Poltava State Medical University
Department Otorhinolaryngology

Acute and Chronic Diseases of Nose and Paranasal Sinusis

prof. Gasyuk Y.A.

«Otorhinolaryngology» originates from greek words – «otos» is ear, «rhinos» – is nose and «larynx»

Abbreviation appears from these words

«ORL or ENT»

Model of Nose and Paranasal Sinusis

Microscopic Anatomy

Mucosa:

Epithelium

- ciliated columnar epithelial cells
- non-ciliated cells
- goblet cells
- basal cells
- basement membrane

Submucosal layer

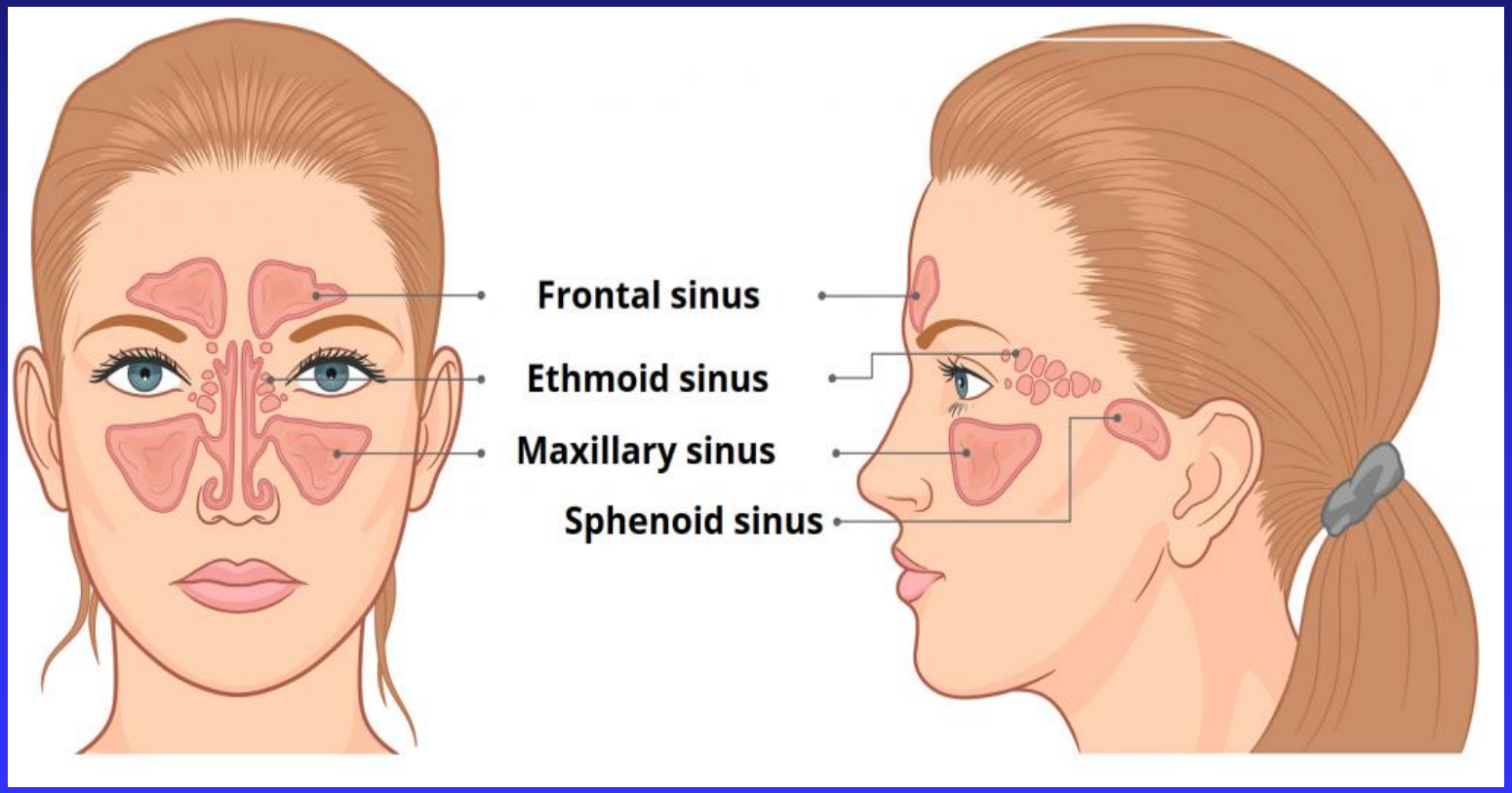
Ciliated Columnar Epithelium

Mucociliary Transport

- directional flow of mucus toward the choanae
- ostium drainage of paranasal sinusis
- inhibits invasion pathogens into mucosa

Mucociliary Transport

Sinuses Anatomy Overview

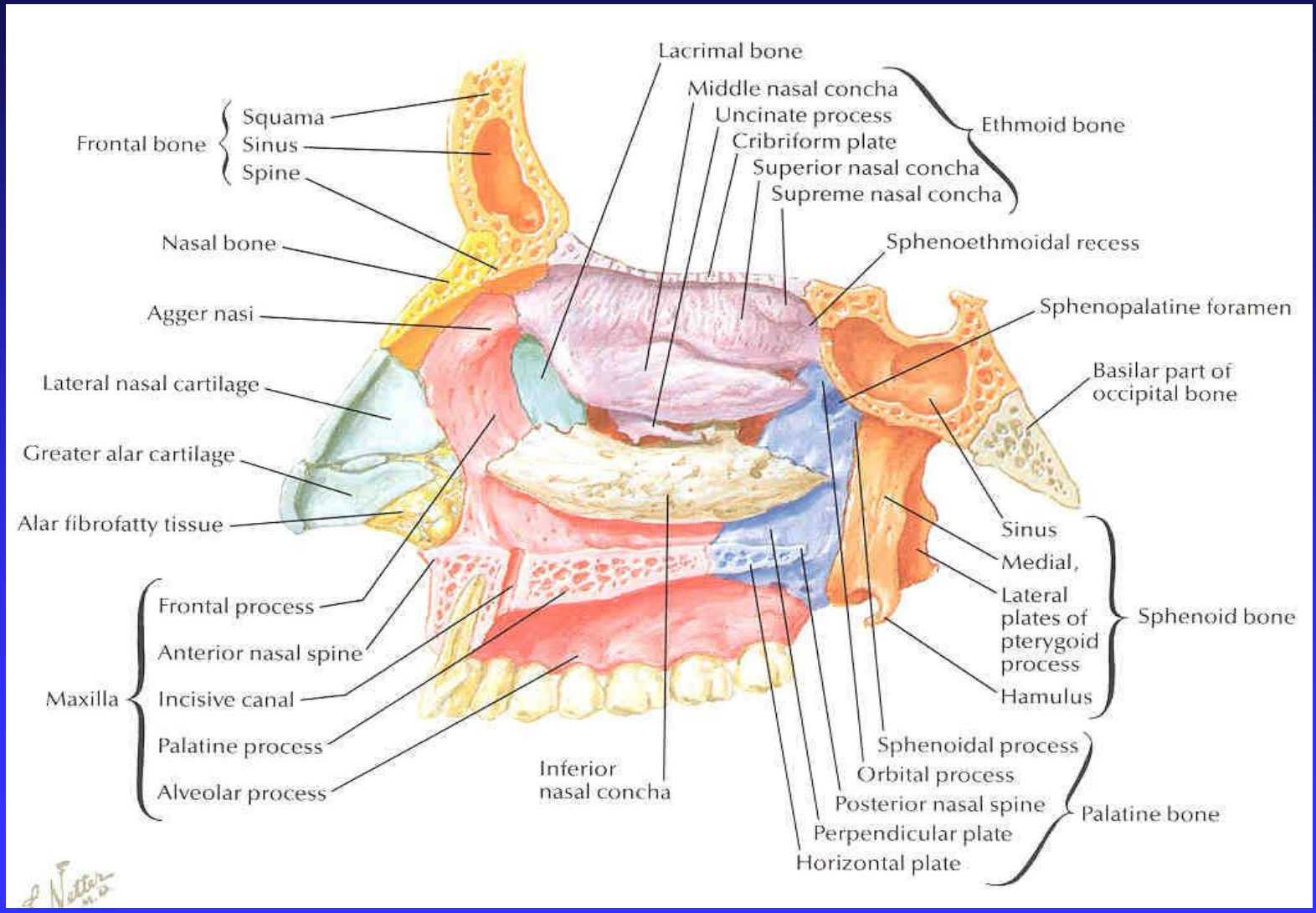


Sinus Development

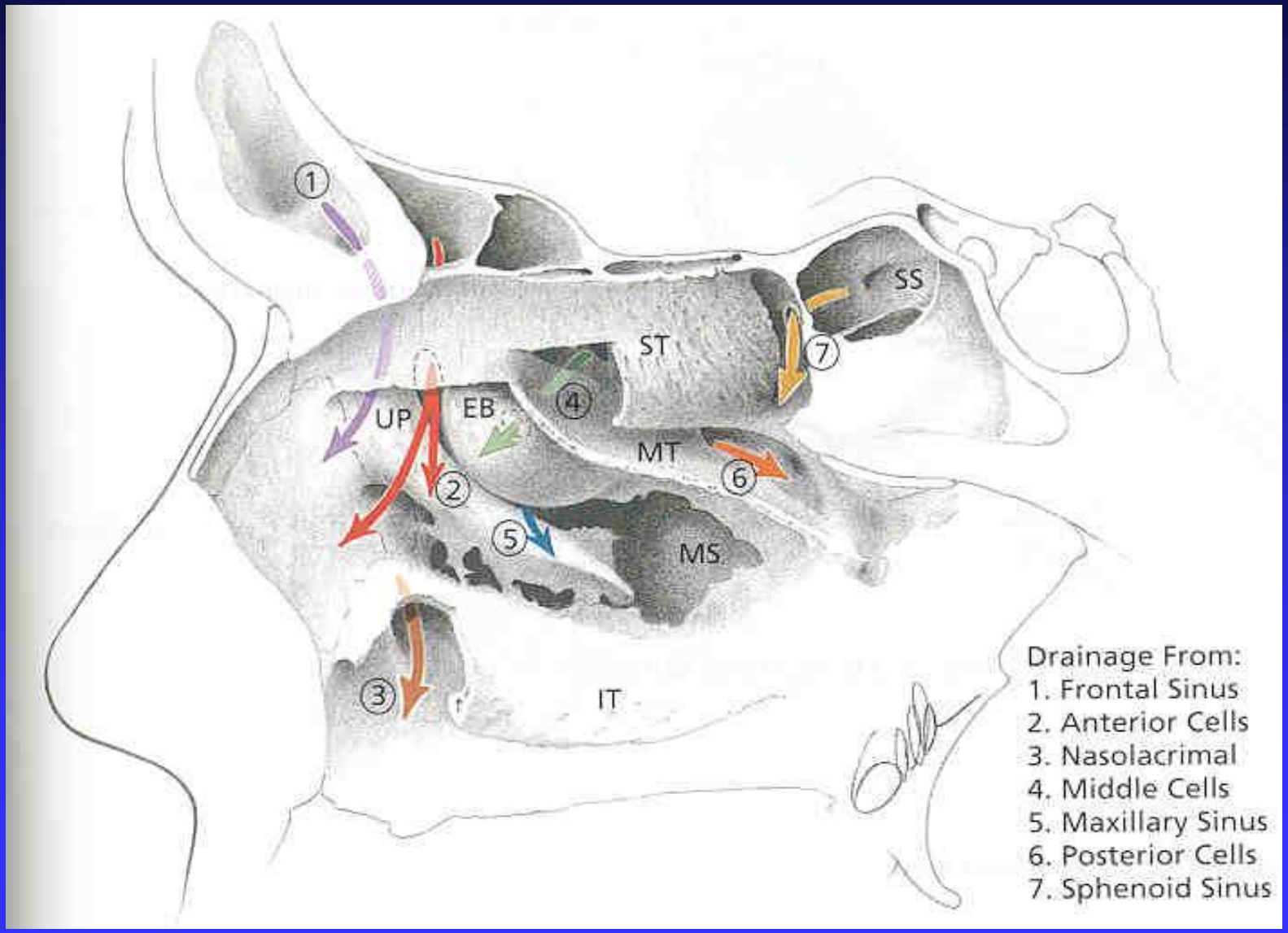
Growth and development of paranasal sinuses

Sinus	Status at birth	Growth	First radiologic evidence
Maxillary	Present at birth	Rapid growth from birth to 3 years. Adult size 15 years	4-5 months after birth
Ethmoid	Present at birth	Reach adult size by 12 years	1 year
Frontal	Not present	Invades frontal bone at the age of 4 years and size increases till teens.	6 years
Sphenoid	Not present	Reaches sella turcica by the age of 7 years, dorsum sellae by late teens and basisphenoid by adult age. Adult size – 15 years.	4 years

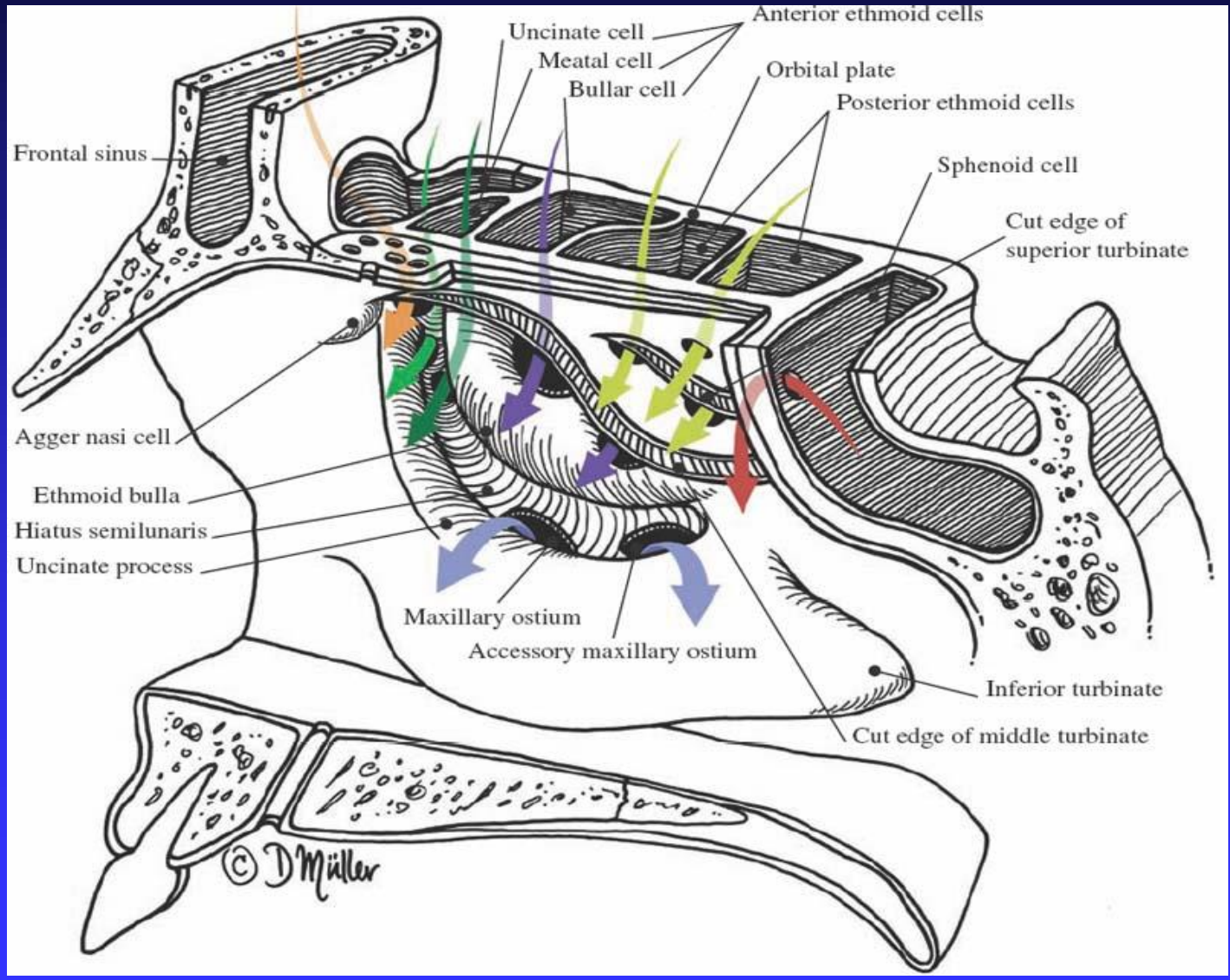
Bone Structures



Schema of Sinus Drainage

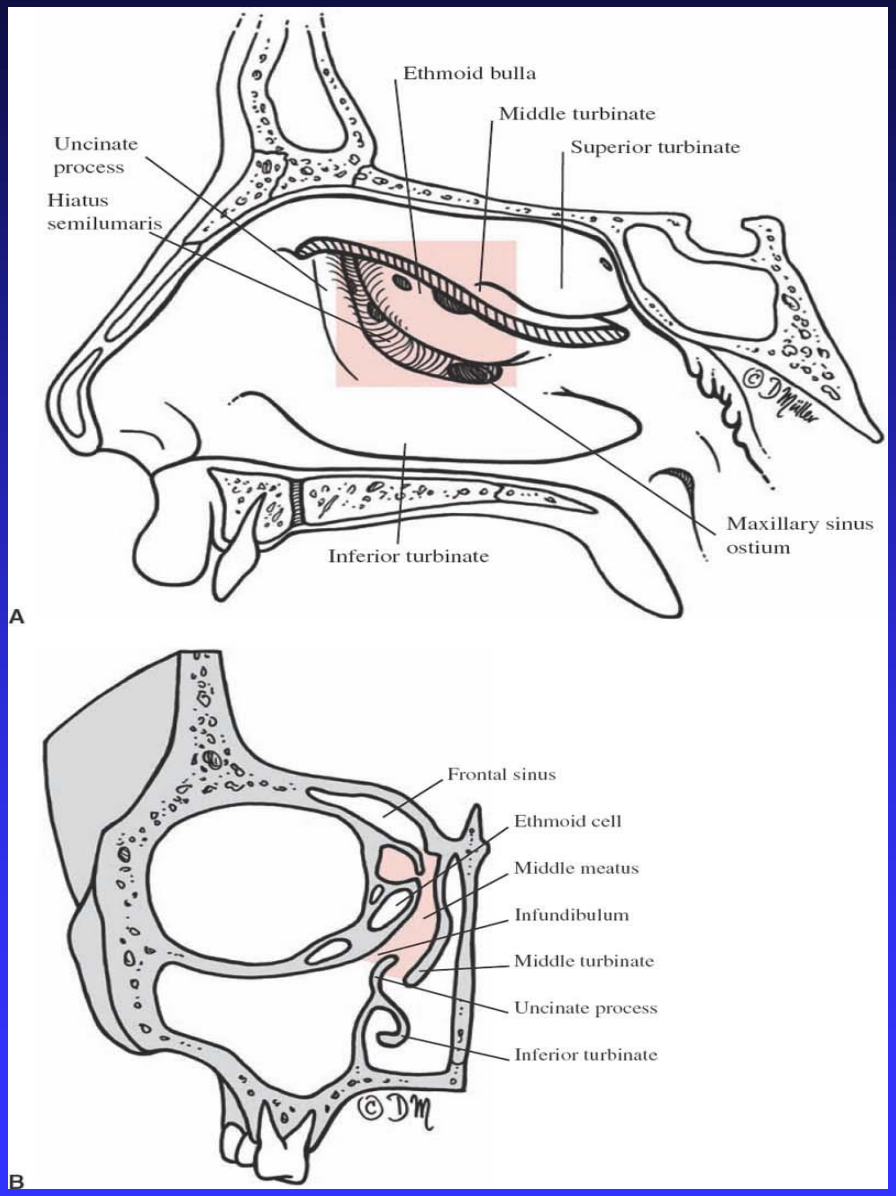


Drainage Systems of Paranasal Sinuses

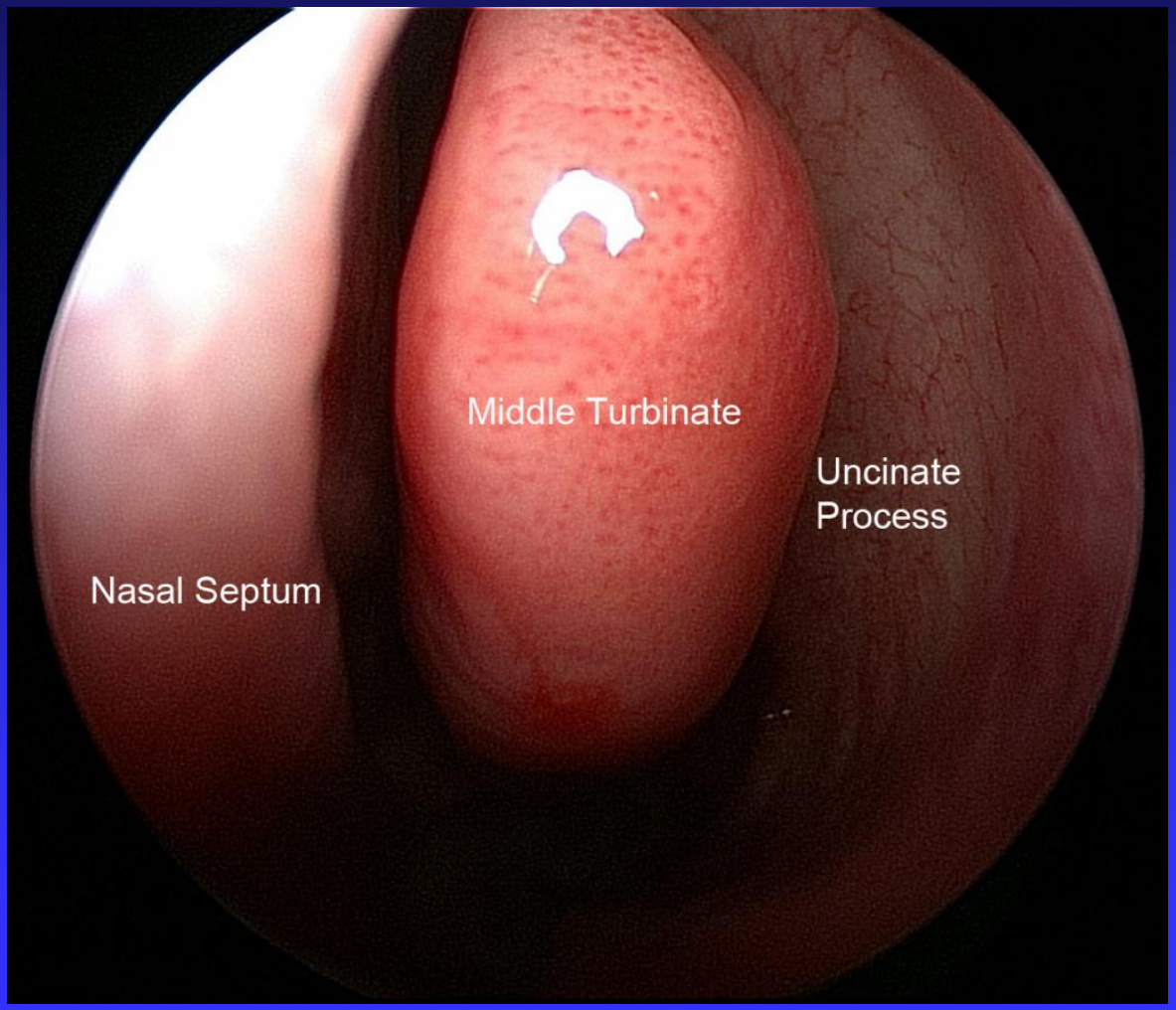


Anterior Osteomeatal Complex

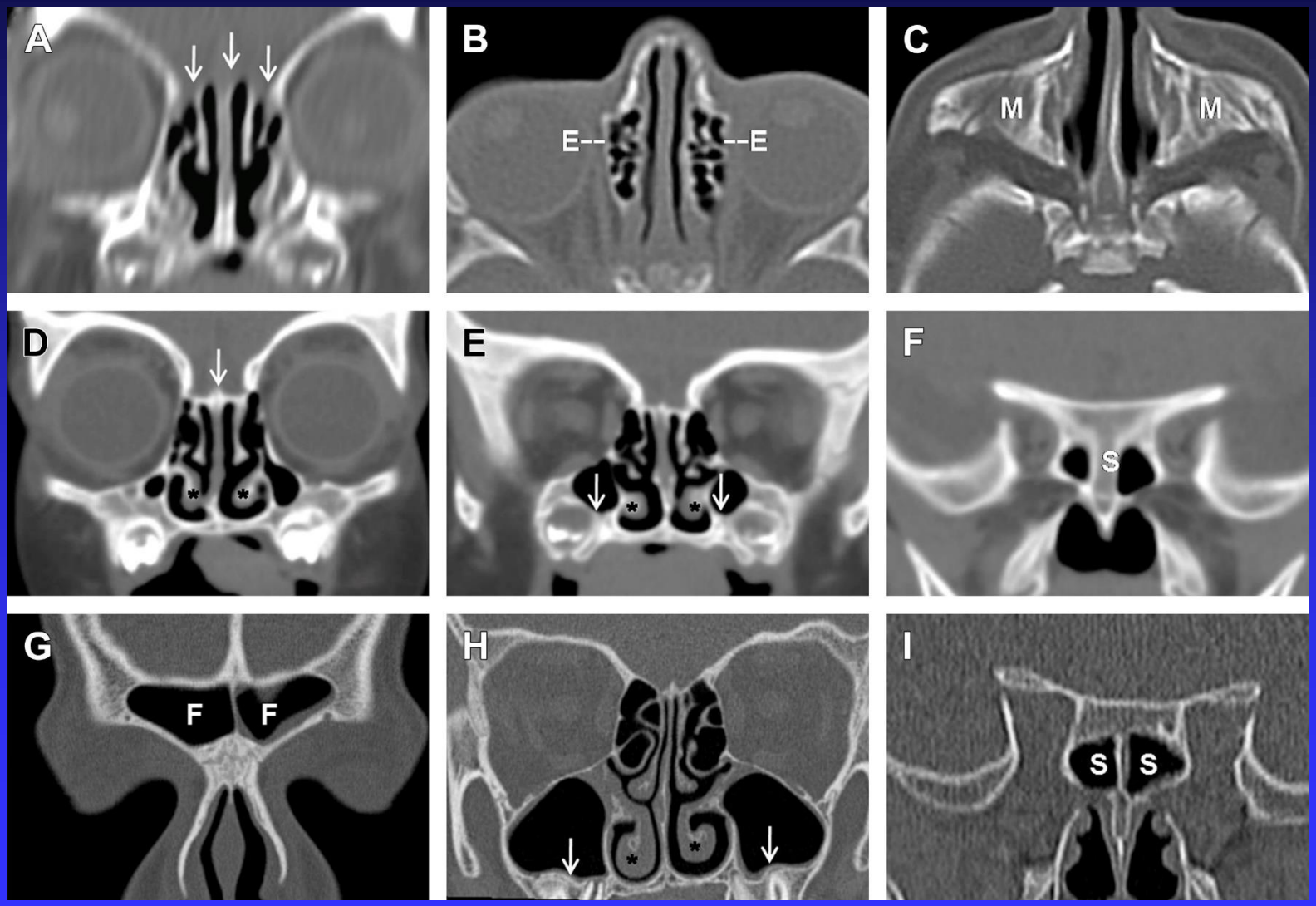
- middle turbinate
- middle meatus
- uncinate process
- ethmoid bulla
- hiatus semilunaris
- infundibulum
- anterior paranasal sinuses drainage



Normal Drainage of Left Maxillary Sinus

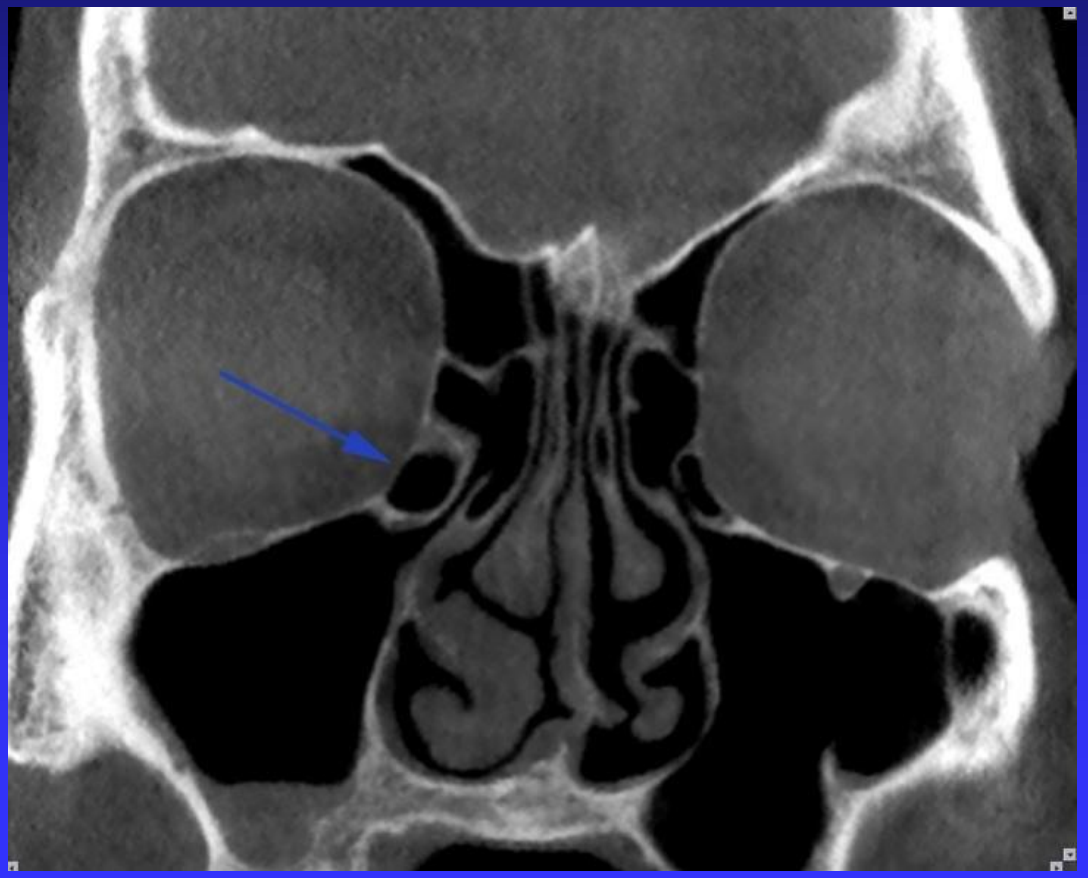


CT of Paranasal Sinuses



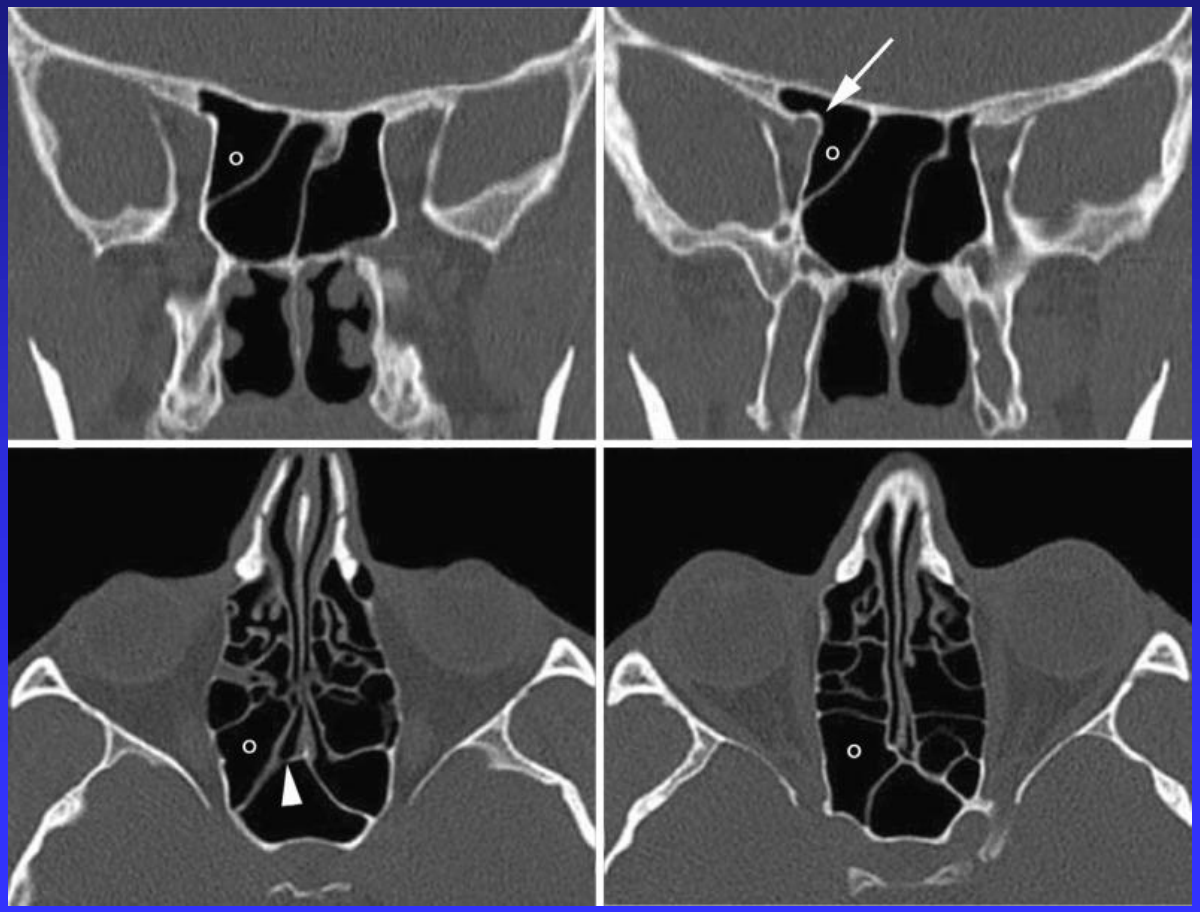
CT of Paranasal Sinuses

arrow points to a Haller cell in the right side



CT of Paranasal Sinuses

«o» points to a Onodi cell extends above and lateral to the right sphenoid sinus



Function of Paranasal Sinuses

- humidifying and thermoregulation of air
- regulation of intranasal pressure
- increasing surface area for olfaction
- resonatory
- lightening the skull
- contribute to facial growth

Chronic Rhinitis

- symptoms that persists for months or years: runny nose, an itchy nose, sneezing, congestion or postnasal drop
- classified as allergic or non-allergic

Allergic Rhinitis

overreacting of immune system to the presence of allergens (ragweed, pollen, mold, dust, pet dander etc) in the air

Treatment of Allergic Rhinitis

- reduce exposure to a particular allergen which is triggering AR
- irrigation of nasal cavity with saline spray
- non-sedating antihistamines
- intranasal steroids (mometazone, fluticasone) or an intranasal antihistamine (azelastine)

Causes of Non-Allergic Rhinitis

- environmental irritants such as detergents, strong odors, smog, and tobacco smoke
- weather changes (cold or dry air)
- hot or spicy foods or beverages
- some medications (pain relievers, oral contraceptives, antidepressants, beta-blockers)
- hormonal changes (pregnancy or thyroid disease)
- stress
- structural problems (deviated septum or enlarged turbinates)
- in some cases the specific cause can’t be identified

Treatment of Non-Allergic Rhinitis

- mild cases - irrigation with saline nasal spray or Neti pot, using of humidifier
- intranasal steroids (mometazone, fluticasone) or an intranasal antihistamine (azelastine)
- in some cases surgery may be needed to repair a deviated septum, remove nasal polyps or reduce the turbinates

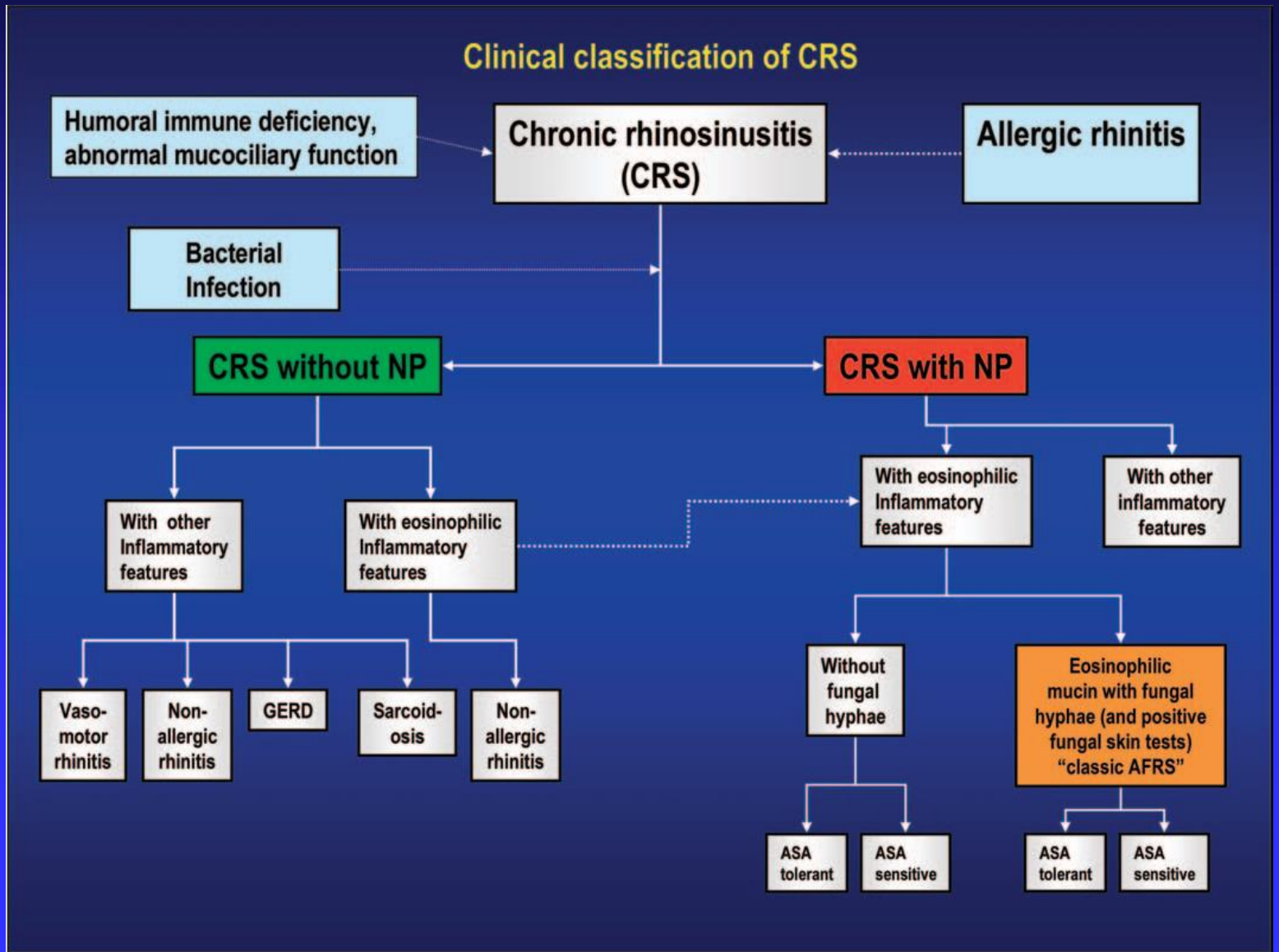
Acute Rhinosinusitis

- inflammation of the nasal mucosa and one or more paranasal sinuses before 3 months
- viral (irrigation and phytoneering therapy)
- postviral (irrigation, phytoneering, intranasal steroid therapy)
- bacterial (irrigation, phytoneering, intranasal steroid, antibacterial therapy)
- surgery rarely necessary usually at complications

Chronic Rhinosinusitis

- persisted disease > 3 months
- periods of inflammatory exacerbation and remission
- with and without nasal polyps
- multifactorial disease caused by disruption of drainage systems of paranasal sinuses
- usually damage to sinus drainage needs surgical treatment (Functional Endoscopic Sinus Surgery)

Classification of Chronic Rhinosinusitis



Diagnostic Criteria for Chronic Rhinosinusitis

Major Criteria	Minor Criteria
Facial pain or pressure	Headache
Facial congestion or fullness	Fever (all nonacute)
Nasal obstruction	Halitosis
Purulent discharge	Fatigue
Hyposmia or anosmia	Dental pain
Purulence on examination	Cough
Fever (acute only)	Otalgia or aural fullness

Diagnosis on rhinosinusitis requires:

- two or more major criteria
- one major and two or more minor criteria
- purulence on nasal examination

Diagnostic Criteria for Chronic Rhinosinusitis

Table 1. American Academy of Otolaryngology–Head and Neck Surgery Diagnostic Criteria for Chronic Rhinosinusitis

The presence of at least two of the following cardinal symptoms for at least 12 consecutive weeks (listed in order of frequency):

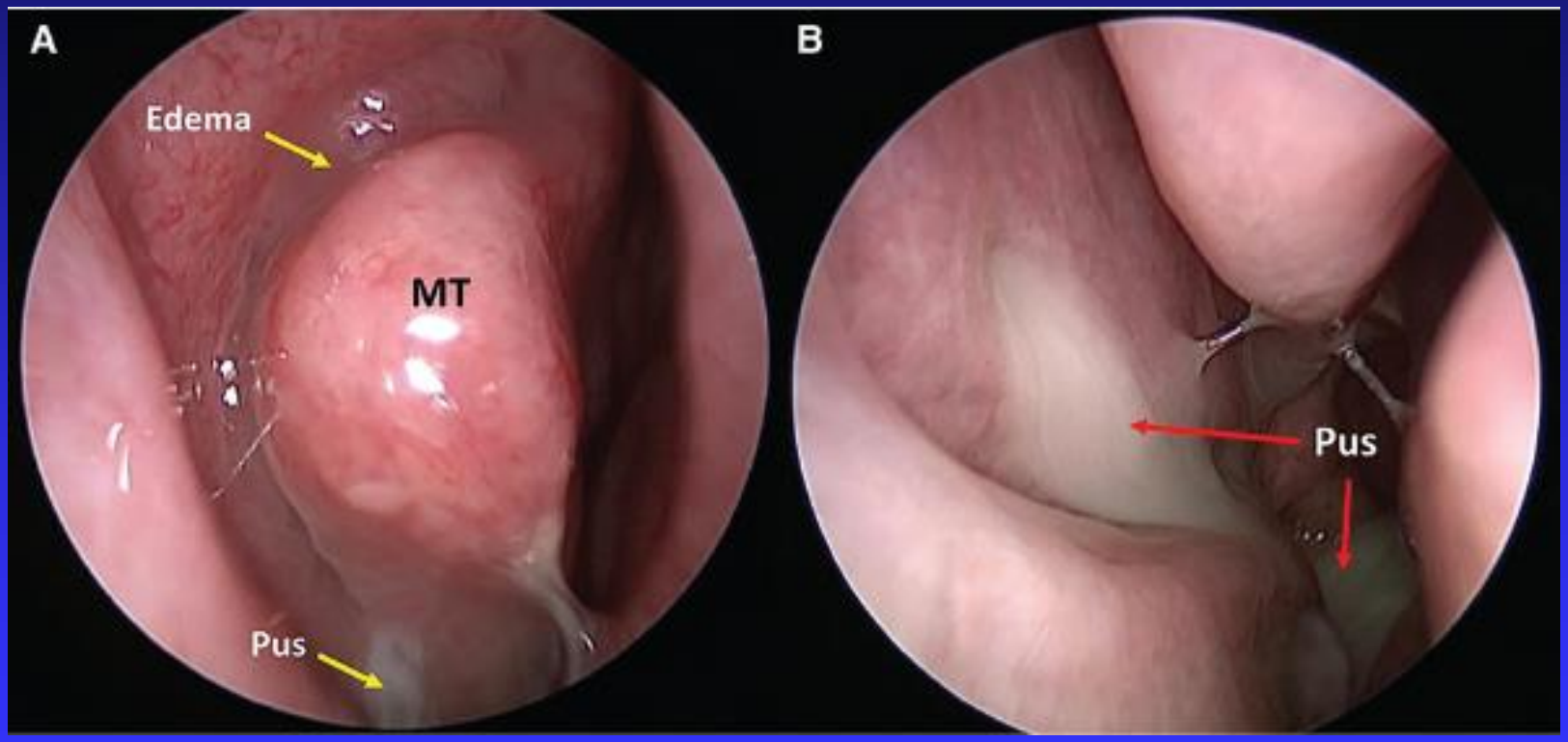
- Nasal obstruction
- Nasal drainage
- Facial pain/pressure
- Hyposmia/anosmia

and

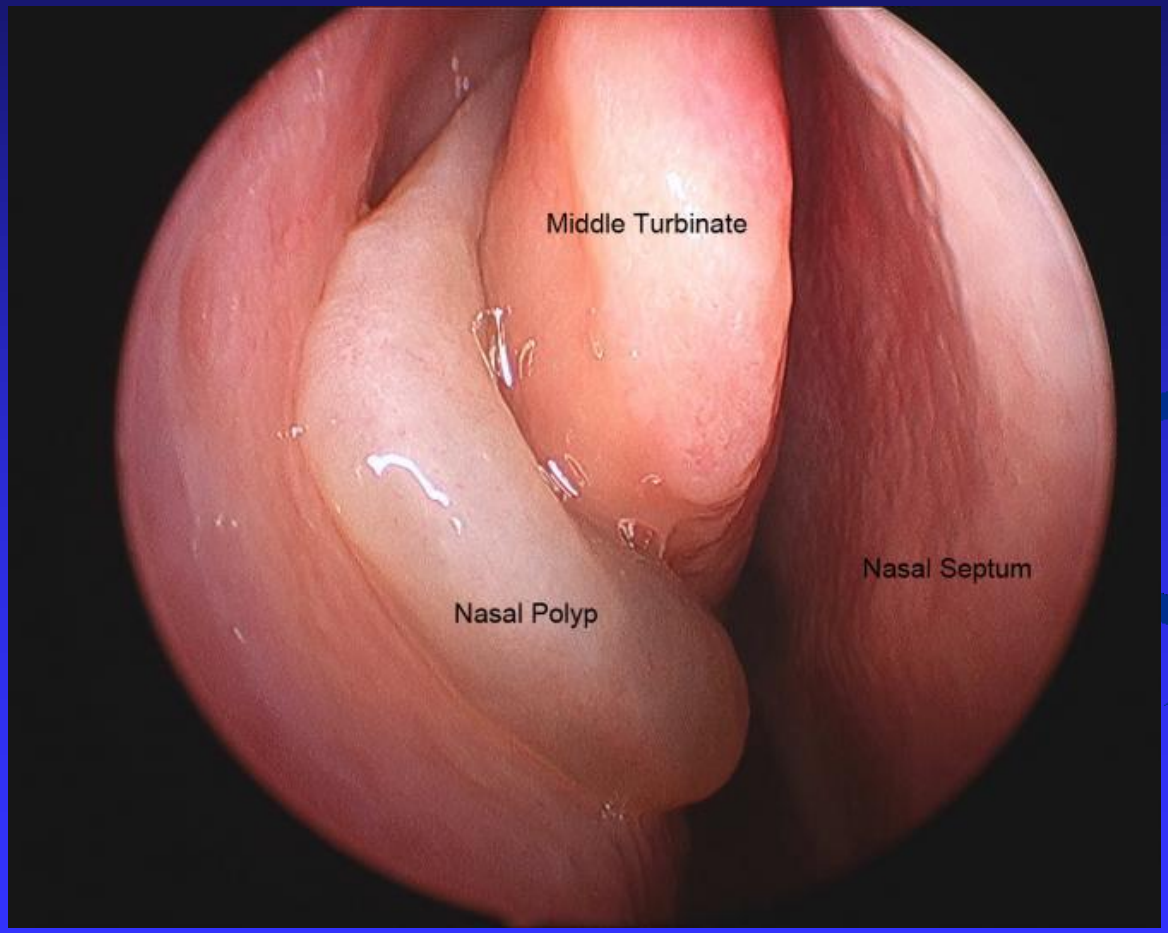
Objective evidence on physical examination (e.g., mucopurulent drainage, edema, polyps in the middle meatus) or radiography (preferably sinus computed tomography)

Information from reference 18.

Rhinoscopy in Purulent Chronic Rhinosinusitis without Nasal Polyps

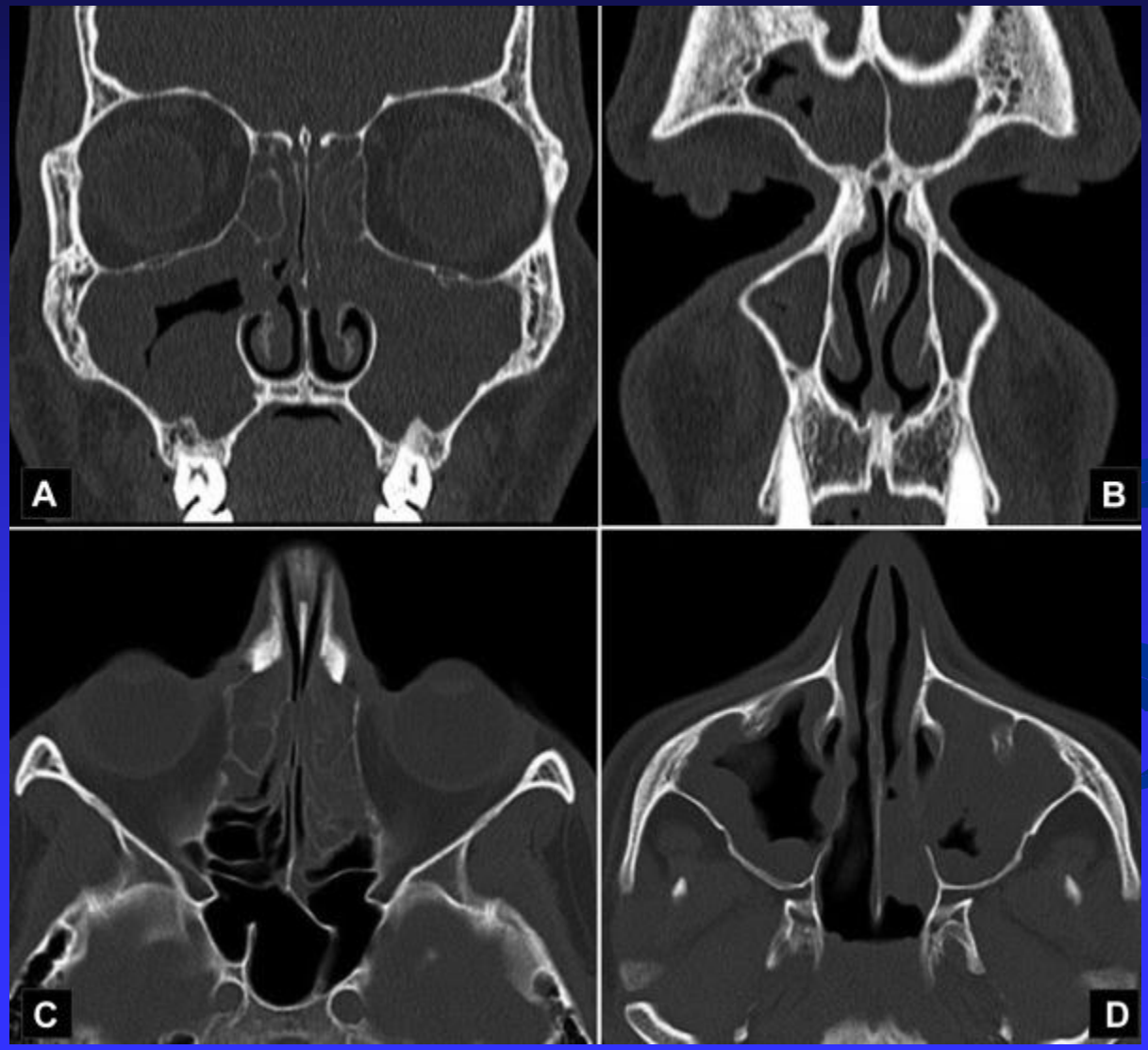


Rhinoscopy in Chronic Rhinosinusitis with Nasal Polyps

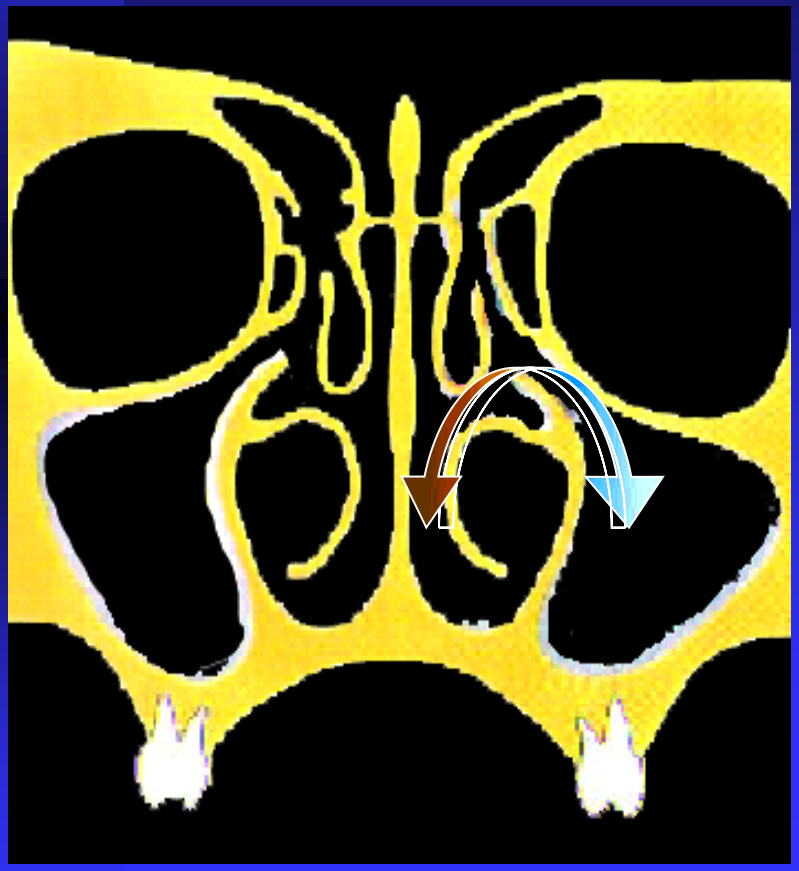


Interpretation of CT in Chronic Rhinosinusitis

CT of Chronic Rhinosinusitis



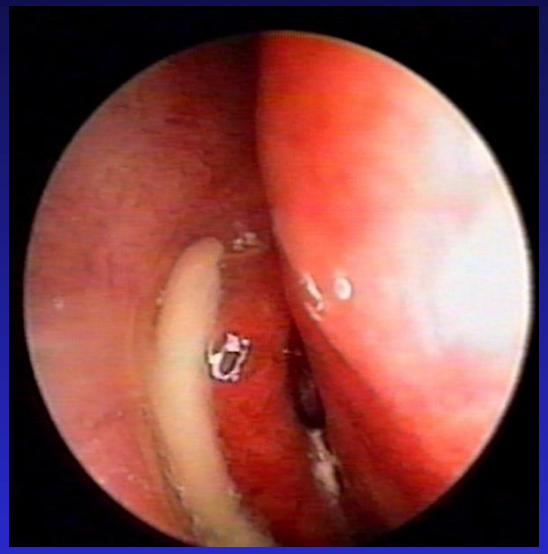
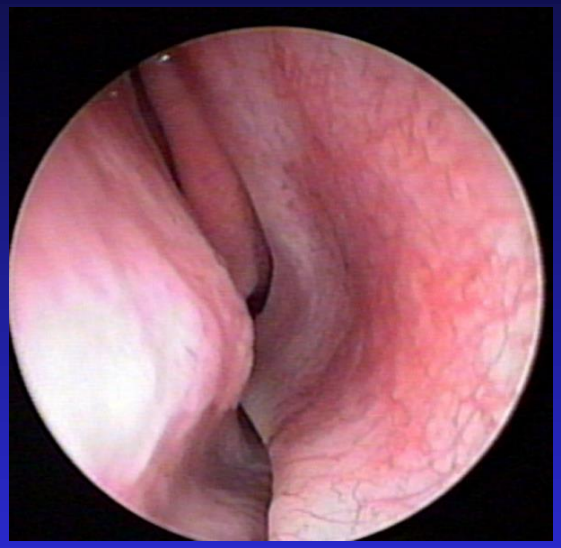
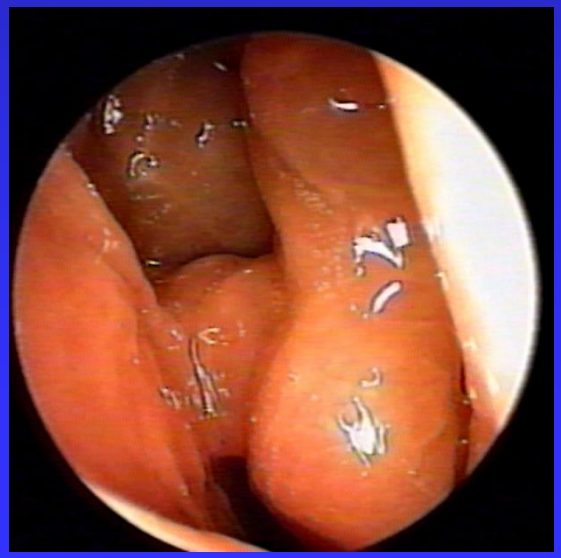
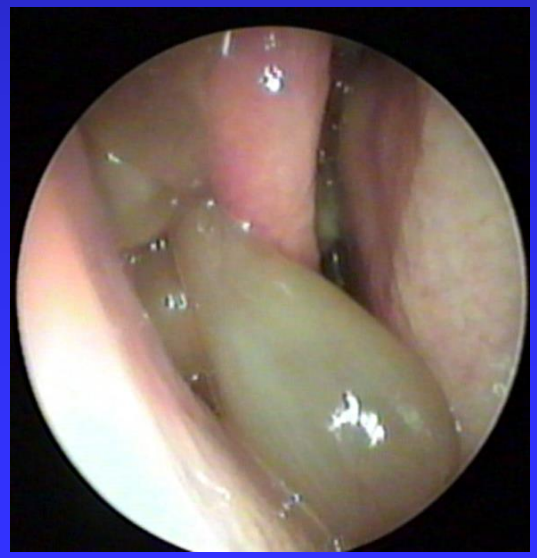
Functional Endoscopic Sinus Surgery



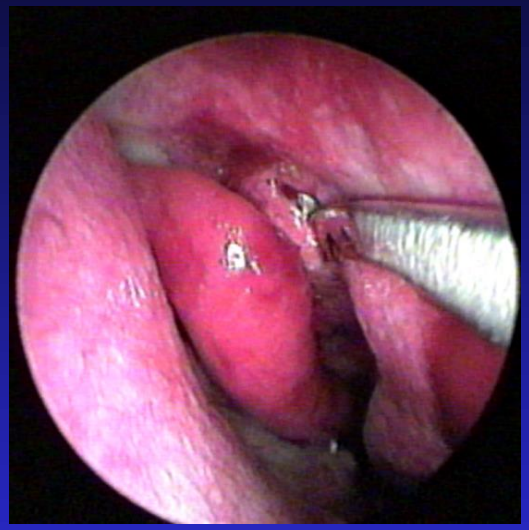
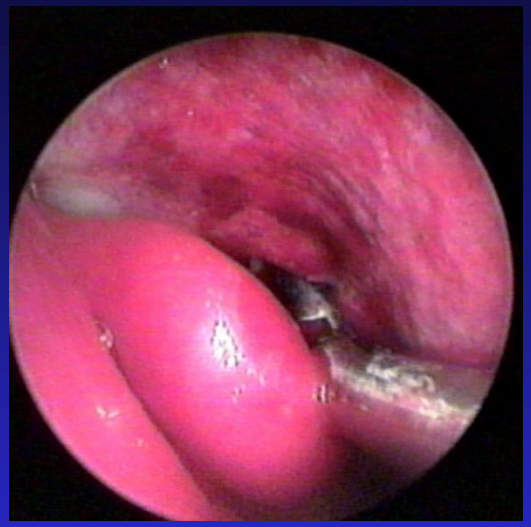
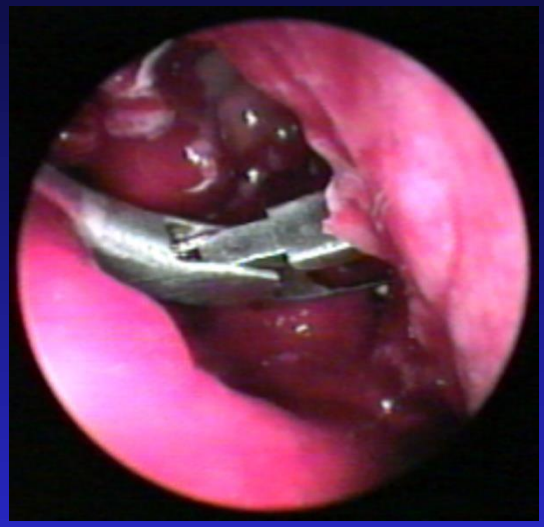
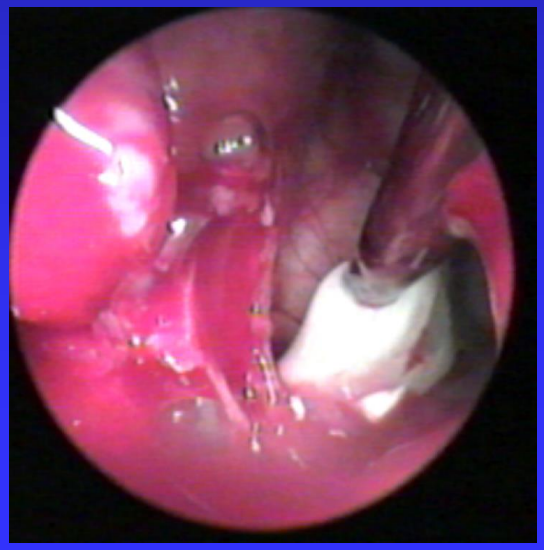
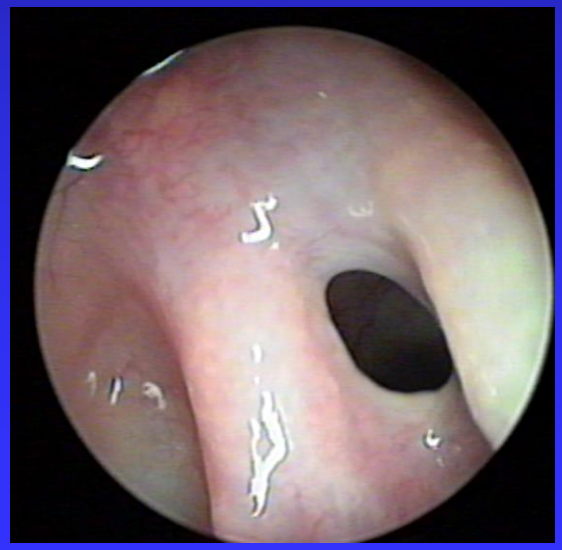
FESS is a minimally invasive surgery which uses endoscopes to enlarge the nasal drainage pathways of the paranasal sinuses to improve sinus ventilation and allow access of topical medications

Functional Endoscopic Sinus Surgery

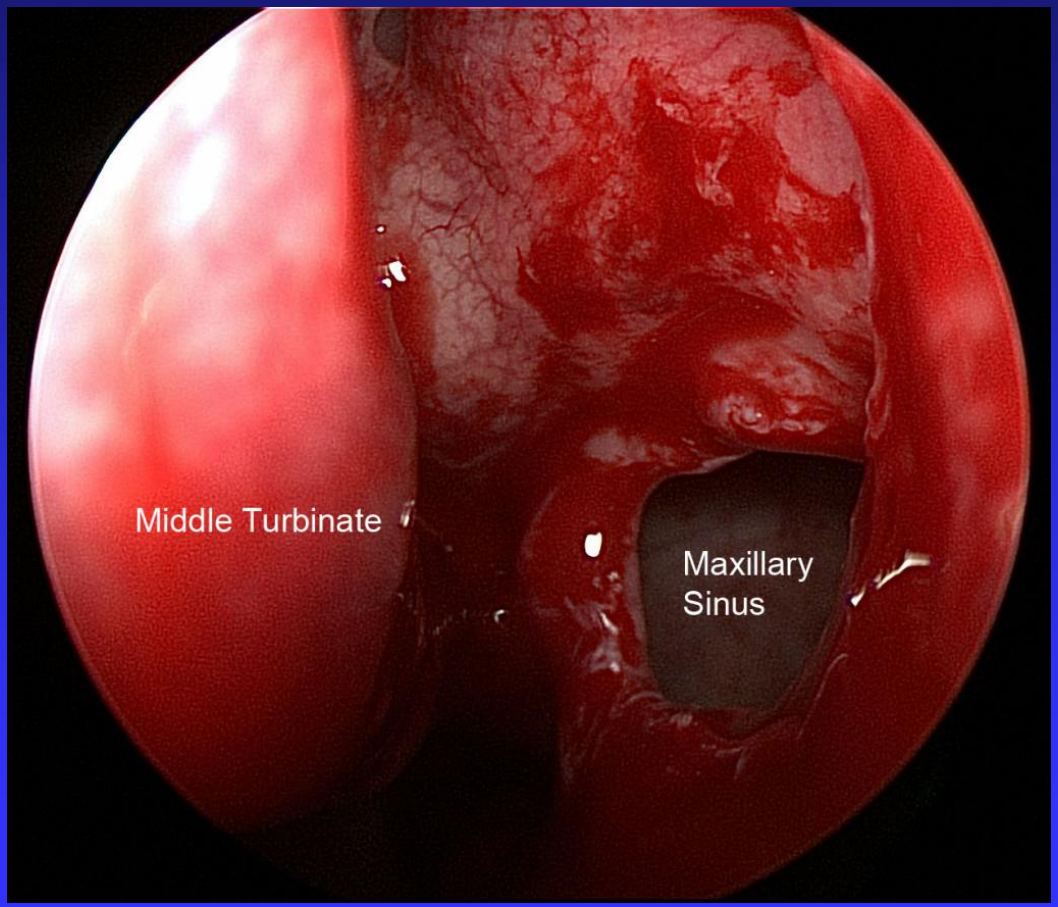
Endorhinoscopy

Endonasal Maxillotomy

Enlarged Natural Hole of Left Maxillary Sinus

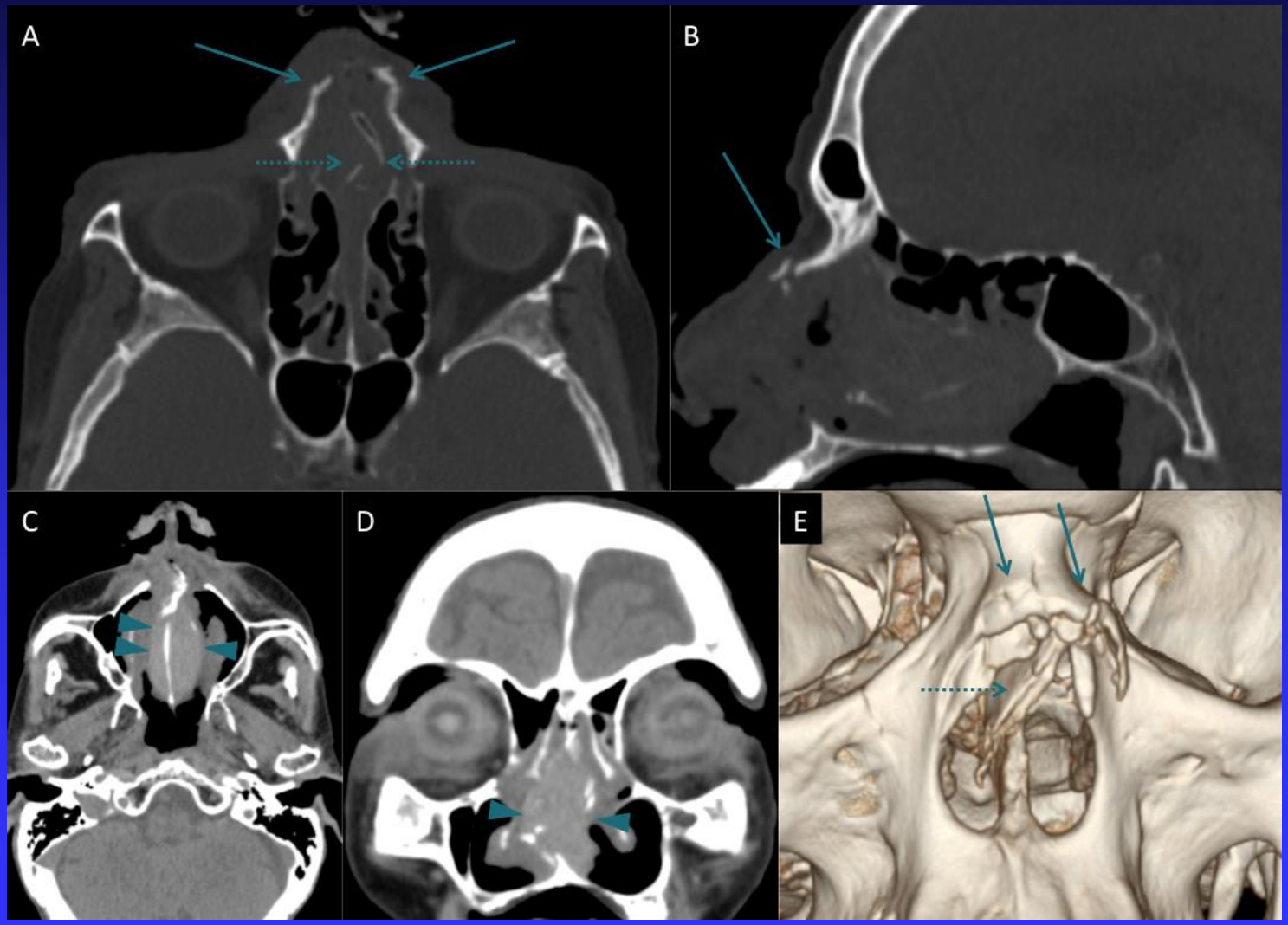


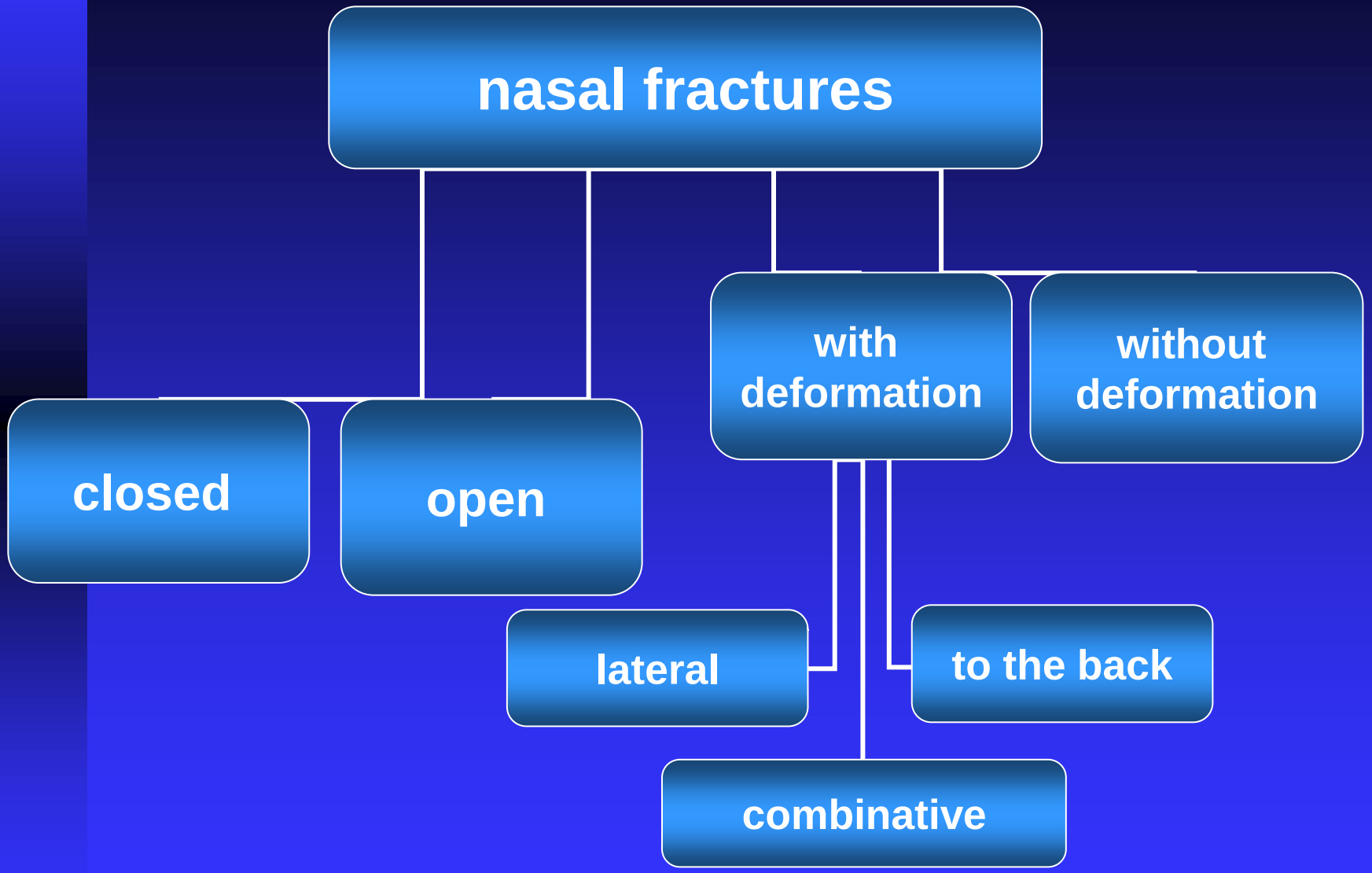
Nasal Fracture

- the most common causes include assault, trauma during sports, falls and road accidents
- comprising about 40% of facial fractures
- symptoms: pain, swelling, tenderness, bruising, deformity, nasal bleeding, disorder of nasal breathing etc
- combinates with other facial fractures, craniocerebral trauma, septal hematoma

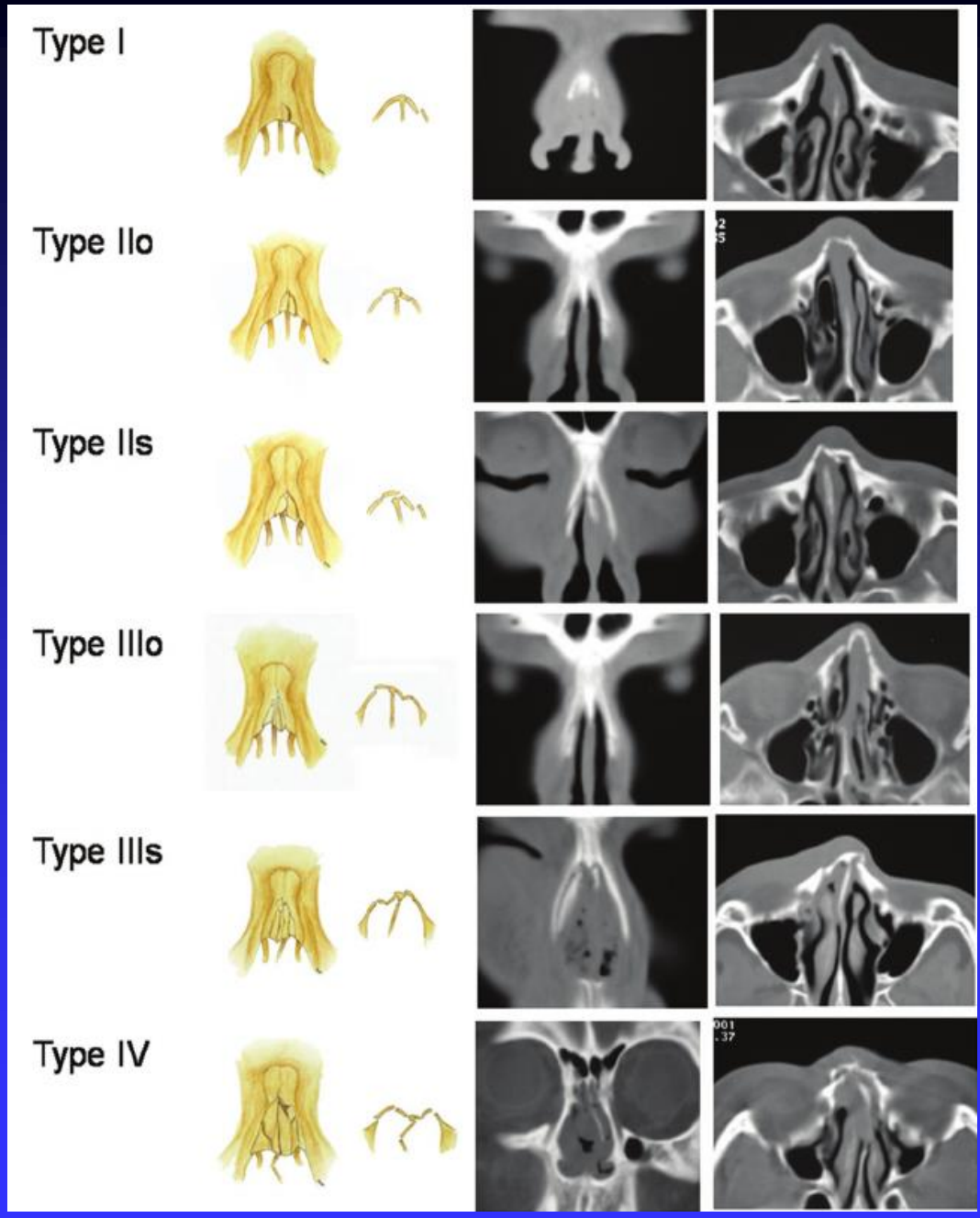
Nasal Fracture

Nasal Fracture



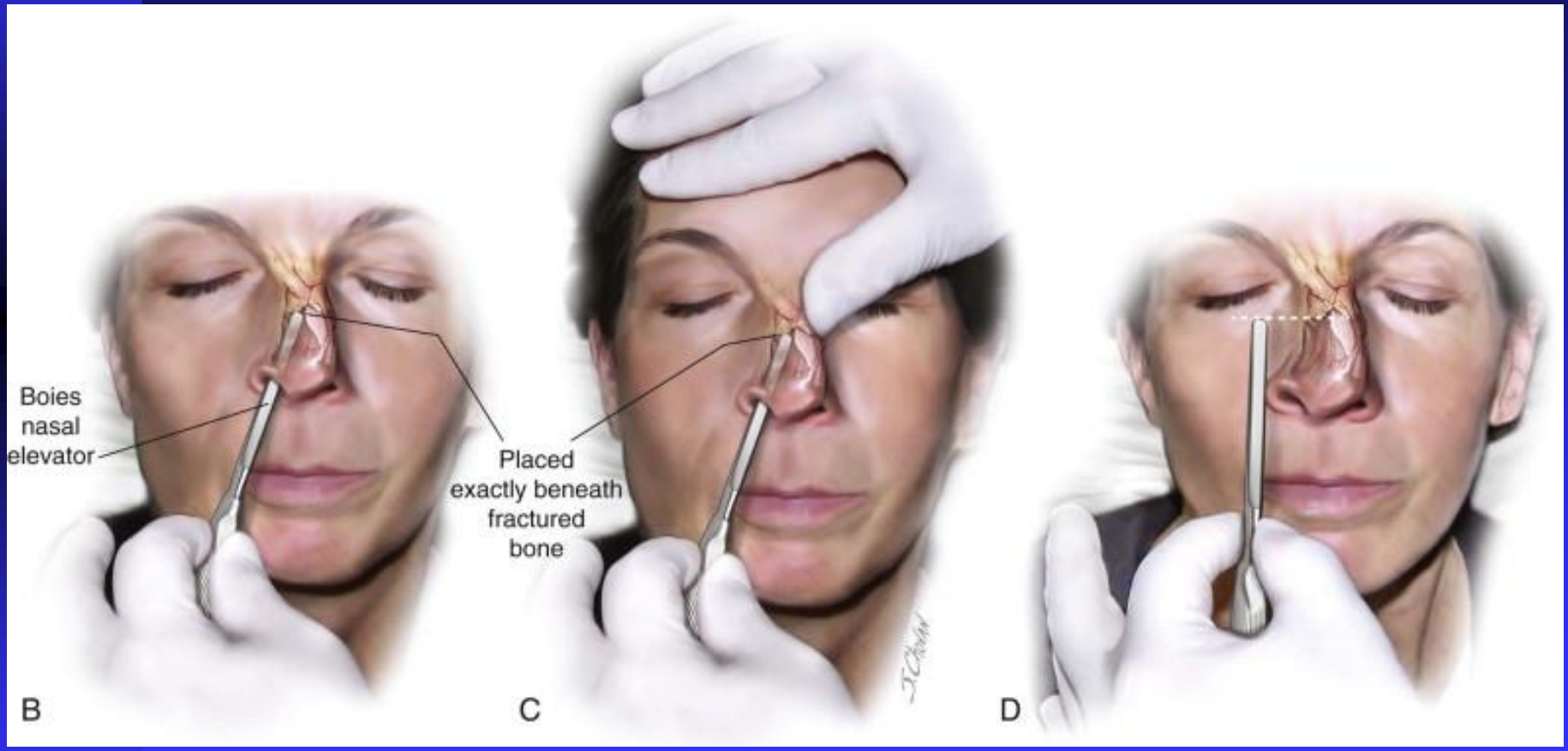

nasal fractures
closed
open
with deformation
without deformation
lateral
to the back
combinative

Classification of Nasal Bone Fracture

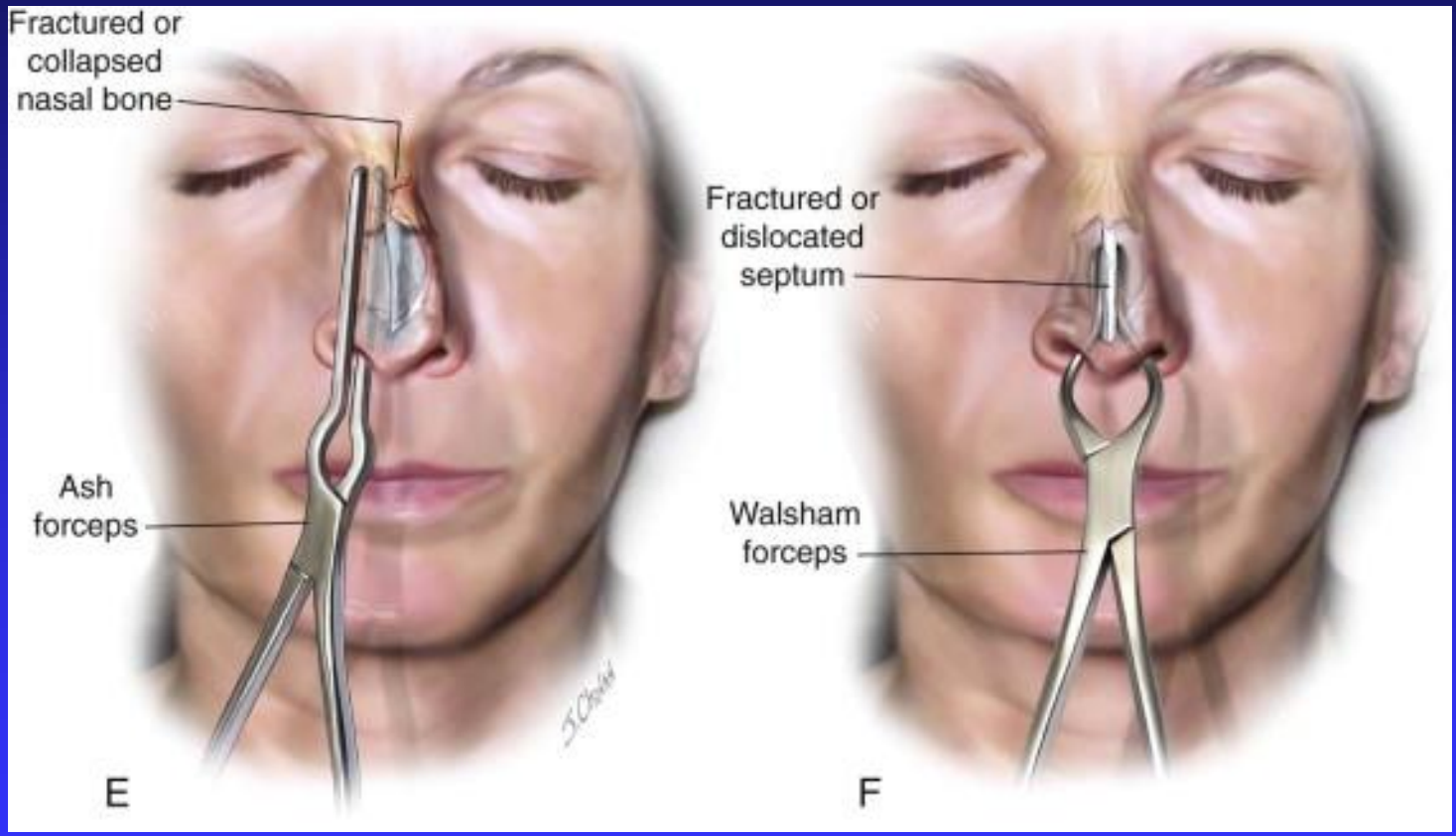


Manual Displacement of Nasal Bones

Nasal Bone Elevation



Forceps Reduction



Nasal Bleeding

local causes

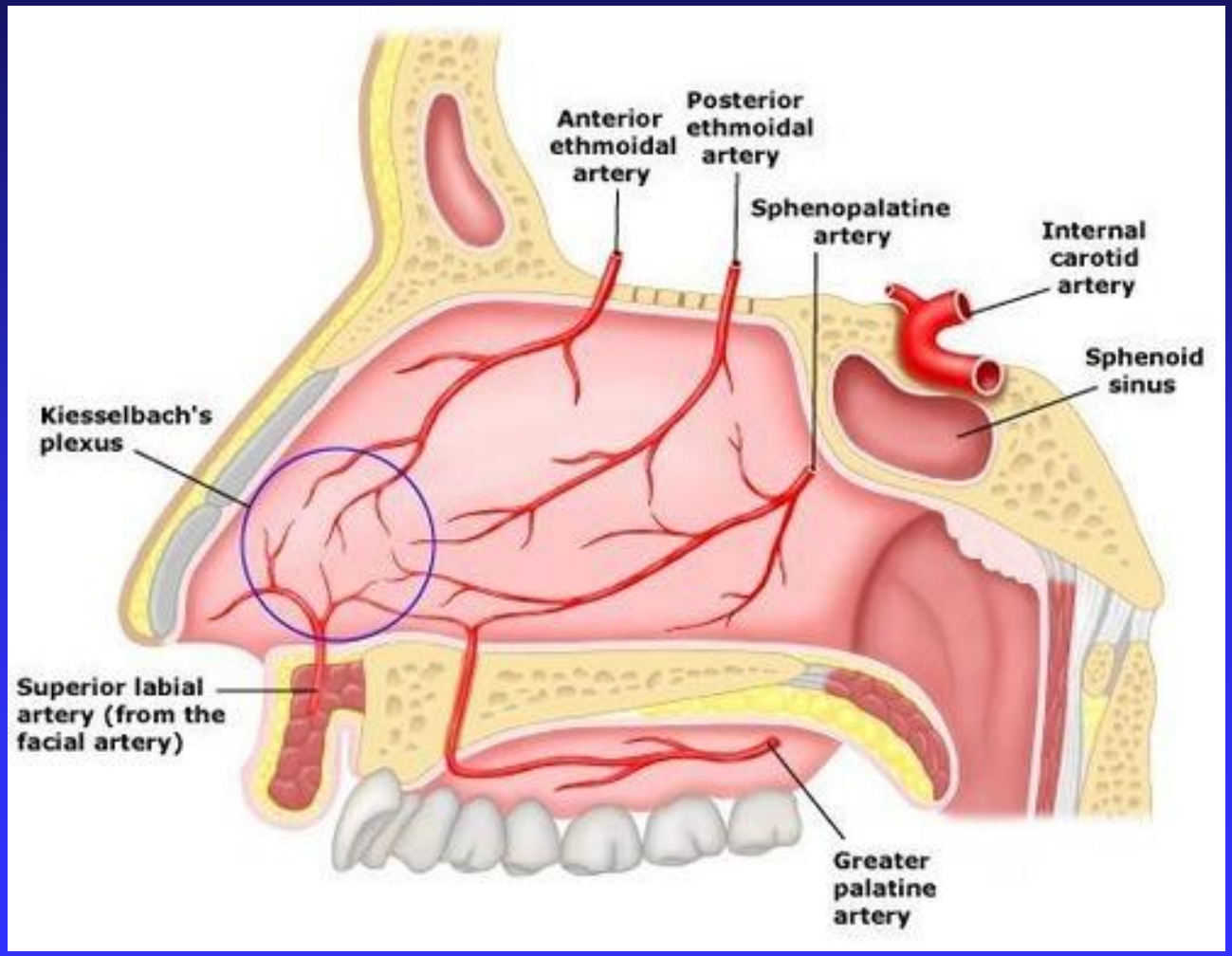
- nose picking
- acute and chronic rhinitis/rhinosinusitis
- blowing your nose with force
- foreign body
- injury to the nose and/or face
- blood-thinning drugs (aspirin, non-steroidal anti-inflammatory drugs etc)
- frequent use of nasal sprays and other topical medications
- facial and nasal surgery
- cocaine and other drugs inhaled through the nose
- chemical irritants
- deviated septum
- tumor of nasal cavity and paranasal sinuses

Nasal Bleeding

general causes

- high blood pressure (hypertonic disease, symptomatic hypertension)
- hemorragic diathesis (hemophilia, von Willebrand disease thrombocytopenia, vasculities)
- vascular diseases (neurovegetative and endocrine angiopathies, atherosclerosis, hereditary hemorrhagic telangiectasia)
- blood diseases (leukemia etc)
- chronic diseases of liver
- sepsis
- pregnancy
- radiation disease

Kiesselbach's (Little's) Area



Management of Nasal Bleeding

- Anterior: localize bleed
  - silver-nitrate cautery
  - surgicel/oxycel (cellulose), gelfoam (gelatin)
  - anterior tamponade of nose (merocel)
- Posterior: more difficult to stop
  - posterior tamponade of nose
  - embolization
  - ethmoid ligation
  - endoscopic cauterization

Anterior Tamponade of Nose

Thank you for attention!