Pharynx, Larynx, Nasal cavity
And Ptterygopalatine Fossa

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Pharynx

Food & Air Passage
**Pharynx**

The pharynx is a skeletal muscle tube that opens anteriorly with 3 regions. The upper part communicates with nasal cavity, the middle communicates with oral cavity, and the lower communicates with the larynx.

- **Nasopharynx**: between sphenoid sinus & uvula
- **Oropharynx**: between uvula & epiglottis
- **Laryngopharynx**: between epiglottis & esophagus

![Diagram of the pharynx](image)
The posterior and lateral walls are 3 skeletal muscles (constrictors) that propel food/liquid inferiorly to the esophagus. Constrictors innervated by CNX. Additional muscles elevate the pharynx (stylopharyngeus is external). Stylopharyngeus innervated by CNIX.

Stylopharyngeus
Superior constrictor
Middle constrictor
Inferior constrictor
Two additional internal muscles we’ll get to later…
Key relationship: Glossopharyngeal nerve wraps around stylopharyngeus muscle.

CN IX wraps around stylopharyngeus muscle and innervates it.
Pharynx Interior

Nasopharynx:
1. Pharyngeal tonsils
2. Auditory tube ostia
3. Salpingopharyngeal fold

Oropharynx:
4. Palatine tonsils

Laryngopharynx:
5. Piriform recess
**Lateral Wall of Pharynx**

1. Pharyngeal tonsils
2. Torus tubarius
3. Auditory tube opening
4. Salpingopharyngeal fold
5. Salpingopharyngeus muscle
6. Levator veli palatini muscle
7. Tensor veli palatini muscle
8. Palatine tonsil
9. Palatoglossal fold/muscle
10. Palatopharyngeus fold/muscle
Summary Rule for Innervation of Muscles of Pharynx and Palate

All muscles of the pharynx and palate are innervated by the vagus nerve, except:

- Stylopharyngeus which is IX
- Tensor veli palatini which is V₃
Sensory Innervation to Pharynx

Glossopharyngeal

“Gag Reflex”

Vagus
Larynx

Vocalization
Laryngeal Cartilages and Ligaments

Larynx functions in phonation & respiration

Epiglottis

Thyroid cartilage

Arytenoid cartilages (ghosted in)

Cricoid cartilage

Trachea

Hyoid

Thyrohyoid membrane

Internal br. superior laryngeal n.

Arytenoids

Cricothyroid membrane
Laryngeal Cartilages and Ligaments

- Cricoid
- Thyroid
- Epiglottis
- Arytenoid
- Vestibular ligament
- Vocal ligament

When covered with mucosa they become folds.

Emergency cricothyrotomy
The interior of the larynx is covered by mucosa and divided into upper (supraglottic) and lower (infraglottic) regions by the glottis.

**What is the glottis?**
- Right & left vocal cords plus space in between them.

- Glottis changes dimensions during respiration/phonation.
Vocal Cords While Singing
Right Vocal Cord Paralysis
The 11 laryngeal skeletal muscles function to ADDUCT, ABDUCT and adjust TENSION on the vocal cords during phonation and respiration.

You are only responsible for two: cricothyroid and posterior cricoarytenoid.
The right & left ventricles are small pockets between vestibular & vocal folds. They are rich in mucous glands that moisten the vocal cords.
Nasal Cavity

Olfaction and Respiration
Nasal Cavity

Roof: cribriform plate

Lateral walls: Concha (turbinates)

Floor: hard palate

Three conchae project medially from lateral wall to create more surface area for humidifying & adjusting air temperature.
There are 4 pairs of paranasal sinuses, each named according to the bone they lie in:

- Frontal
- Sphenoid
- Ethmoid
- Maxillary

Mucosa lining sinuses produces nitric oxide which is antiviral and bacteriostatic. Thereby they assist immune system.
Nasal Cavity
Osteology Lateral Wall

Frontal Bone

Ethmoid Bone:
1. cribiform plate
2. superior concha
3. middle concha

Nasal Bone

Sphenopalatine foramen

Lacrimal Bone

Inferior Nasal Concha

Maxilla:
6. nasal surface
7. palatine process
8. alveolar process

Palatine Bone:
4. perpendicular plate
5. horizontal plate

Sphenoid Bone:
9. med. pterygoid plate
10. sphenoid sinus
A meatus is the space immediately lateral to a concha.
Drainage Ostia Within Nasal Cavity

**Middle meatus:**
- Frontal sinus
- Ethmoids (ant & mid)

**Inferior meatus:**
- Nasolacrimal duct

**Superior meatus:**
- Ethmoids (post.)

**Sphenoethmoidal:**
- Sphenoid sinus

**Semilunar hiatus**
Nasal Cavity
Mucosal Innervation: Sensory $V_1$ & $V_2$

1. nasal branches of
2. anterior ethmoidal br. of nasociliary nerve
3. lateral nasal branches
4. nasopalatine nerve

4. Passes thru incisive canal to innervate maxillary anterior teeth.
Blood supply is via the maxillary artery which passes thru pterygopalatine fissure to give rise to 3 terminal branches: 1. sphenopalatine, 2. descending palatine and 3. infraorbital.
Nasal Cavity: Blood Supply

These arteries anastomose within nasal cavity, representing an anastomosis between external and internal carotid arteries.

Epistaxis = nosebleed
Pterygopalatine Fossa

PT Fossa, V₂ & Maxillary Artery
Pterygopalatine Fossa

Small, cone-shaped fossa with 6 openings: 1 laterally, 1 medially, 1 anteriorly, 1 inferiorly and 2 posteriorly.

Houses pterygopalatine ganglion, V₂ & terminal branches of maxillary artery.

Lateral View

1. Pterygomaxillary fissure
Once you break plane of fissure you are in pterygopalatine fossa.

Medial View

2. Sphenopalatine foramen
Opening from pterygopalatine fossa into nasal cavity.

Transmits maxillary artery
Transmits sphenopalatine artery
Two Posterior Openings

3. foramen rotundum
Transmits maxillary nerve

4. Pterygoid canal
Transmits nerve of pterygoid canal (Vidian’s nerve)
How to cannulate the pterygoid canal

- Greater palatine foramen
- Medial pterygoid plate
- Pterygoid canal
- Foramen magnum
5. palatine canal

Transmits greater & lesser palatine nerves & descending palatine artery; exits are greater & lesser palatine foramina.
One Anterior Opening Leading Out of in PT Fossa

6. Inferior orbital fissure

Transmits infraorbital nerve
Summary of 4 openings in PT Fossa

- Sphenopalatine foramen
- Foramen rotundum
- Pterygoid canal
- Palatine canal
- Inferior orbital fissure
Pterygopalatine Ganglion:

Greater petrosal nerve from facial
Pterygopalatine Ganglion:

1. Lateral nasal branches
2. Great palatine nerves
3. Lesser palatines
4. Branch to maxillary n.

Greater petrosal nerve from facial
Nerve of pterygoid canal (Vidian’s nerve)
Sympathetics
Mucosal glands
Pterygoid glands
Thus, lacrimal gland is innervated by VII via PT ganglion.
Any Questions?