Surgical Anatomy of the Paranasal Sinuses

Brent A. Senior, MD, FACS, FARS
Sheila and Nathaniel Harris Professor of Otolaryngology/Head and Neck Surgery and Neurosurgery
University of North Carolina at Chapel Hill
Disclosures

- **Consultant**
  - Sinuwave
  - Laurimed
  - Entrigue
  - Nasoform
  - Olympus Gyrus

- **Speaker**
  - Stryker
  - Genentech

- **Stockholder**
  - Entrigue
  - Remedease
  - Nasoform
Objectives

- To gain basic and advanced understanding of the surgical anatomy of the nose and sinuses
  - To gain understanding of the basic embryology of the paranasal sinuses and its influence on the surgical anatomy
  - To gain understanding of the special named sinuses
  - To gain understanding of the spaces of the sinuses
• Anterior Ethmoid A
  » Anterior medial to post lateral

• Posterior Ethmoid A
  » Encased in Bone
Embryology of the Lateral Nasal Wall and Sinuses

*Basal Lamellae* of the Lateral Nasal Wall

- First - uncinate
- Second - ethmoid bulla
- Third - middle turbinate
- Fourth - superior turbinate
- Fifth - supreme turbinate
Middle Turbinate

» Oriented in three planes:

» Divides the anterior and posterior ethmoid sinuses
  • The basal lamella
  • Occasionally flat, but frequently indented by posterior pneumatization of the bulla

» Defines the “spaces” of the sinuses
Anatomic Terminology and Nomenclature: Spaces

- **Hiatus semilunaris (Grunwald)**
  - a two-dimensional space analogous to a doorway
  - Inferior = Doorway btn bulla and the uncinate
  - Superior = doorway btn bulla and the MT
    - Strictly: btn the basal lamella and the bulla
Anatomic Terminology and Nomenclature: Spaces

The Recesses

» Suprabullar Recess
  • Discrete or potential space between the bulla and the skull base

» Retrobullar Recess
  • Discrete or potential space between the bulla and the basal lamella of the middle turbinate

» SB Recess and RB Recess = Sinus Lateralis
  • The hiatus semilunaris superior is the opening to the sinus lateralis
Intact Bulla Anterior Ethmoidectomy (Left)
Anatomic Terminology and Nomenclature: Spaces

- **Infundibulum (3)**
  - frontal
  - maxillary
  - ethmoid

  - the three dimensional space that the doorway of the hiatus semilunaris inferior opens into
  - bounded by uncinate process and the lamina papyracea
• Ethmoid Roof
  » Frontal bone (fovea) and the cribriform
  » varying depth to the olfactory fossa
    • flatter more posterior
    • occasionally asymmetrical
  » Slope from ant to post
Anterior Ethmoid and Related Structures

Nasal Fontanelles

- divided (arbitrarily) by the projection of the uncinate over its surface
  - posterior (superior) = accessory ostia of the maxillary sinuses
  - anterior (inferior) = maxillary ostium
Anterior Ethmoid and Related Structures

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Posterior Ethmoid and Related Structures

• Sphenoethmoid recess
  » Medial border: septum
  » Lateral border: superior turbinate
  » Superior border: ethmoid roof
  »Contains the opening of the sphenoid sinus
Sphenoid Approach: Inside Out (Right)
Sphenoid Approach: Outside In (Left)
Frontal Sinus Outflow Tract

- Infundibulum (above)
- Frontal ostium (neck)
- Frontal recess (below)
  - Ethmoid Bulla cells located posteriorly
    - Suprabullar cells
      - Suprabullar recess
    - Frontal bullar cells
    - Supraorbital cells
  - Agger Nasi located anteriorly
    - Agger nasi cell
    - Frontal cells
      - Bent and Kuhn, 1994
  - Intersinus Septal Cells located medially
How to Perform Endoscopic Frontal Sinusotomy: Think Outside the Box!

MT and intersinus septal cell

Frontal Infundibulum

Agger nasi, Frontal cells, and uncinate

Bullar cells, SOE

Anterior

Posterior

Medial

Lateral

The Box

Left Side

Right Side

Box Dimensions: 720.0x540.0
How to Perform Endoscopic Frontal Sinusotomy

The Box Left Side