



Third year GIT..

Anatomy

Lecture (3)

Anatomy of Palate, Pharynx, and Esophagus

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ILOs

- 1. Describe parts and structure, location, relations of the palate.**
- 2. Understand the muscles, movements, blood & nerve supply and lymph drainage of soft palate.**
- 3. Describe the extension, relations, and parts of pharynx.**
- 4. Describe muscles, blood & nerve supply, and lymph drainage of pharynx.**
- 5. Describe the extension, parts, relations, blood & nerve supply, and lymph drainage of esophagus.**

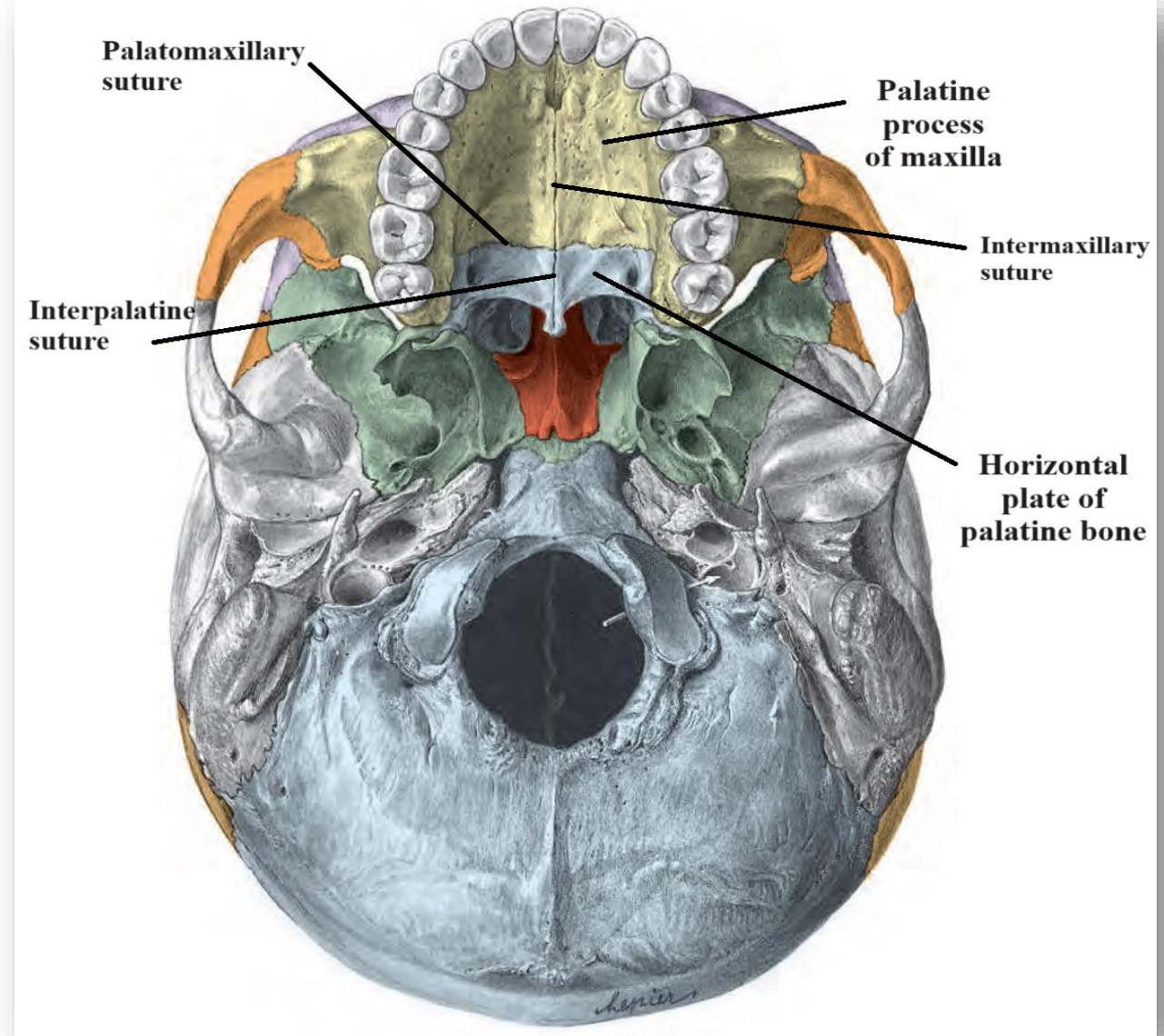
Palate

The palate forms the roof of the mouth and is formed of two parts:

- Hard palate in front.
- Soft palate behind.

Hard palate:

- **Forms** the anterior part of roof of the mouth.
- **Bounded** in front and laterally by the tooth-bearing alveolus of the upper jaw. It is continuous posteriorly with the soft palate.



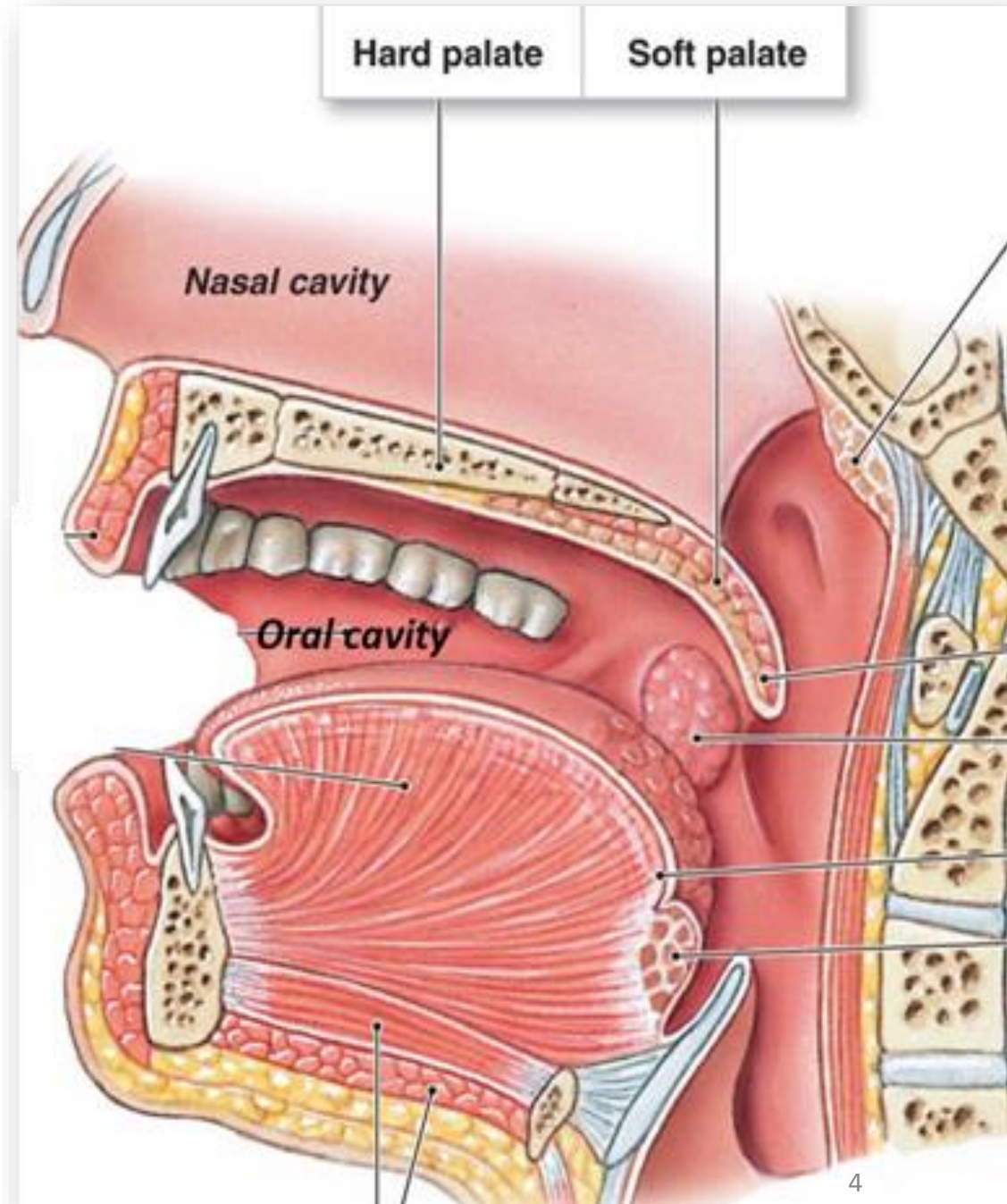
Soft Palate

Site:

- It is a mobile flap attached to the posterior border of the hard palate, sloping downward and backward.

Description:

- The anterior (oral) surface of the soft palate is concave.
- The posterior aspect is convex and continuous with the nasal floor.
- the sides blend with the pharyngeal wall.
- The posterior (inferior) border is free.
- A median conical process, the uvula, projects downwards from its posterior border.
- Taste buds are found on the oral aspect of the soft palate.



Soft palate

Structure of soft palate:

- Palatine aponeurosis.
- Five bilateral muscles.
- Covered by mucous membrane.

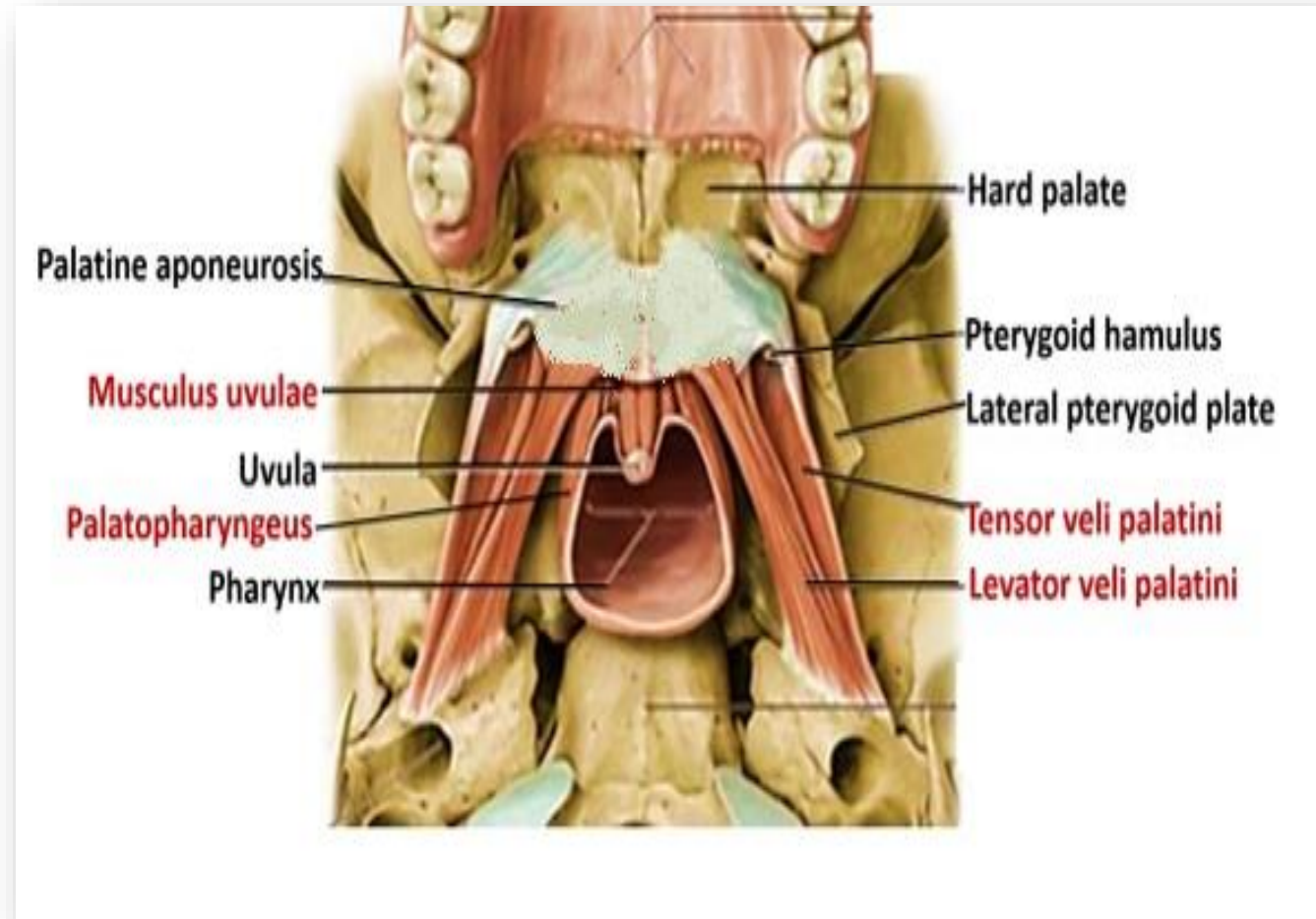
Muscles of soft palate:

1- Tensor palati (Tensor veli palatini)

Origin: Scaphoid fossa & cartilaginous part of pharyngotympanic tube.

Insertion: by flattened expanded tendon (**palatine aponeurosis**) to the posterior border of hard palate.

Action: It makes soft palate tense & tight.



Muscles of soft palate

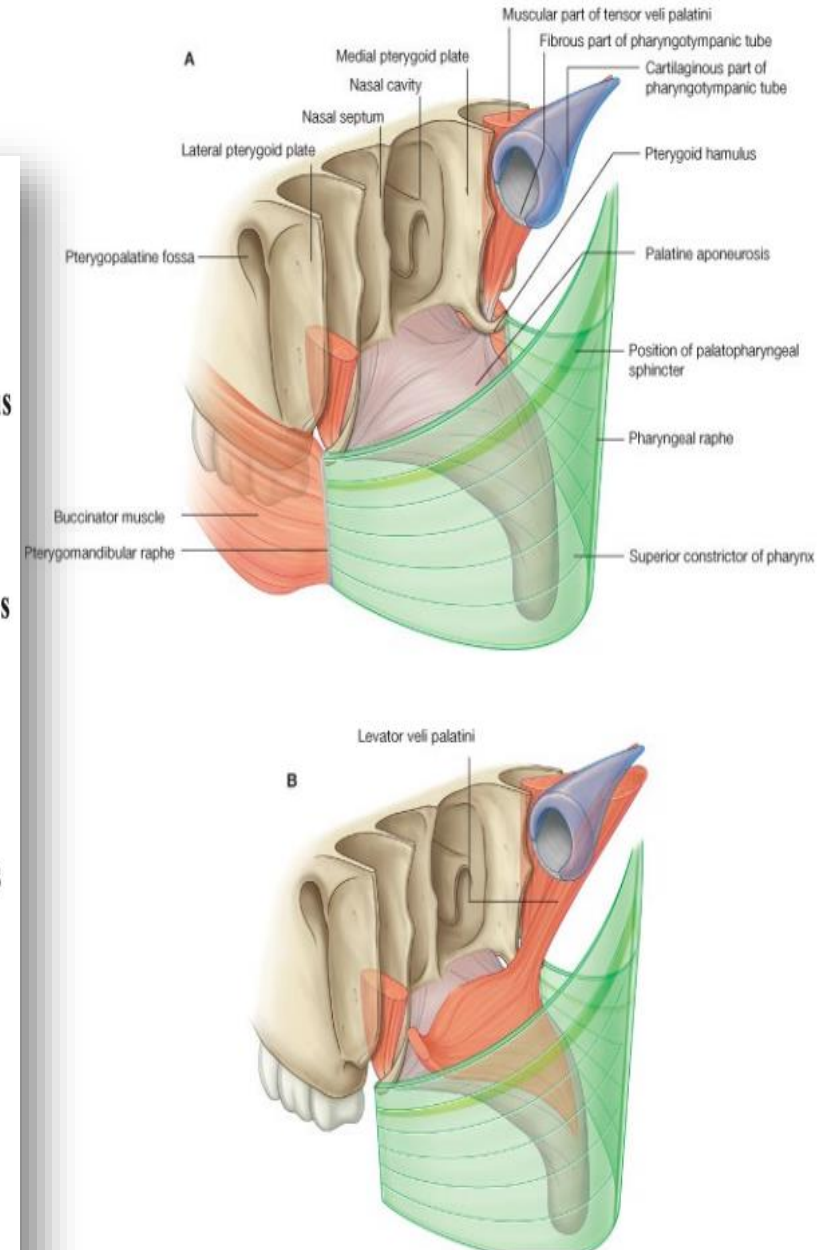
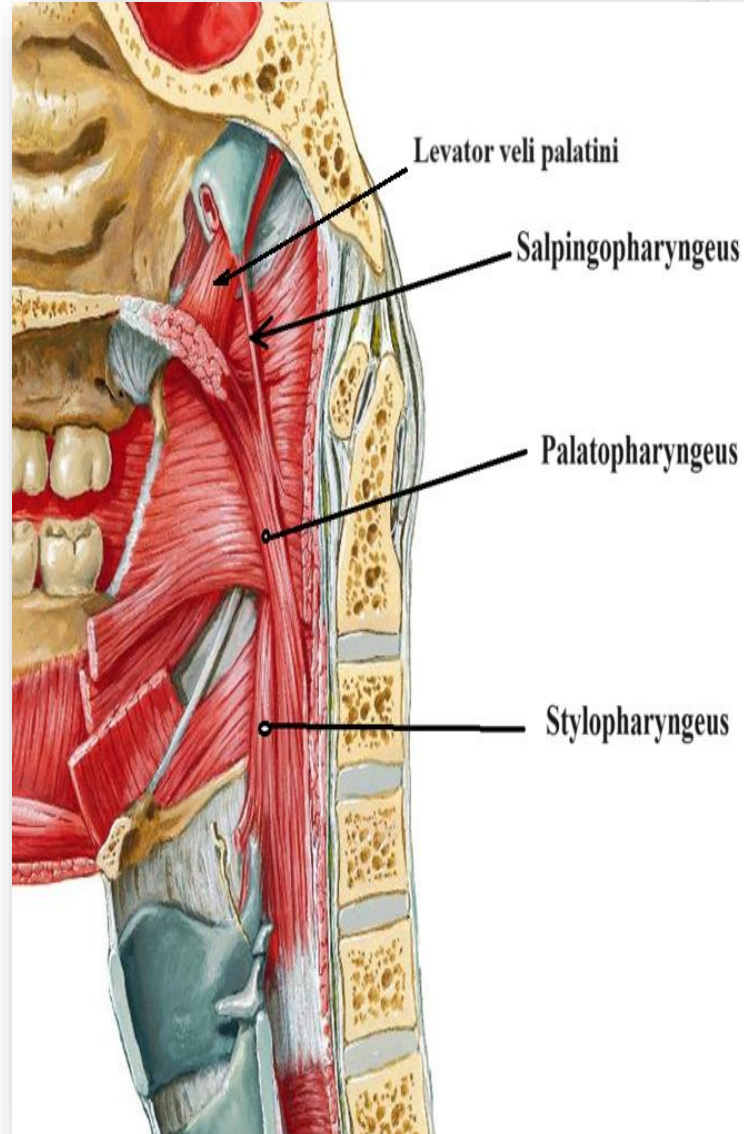
2- Levator veli palatini:

Origin: Petrous bone & cartilaginous part of the pharyngotympanic tube.

Insertion: Upper surface of the palatine aponeurosis.

Action:

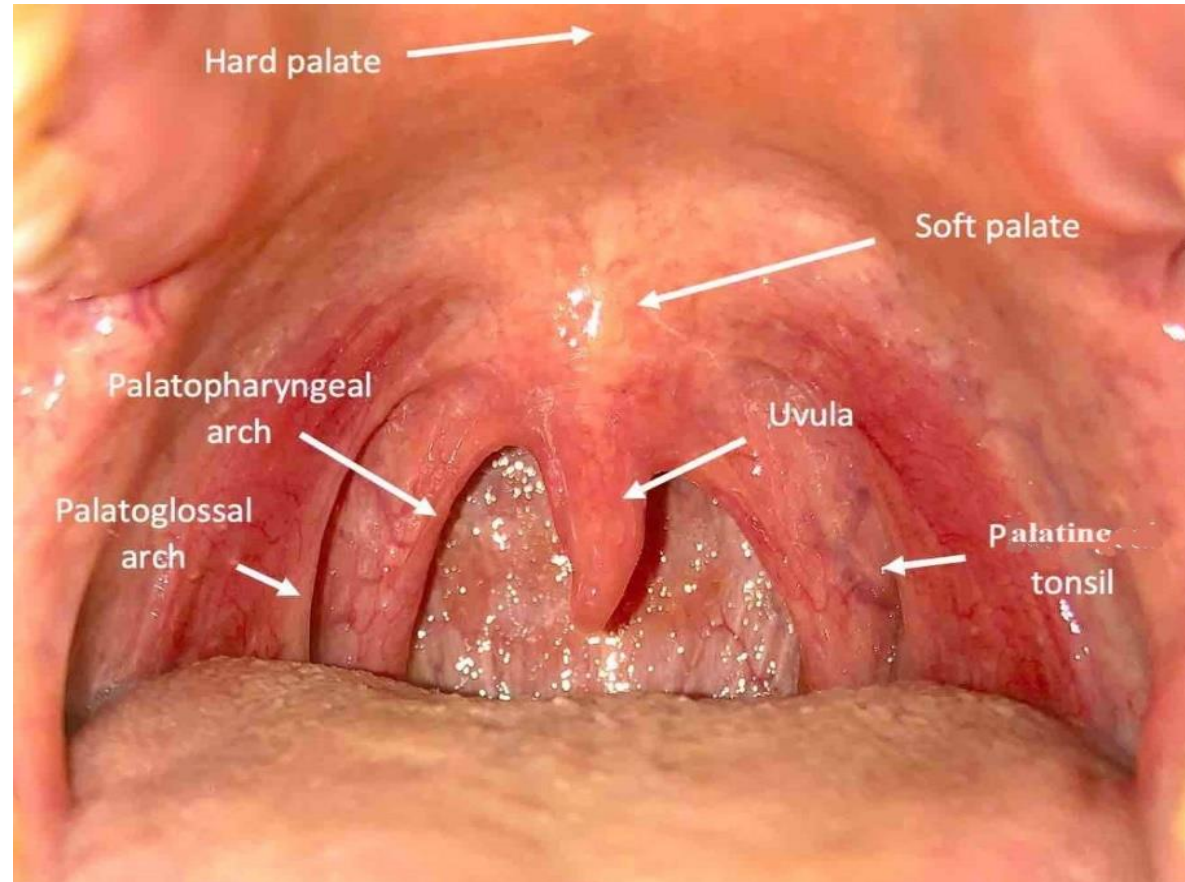
- They pull the soft palate upwards and backwards, to close the pharyngeal isthmus, so prevent regurgitation of food & fluids into nasopharynx during swallowing.
- It opens the Eustachian tube, so permits equalization of air pressure between nasal cavity and middle ear.



Muscles of soft palate

3-Palatoglossus:

Discussed before.



Muscles of soft palate

4- Palatopharyngeus:

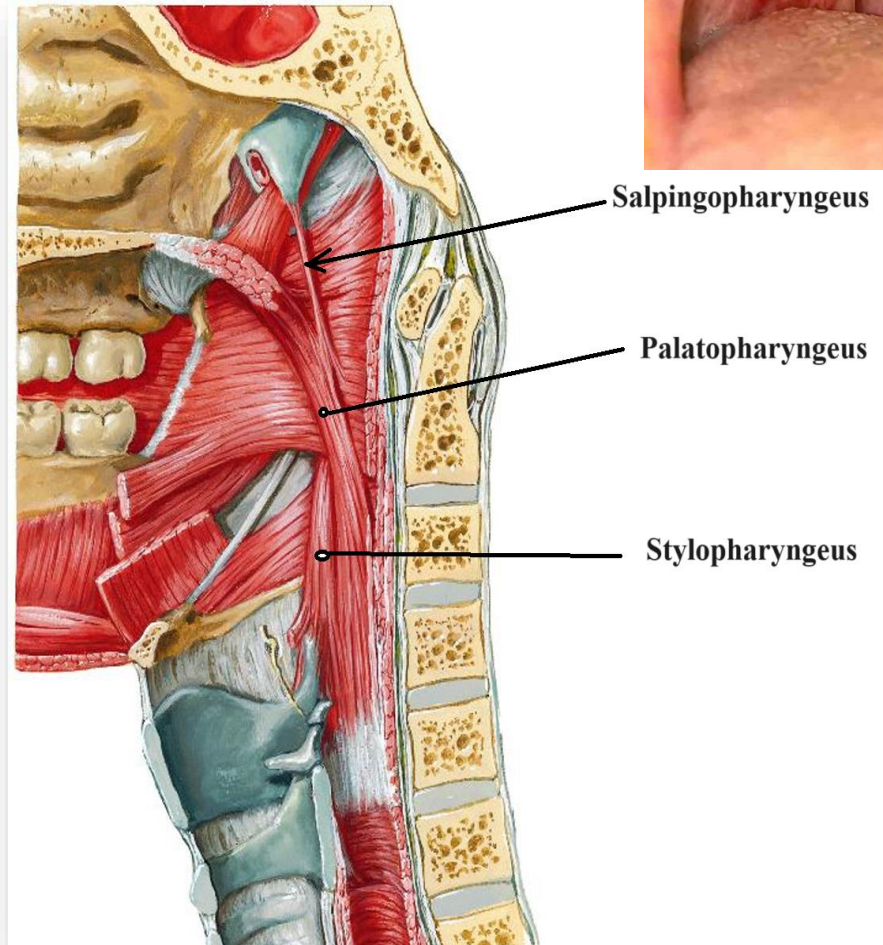
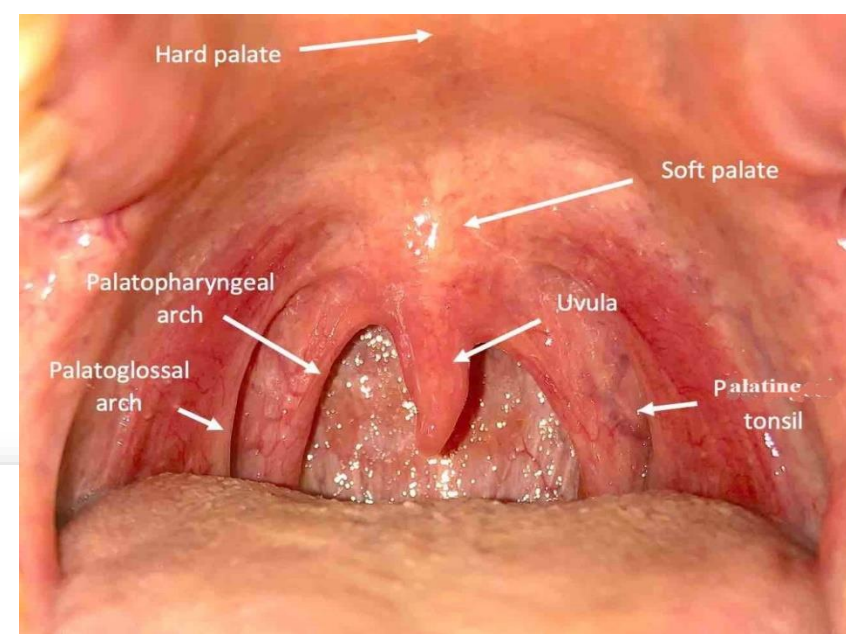
Origin: Upper surface of the palatine aponeurosis.

➤ The muscle arches downwards raises a fold of mucous membrane (palatopharyngeal fold).

Insertion: Posterior border of thyroid cartilage.

Action:

- They **pull** the larynx upward to close laryngeal inlet.
- They **shorten** the pharynx during 2nd stage of swallowing.



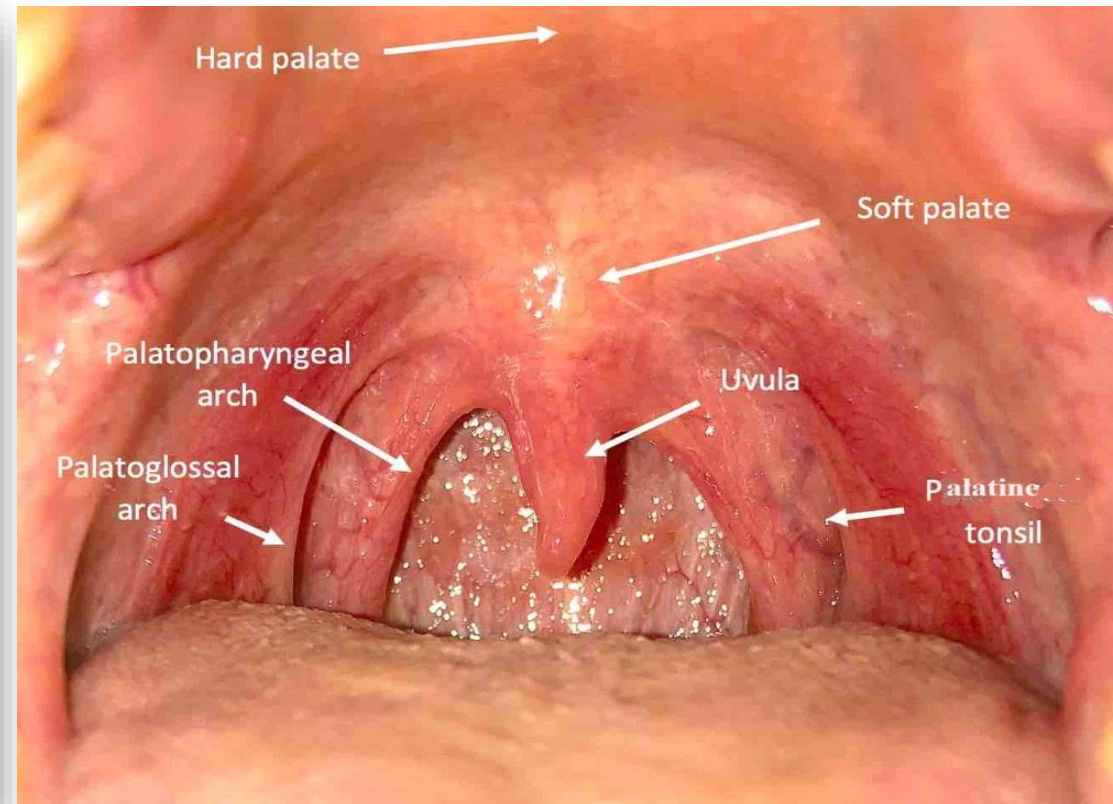
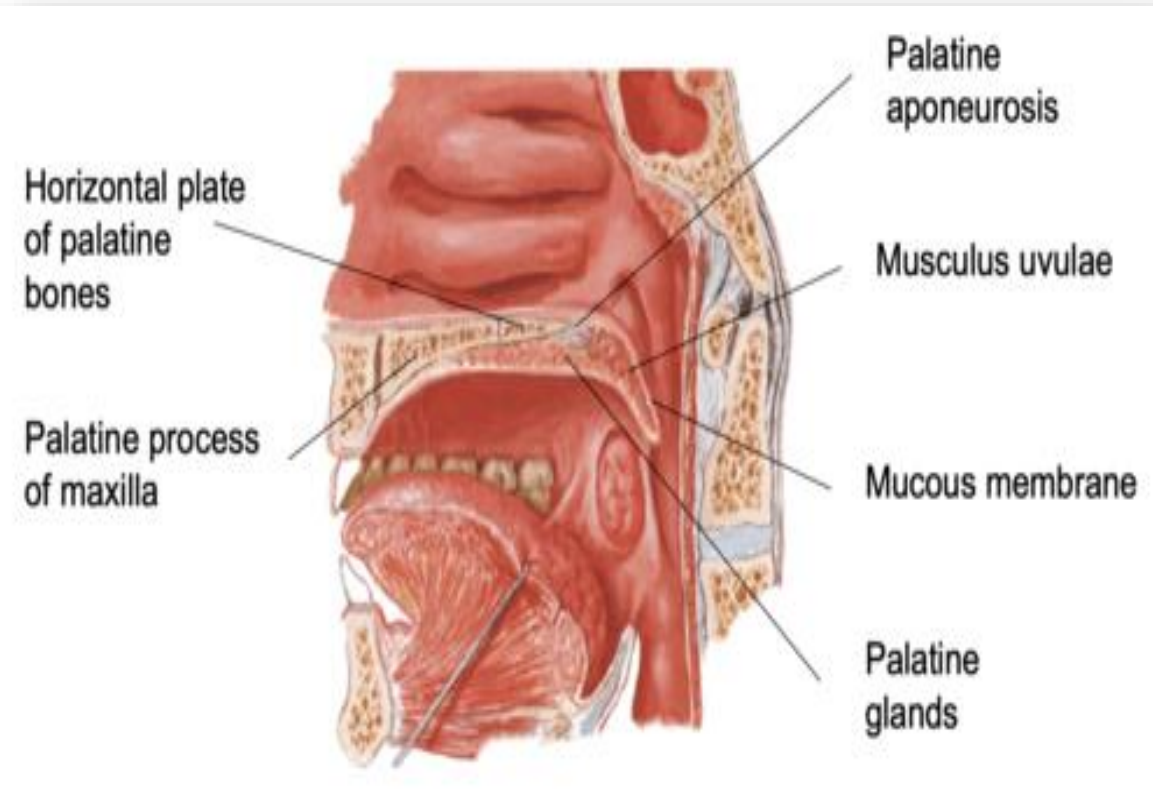
Muscles of soft palate

5- Musculus Uvulae:

Origin: Posterior nasal spine of hard palate.

Insertion: Mucous membrane of the uvula.

Action: it **pulls** the uvula to its own side.



Soft palate

Nerve supply of soft palate:

Motor:

All palatine muscles are supplied by **cranial part of accessory nerve via pharyngeal plexus. EXCEPT tensor palati** which is supplied by **Mandibular nerve (5th C.N.)**.

General sensation:

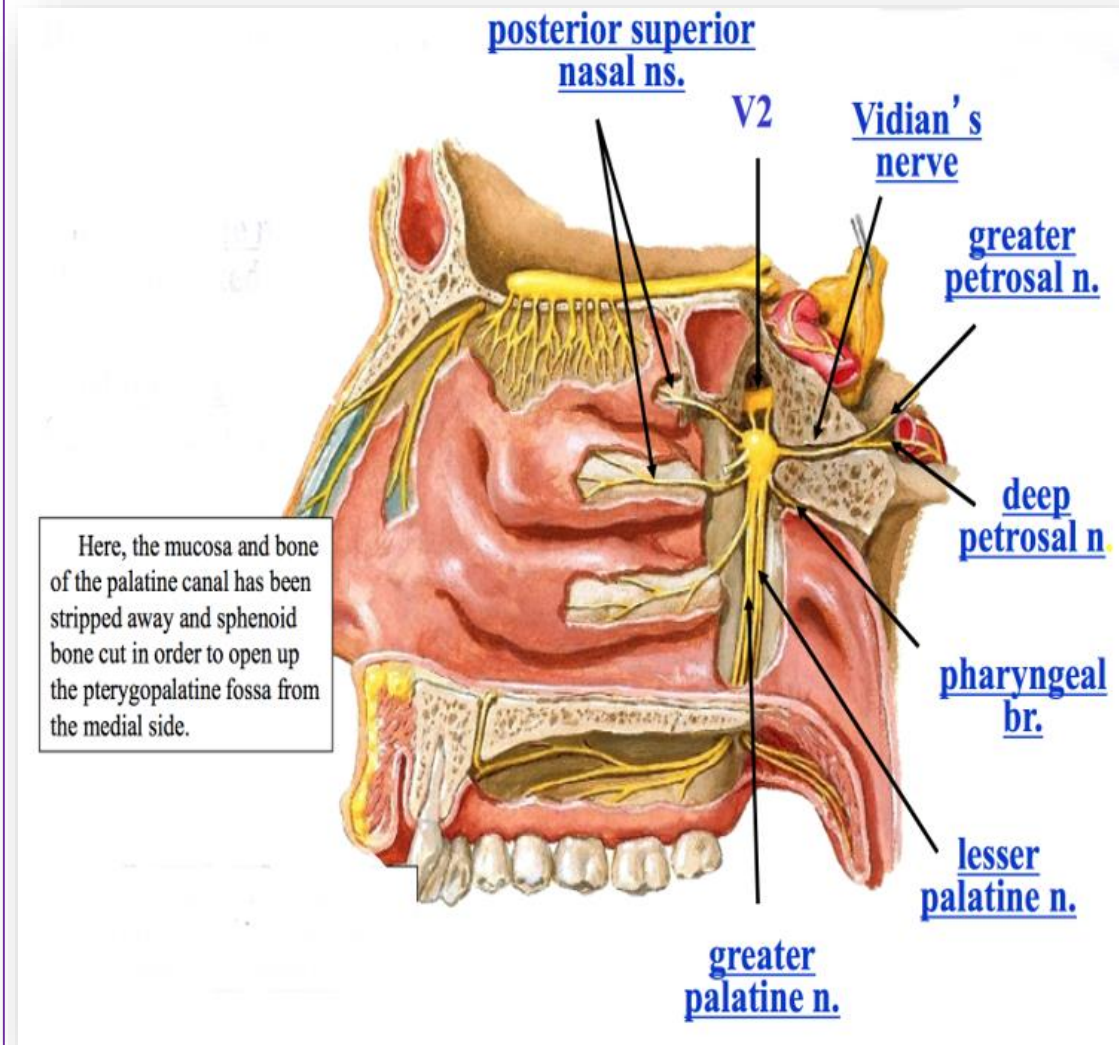
Sensory fibers of maxillary nerve **through lesser palatine nerve** (a branch of the pterygopalatine ganglion).

Sensation of taste:

By greater petrosal nerve (a branch of the facial nerve) through the lesser palatine nerve.

Parasympathetic supply:

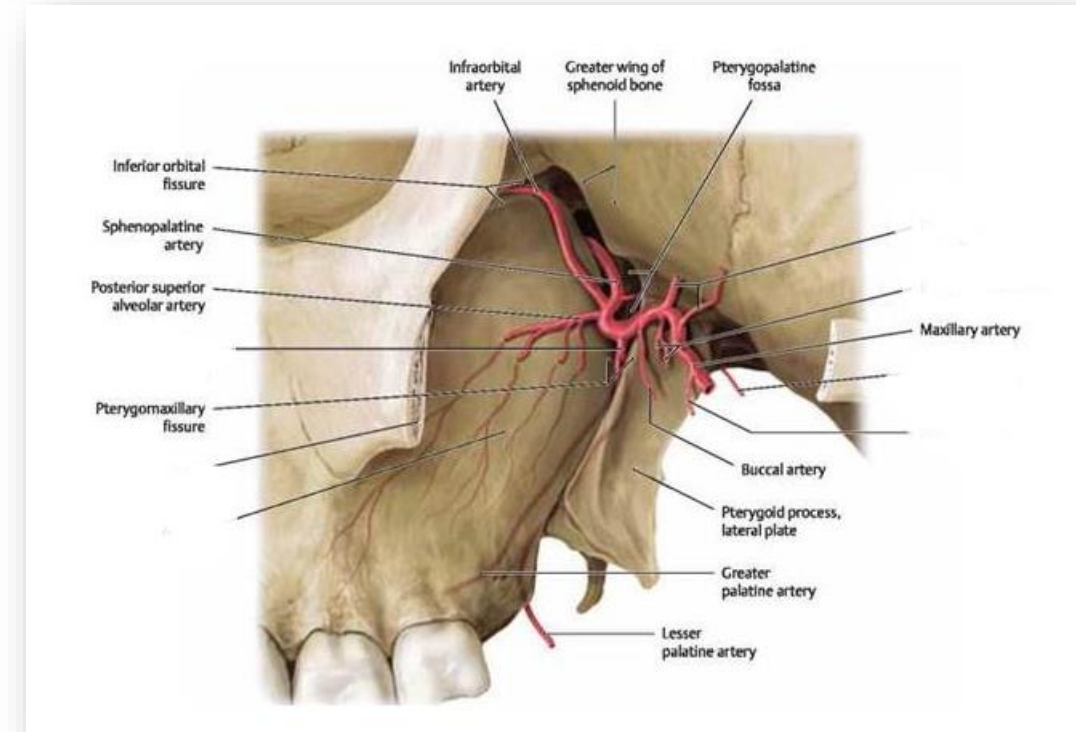
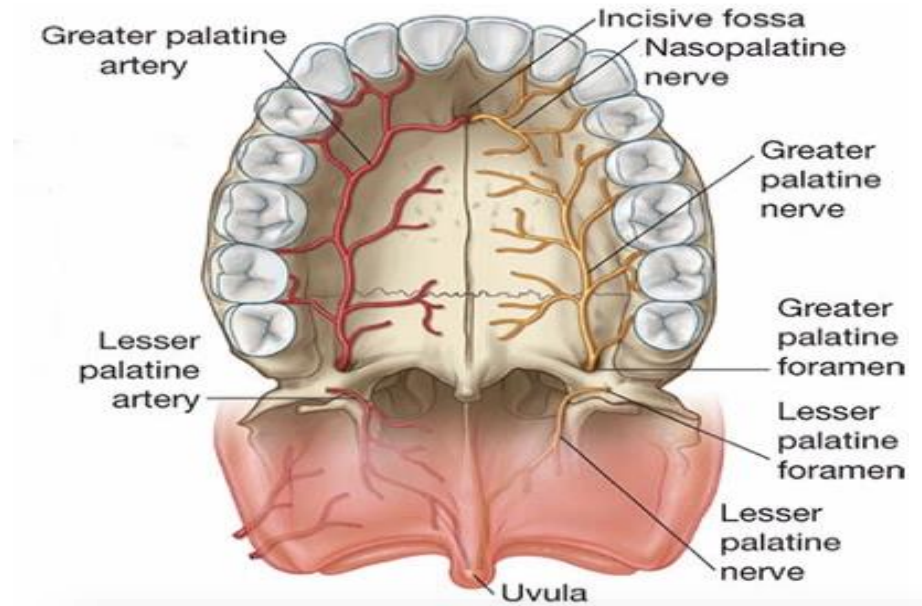
By greater petrosal nerve (a branch of the facial nerve) through lesser palatine nerve.



Soft palate

Vascular supply palate:

- **Greater palatine artery**, a branch of the third part of the maxillary artery. It gives off two or three **lesser palatine arteries**, supply the soft palate and tonsil.



Pharynx

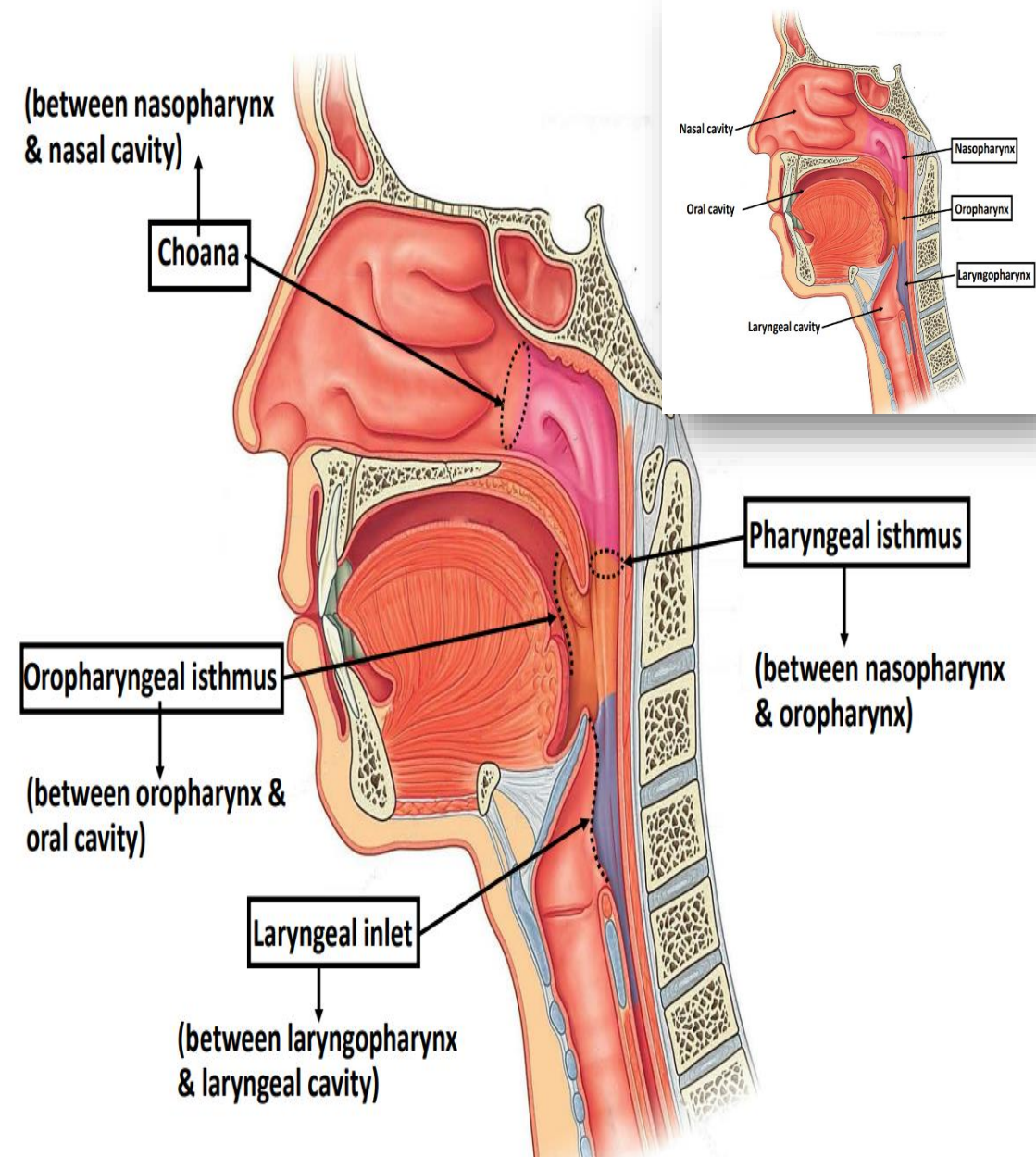
Def.: It is musculomembranous tube, about (12 – 14 cm) long.

Extension:

- It begins **from** the base of the skull (posterior part of the body of the sphenoid and the basilar part of the occipital bone).
- **It ends at the level of C6 vertebra** (level of cricoid cartilage), where it becomes continuous with the esophagus.

Description:

- Its upper end is wider than its lower end.
- **It is divided into three parts:**
Nasopharynx, Oropharynx & Laryngopharynx.



Oropharynx

Extension: It extends from the lower surface of the soft palate to the upper border of the epiglottis.

Boundaries & Communications:

Anteriorly:

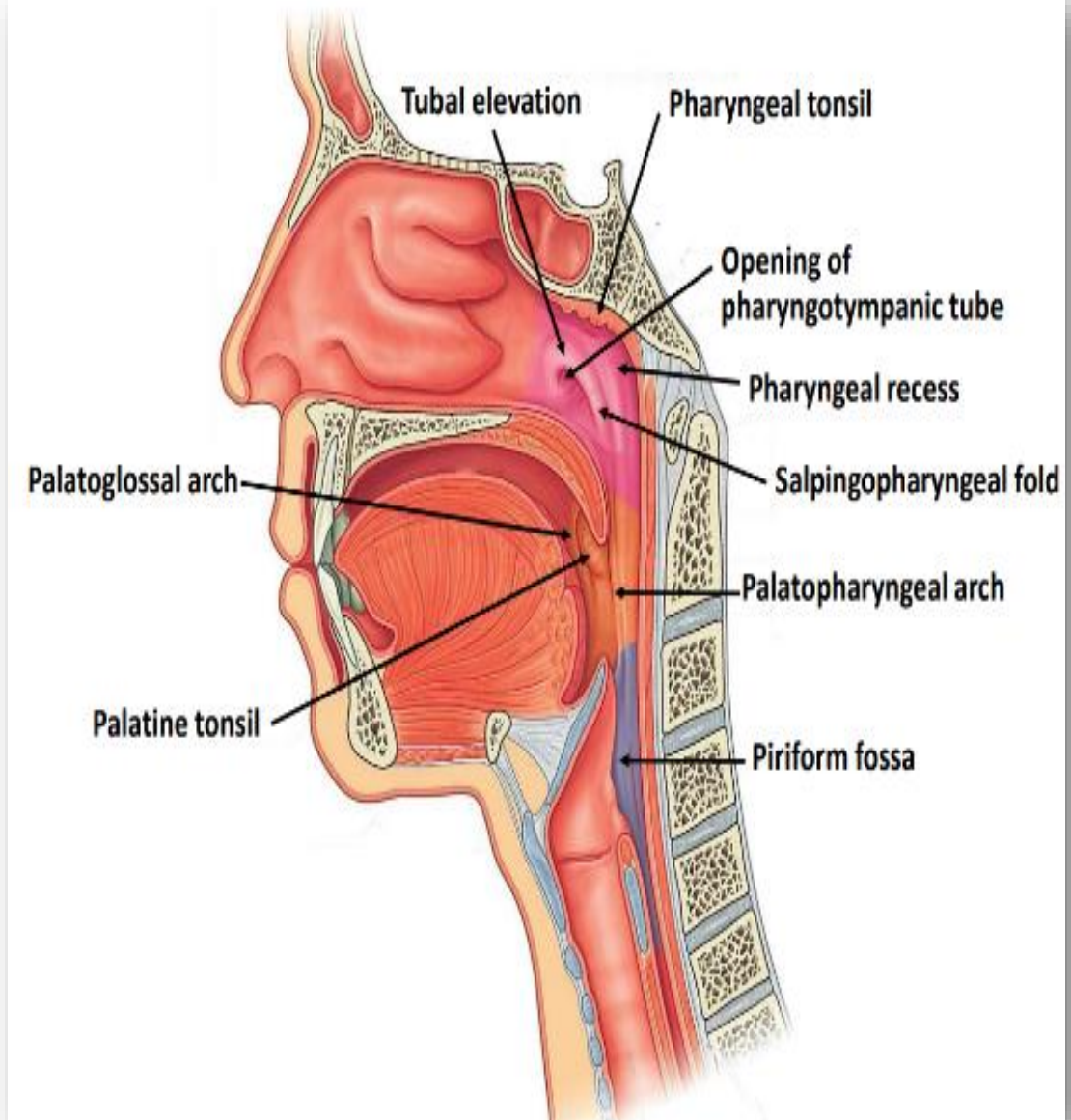
- It communicates with oral cavity proper through **oropharyngeal isthmus** which is an interval between the two palatoglossal arches.
- **Base of the tongue** makes part of its anterior wall.

Superiorly:

- It communicates with the nasopharynx **through the pharyngeal isthmus** (which is between the soft palate and the posterior pharyngeal wall).

Inferiorly:

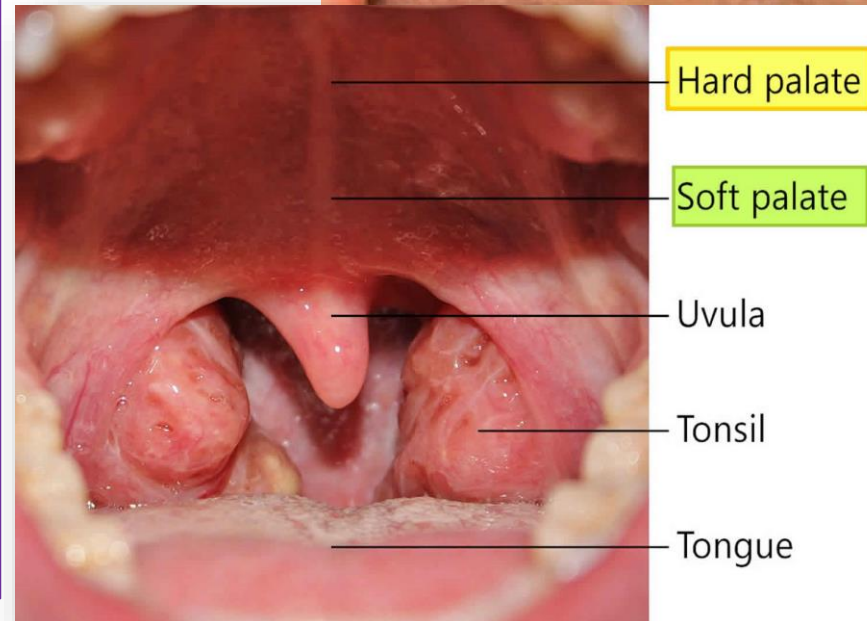
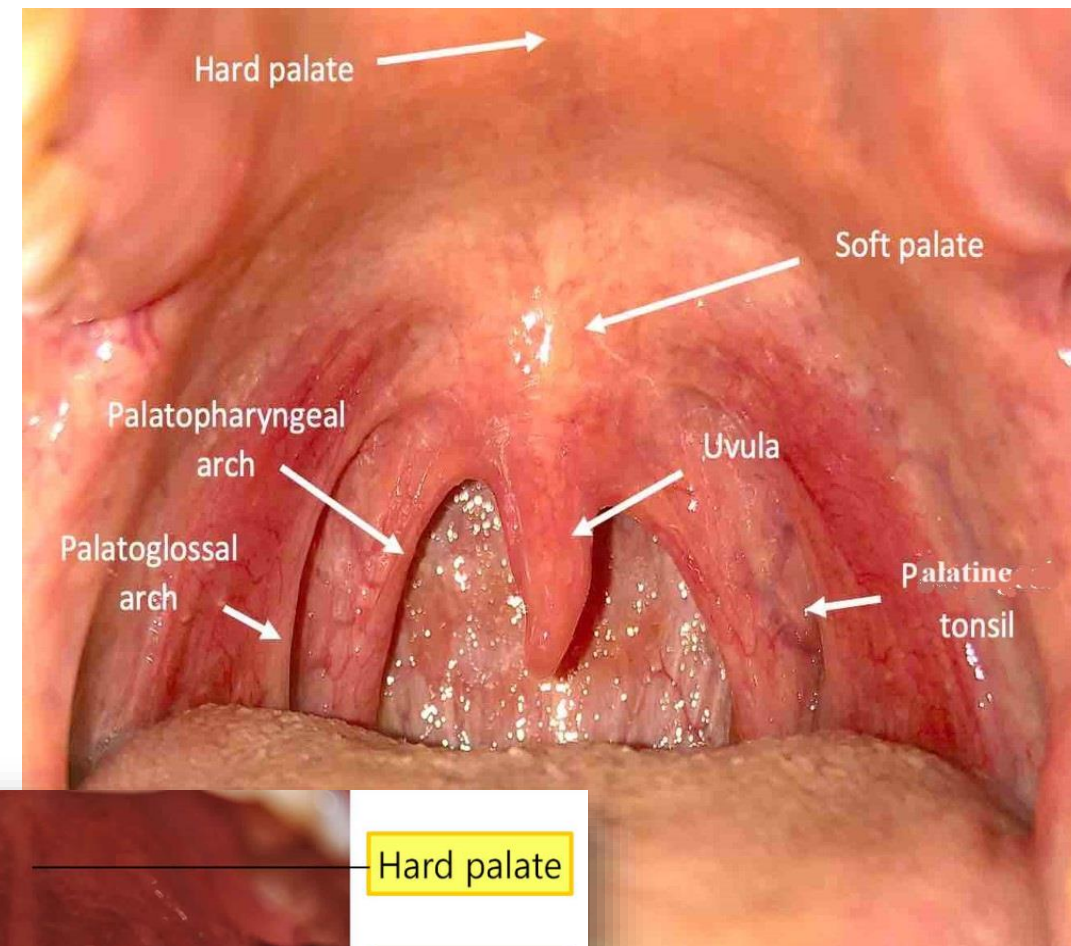
- It communicates with laryngopharynx.



Lateral wall of Oropharynx

The lateral wall of the oropharynx presents two prominent arches (folds):

- **The palatoglossal arch:** Anterior fold of mucous membrane runs from the soft palate to the side of the tongue and covers the palatoglossus muscle.
- **The palatopharyngeal arch:** Posterior fold of mucous membrane, runs from the soft palate to the lateral wall of the pharynx and covers the palatopharyngeus muscle.
- **A tonsillar sinus:** lies between the two arches, and contains the palatine tonsil.



Constrictors

1- Superior constrictor muscle:

Origin: Pterygomandibular raphe.

2- Middle Constrictor:

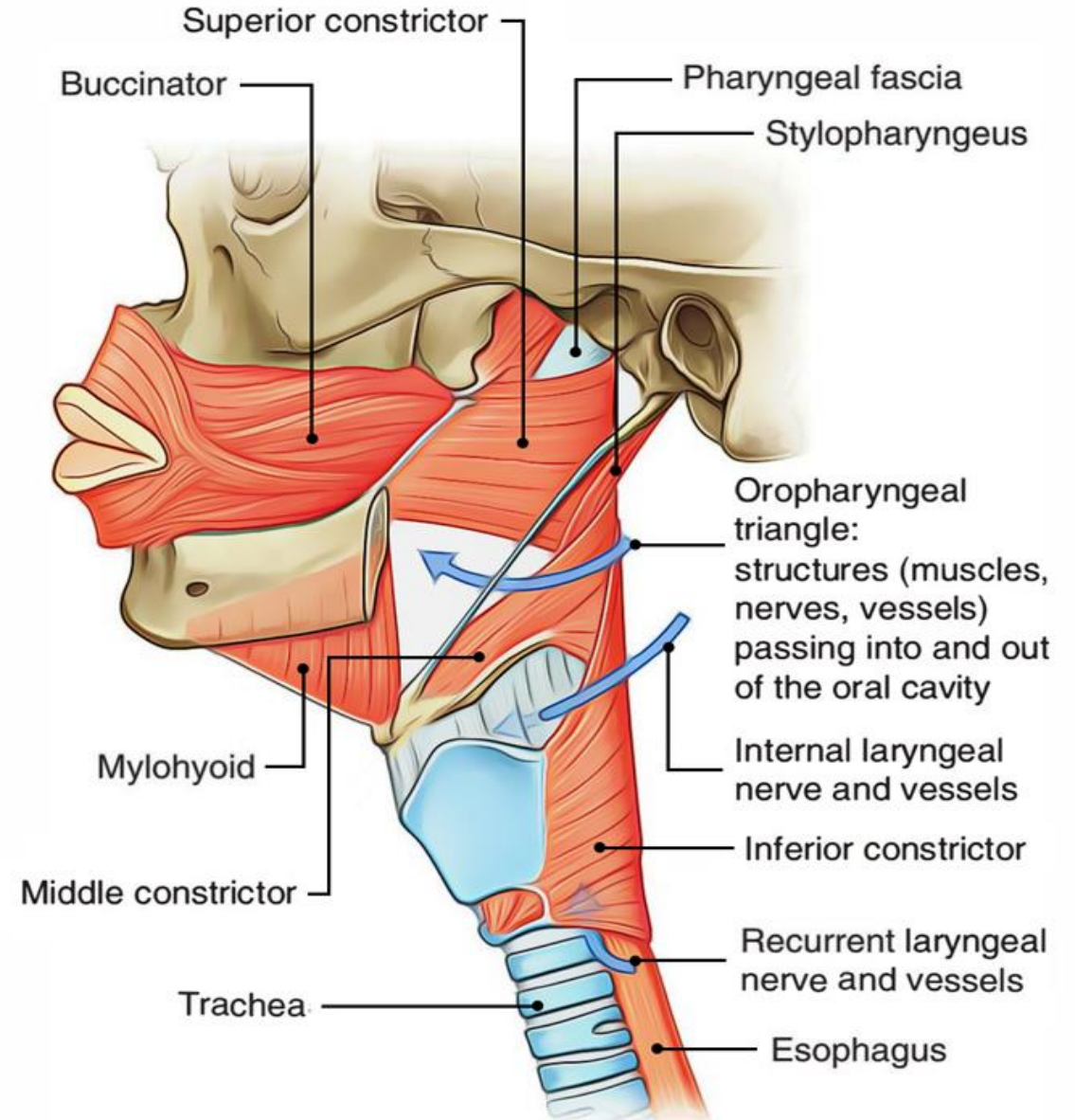
Origin: Hyoid bone & Stylohyoid ligament.

3- Inferior Constrictor:

Origin: It is divided into two parts.

- **Thyropharyngeus part:** Thyroid cartilage.
- **Cricopharyngeus part:** Cricoid cartilage, its fibers pass horizontally around the lowest part of the pharynx.

Insertion: The constrictor muscles sweep backwards and overlap each other **to be inserted into** a median fibrous raphe.



Longitudinal muscles of pharynx

1-Stylopharyngeus:

Origin: Styloid process.

Insertion: It passes downwards and forwards along side of pharynx, passes through gap between superior and middle constrictors, **to be inserted into** posterior border of thyroid cartilage.

2-Palatopharyngeus:

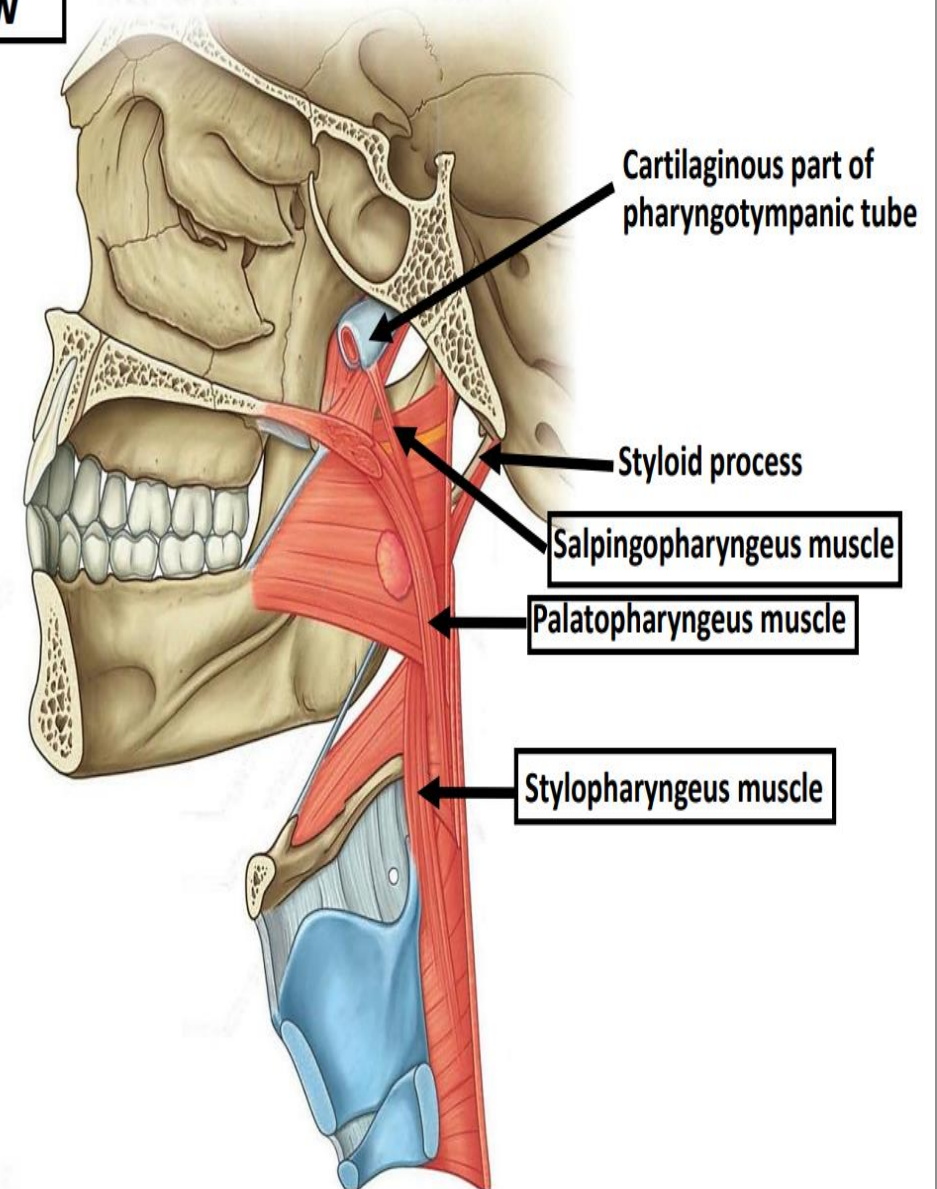
Discussed before.

3- Salpingopharyngeus:

Origin: Cartilaginous part of pharyngotympanic tube.

Insertion: It passes downwards and blends with the palatopharyngeus.

Medial view



Action of Muscles of pharynx

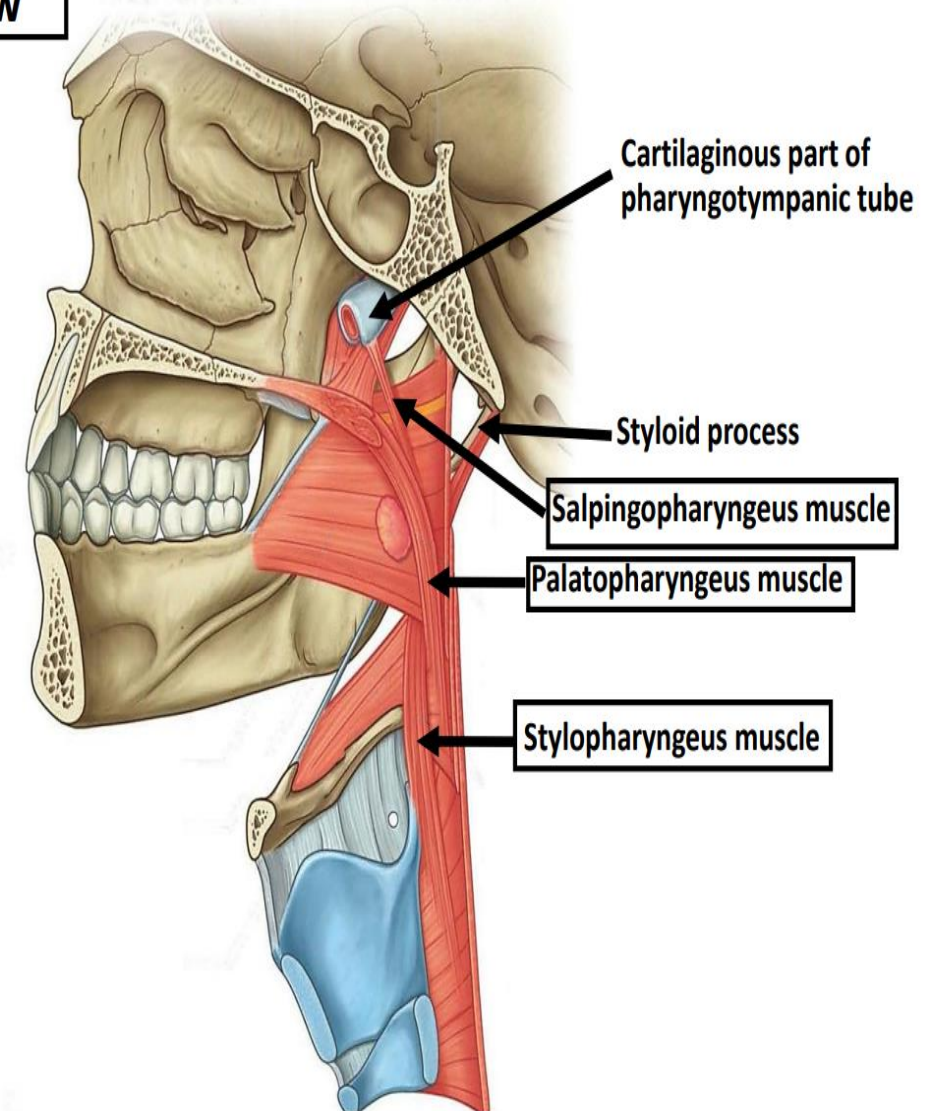
1-The successive contraction of constrictor muscles propels the bolus of food down into the esophagus.

2-The longitudinal muscles act to shorten the pharynx, and elevate the larynx during second stage of swallowing.

3-The Cricopharyngeus act as a sphincter on the lower end of pharynx; preventing the entry of air into esophagus between the acts of swallowing. To prevent the reflux of foods from the esophagus into the pharynx.

- The cricopharyngeus is usually shut tight. When a person swallows, it relaxes and allows food to pass.
- **Cricopharyngeal Dysfunction;** the muscle doesn't relax or relaxes in an uncoordinated manner lead to difficulty swallowing (dysphagia).

Medial view



Nerve supply of Pharynx

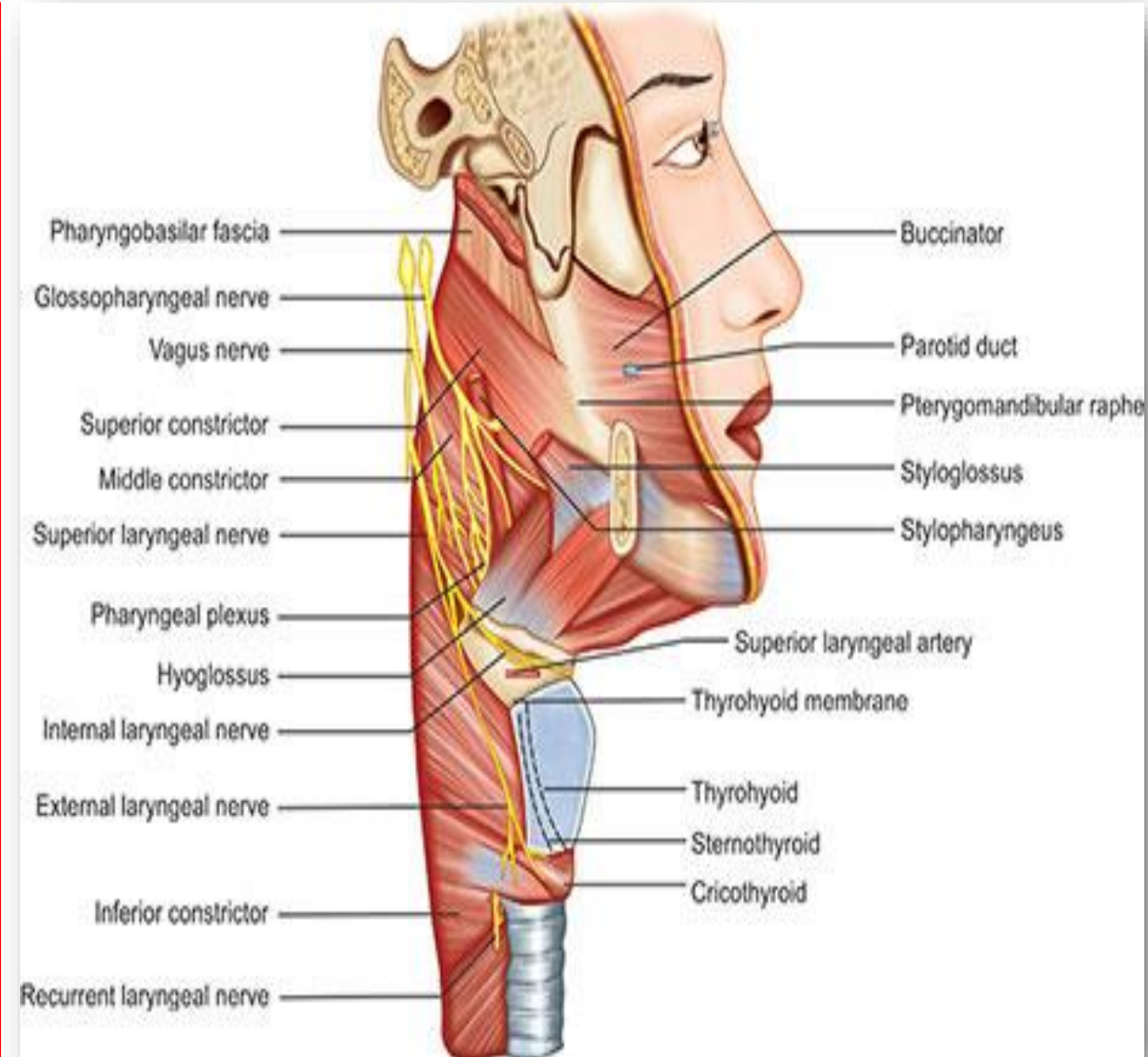
Sensory nerve supply of the pharyngeal mucous membrane:

- **Naso-pharynx:** Maxillary nerve.
- **Oro-pharynx:** Glossopharyngeal nerve.
- **Laryngo-pharynx:** Vagus nerve.

Motor supply:

All muscles of pharynx are supplied by cranial part of the accessory nerve through the pharyngeal plexus **EXCEPT** stylopharyngeus which is supplied by glossopharyngeal nerve.

Pharyngeal plexus is a nerve plexus located upon the outer surface of the pharynx. It contains a motor component (derived from the vagus nerve, a sensory component (derived from the glossopharyngeal nerve, and sympathetic component (derived from the superior cervical ganglion).



Pharynx

Blood supply of the pharynx by:

- Ascending pharyngeal artery.
- Tonsillar branches of facial artery.
- Branches of maxillary and lingual arteries.

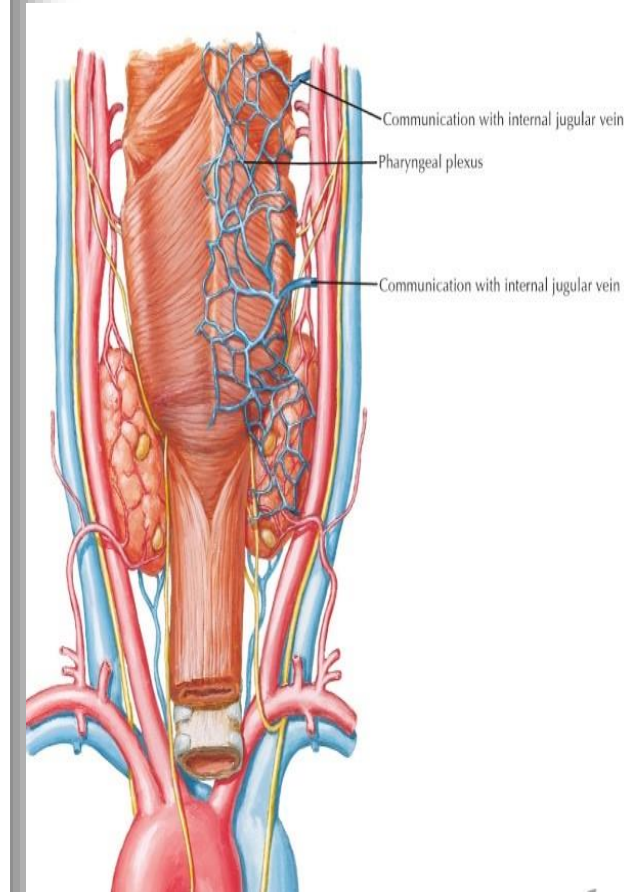
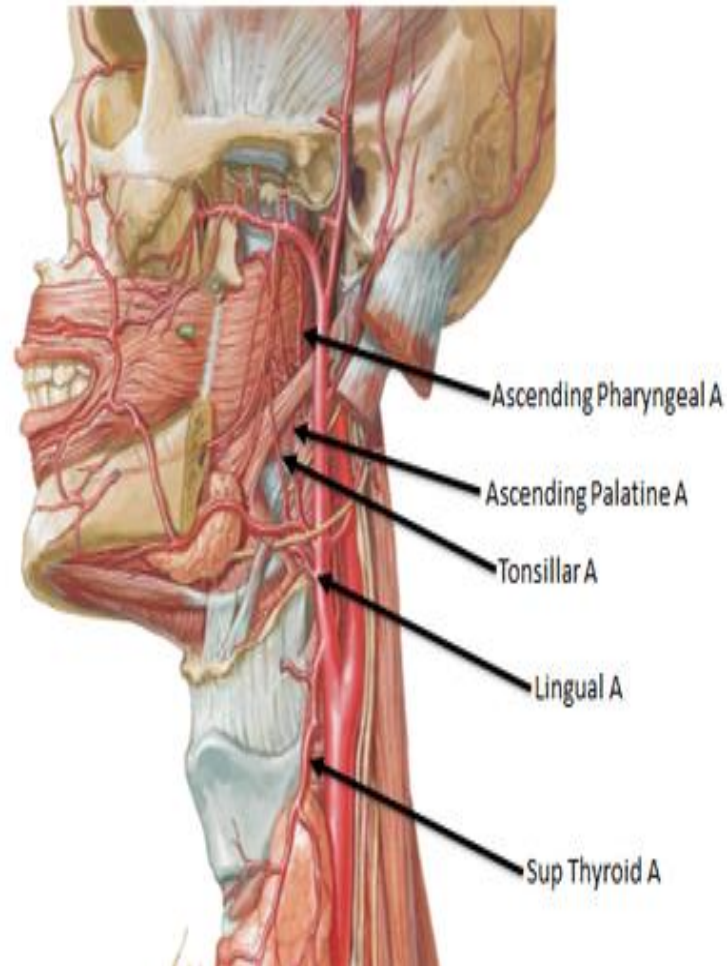
Venous drainage:

By the **pharyngeal venous plexus**, which drains into the **internal jugular vein**.

Lymph drainage of the pharynx

Deep cervical lymph nodes.

Arteries of the Pharynx (lateral view)



Pharynx

Killian's Dehiscence:

- **Potential gap** posteriorly between Thyropharyngeus and Cricopharyngeus.

Pharyngeal Pouch (Zenker's Diverticulum):

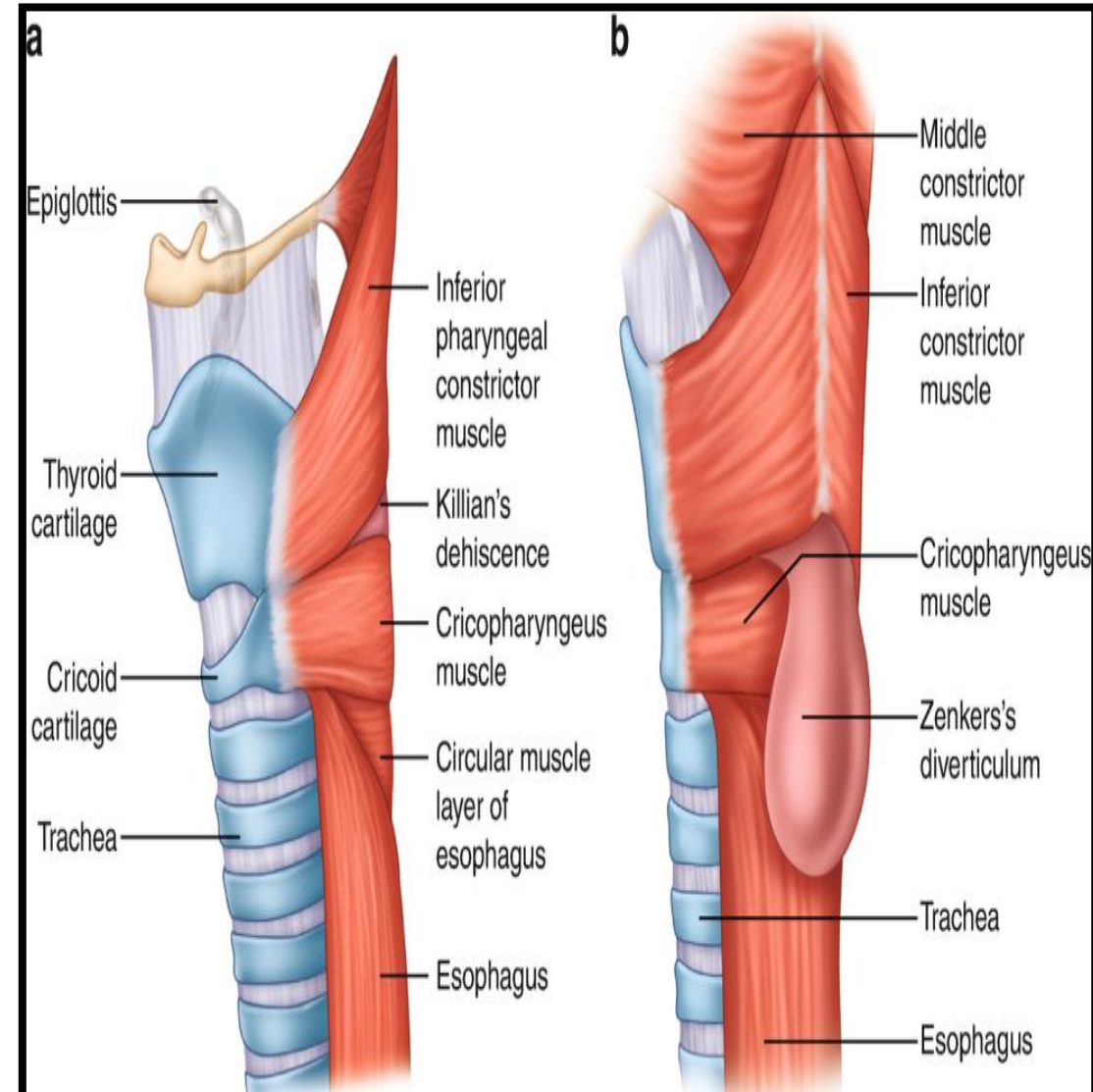
- A diverticulum which is **formed by** bulging of mucosa and submucosa of pharynx through the Killian's dehiscence.

Reason: Neuromuscular incoordination. Cricopharyngeus fails to relax when Thyropharyngeus is contracting, bolus of food is pushed backwards and tends to produce a diverticulum.

Person with Zenker's diverticulum experience:

Difficulty swallowing.

Sensation of “a lump in the throat”.



Gaps in Pharyngeal Wall in Relation to Constrictor Muscles

1- Gap between the base of skull and upper border of Superior Constrictor (Sinus of Morgagni).

Filled by tensor veli palatini and levator veli palatini muscles.

Closed by the pharyngobasilar fascia.

Structures passing: Ascending Palatine Artery.

2-Gap between the Superior & Middle Constrictors:

Structures passing: Stylopharyngeus muscle & Glossopharyngeal nerve.

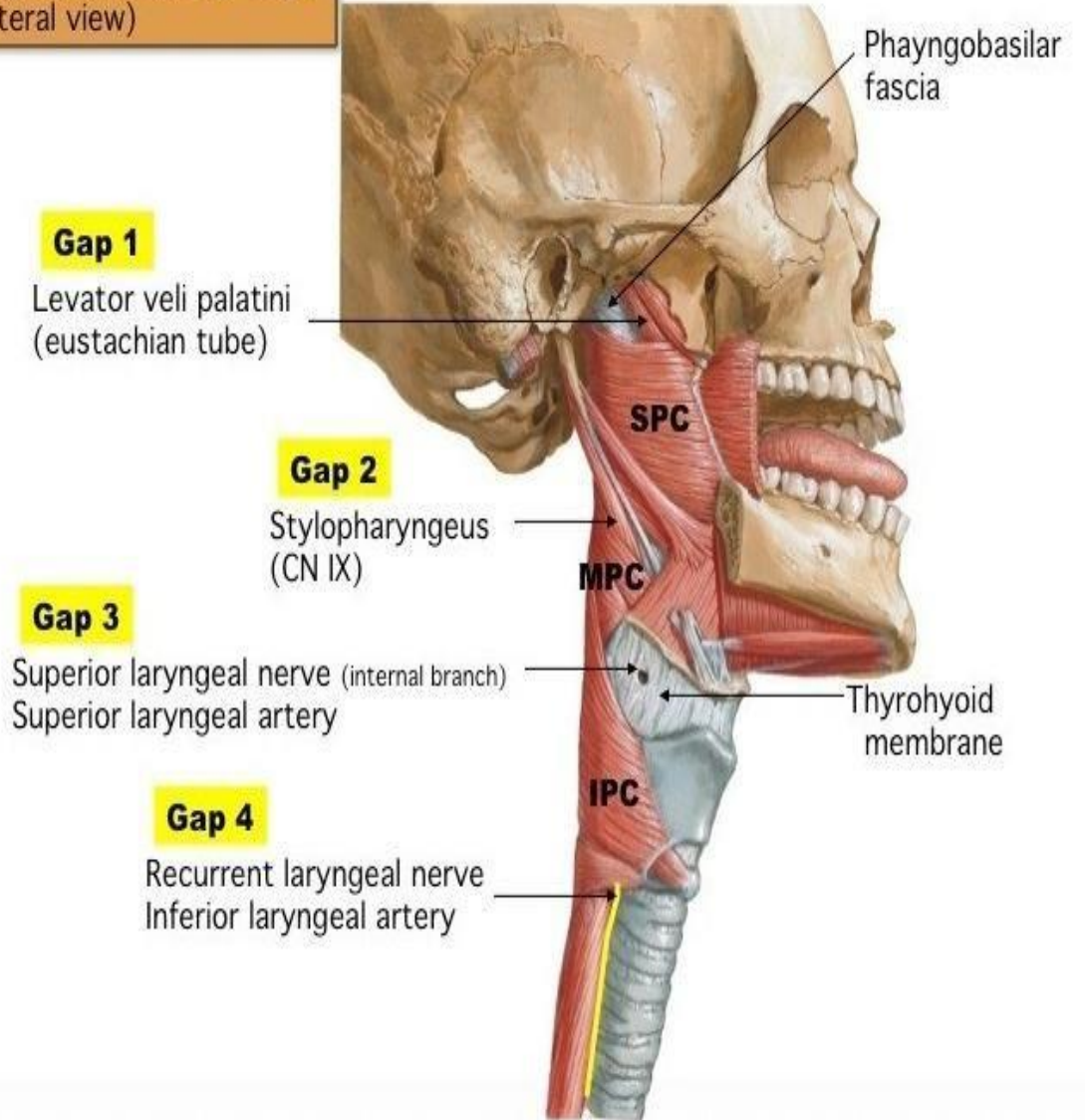
3- Gap between the Middle & Inferior Constrictors:

Structures passing: Superior laryngeal vessels & Internal laryngeal nerve.

4- Gap below Inferior Constrictor:

Structures passing: Inferior laryngeal vessels & Recurrent laryngeal nerve.

Pharyngeal Muscles & Gaps (lateral view)



Esophagus

Def: The esophagus is a muscular tube, Conducts food from pharynx into stomach. about (25 cm) long.

Beginning:

- It **begins** from the lower border of the pharynx **at the level of the 6th cervical vertebra.**

Termination:

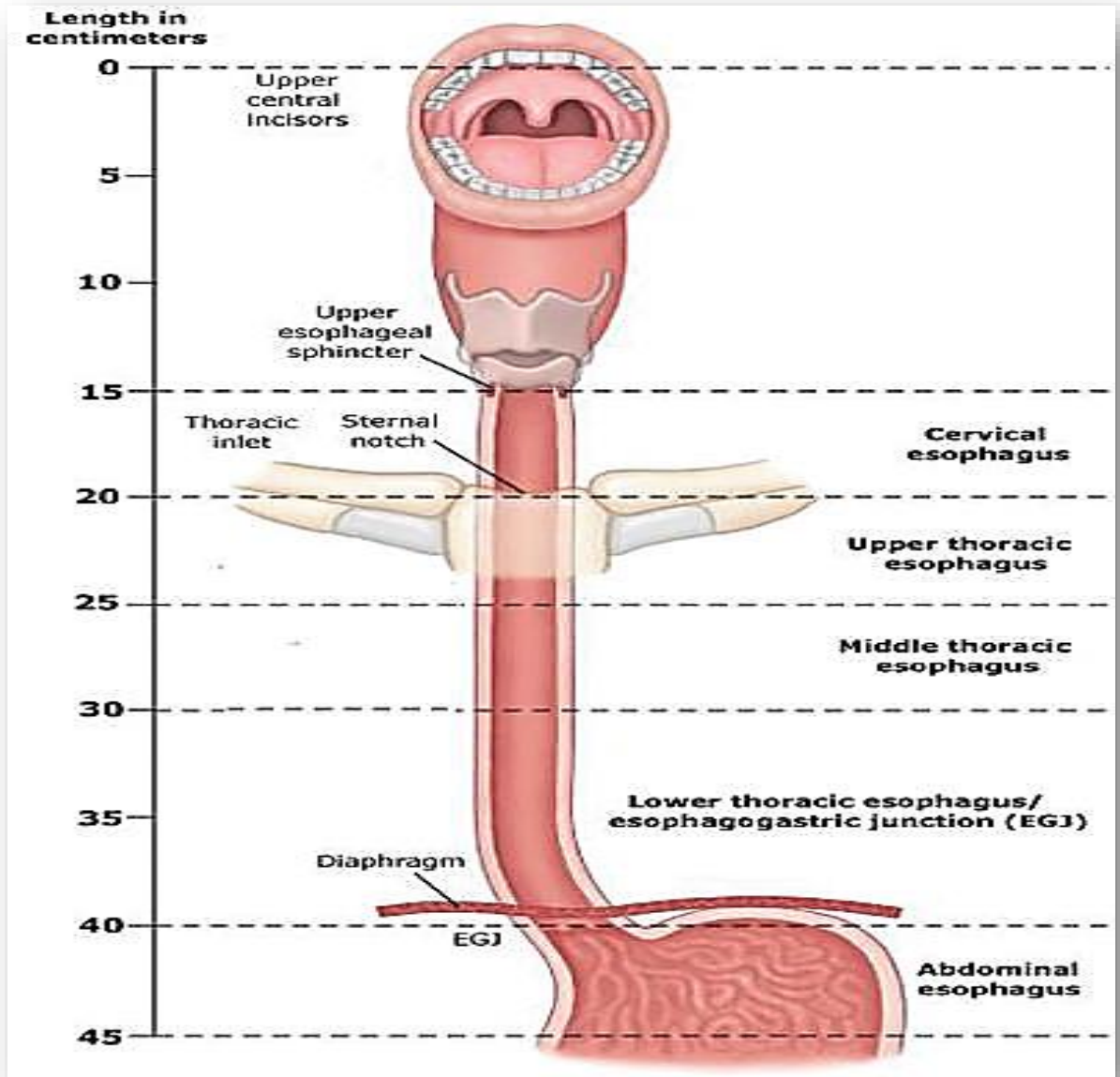
- It **ends** in the cardiac orifice of the stomach at the level of **T11 vertebra**, (one inch) to the left of the median plane.

Course:

1-Cervical part: it is about 4 cm .

2-Thoracic part: it is about 20 cm .

3-Abdominal part: It is about 1-2 cm .



Esophagus

Curves:

1-Anteroposterior curvature: The oesophagus follows the cervicothoracic curvatures of the vertebral column.

2-Side to side: Two inclinations to the left: one at level of T1 and the other at T7.

Constrictions:

1-At its beginning →6 inches from incisors.

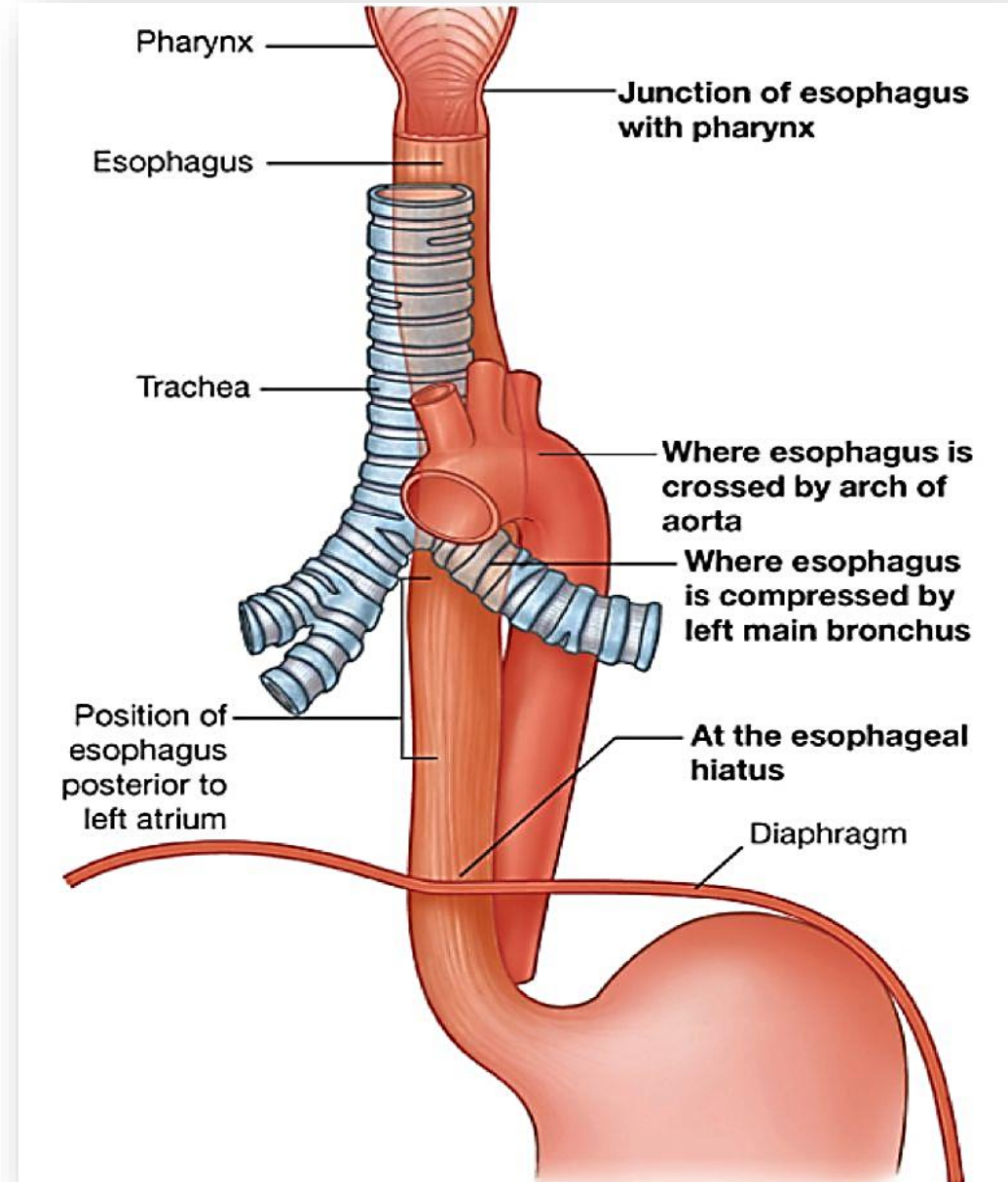
2-At the crossing of the arch of aorta →9 inches from incisors.

3-At the crossing of the left bronchus →12 inches from incisors.

4-At the diaphragmatic opening →15 inches from incisors.

Clinical importance:

During the introduction of oesophagoscope, these constrictions at these distances should be expected as it make some resistance.



Relations of Cervical part of Esophagus

Anterior relations:

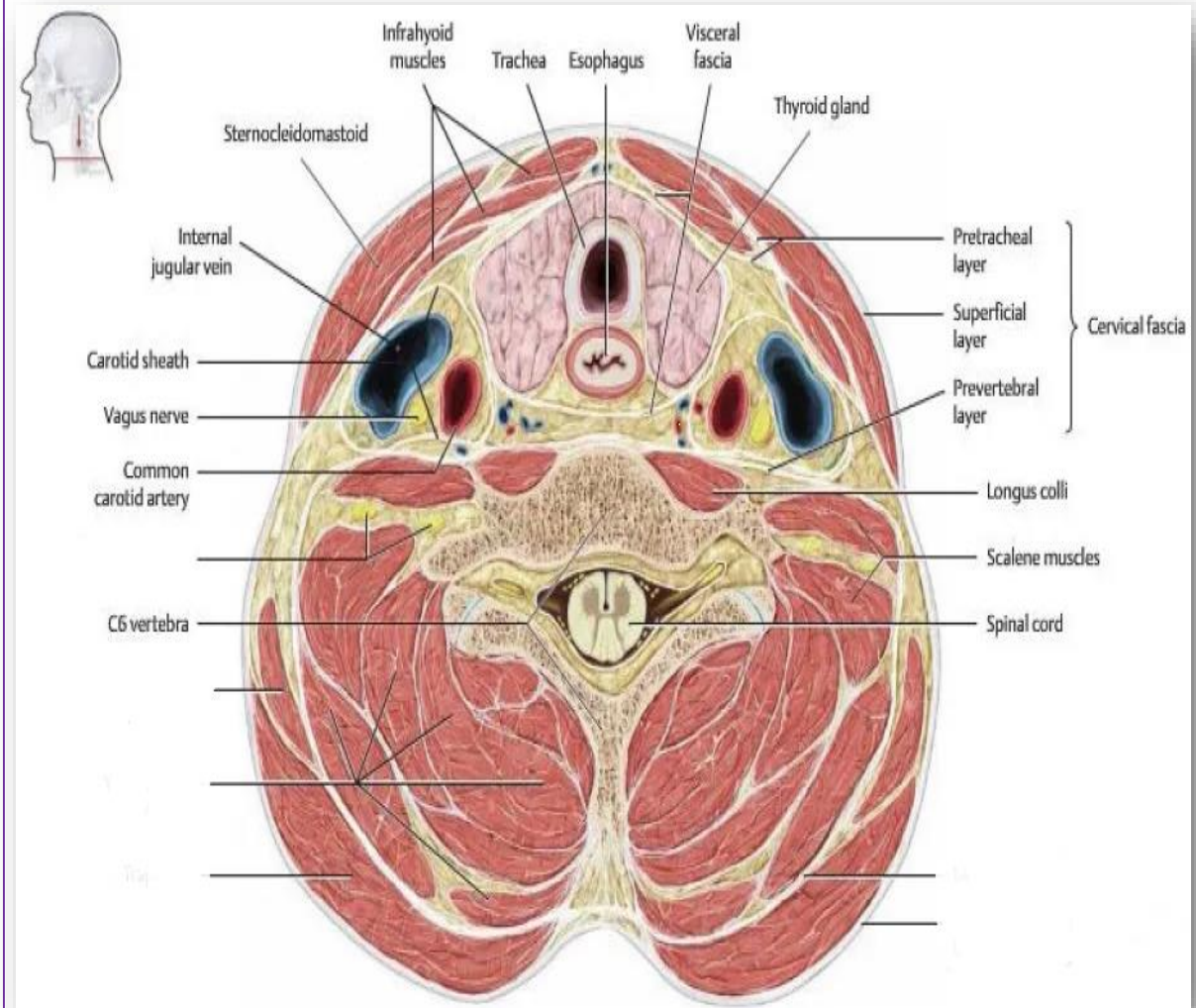
- Trachea.
- Recurrent laryngeal nerves one on each side, in the groove between trachea and esophagus.

Posterior relations:

- Longus colli muscle.
- Vertebral column.

Lateral relations:

- Common carotid arteries (on each side).
- Thyroid gland (on each side).
- Thoracic duct ascends for a short distance (along its left side).



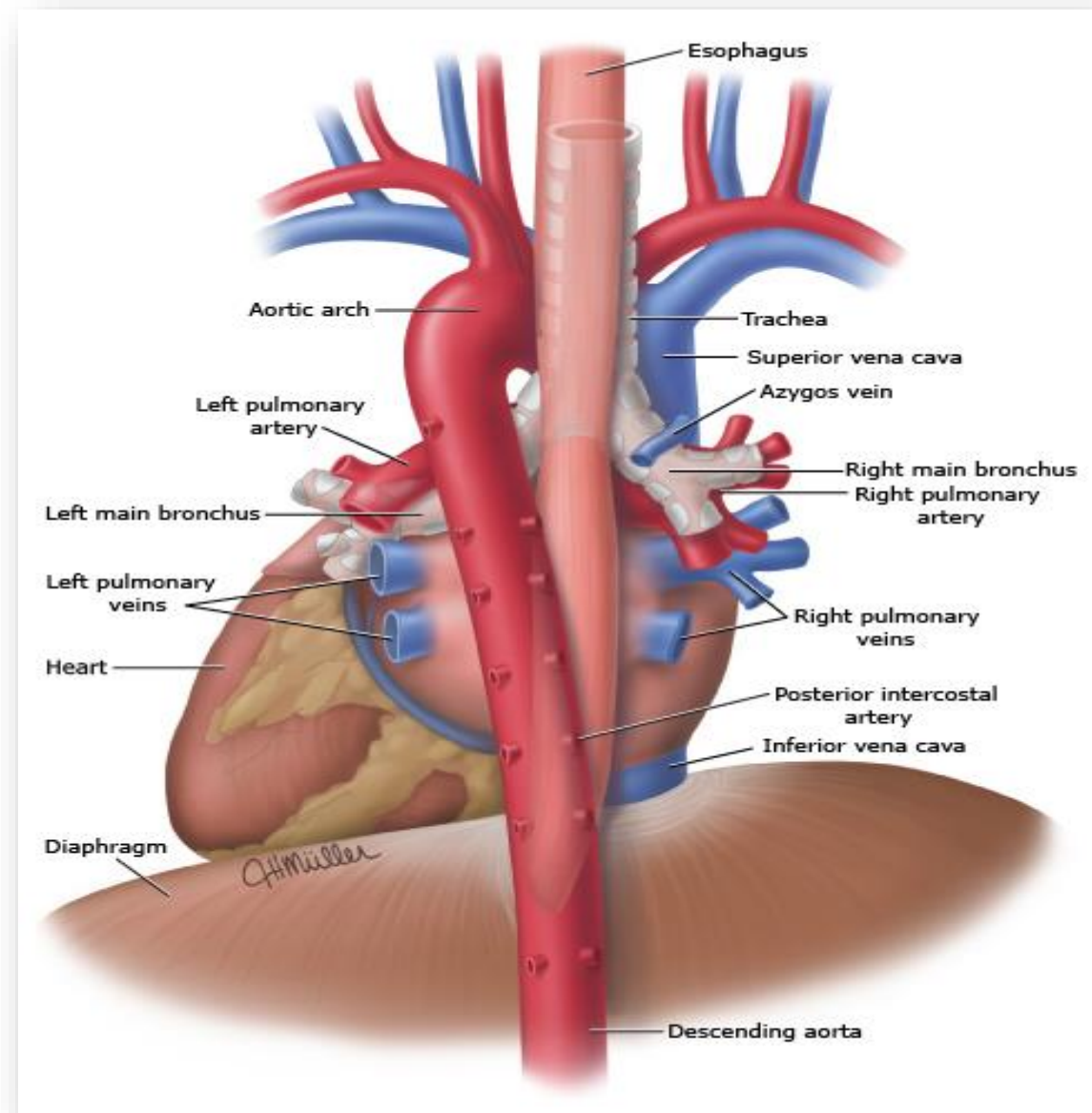
Thoracic part of Esophagus

❑ It passes through **superior mediastinum** and then through **posterior mediastinum**.

Anterior relations: From above downwards:

- Trachea.
- Left principal bronchus at (T5).
- Pericardium (separates esophagus from left atrium) at (T5-T8).
- Diaphragm (T8-T10).

The clinical importance: In cases of left-sided heart failure, the oesophagus may be compressed backwards by the enlarged left atrium.



Thoracic part of Esophagus

Posterior relations:

- Thoracic vertebrae.

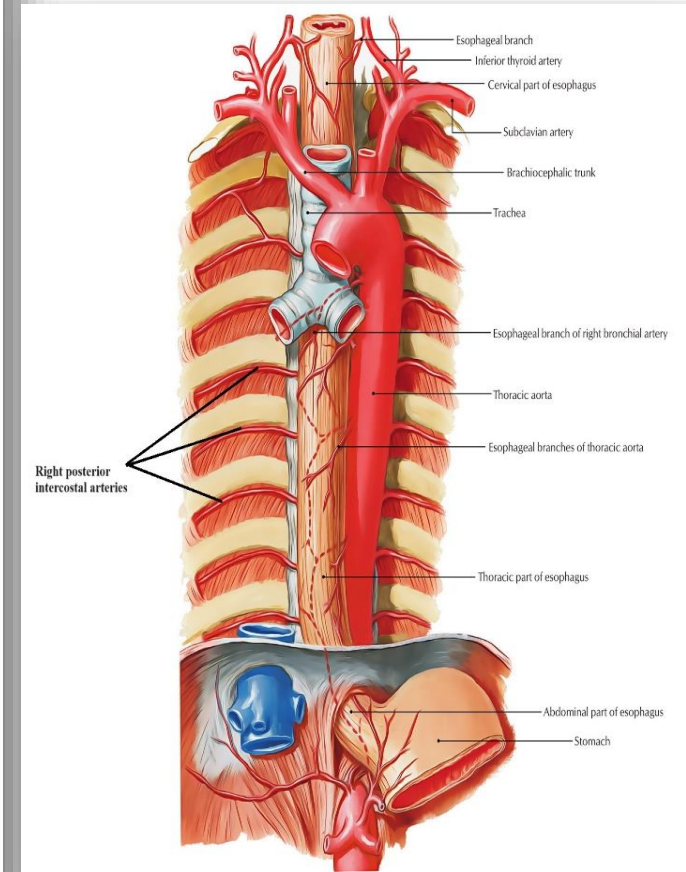
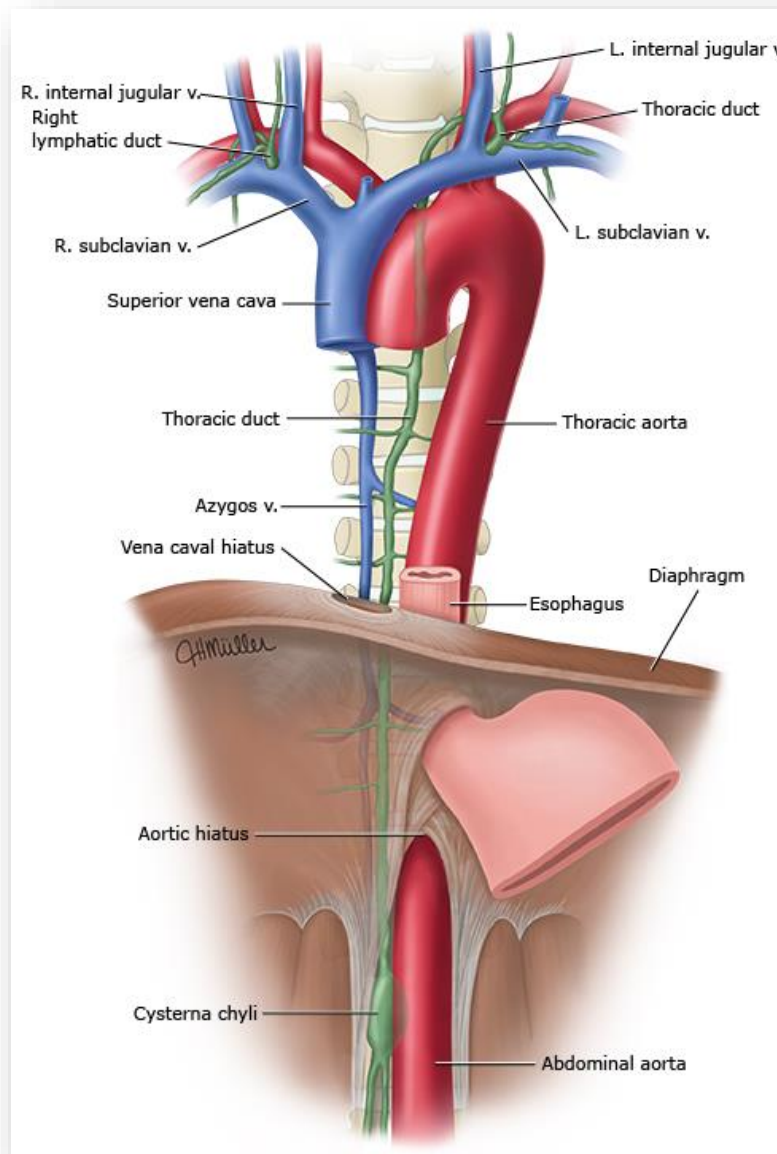
In posterior mediastinum, The oesophagus is separated from the vertebral column by:

a-Thoracic duct.

b-Azygos vein.

d-Right posterior intercostal arteries.

e-Descending thoracic aorta at its lower part (T7-T9).



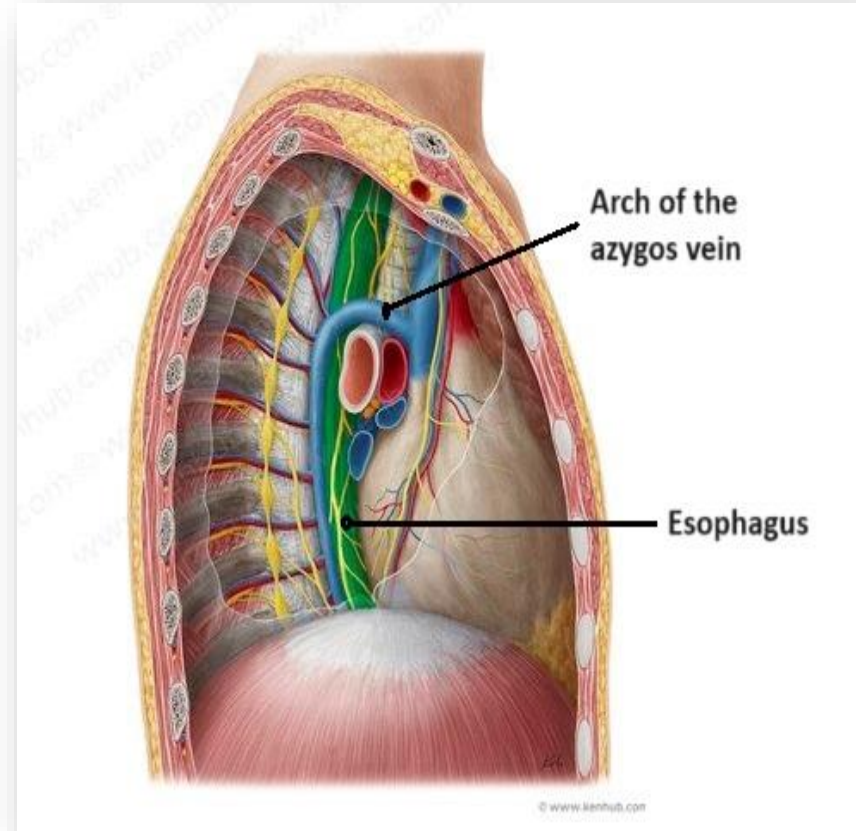
Thoracic part of Esophagus

Right relations:

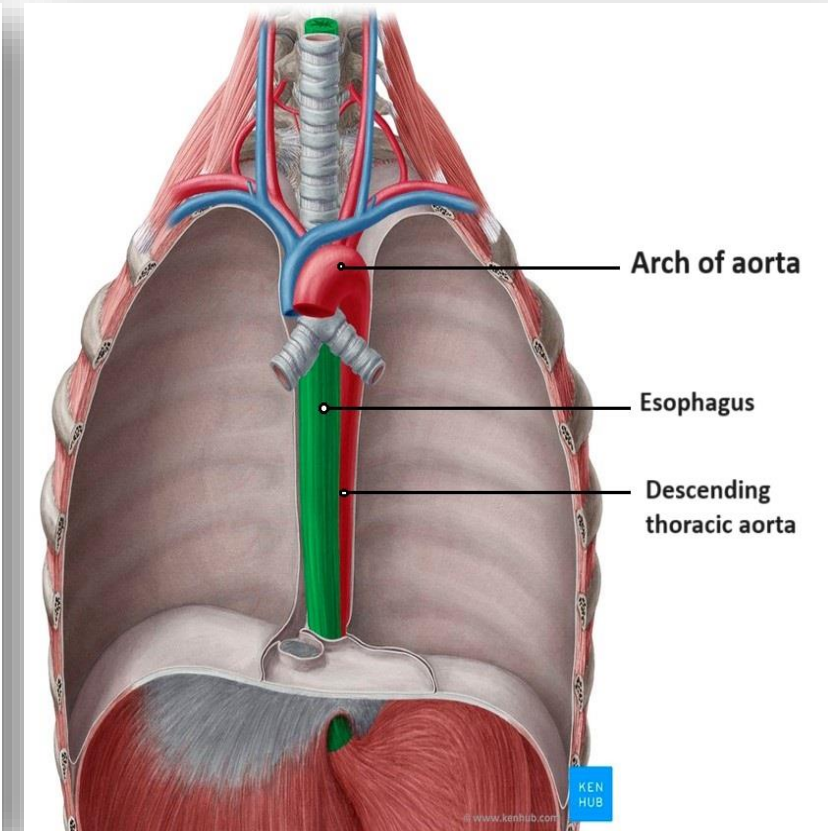
- Right pleura.
- Arch of the azygos vein.

Left relations:

- Left pleura.
- Arch of aorta.
- Descending thoracic aorta.



Right relations



Left relations

Abdominal part of Esophagus

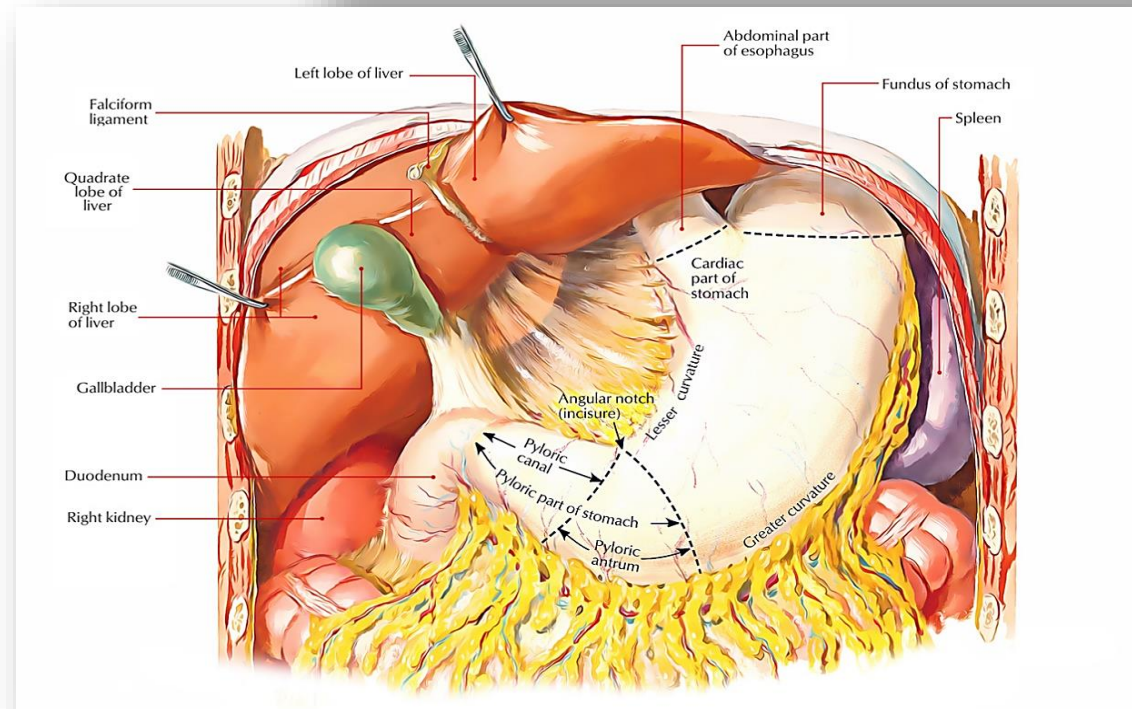
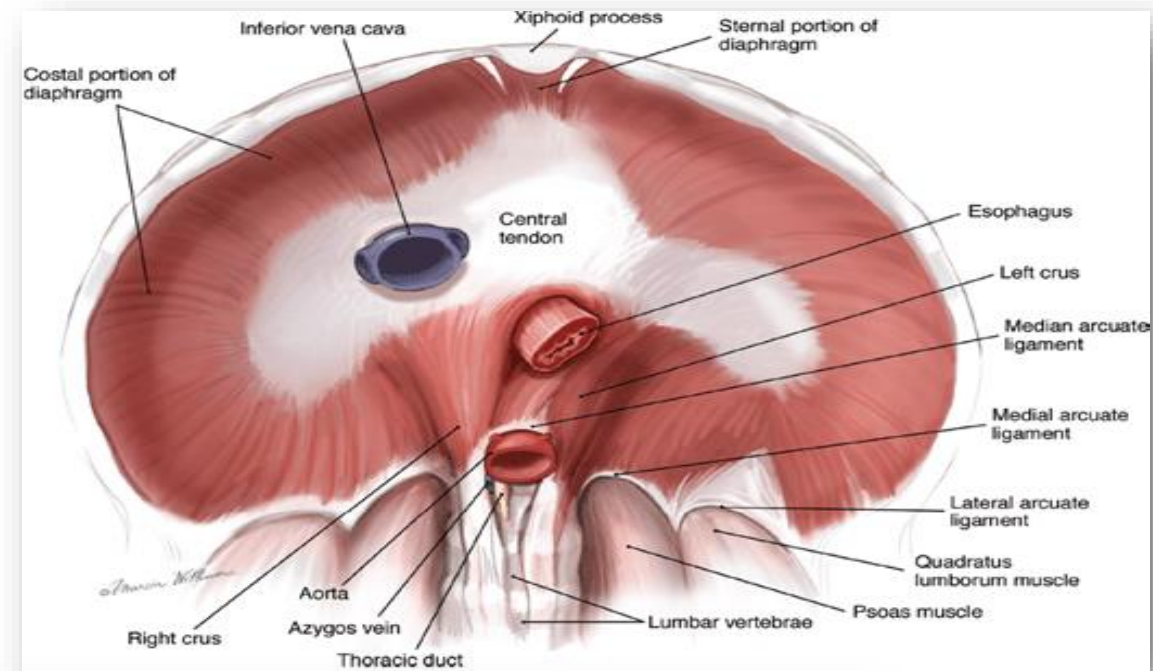
- It is a part of the esophagus in the abdomen after passing through the diaphragm at the level of T10 vertebra.
- It ends in the cardiac orifice of the stomach.

Anterior relations:

The left lobe of the liver.

Posterior relations:

The left crus of the diaphragm.

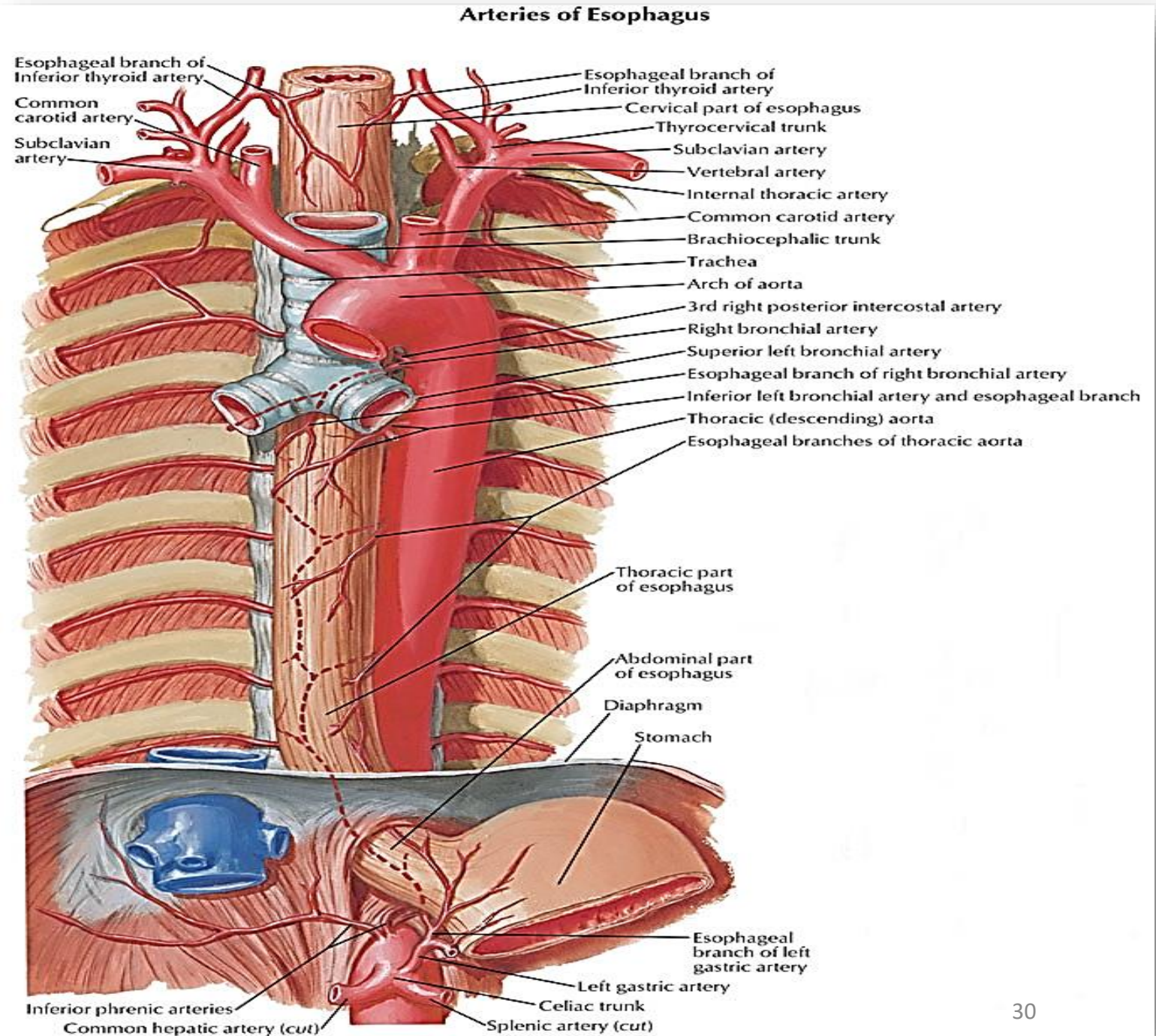


Esophagus

Arterial supply:

The oesophagus is supplied by branches from;

- **Cervical part:** Inferior thyroid artery.
- **Thoracic part:** Descending thoracic aorta.
- **Abdominal part:** Left gastric artery.



Esophagus

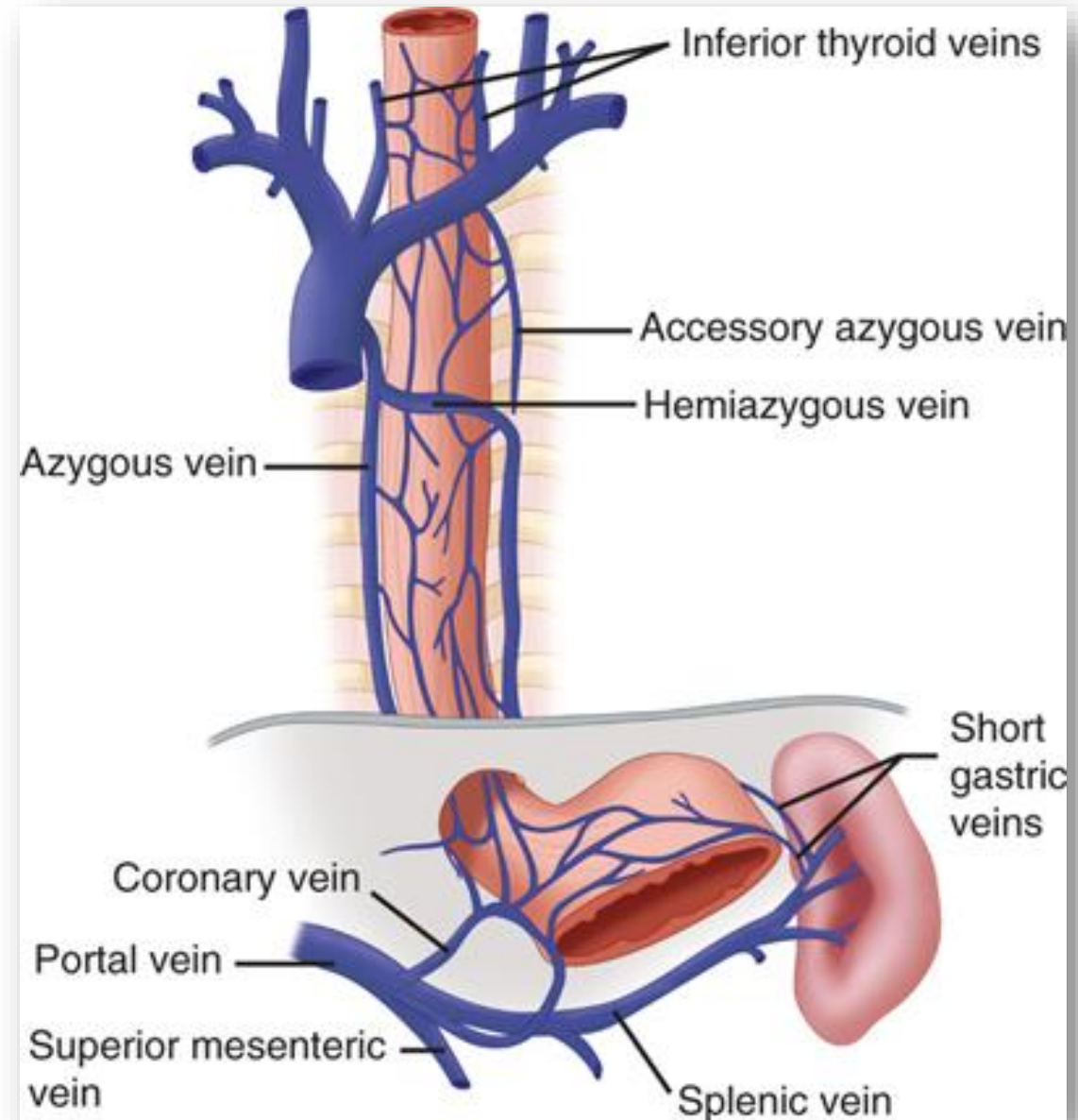
Venous drainage:

It is drained by:

- **Cervical part:** into inferior thyroid vein.
- **Thoracic part:** into azygos vein.
- **Abdominal part:** into left gastric vein, a tributary of portal vein.

Portal-systemic anastomoses at the lower part of esophagus:

- Esophageal veins of azygos vein → systemic circulation.
- Esophageal veins of left gastric vein → portal circulation.
- **Clinical case** of **esophageal varices** in case of portal hypertension.
- Clinical symptom: Vomiting of blood



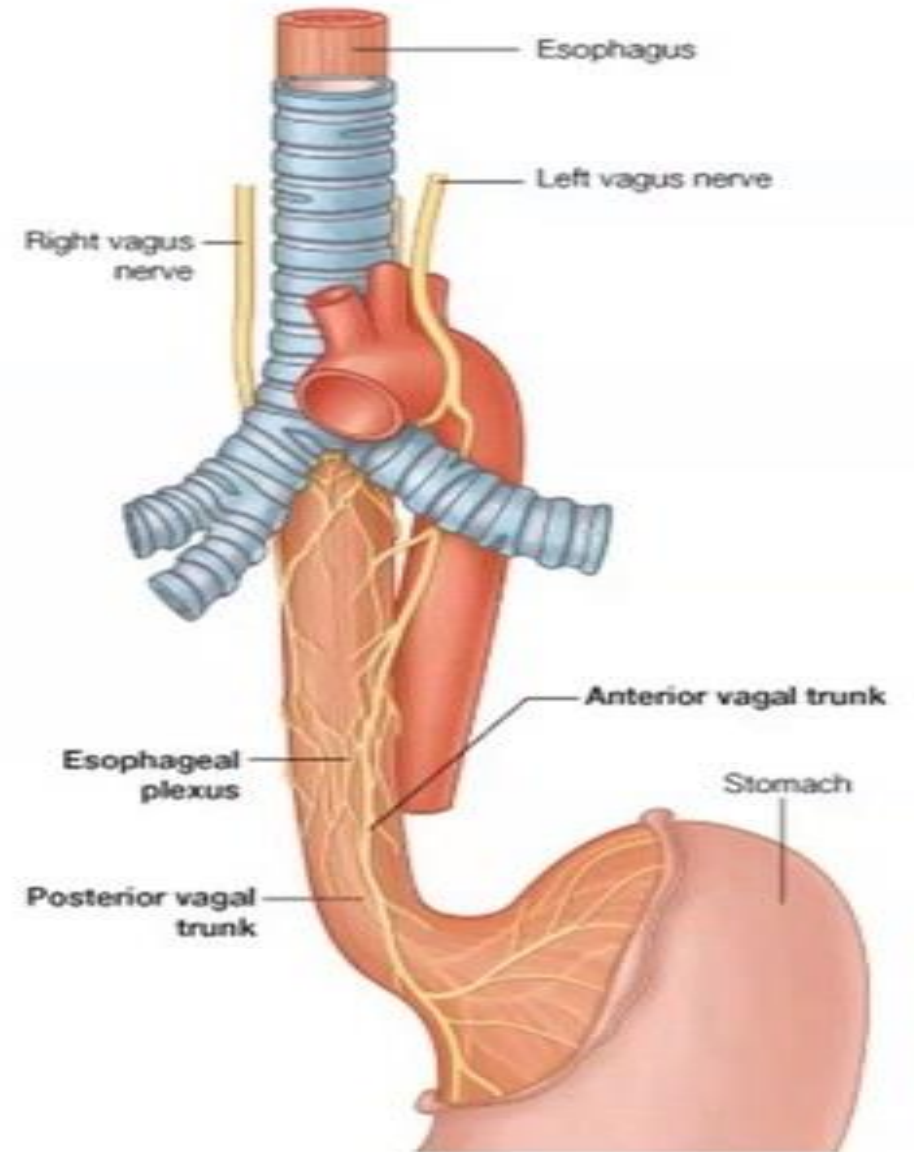
Esophagus

Nerve supply:

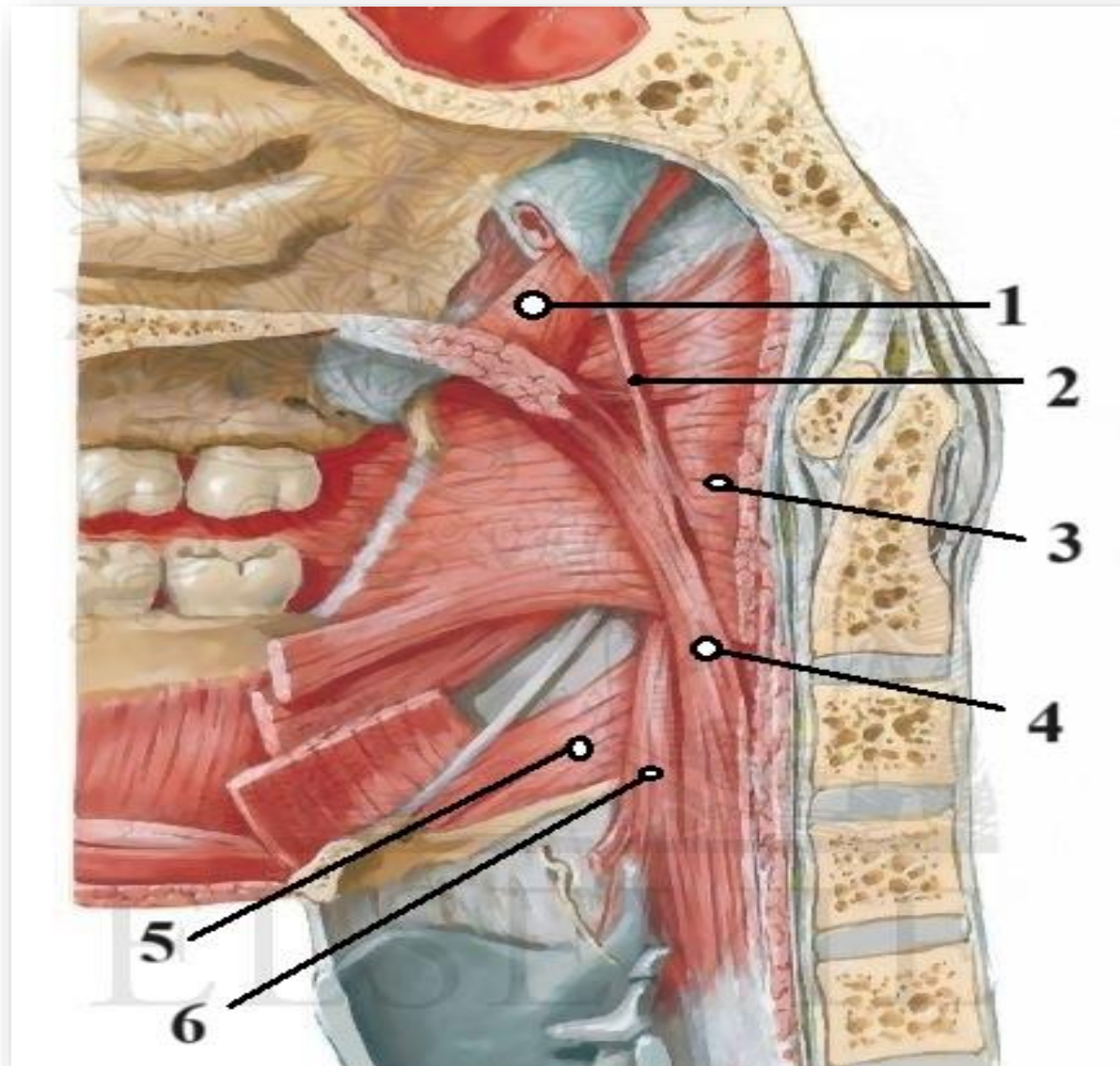
- It is supplied by **anterior and posterior oesophageal plexuses.**

Lymphatic drainage:

- Efferent vessels from the cervical oesophagus drain to the **deep cervical nodes.**
- Vessels from the thoracic oesophagus drain to the **posterior mediastinal nodes.**
- Those from the abdominal oesophagus drain to the **left gastric lymph nodes.**



Quiz-image



THANKS