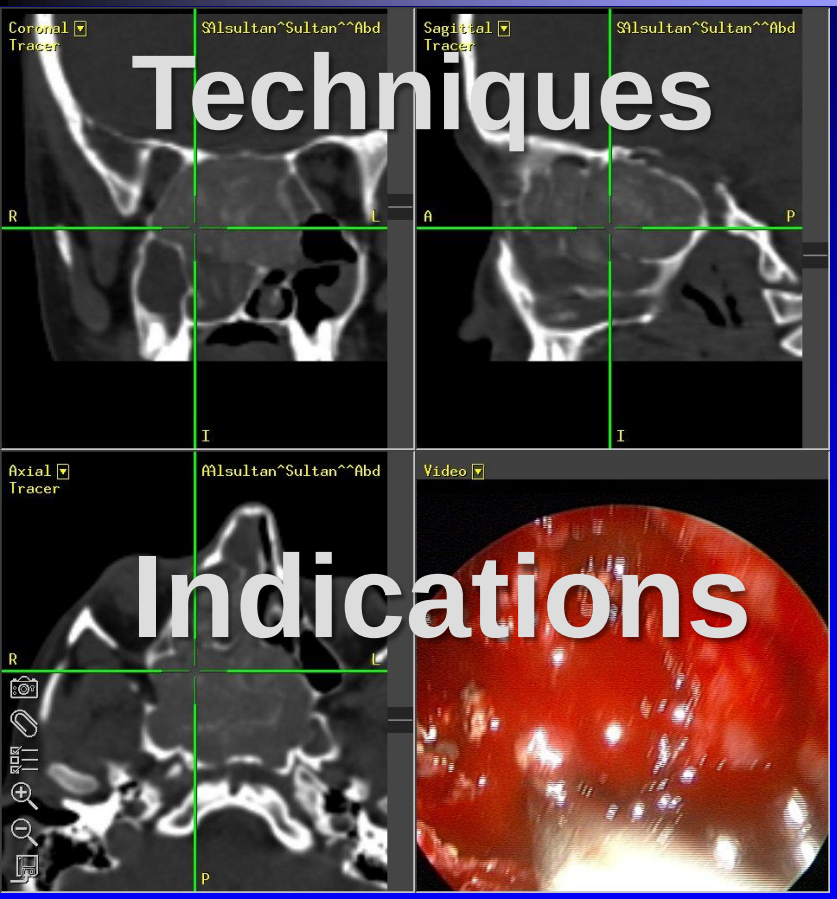
Medical Management

- Antibiotic for 10 – 14 days (Pen, Cephalo)
- Decongestant
  - Topical or Systematic
- Steroid Topical spray
- Symptomatic Treatment
- Nasal Wash
- **Rpeat treatment 2x or 3x over 2-3 Months**
- **PNS CT Scan**

Recalcitrant Rhinosinusitis

- Allergy
- Immunodeficiency
- Cystic fibrosis
- Ciliary dismotility disorders
- **Gastroesophageal Reflux Disease**

Functional Endoscopic Sinus Surgery (FESS)

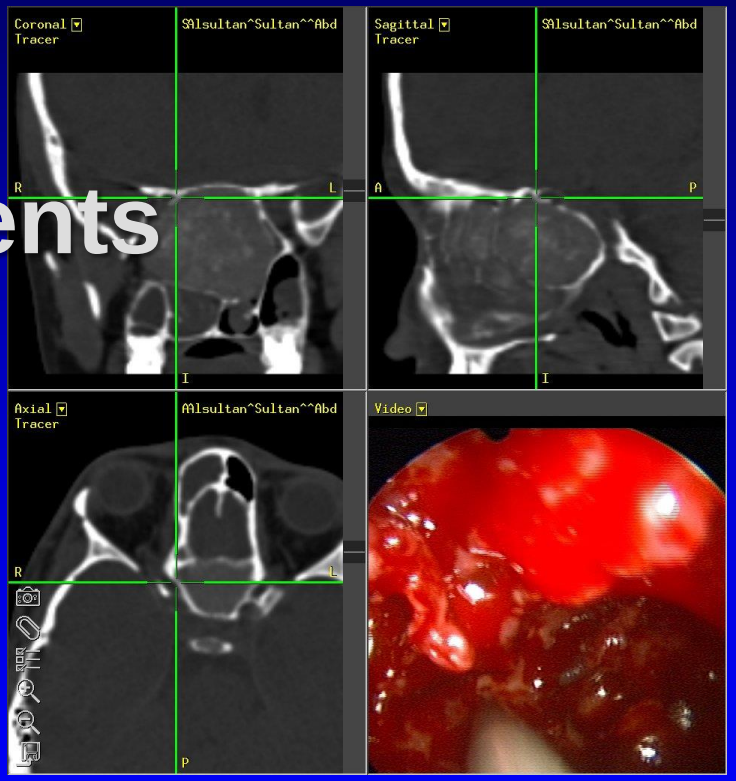


Techniques

Indications

Computer Assisted Surgery

Power Instruments



FESS Goals & Results

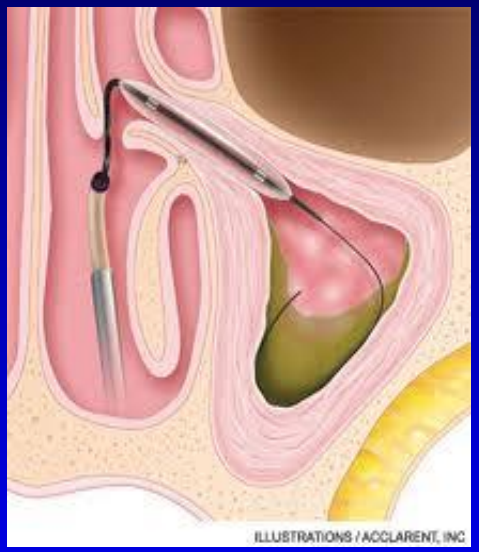
Goals

1. Eradication of Disease
2. Areation
3. Drainage
4. Post Op Access

Results

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

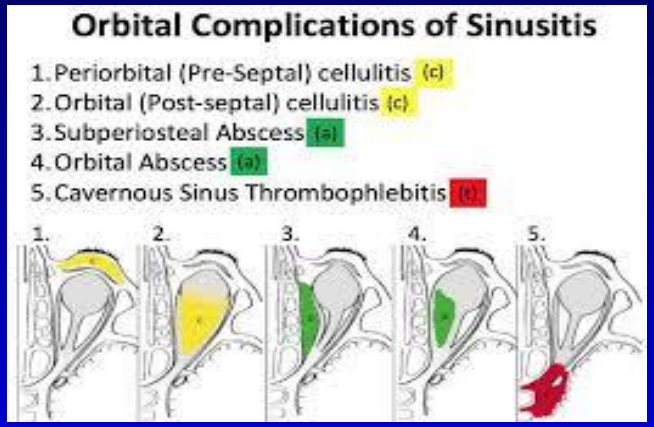
Balloon Sinoplasty

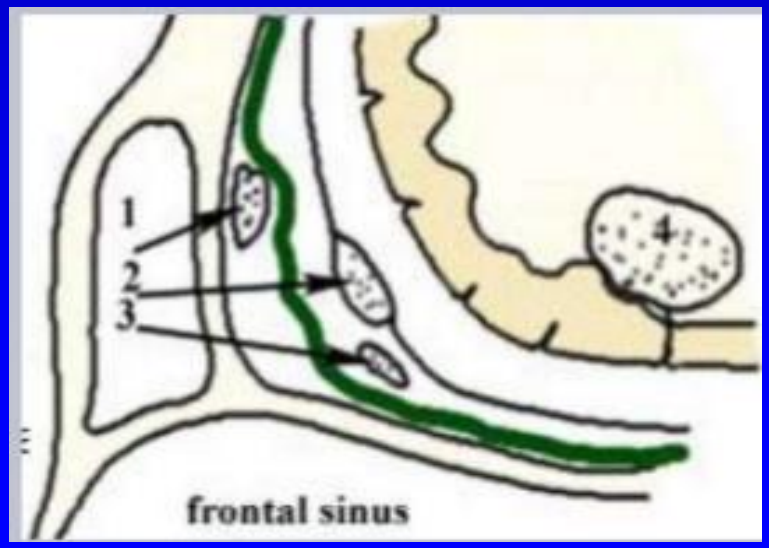


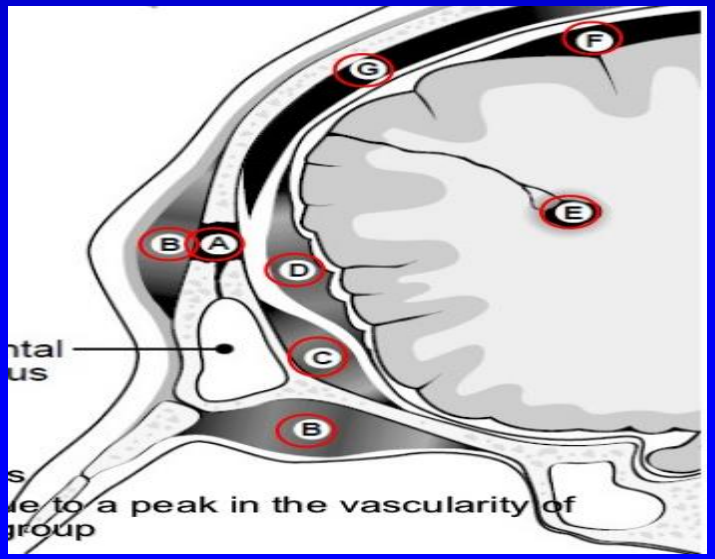
New Procedure
Expensive
Good for narrow frontoethemoid recess

Sinusitis Complications

1. **Orbital**
2. **Cranial**
3. **Extracranial**



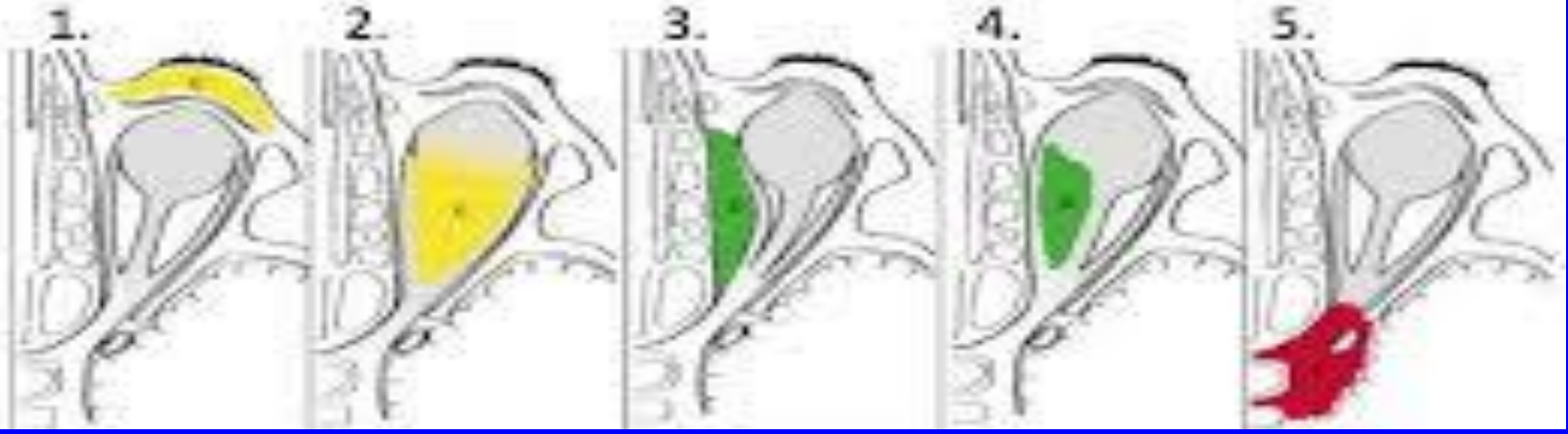




Chandler Clasifications

Orbital Complications of Sinusitis

1. Periorbital (Pre-Septal) cellulitis (c)
2. Orbital (Post-septal) cellulitis (c)
3. Subperiosteal Abscess (a)
4. Orbital Abscess (a)
5. Cavernous Sinus Thrombophlebitis (t)



Al Anazi & Al Dousary Classification

International Forum of Allergy & Rhinology

Original Article

Ophthalmic manifestations of paranasal sinus disease: a clinical grading system†

Fatma H. Al Anazy MD*, Surayie H. Al Dousary MD

Article first published online: 12 MAR 2012

DOI: 10.1002/alr.21029

Issue

International Forum of Allergy & Rhinology

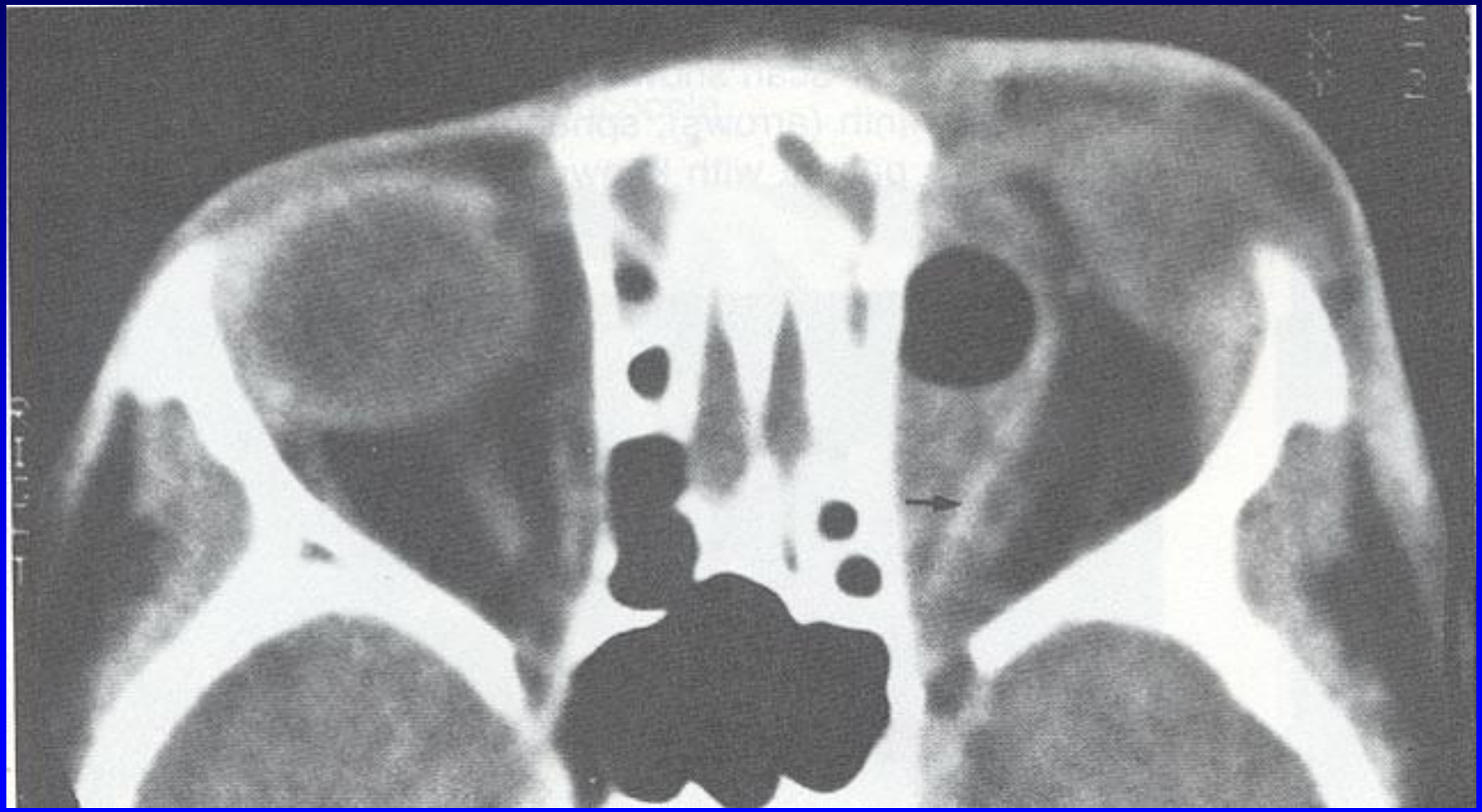
Volume 2, Issue 4, pages 331–335, July/August 2012

Chandler's classification ;Based on Eye Acute Infection and their anatomic location

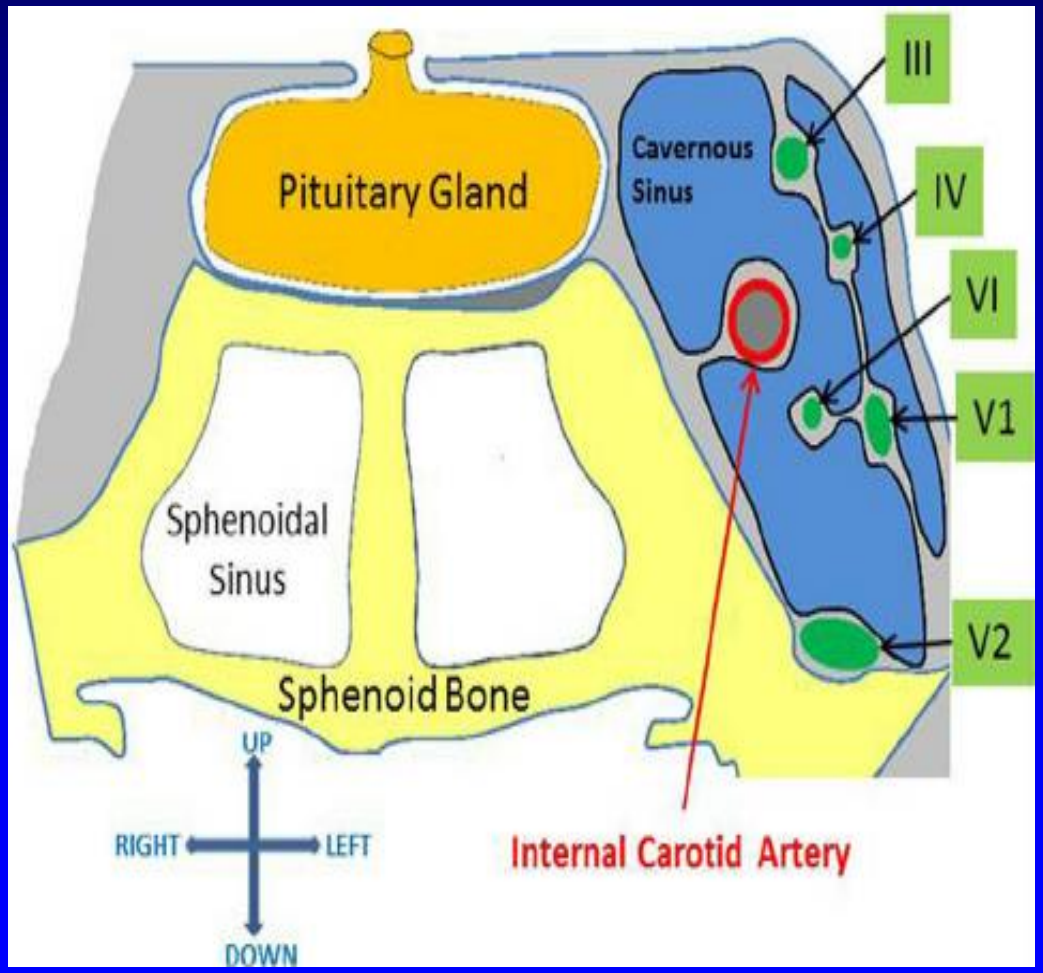
- Clinical grading system that doesn't require Imaging
- Encompass Acute orbital infection and chronic Sinogenic pathology causing orbital manifestation.
- Radiologic findings does not correlate well with clinical severity
- Chronic Paranasal sinus disease in (74 %) of the cases.

Grade	Presentation	Number	ARS	AFS	CRS
I Anatomical Disturbance	Proptosis	**15(36%)**	**0**	**10**	5
II Functional Involvement	Epiphoria Diplopia Ophthalmoplegia Ptosis	**11(26%)**	**0**	**8**	3
III Orbital Infection	Orbital cellulitis, Pre septal-cellulitis Orbital abscess Subpereostial abscess	**11(26%)**	**3**	**3**	5
IV Visual Impairment	Visual Impairment, blindness	**5(12%)**	**1**	**4**	0

CT SCAN PNS



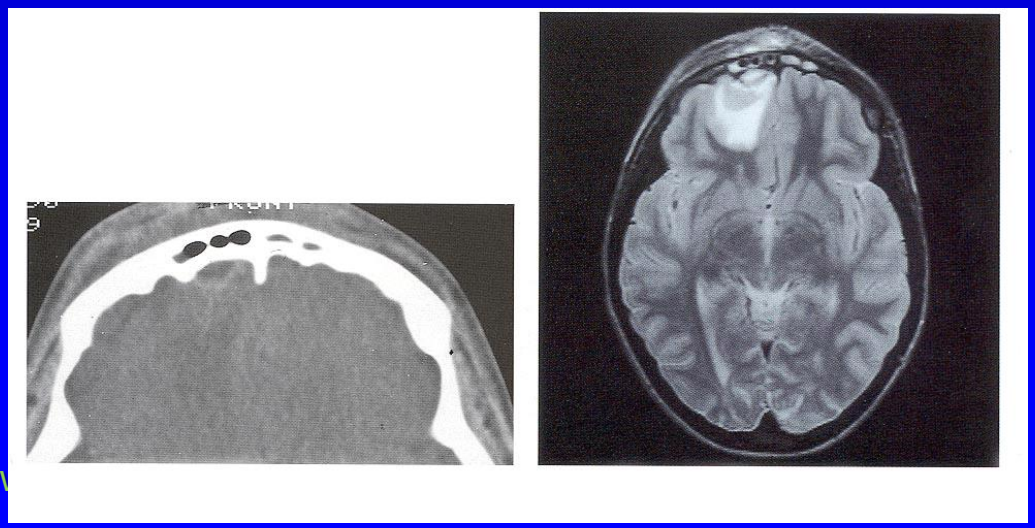
CAVERNOUS SINUS THROMBOSIS

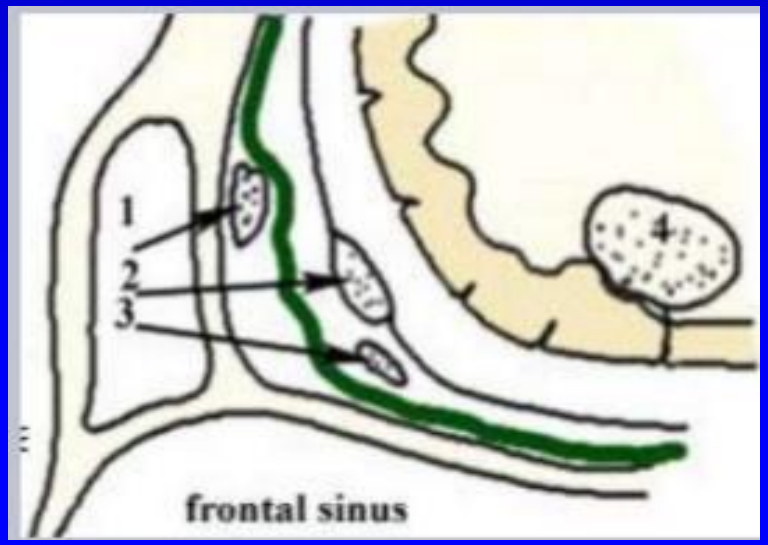


Intracranial Complications

- Meningitis Common in Children
- Subdural or Epidural Abscess
- Cerebral Abscess

  Neurosurgery, Ophthalmology, ID Involvement





Treatment of Acute Complication

- Admit the patient
- IV antibiotics

  3rd Generation of Cephalosporine) + Clindamycin
- Abscess I&D and Surgery of the primary site
- Consultation of the Related Speciality

Mucoceles

- Mucoceles are **chronic**, cystic lesions of the sinuses lined by pseudostratified epithelium
- **Expand slowly**, often requiring many years
- **Etiology** Either due to obstruction of ostia or to simple obstruction of minor salivary gland
- **30% are idiopathic**

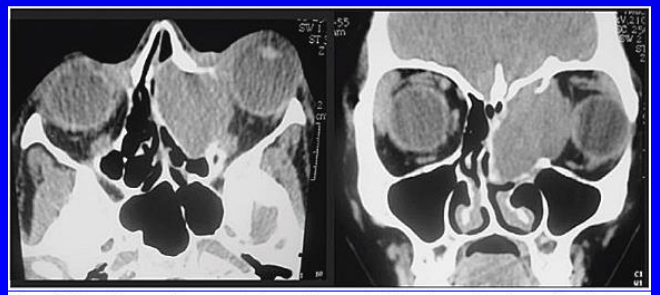
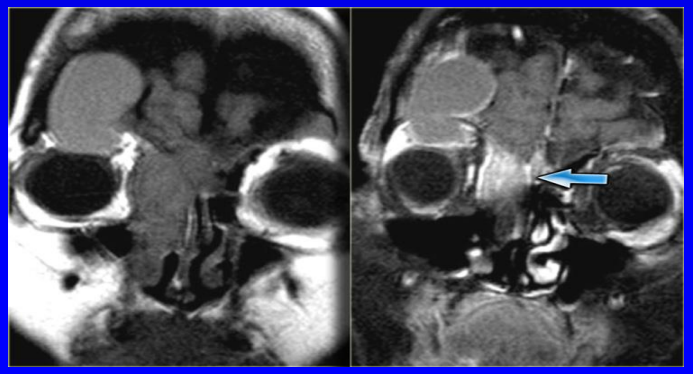


Figure 2. Nasal fossa and paranasal sinuses CT scan at axial and coronal sections evidencing image of left frontoethmoidal region with displacement of ocular globe on the left (proptosis).



Other Complications

- Osteitis: **diagnose initially with technetium bone scan (osteoblastic** activity) and gallium bone scan (inflammation), follow with gallium scans; Rx: parenteral antibiotics, surgical debridement, sinus surgery
- Pot's Puffy Tumor: **frontal bone osteomyelitis, soft doughy swelling** of forehead, high risk of intracranial extension; Rx: parenteral antibiotics, trephination, may require surgical debridement
- Superior Orbital Fissure Syndrome: **fixed globe, dilated pupil (CN** III, IV, VI), ptosis, hypesthesia of upper eyelid (CN V1); Rx: urgent surgical decompression
- Orbital Apex Syndrome: **similar to Superior Orbital Fissure** Syndrome with added involvement of optic nerve (papilledema, vision changes)
- Sinocutaneous Fistula: **usually begins as a frontal osteomyelitis**

Fungal Sinusitis

- **Invasive fungal sinusitis**

  Presence of fungal hyphae within the mucosa, submucosa, bone, or blood vessels of the paranasal sinuses

  - **Acute Invasive Fungal Sinusitis**
  - **Chronic Invasive Fungal Sinusitis**
  - **Chronic Granulomatous Invasive Fungal Sinusitis**

- **Noninvasive fungal sinusitis**

  Absence of fungal hyphae within the mucosa and other structures of the paranasal sinuses

  - **Allergic Fungal Sinusitis**
  - **Fungus Ball (fungus Mycetoma)**

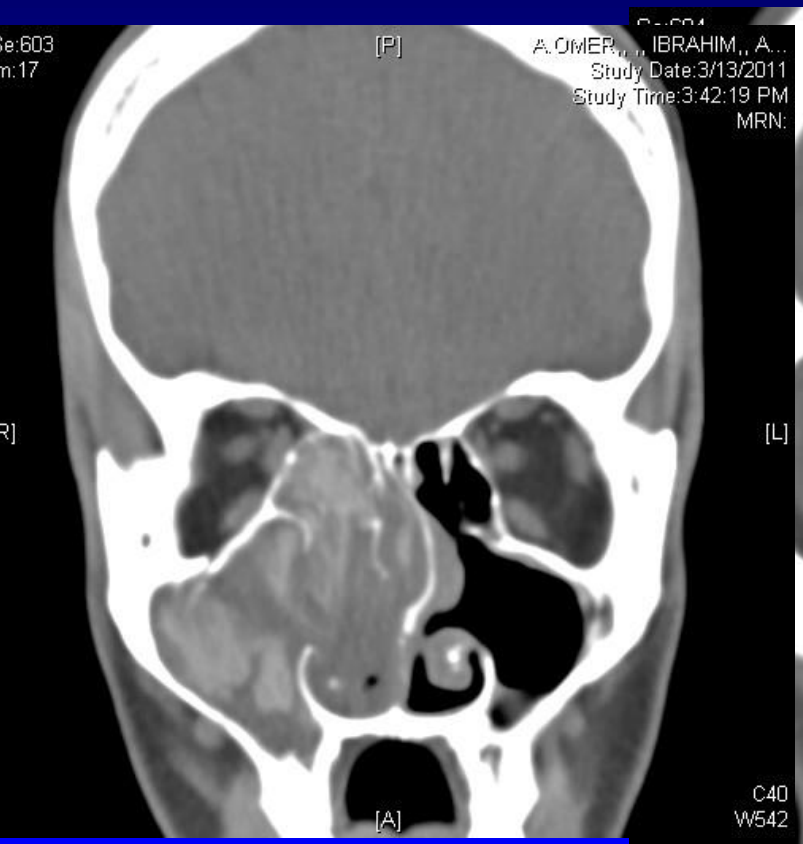
Allergic fungal Sinusitis

- Nasal obstruction
- Allergic rhinitis, or chronic sinusitis
  - Nasal congestion, Purulent rhinorrhea, Postnasal Drainage, or Headaches
- Patients are atopic
  - Unresponsive to antihistamines, Intranasal Corticosteroids, and prior immunotherapy
- Patients with AFS always are immunocompetent
- 5-10% of chronic rhinosinusitis patients actually cases of AFS
- Two thirds of patients report a history of allergic rhinitis
- 90% of patients demonstrate elevated specific IgE to one or more fungal antigens.
- 50% of patients in a series by Manning et al had asthma.
- No linkage to aspirin sensitivity has been established.

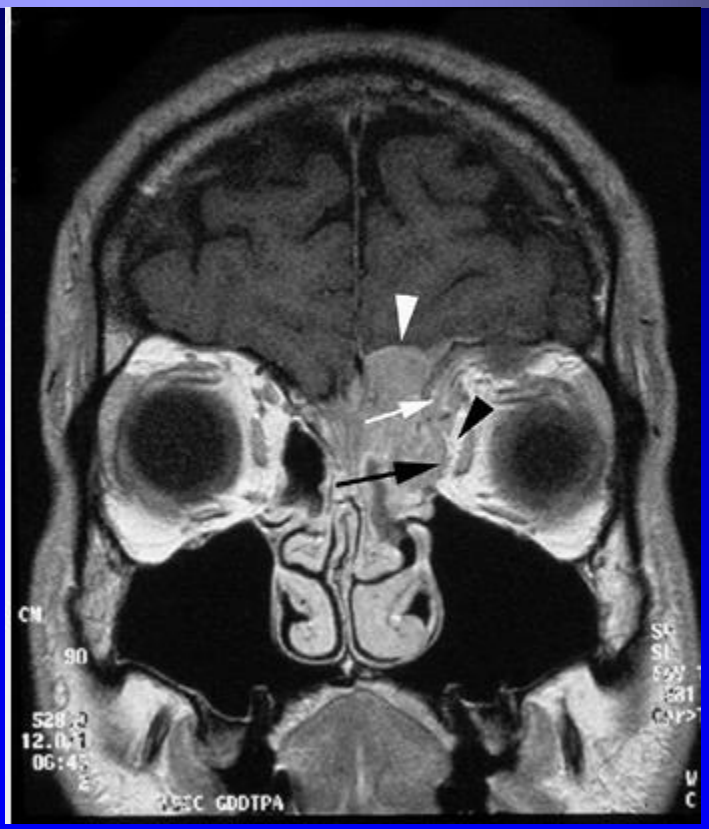
Examination

- Findings typically is broad
  - Intranasal inflammation and polyposis
- Facial dysmorphism:
  - Proptosis
  - Telecanthus
  - Malar flattening
  - More often was seen in children than in adults (42% vs 10%)
- Orbital Features
  - Proptosis usually occurs over long periods, no diplopia
  - Visual loss from AFS caused by compression of the ophthalmic nerve or inflamatory process

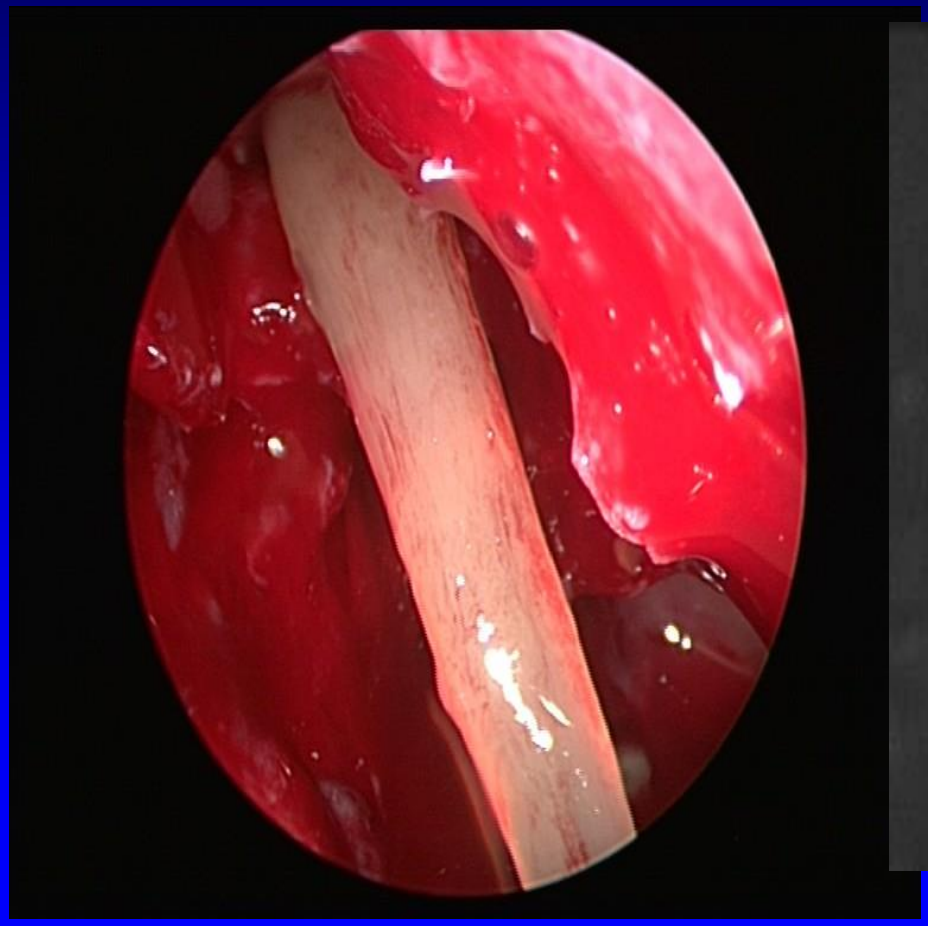
CT Scan Features

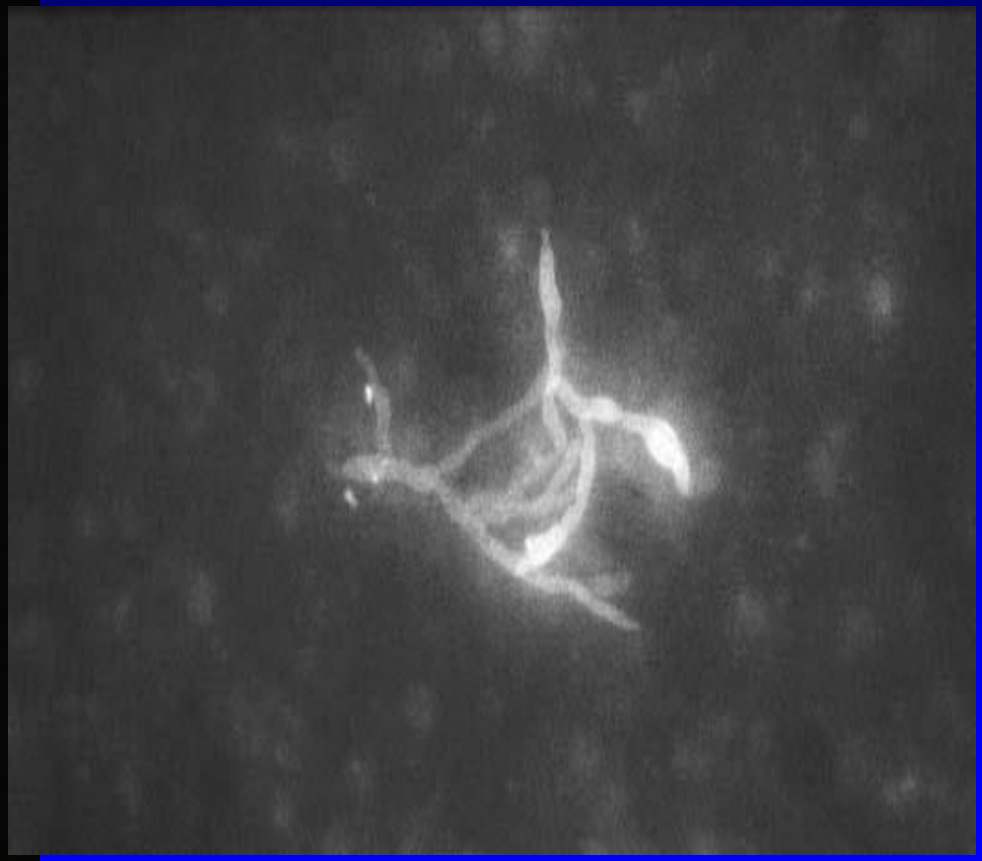


Intracranial Extensions



Mucin & Fungal Stain



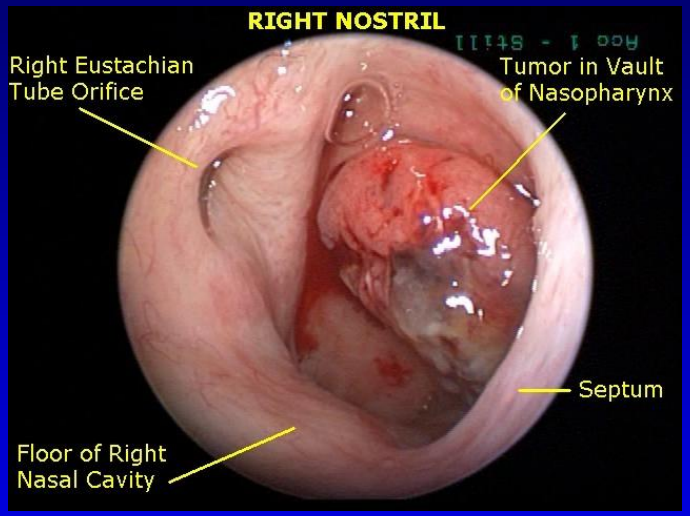


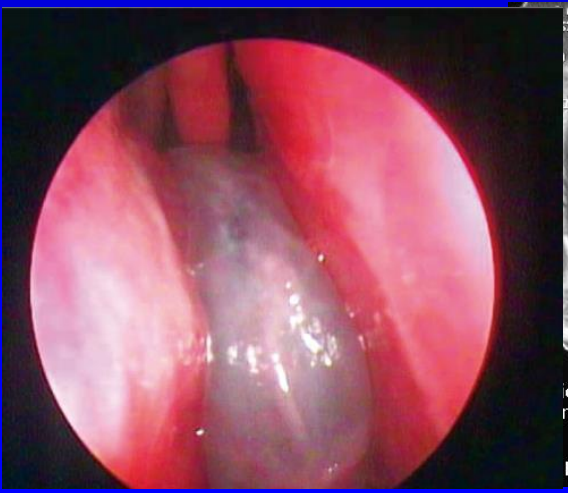
AFS Treatment

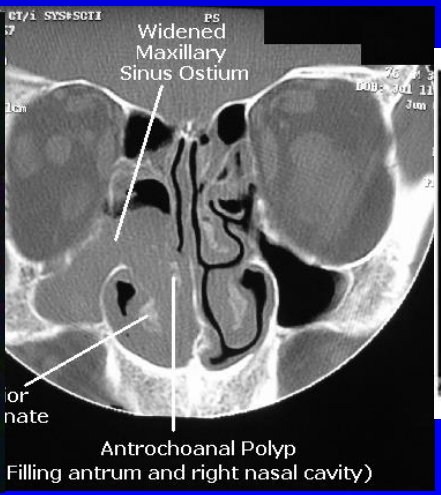
- The treatment of choice
  - **Endoscopic debridement (FESS)**
    - a perioperative short course of **steroids**.
- **Postoperative** mold containing **immunotherapy** is a promising therapeutic advance in limiting recurrence.
- The role of systemic **antifungal** therapy is inadequately studied.
  - **Itraconazole** orally is well tolerated and effective in vitro against common causes of AFS.

Unilateral Nasal Mass

- Allergic Fungal Sinusitis
- Antrochoanal Polyp
- Inverted Papilloma
- Carcinoma







Invasive fungal sinusitis

- Mucormycosis is encountered in dust and soil and enters through the respiratory tract
- Ketoacidosis predisposes to mucormycosis, as the fungus thrives in acidic environments
- Initially seen as engorgement of turbinates, followed by ischemia and necrosis of the turbinates and adjacent nose
- The fungus invades vascular channels and causes hemorrhagic ischemia and necrosis
- Frequently fatal. 90% mortality in immunocompromised

Treatment

- Treated with **radical surgical debridement**
- **Amphotericin B**
- **Correction of underlying immunosuppression**