The Nose and Nasopharynx

**NASAL CAVITY**

**BOUNDARIES & CORONAL VIEW**

- Nasal cavity extends from nares to choanae (posterior septum)
- **Floor:** Hard palate
- **Roof:** Sphenoid and ethmoid
- **Medial wall:** Septum
- **Lateral wall:** medial orbit, ethmoidal air cells, maxillary sinus

![Diagram of nasal cavity boundaries and structures]

**MUCOSA**
- Olfactory nerve
- Vestibular - skin & hair
- Respiratory - Pseudostratified ciliated columnar
- Nerves: CN I, Va, Vb
LATERAL WALL OF LEFT NASAL CAVITY

**Superior meatus**
Under superior concha (cut away).
Opening of posterior ethmoidal
air cells

**Inferior meatus**
Under inferior concha (cut away). Opening
of nasolacrimal duct

**Middle meatus**
Under middle concha (cut away).
Opening of
1. Maxillary sinus
2. Bulla ethmoidalis. Drainage for
   anterior group (previously anterior and
   middle ethmoidal sinus)
3. Infundibulum from frontal sinus into
   which some of the anterior ethmoidal
   group drain. The infundibulum is at the
   anterior end of the
4. Hiatus semilunaris
**BLOOD SUPPLY OF LATERAL WALL OF NOSE**

1. **Branch of greater palatine**
2. **Perforating branches of greater palatine**
3. **Anterior superior alveolar from infra-orbital**

Note anastomoses between **internal** & external carotid arteries on both medial & lateral walls of the nasal cavity.
NASAL SEPTUM
LITTLE’S AREA (Nose bleeds)

BONES & BLOOD SUPPLY
- Anterior ethmoidal artery from ophthalmic
- Nasal bone
- Nasal spine of frontal bone
- Septal cartilage
- Septal branches of superior labial artery from facial
- Ascending branch of greater palatine artery from maxillary

Note anastomoses between internal & external carotid arteries on both medial & lateral walls of the nasal cavity

VENOUS DRAINAGE
- Anterior - to face
- Posterior - to pterygoid plexus. Also via ethmoidal veins to ophthalmic and inferior cerebral veins. 1% via foramen caecum to superior sagittal sinus

LYMPHATIC DRAINAGE
- Lateral wall and septum. Posterior: to retropharyngeal and to anterior/superior deep cervical. Anterior: to submandibular

LINING
- Respiratory epithelium - pseudostratified ciliated columnar with mucous cells and very vascular
- Olfactory epithelium - ciliated nerve cells, yellowish, on roof & septum, under superior concha & in sphenoo-ethmoidal recess
L/M PSN = Lateral & medial posterior superior nasal, from nasopalatine, from Vb, from pterygopalatine ganglion
Anterior ethmoidal from nasociliary, from Va
Lateral posterior inferior nasal, from greater palatine, from Vb, from pterygopalatine ganglion
Nasopalatine from Vb, from pterygopalatine ganglion
Anterior superior alveolar, from infra-orbital, from Vb
Infra-orbital, from Vb
ETHMOIDAL SINUSES

Diagrammatical representation of the ethmoid bone to show the left and right ethmoidal sinus joined by the cribriform plate. The roof of the air cell containing sinuses on each side is the orbital plate of the frontal bone. Anterior to the ethmoid bone is the lacrimal bone & posterior is the sphenoid bone.

Ethmoidal sinuses lie between the orbit & nose in the lateral (labyrinthine) part of the bone.
Septa lie between 3-18 lots of air cells.
Blood supply: Supra-orbital, anterior/posterior ethmoidal, sphenopalatine.
Lymph drainage: Submandibular and retropharyngeal.
Nerve: Supra-orbital (Va), Anterior ethmoidal (Va), lateral posterior superior nasal (Vb), posterior ethmoidal (Va).
FRONTAL SINUSES

- Appear at 2 years
- Unequal in size
- Bony septum
- Lie between orbit and anterior cranial fossa
- **Nerves:** Supra-orbital & supratrochlear nerves
- **Blood supply:** Supra-orbital & supratrochlear arteries
- **Lymph drainage:** Submandibular
- **Veins:** Diploic & superior ophthalmic

![Diagram of frontal sinuses]

- Drainage (diagrammatic)
- Ostium: lower medial aspect
- To middle meatus via frontonasal canal (anterior end of hiatus semilunaris)
- May drain via infundibulum from anterior ethmoidal sinus
SPHENOIDAL SINUSES
Paired in body of sphenoid
Septum: Asymmetrical
If small: Then anterior to pituitary fossa
If large: Then beneath pituitary fossa, extending posteriorly to basi-occiput and laterally into greater wing
Ostium: In anterior wall, opening into spheno-ethmoidal recess
Laterally: Cavernous sinuses, internal carotid artery and maxillary nerve
Posteriorly: Posterior cranial fossa and pons
Inferiorly: Roof of nasopharynx, nerve of pterygoid canal & palatovaginal canal (containing pharyngeal branch of Vb)
Walls: Indented by pterygoid & palatovaginal canals, internal carotid artery and maxillary nerve (Vb)
Nerve supply: Posterior ethmoidal (Va) & branches of pterygopalatine ganglion
Blood supply: Posterior ethmoidal & sphenopalatine branches of maxillary artery
Lymph drainage: Retropharyngeal
MAXILLARY SINUS

- Pyramidal shape
- Anterior & posterior walls are maxilla
- Drains into posterior hiatus semilunaris of middle meatus
- Ostium is 3-4mm high on posterior end of nasal wall
- May be a second ostium
- **Blood supply:** Small arteries from facial, maxillary, infra-orbital & greater palatine
- **Lymph drainage:** Submandibular glands
- **Nerve supply:** Anterior/middle/posterior superior alveolar with secretomotor from pterygopalatine ganglion
- **Feature:** The infra-orbital nerve lies in its ridge (junction of roof and anterior wall)

Lateral

Lateral extension into zygomatic process of maxilla

Medial

- Orbit
- Ostium
- Alveolar part of maxilla
- Floor of nose

Frontal sinus

- Largest sinus.
- Drains to middle meatus.
- Small at birth, enlarges 6-7 years.
- Respiratory epithelium.
- Lighten skull.
- Warm & moisten air.
- Resonate voice.

Note that the opening is high up on the medial wall.
PARanasal Sinuses - General

- 4 pairs
- Lined by respiratory epithelium
- Communicate with nose via ostia
- Abundant sensory nerve supply at ostia
- Mucus is drained by cilia
- Function unknown but they lighten the skull, warm & moisten the air, resonate the voice

<table>
<thead>
<tr>
<th>MAXILLARY</th>
<th>ETHMOIDAL</th>
<th>SPHENOIDAL</th>
<th>FRONTAL</th>
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<tbody>
<tr>
<td>AT BIRTH</td>
<td>Small</td>
<td>Absent</td>
<td>(appear at 2y)</td>
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<tr>
<td>6-7 YEARS</td>
<td>Enlarge</td>
<td>Enlarge</td>
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<td>(2ND DENTITION)</td>
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<tr>
<td>POST PUBERTY</td>
<td>Large</td>
<td>Large</td>
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<tr>
<td>BONE GROWTH</td>
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PARanasal Air Sinuses
A  Frontal
B  Ethmoidal
   anterior
   middle
   posterior
C  Sphenoidal
NASOPHARYNX - RIGHT

- From **CHOANAES** to **LOWER BORDER OF SOFT PALATE**
- **Back and sides**: pharyngobasilar fascia
- **Posterior**: prevertebral space/fascia, body of C1 vertebra
- **Anterior**: choanae & back of soft palate
- **Inferior**: Soft palate & pharyngeal isthmus
- **Superior**: Pharyngeal tonsil (adenoid), sphenoid & occiput
- **Epithelium**: Ciliated columnar
- **Features**: • Opening of auditory tube
  • Pharyngeal tonsil
  • Tubal tonsil
  • Pharyngeal recess (of Rosenmuller)
  • Salpingopharyngeus & levator palati
  • N: Pharyngeal br of Vb

**Diagram Details**:
- Base of skull
- Choanae
- Isthmus (lower border of soft palate)
- Anterior
  - Pharyngeal tonsil
  - Tubal tonsil
  - Pharyngeal recess (of Rosenmuller)
- Posterior
  - Salpingopharyngeal fold/muscle

**Muscles**:
- Auditory tube
- Tensor palati
- Palatoglossus
- Middle constrictor
- Palatopharyngeus
- Superior constrictor
- Salpingopharyngeus
- Palatopharyngeal sphincter
- Levator palati

**Mucosa removed**