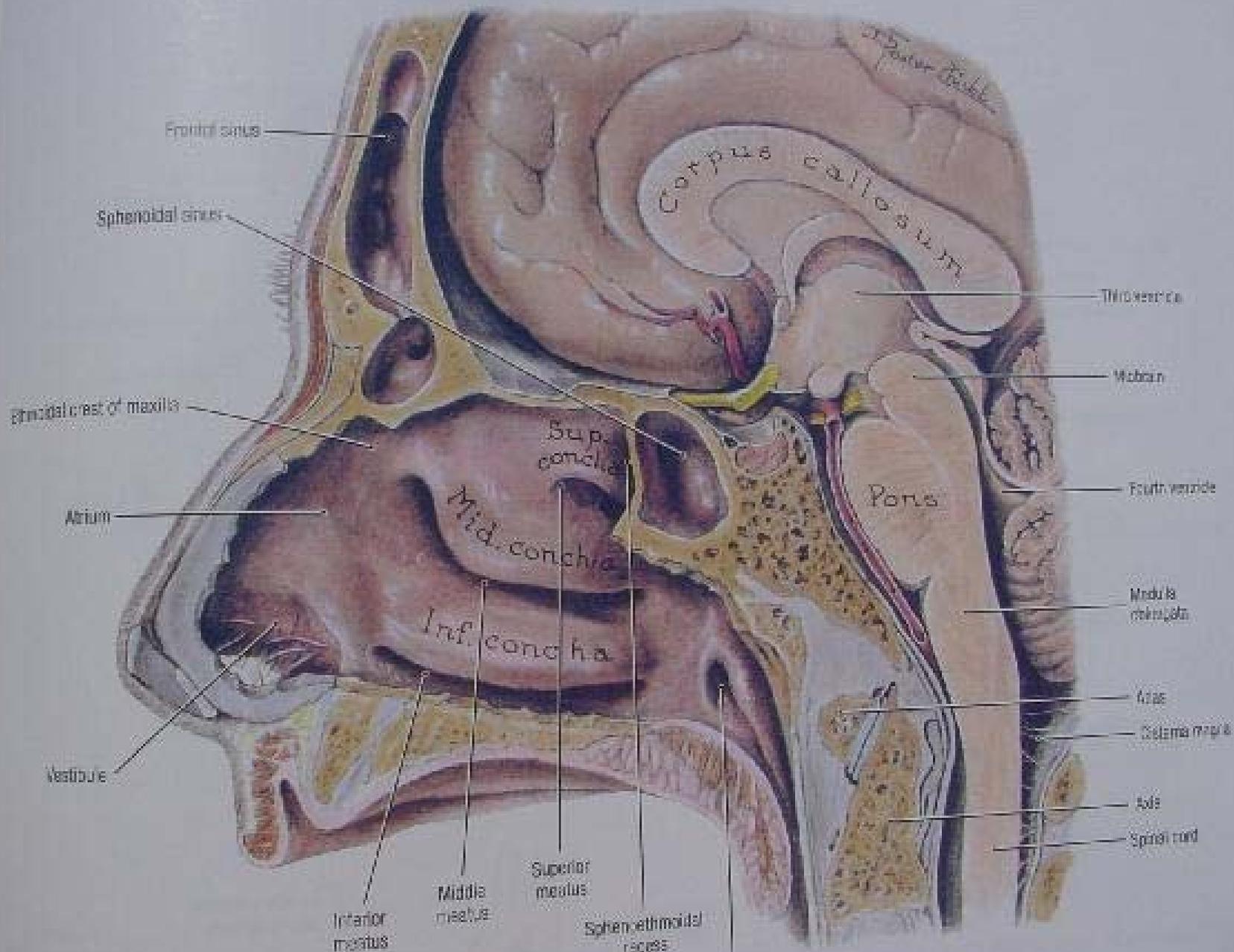


# Bits & pieces of sinusitis

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# Objectives of the lecture

- To clarify the role that **anatomy** and **physiology** plays in the **pathogenesis** of sinusitis.
- To differentiate the **different forms** of sinusitis
- To interpret correctly the **radiological** findings
- To prescribe the **appropriate therapy** for the patients
- To get updated in **surgical** managements



Frontal sinus

Sphenoidal sinus

Ethmoidal crest of maxilla

Atrium

Vestibule

Inferior meatus

Middle meatus

Superior meatus

Sphenoidal recess

Pharyngeal orifice of auxiliary tube

Corpus callosum

Third ventricle

Woban

Fourth ventricle

Medulla oblongata

Atlas

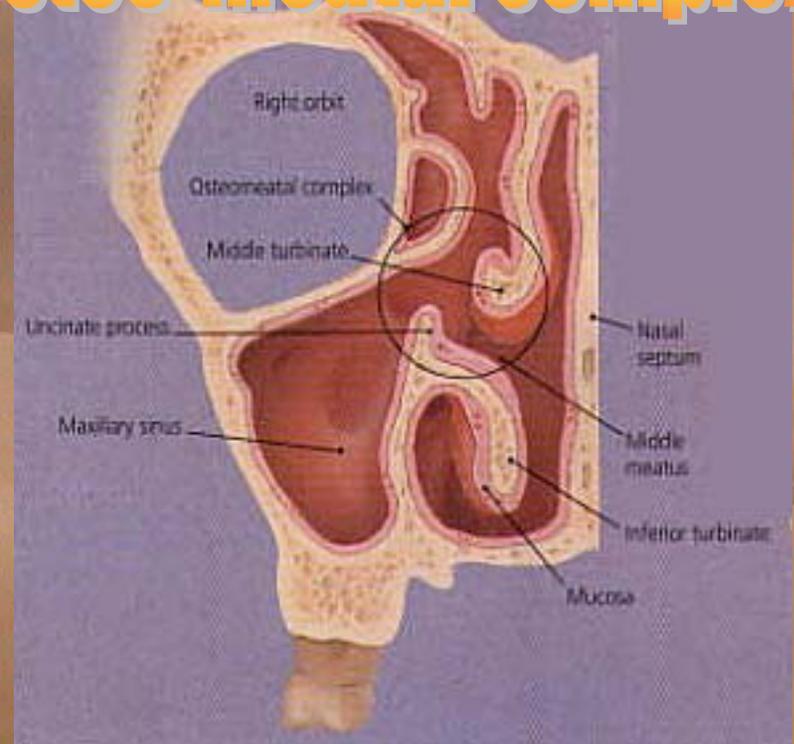
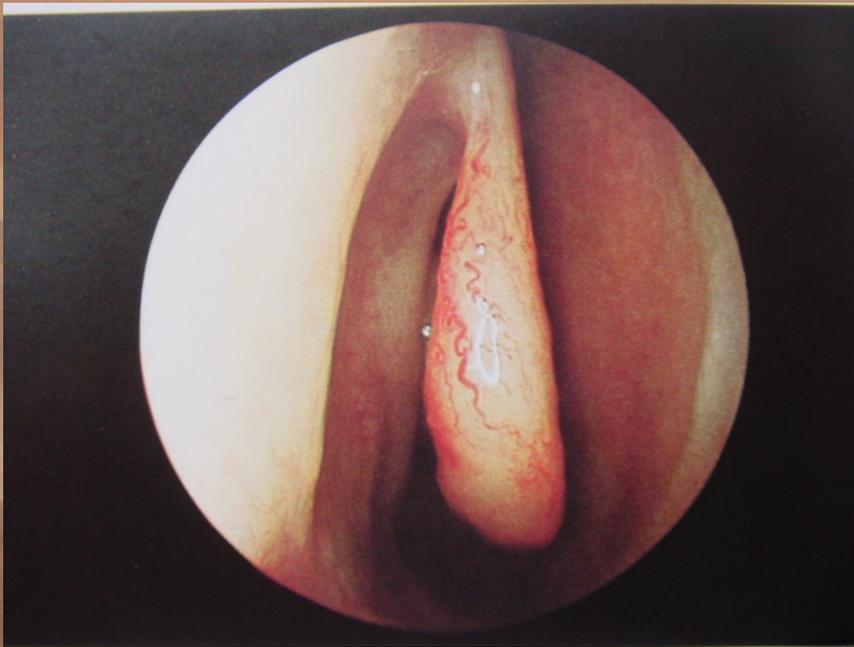
Systema magra

Axis

Spinal cord

Pons

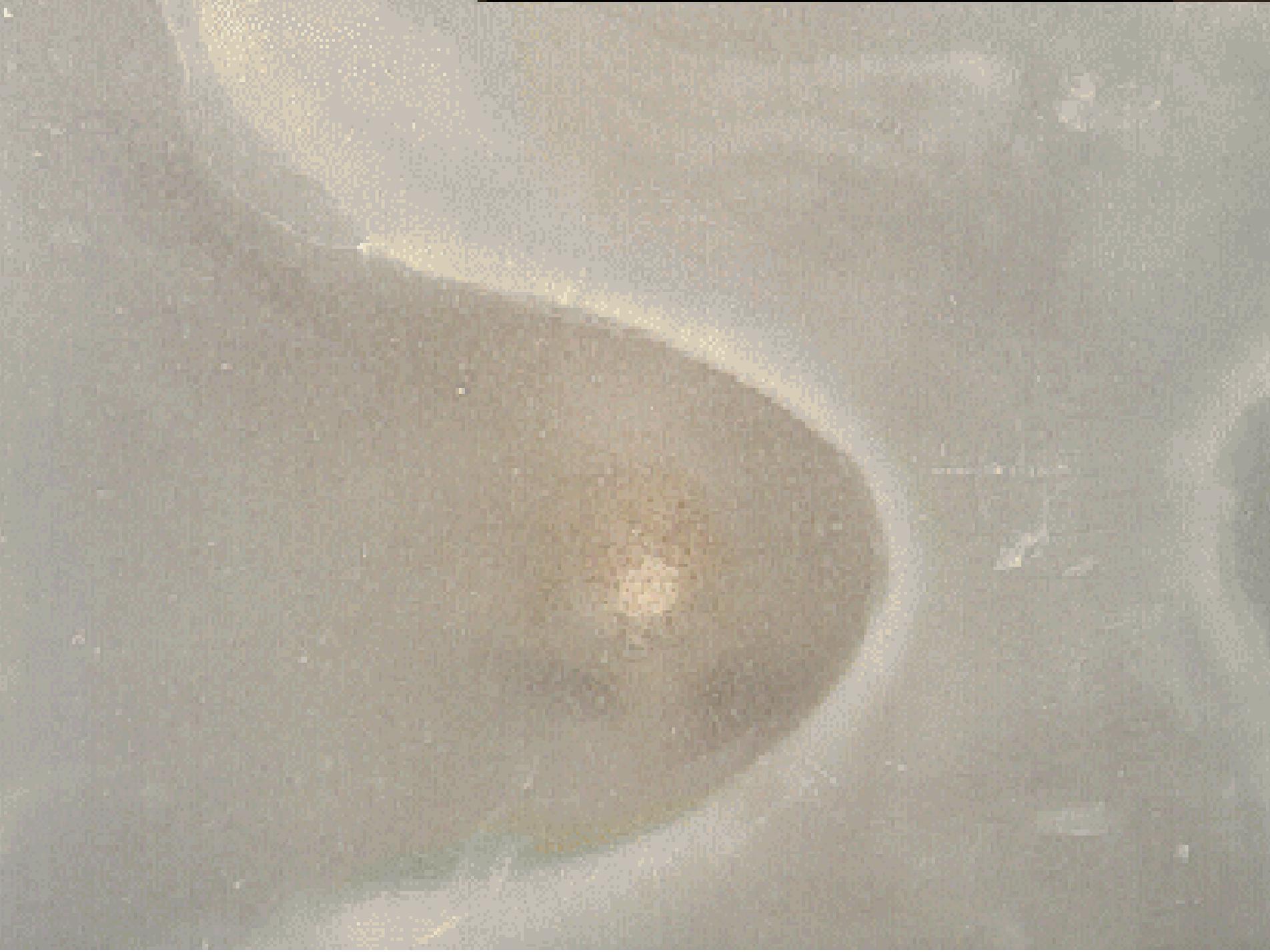
# osteo-meatal complex



Ethm., maxill.-present at birth

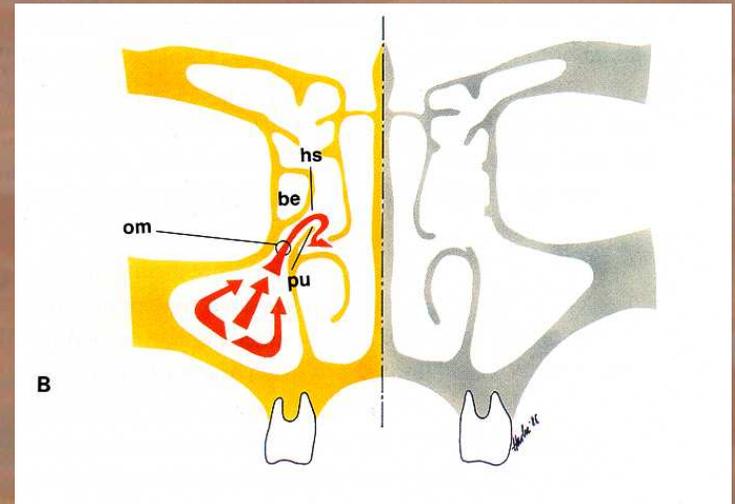
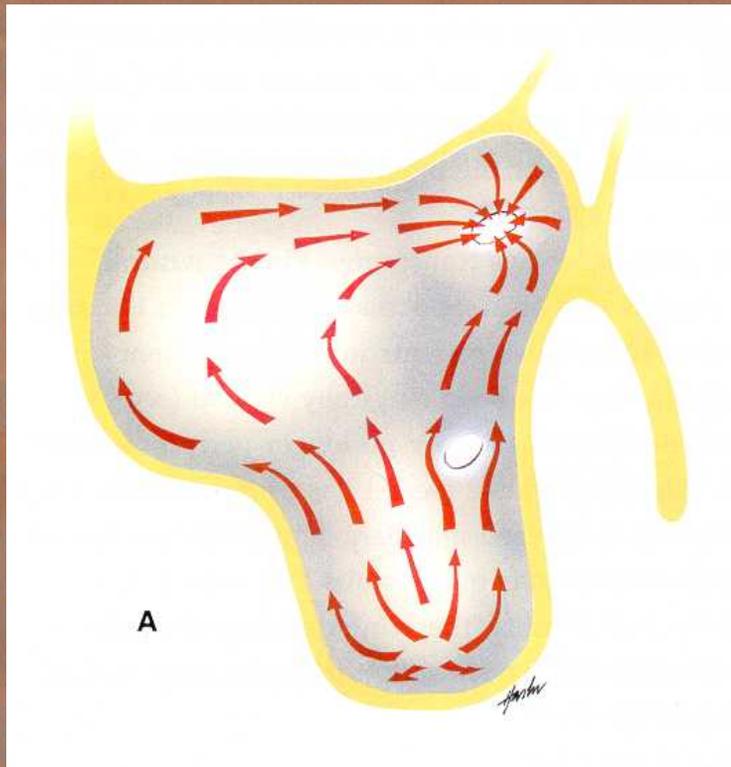
Sphenoid - age of 5 yrs

Frontal - age 7-12 yrs



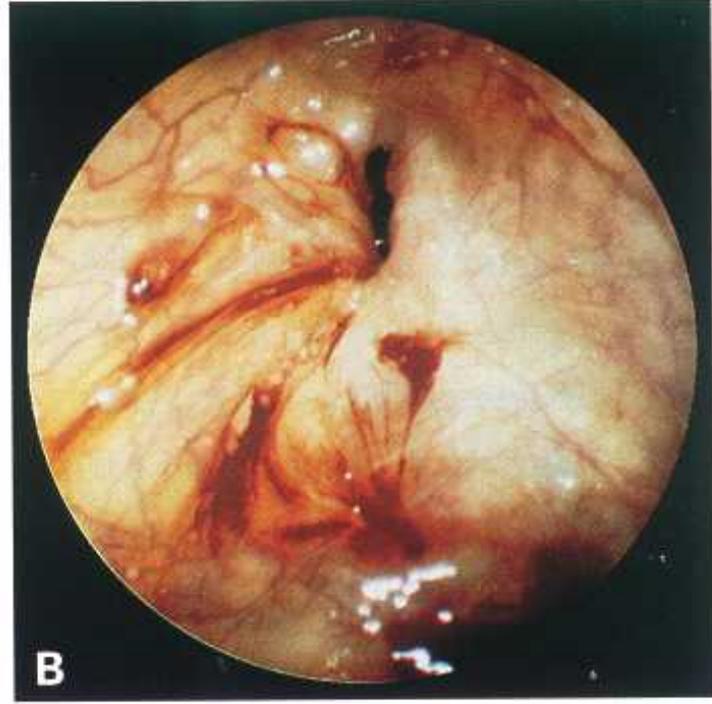
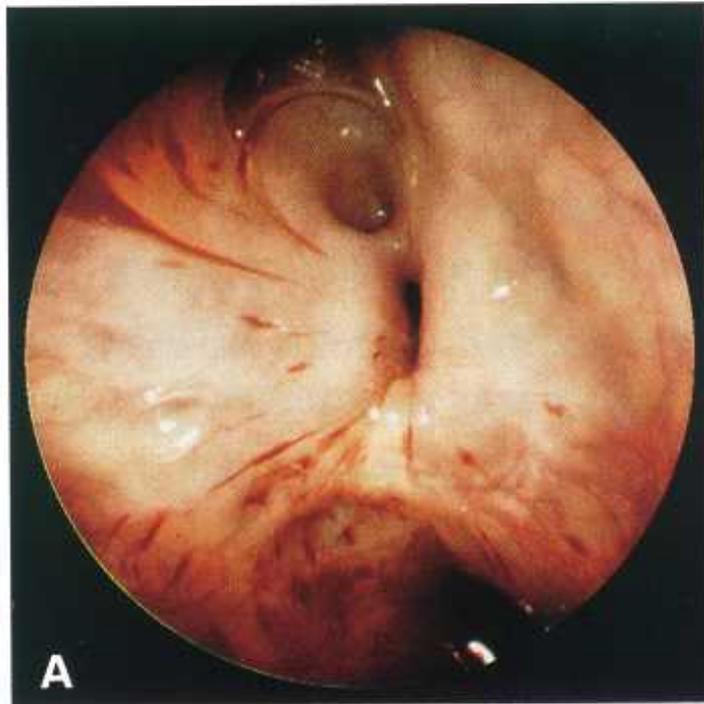
# Physiology of sinus function

Ventilation and drainage !!!



Columnar-ciliated  
respiratory epithelium

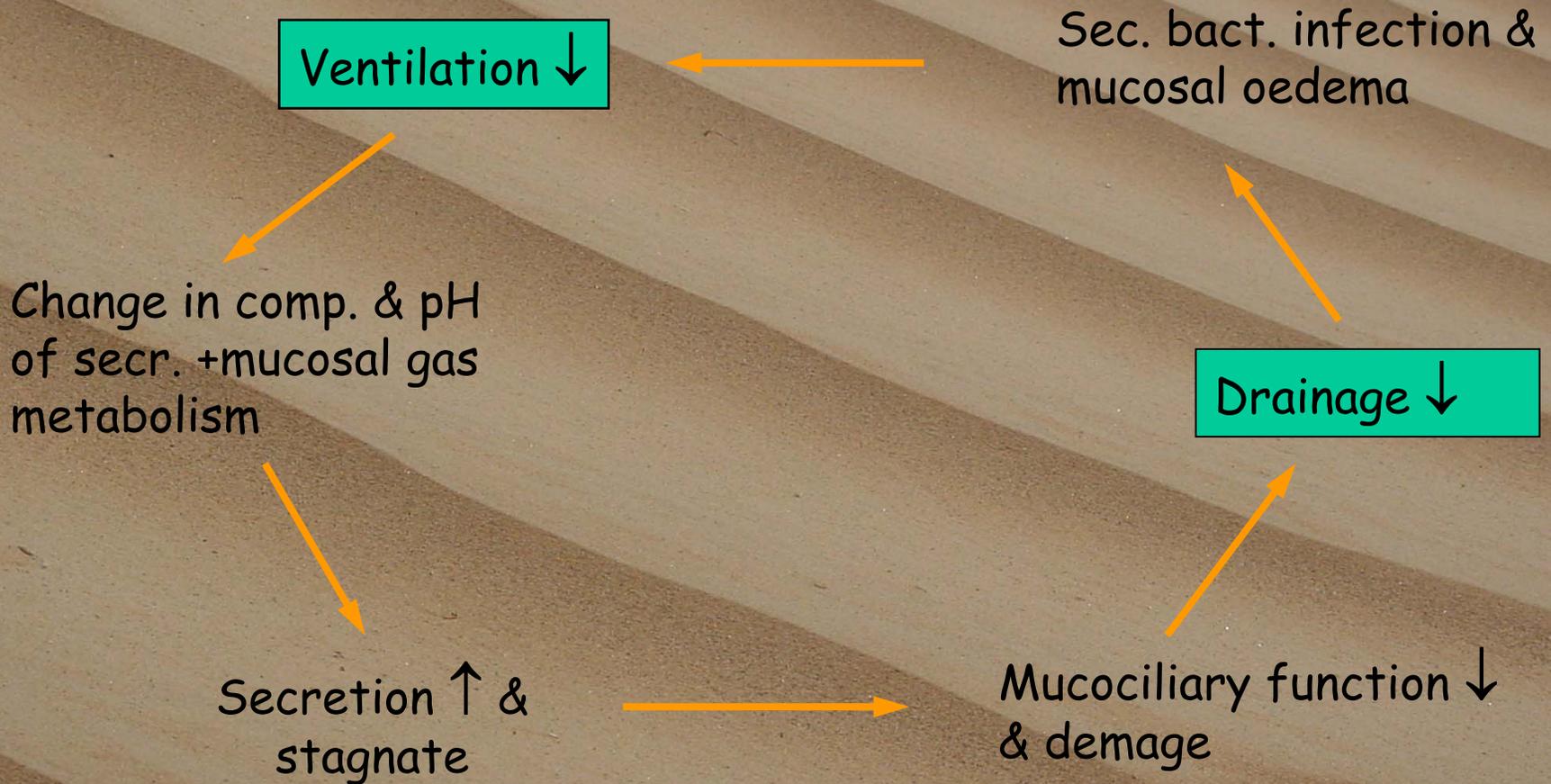
# Mucociliary transport



# Patho-mechanism of infection

- Sinuses are sterile
  - Nose and nasopharynx > bact. & fungi
  - Drainage + ventillation > clearance > ~~infection~~
  - Predisposing factors
    - viral URTI
    - allergic rhinitis
    - anatomical ...
- |  |                       |                    |
|--|-----------------------|--------------------|
|  | mucosal oedema        | } bact.<br>infect. |
|  | ostium close          |                    |
|  | no ventill.,no drain. |                    |
- Dental origin, trauma...

# Pathophysiology of ostium obstruction



# Bits & Pieces

- Most infections involving nose and paranasal sinuses are VIRAL URTI.
- 6-8 times URTI annually in children → 5-13% complicated with acute bact. sinusitis
- 80 % of bact. sinusitis is the result of previous viral URTI

# Bits & pieces

- 31 million pts in USA has sinusitis annually
- URTI- most common disease in ERs
- 2% of URTI-s develop acute bact. sinusitis
- Challenge is to differentiate between  
URTI & allergic rhinitis & bacterial sinusitis
- 5 billion USD spent on medical therapy
- 60 billion USD for surgical treatment

# Clinical Forms

**Acute,** ( < 30 days, symptoms resolve completely)

**Subacute,** (30-90 days, symptoms resolve completely)

**Chronic,** (>90 days, eg. cough, discharge, obstruction)

**Recurrent acute,** (acute episodes but disease free  
intervals of min 10 days)

**Acute on chronic,** (no disease free intervals)

# *Pathogens involved:*

•In adults:

*In acute- Streptococcus pneumoniae and Haemophilus influenzae*

*In chronic- infecting organisms are variable, and a higher incidence of anaerobic organisms is seen (eg, Bacteroides, Peptostreptococcus, and Fusobacterium species).*

•In children:

similar + *Moraxella catarrhalis*.

*Staphylococcus aureus* is an occasional finding.

•In systemically impaired hosts:

*Candida, Aspergillus, and Phycomycetes* may be the cause.

Risk factors: diabetes mellitus, cancer, hepatic disease, renal failure, burns, extreme malnutrition, and immunosuppressive diseases.

## History:

- Presentation of sinusitis is often **nonspecific**.
- Patients may present with a persistent cold.
- Most complaints are **related to the involved sinus**.
- Common complaints are **nasal congestion**, purulent **discharge**, and facial **pain** with headache.
- Pain is often **exacerbated by** leaning forward or any head movement, reproducible by percussion, pressure.
- Patients may complain of **retro-orbital pain** if the ethmoid sinus is involved.
- Some patients complain of dental pain or alteration in smell.

# Bits & pieces to consider in children

Ethm., maxill.-present at  
birth

Sphenoid - age of 5 yrs

Frontal - age 7-12 yrs

- Most URIs last 5-7 days.
- By 10 days, the URTI almost always improves.
- Most rhinoviral infections improve within 7-10 days so the complaint of persistent or worsening symptoms may indicate a developing bacterial sinusitis.
- Daytime cough and persistent nasal discharge.
  - Facial pain and headache are rare in children.
  - Occult chr. sinusitis (7-12 yrs)
    - sec. disease of bronchi & lung (Sinobronchial sy).
    - developmental problems & disorders
    - unexplained fever
    - disorders of stomach & intestine
- Mucoviscidosis , Cartagener` s sy

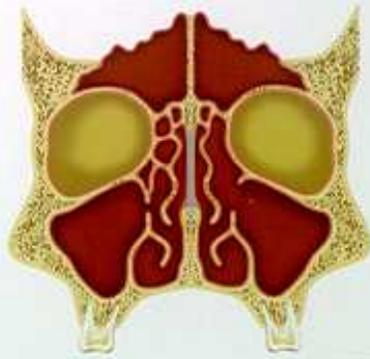
# Physical:

- Purulent secretions in the middle meatus (highly predictive of maxillary sinusitis).
- Fever is seen in fewer than 2% of individuals with sinusitis.



- Facial tenderness to palpation or pressure is present.
- Complete opacification of sinus on (transillumination) is present.

# Diagnosis



- Sinus aspiration (gold standard but I invasive, painful, time-consuming and not feasible.)

- Clinical hx, signs and symptoms  
(rhinoscopy, nasal endoscopy)

(Clinical dg. in uncomplicated cases is enough !!!)

- Plain X-rays & Transillumination

(limited use, false neg. 40%, only maxill. sinus can be judged, positioning young children`s head is difficult.)



# Diagnosis



- CT \*nonresponsive to AB,
  - \*persistant, chronic, recurrent symptoms /daytime cough, post-nasal drip, fever, purulent discharge chronic/
  - \*complication
  - \*surgery
  - (extremely sensitive > over diagnosis !!!)
  - Can NOT stand alone as diagnostic evidence
- MRI (if intracranial spread)

# Therapy

URTI- viral! & Allergic rhinitis-allergy!

## Acute bacterial:

antibiotics (adequate dose! & antibacterial spectra!  
culture & sensitivity)

decongestants (topical, systemic),  
antihistamines, saline irrigation, mucolytics,  
Vitamin C, homeopathic medicines, Zinc nasal  
gel, Echinacea preps.

## Recurrent acute & chronic:

above + risk factors!+ predisposing factors  
consider ENT appointment!

# AB use in USA

## Acute non-complicated bacterial sinusitis

- Amoxicillin 45 or 90 mg/kg/d in 2  
risk factors for resistance- previous use of AB
  - attendance to daycare
  - age < 2 yrs

## In Amoxi allergy

- Cefdinir
- Cefuroxime
- Cefpodoxime
- Clarithromycine
- Azythromycine

## In Penicillin resistant Streptococcus pneumoniae

- Clindamycine

# AB use in USA

## Prev. AB, or no improvement to AB, or severe symptoms

- Amoxicillin + Clavulanic acid
- or
- Cefdinir
- Cefuroxime
- Cefpodoxime
- Ceftriaxone
- Trimetroprim + sulfamethoxazole

## No improvement for 2<sup>nd</sup> AB th.

- Ceftriaxone i.v.
- Cefotaxime i.v.                      Consider ENT appointment.

## In Complications

- Ceftriaxone i.v.
- Cefotaxime i.v.
- Vancomycine
- Ampicillin + Sulbactam

# Complications

- **Soft tissue swelling** (upper eyelid-frontal, lower-ethmoid, cheek-maxillary)
- **Orbital** (periorbital oedema, phlegmone, superiosteal-, intraorbital abscess)
- **Intracranial** (epi-, subdural-, brain abscess, cavernosus sinus trombosis, meningitis)
- **Osteomyelitis of frontal bone** (Pott`s puffy tumor)

A photograph of a sandy beach with several sets of footprints and long shadows cast across the sand. The text is overlaid on the image.

Sinusitis

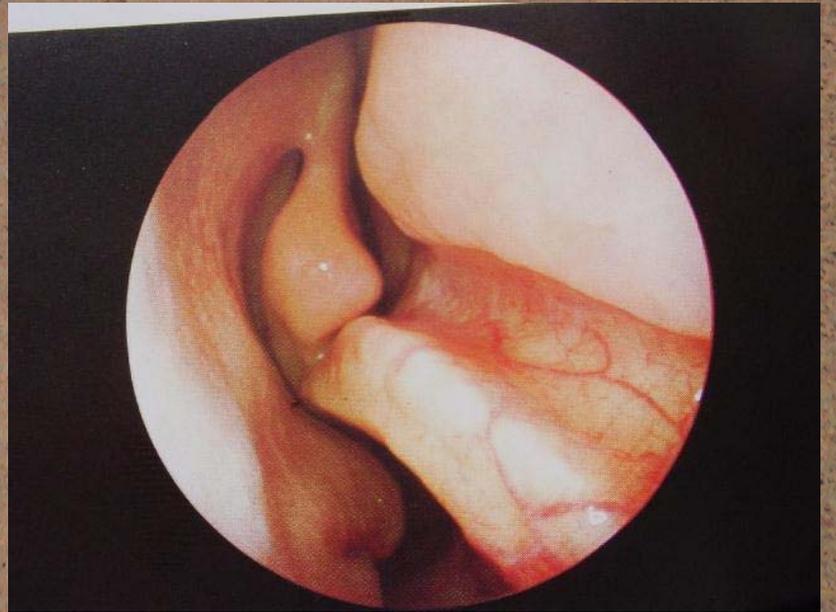
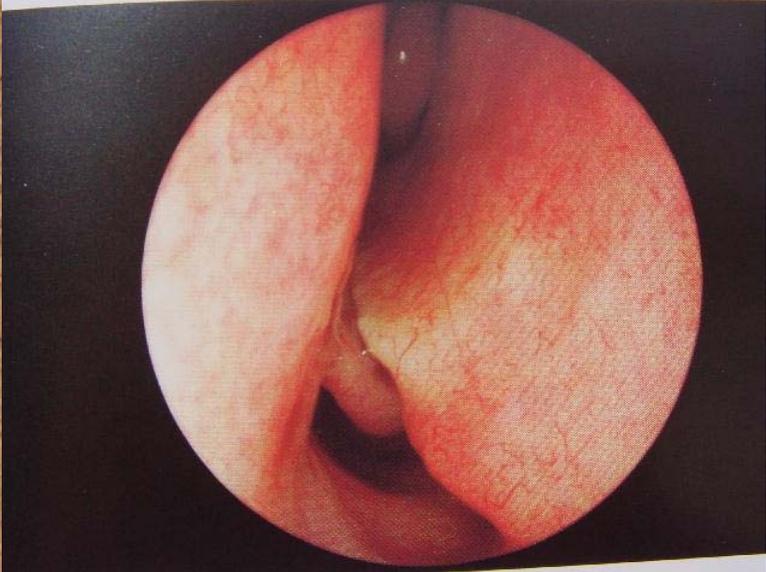
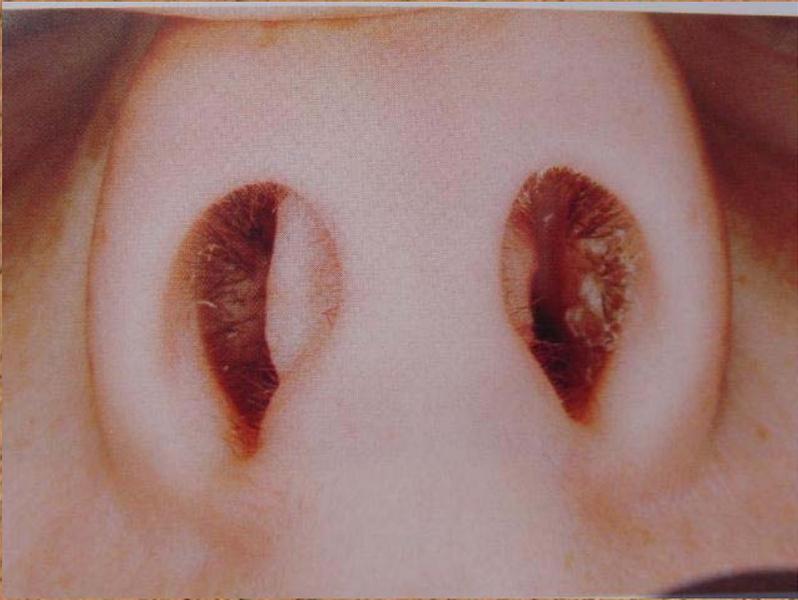
Chronic ???

&

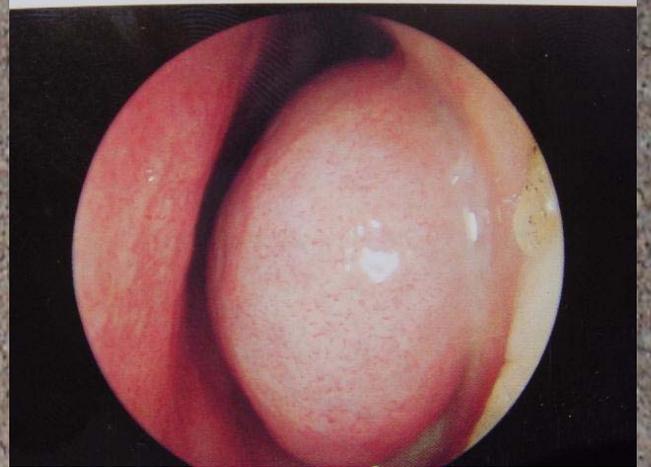
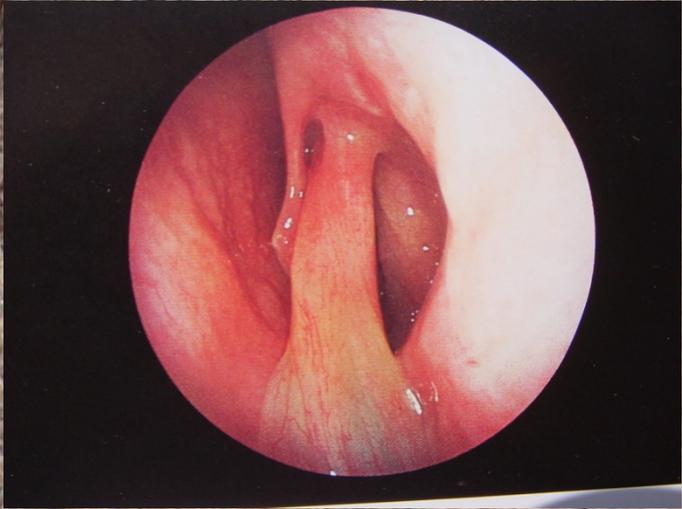
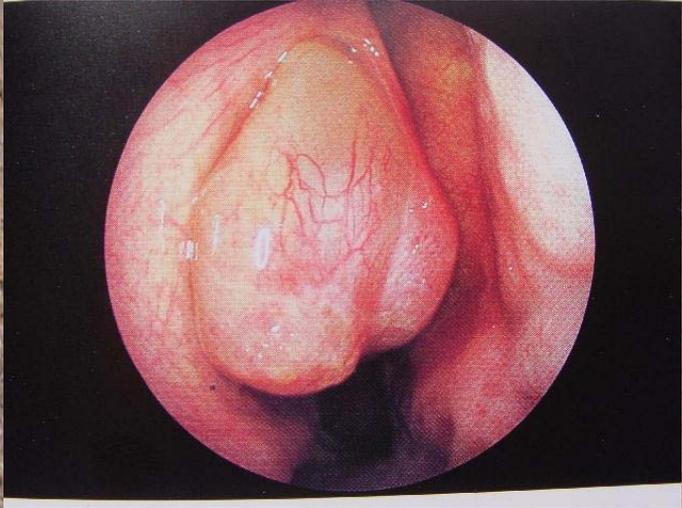
Recurrent  
???

# Predisposing factors of chronic rhinosinusitis

- Repeated viral respiratory infections,
- Allergic / non-allergic rhinitis,
- Variations of nasal anatomy/or other factors that hinder normal air flow through the nose,
- Congenital or acquired immunodeficient sy.-s,
- Mucociliary dyskinesias,
- Cystic fibrosis,
- Dental origin
- Environmental pollution,
- Thermic insult to nasal mucosa (AC ...)









Repeated AB Therapy

# FESS

## Functional Endoscopic Sinus Surgery

- Minimal invasive surgical technique to restore ventilation, drainage and normal function of the paranasal sinuses.

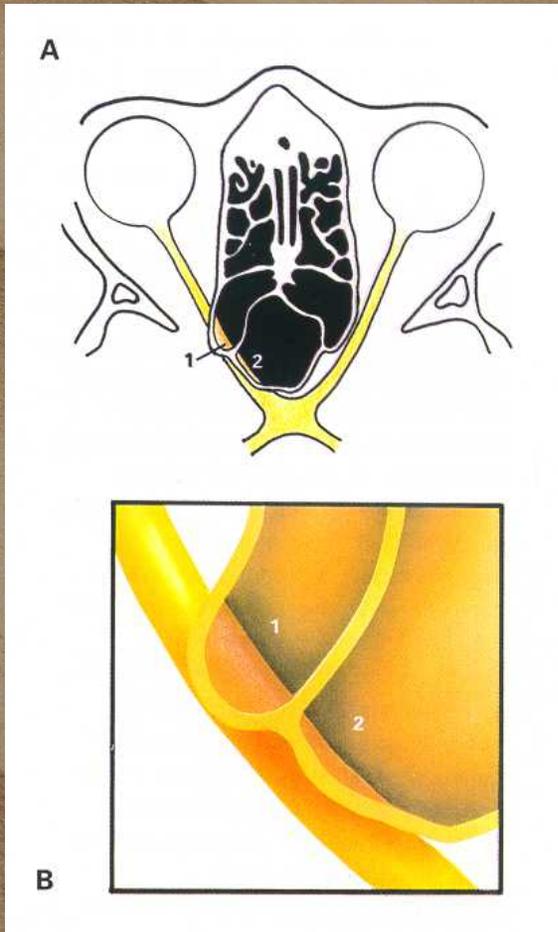
# Indication of FESS

in patients in whom medical therapy has failed  
in case of:

- chronic infective sinusitis
- acute on chronic sinusitis
- recurrent acute infective sinusitis

FESS- minimal invasive BUT! can be extremely harmful

# WHY?





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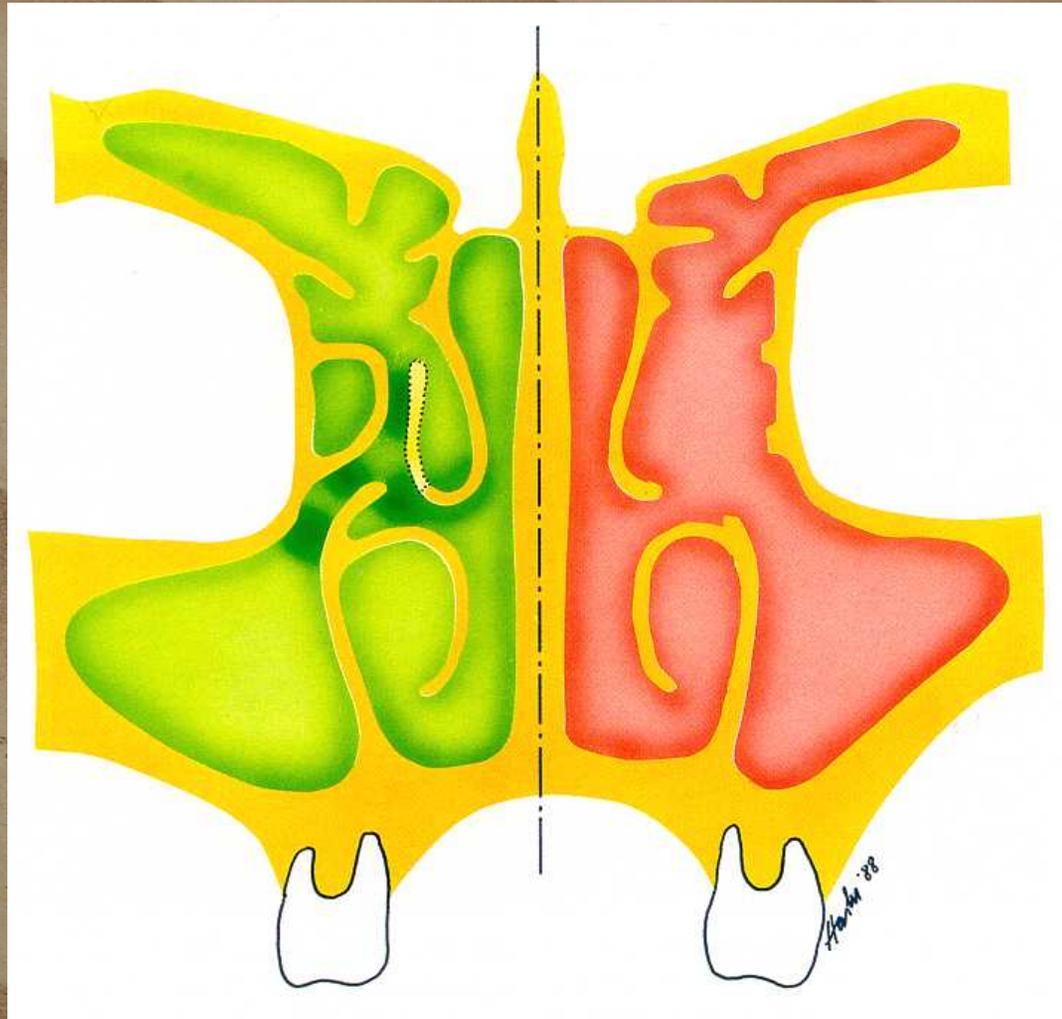
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12 4 2003

# Aim of FESS



# Summery

- How **anatomy** and **physiology** plays in the **pathogenesis** of sinusitis.
- **Different forms** of sinusitis.
- **Use of radiologic** imaging.
- **Recommended therapy** of the different forms.
- **Updates in the surgical** managements.

Thank you