"Pharynx"

》 Introduction

- Situated behind nasal cavities, mouth and larynx

- Funnel shaped

- Upper wider end lies under the base of skull

- It's lower narrow end is continuous with the oesophagus opposite the 6th cervical vertebra

- Pharynx it also continuous with tympanic cavity via auditory tube

- Has a musculomembranous wall which is deficient anteriorly

- Anteriorly, pharynx is replaced by

- Choanae (anterior to nasopharynx)
- Opening into mouth (anterior to oropharynx)
- Inlet of larynx (anterior to laryngeopharynx)

-> Parts

i) Nasopharynx
ii) Oropharynx
iii) Laryngeopharynx

● Nasopharynx

- Extends from the base of skull to the upper surface of soft palate at the level of CI

- Anteriorly: Communicates with soft palate

》 Roof:

- Supported by body of sphenoid and basilar parts of occipital bone

- Pharyngeal tonsil sits in the submucosa of the roof

》 Floor:

- Sloping upper surface of soft palate

- Pharyngeal isthmus (palatopharngeal isthmus) is the opening between the soft palate and posterior pharyngeal wall

» Anterior wall

- Posterior nasal apertures

» Posterior wall

- Supported by anterior arch of atlas

» Lateral Wall

- Contains opening of auditory tube

- Tubal elevation (torus tubarus) → elevated ridge that caps this opening
- Pharyngeal recess (aka fossa of Rosenmuller) is a depression in the pharyngeal wall behind the tubal elevation resulting from the angular attachment of pharyngeobasilar fascia to the base of skull in front of carotid canal → a misguided catheter may enter ICA through this recess

- Salpingopharyngeal fold is a vertical fold of mucous membrane covering salpingopharyngeus muscle → extends downward from the tubal elevation behind the auditory tube

● Oropharynx

- Lies behind the oral cavity

》 Roof

- Formed by under surface of soft palate

》 Anterior wall

- Opens into mouth

》 Posterior wall

- Supported by 2nd and 3rd cervical vertebra

》 Floor

- Posterior 1/3 of tongue
- Interval between tongue and epiglottis
- Median glossoepiglottis fold (in the midline)
- Lateral glossoepiglottisc fold (laterally)
- Depression on each side of the median glossoepiglottic fold is the vallecla

》 Lateral wall

• Palatoglossal arch → fold of mucous membrane covering the palatoglossus muscle

• Interval between paired palatoglosssal arches is called oropharyngeal isthmus → marks the boundary between mouth and pharynx

• Palatopharyngeal arch → fold of mucous membrane covering palatopharngeus muscle

》 Palatine Tonsils

• Masses of lymphoid tissue covered by mucous membrane

• Have tonsillar crypts

> Relations:

- Anteriorly → Palatoglossal arch
- Posteriorly → Palatopharyngeal arch
- Superiorly → Soft palate
- Inferiorly → Posterior 1/3 of tongue

- Medially → Cavity of oral part of pharynx
- Laterally → Capsule is separated from the superior constrictor muscle by loose arcolar tissue

> Blood supply

- Tonsillar branch of facial artery
- The veins pierce the superior constrictor muscle and join the external palatine, the pharyngeal or the facial veins

> Lymph Drainage

- Deep cervical lymph nodes (jugulodigastric)

》 Waldeyer's Ring:

• lymphoid tissue that surrounds the opening of respiratory and digestive tract

> Boundaries

- Laterally → Palatine and tubal tonsils
- Superiorly → Pharyngeal tonsils
- Posteriorly → Lingual tonsils

● Laryngeopharynx

• Lies behind the opening into the larynx

》 Anterior wall

• Inlet of larynx

》 Posterior wall

• C4-C6 cervical vertebrae

》 Lateral wall

• Supported by thyroid cartilage and thyrohyoid membrane

> Piriform fossa: Depression in the mucous membrane on each side of the laryngeal inlet

- Medial boundary : Aryepiglottic fold
- Lateral boundary: Thyroid cartilage

》 Pharyngeal Mucous Membrane Sensory Nerve Supply

> Nasopharynx: Maxillary nerve (V2)

> Oropharynx: Glossopharyngeal nerve

> Laryngeopharynx: Internal laryngeal branch of Vagus nerve

》 Pharyngeal Blood Supply

> Ascending Pharyngeal artery
> Tonsillar branches of Facial artery
> Branches of maxillary and lingual arteries

》 Pharyngeal Muscles

MUSCLE	ORIGIN	INSERTION	NERVE SUPPLY	ACTION
Superior constrictor	Medial pterygoid plate, pterygoid hamulus, pterygomandibular ligament, mylohyoid line of the mandible	Pharyngeal tubercle of the occipital bone, raphe in midline posteriorly	Pharyngeal plexus (vagus nerve)	Aids soft palate in closing off nasal pharynx, propels bolus downward
Middle constrictor	Lower part of stylohyoid ligament, lesser and greater cornu of hyoid bone	Pharyngeal raphe	Pharyngeal plexus (vagus nerve)	Propels bolus downward
Inferior constrictor	Lamina of thyroid cartilage, cricoid cartilage	Pharyngeal raphe	Pharyngeal plexus (vagus nerve)	Propels bolus downward
Cricopharyngeus	Lowest fibers of inferior constrictor muscle			Sphincter at lower end of the pharynx
Stylopharyngeus	Styloid process of the temporal bone	Posterior border of the thyroid cartilage	Glossopharyngeal nerve	Elevates the larynx during swallowing
Salpingopharyngeus	Auditory tube	Blends with palatopharyngeus	Pharyngeal plexus (vagus nerve)	Elevates pharynx
Palatopharyngeus	Palatine aponeurosis	Posterior border of the thyroid cartilage	Pharyngeal plexus (vagus nerve)	Elevates wall of the pharynx, pulls palatopharyngeal arch medially

》 Killian's Dehiscence

- Gap between thyropharyngeus and cricopharyngeus part of the inferior constrictor muscles of pharynx

» Lymphatic Drainage of Pharynx

- Deep cervical nodes
- Paratracheal nodes
- Retropharyngeal nodes

» Swallowing Process (Deglutition)

-> Oral Phase (Voluntary):

1) Bolus Formation:

- Masticated food is formed into a compact ball (bolus) on the top surface (dorsum) of the tongue.

2) Tongue Movement:

- Styloglossus muscles on both sides contract, pulling the base of the tongue up and back.

3) Bolus Propulsion:

- Palatoglossus muscles squeeze the bolus backward into the pharynx.

-> Pharyngeal Phase (Involuntary):

1) Nasal Passage Closure:

• Soft palate elevates, shutting off the nasal cavity from the pharynx to prevent food entry.

2) Laryngeal Closure:

• Stylopharyngeus, salpingopharyngeus, thyrohyoid, and palatopharyngeus muscles contract.

• Larynx and upper pharynx are pulled upward.

• Epiglottis covers the laryngeal entrance.

• Aryepiglottic folds close together, further narrowing the opening.

• Arytenoid cartilages are pulled forward by muscle contractions

3) Bolus Passage:

• Superior, middle, and inferior constrictor muscles contract in sequence, pushing the bolus down the pharynx.

- Some food may pass through the piriform fossae on either side of the larynx.

4) Esophageal Entry:

- Cricopharyngeus muscle (lower pharynx) relaxes, allowing the bolus to enter the esophagus

-> Crossing of Food and Air Pathways in Pharynx

- Food (digestion) and air (respiration) pathways meet in the pharynx.

- Soft palate acts as a flap valve:

》 Chewing: Shuts mouth from pharynx to allow breathing.

》 Swallowing: Raises fully to block nasopharynx, preventing food entry.

》 Breathing Control:

- Raised for maximum air flow through mouth (not nose).

- Allows forceful breathing (wind instruments, expelling mucus).