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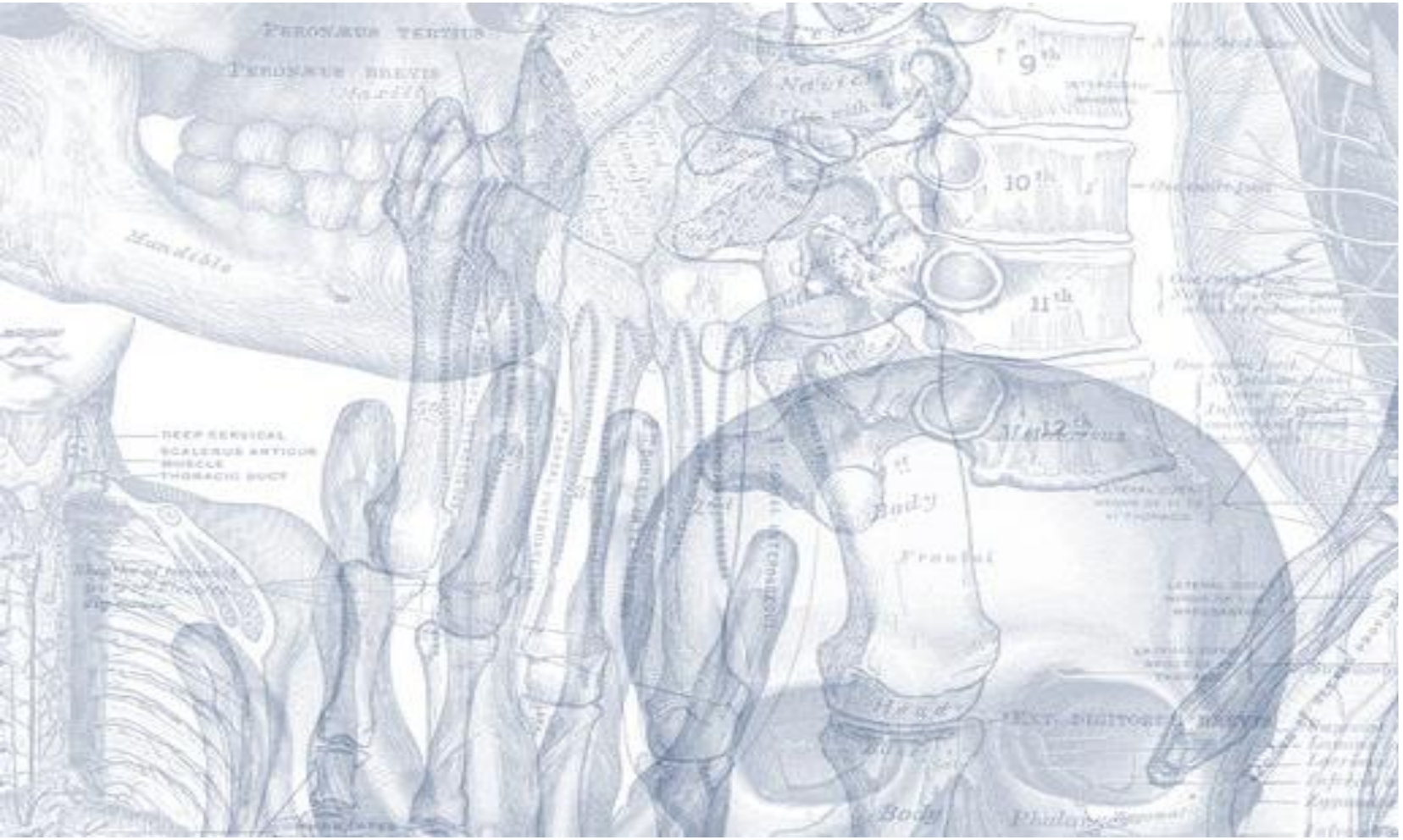


ANATOMY
TEAM 436

436
MEDICINE
KING SAUD UNIVERSITY

تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

Oral Cavity, Esophagus And Stomach

Please view our Editing File before studying this lecture to check for any changes.

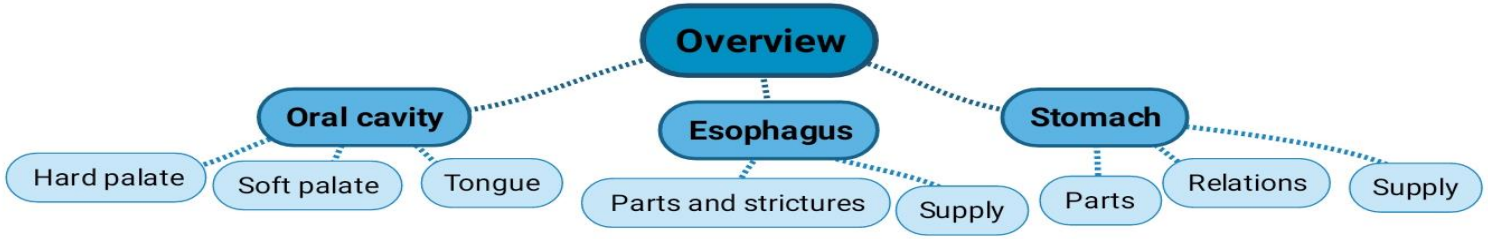
Color Code

- **Important**
- **Doctors Notes**
- **Notes/Extra explanation**

Objectives

By the end of the lecture you should be able to:

- ✓Describe the anatomy the oral cavity, (boundaries, parts, nerve supply).
- ✓Describe the anatomy of the palate, (parts, muscles, nerve & blood supply).
- ✓Describe the anatomy of the tongue, (structure, muscles, motor and sensory nerve supply, blood supply , lymph drainage).
- ✓Describe the anatomical view of the esophagus**;** extent, length, parts, strictures, relations, blood & nerve supply and lymphatic.
- ✓Describe the anatomical view of the stomach**;** location, shape, parts, relations, blood & nerve supply and lymphatic



Oral Cavity

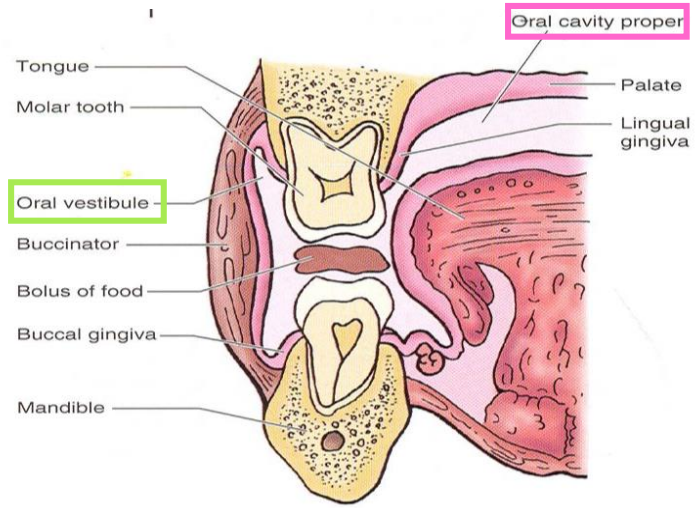
- The mouth extends from lips anteriorly to the oropharyngeal isthmus posteriorly (the junction between mouth & the pharynx).
- It is divided into : 1- Vestibule 2- Mouth cavity proper

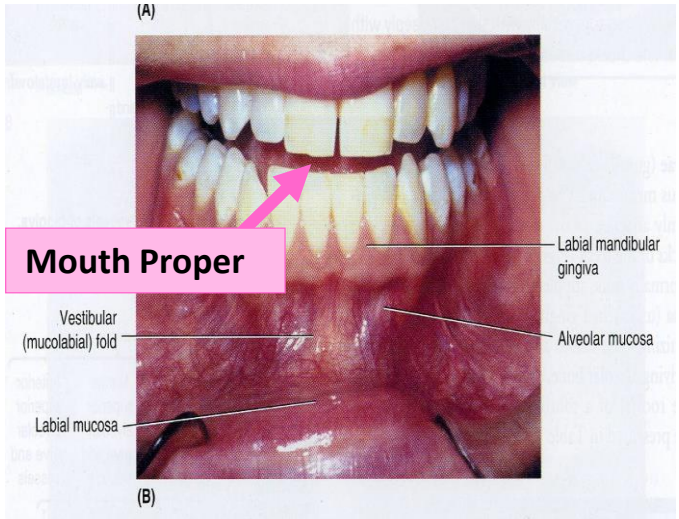
Vestibule

- Which lies between teeth & gums internally and lips & cheeks externally
- The vestibule receives the opening of the **parotid duct** opposite the **upper 2nd molar tooth**

Mouth cavity proper

- Lies within the alveolar arches, gums, and teeth
- **Roof**: Formed by the hard & soft palate.
- **Floor**: Formed by the anterior 2/3 of the tongue
- It communicates with the vestibule behind the **3rd molar** tooth, when you close your lips.

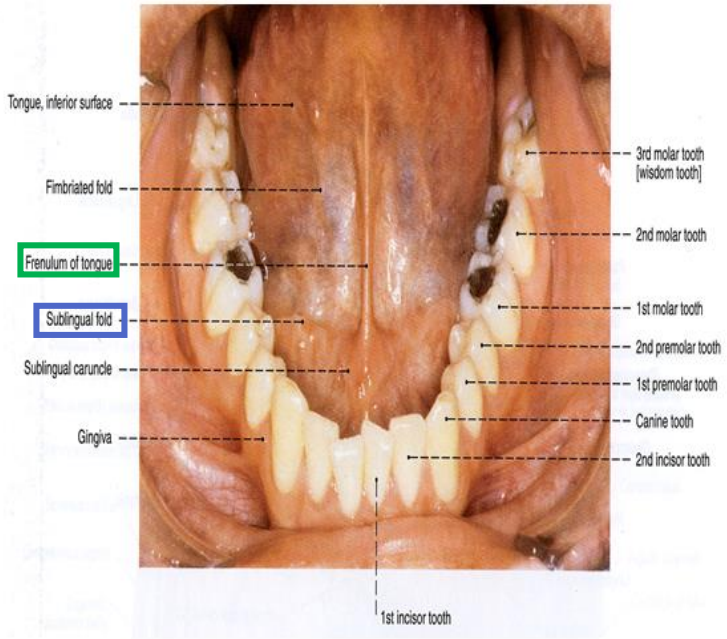


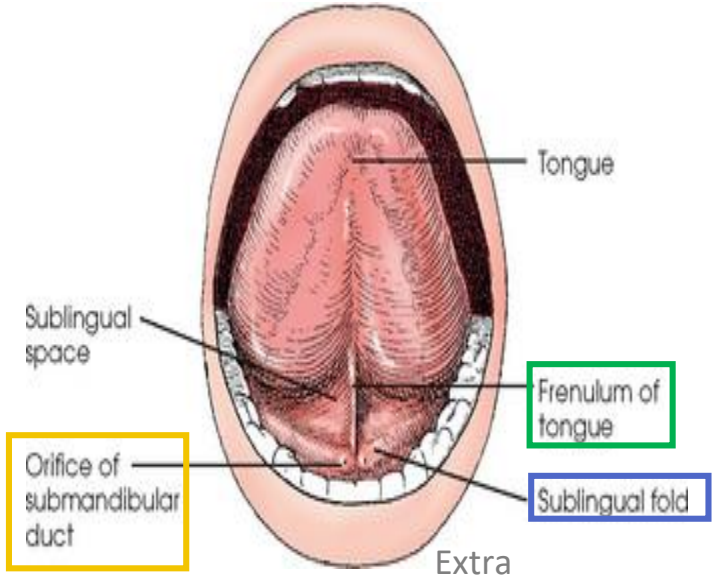


Oral Cavity

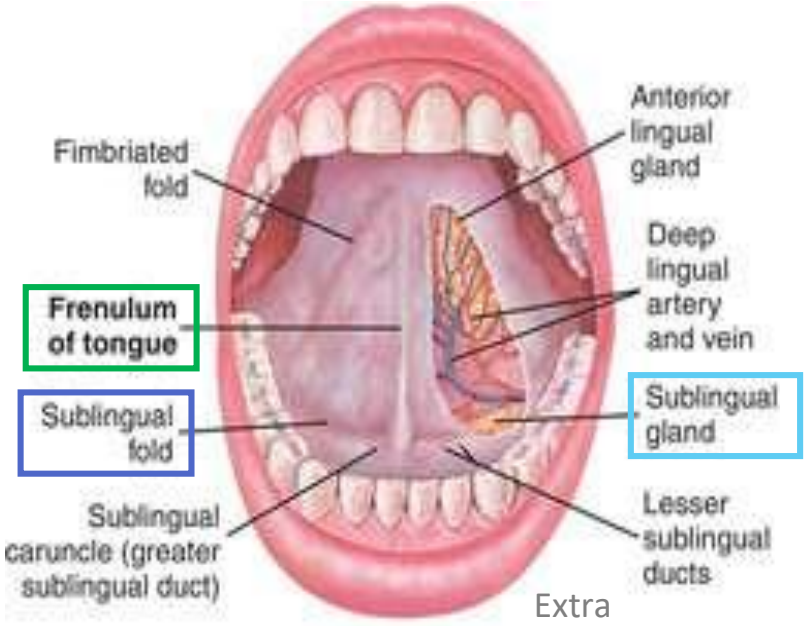
Under Surface Of The Tongue:

1. **Frenulum lingulae** in the midline. It connects the under surface of the tongue to the floor of the mouth.
2. **Orifice of the Submandibular Duct*** opens on each side of the frenulum.
3. **Sublingual Fold** (formed by the underlying **sublingual salivary gland***).





Extra

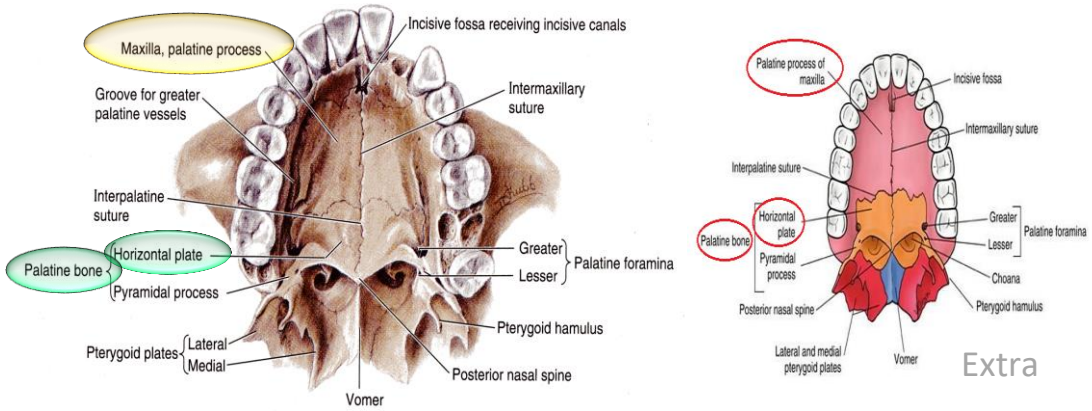
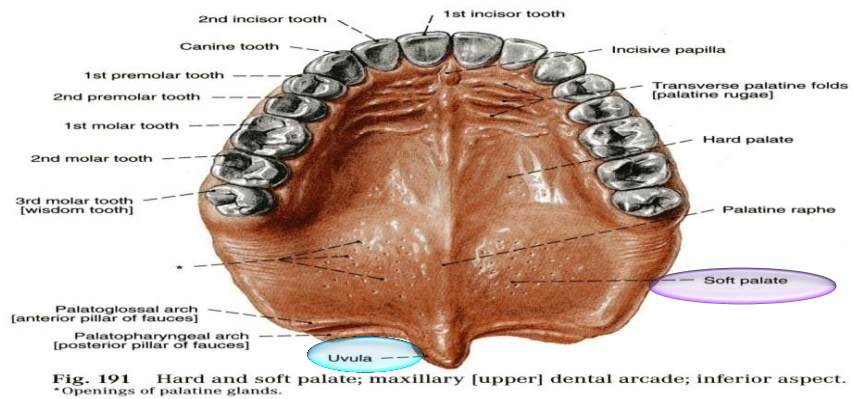


Extra

*we will discuss the salivary glands in more detail in the next lecture.

Oral Cavity

- The Palate forms the roof of the mouth and it is divided into two parts:
  The **Hard** (Bony) palate *in front* & The **Soft** palate *behind*.

The Hard Palate	The Soft Palate
	 Fig. 191 Hard and soft palate; maxillary [upper] dental arcade; inferior aspect. *Openings of palatine glands.
• The hard palate is formed by (4 bones): 2 Palatine processes of the maxillae 2 Horizontal plates of palatine bones posteriorly. • It is Bounded Laterally by the alveolar arches of the maxilla. • Behind it is continuous with the soft palate. • The hard palate forms the floor of the nasal cavities.	• It is a mobile fold formed of a bag of mucous membrane filled with striated muscles. • It is attached to the posterior border of the hard palate. • Its free posterior border is a conical projection called the uvula. The tongue is composed of two parts 1) oral (palatine) part forms the anterior two thirds 2) pharyngeal part forms the posterior one third.

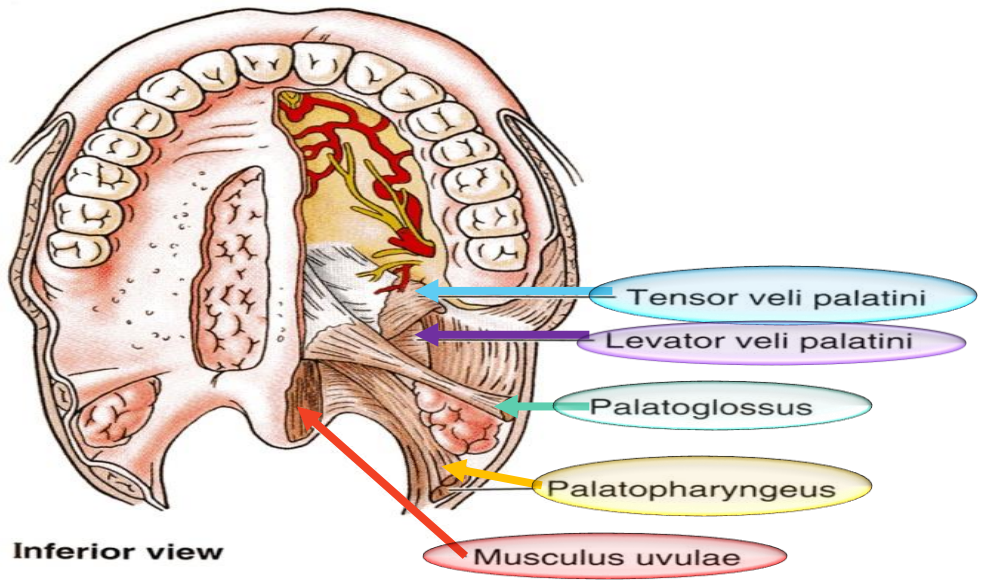
Oral Cavity

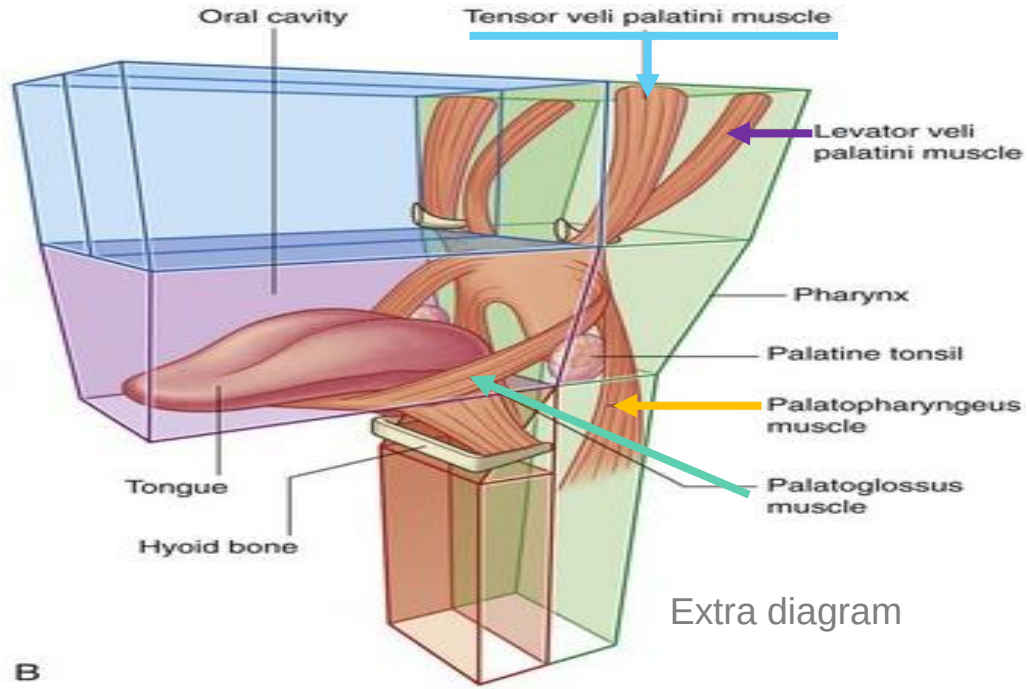
Soft Palate (Muscles)

Five pairs (one on each side) of muscles:

1. Tensor veli palatini*	• Tenses the soft palate
2. Levator veli palatini*	• Elevates the soft palate
3. Palatoglossus	• Pulls palatoglossal fold toward midline
4. Palatopharyngeus	• Moves palatopharyngeal fold toward midline
5. Musculus uvulae	• Elevates uvula

*A shorter name:
Tensor palatine
Levator palatine



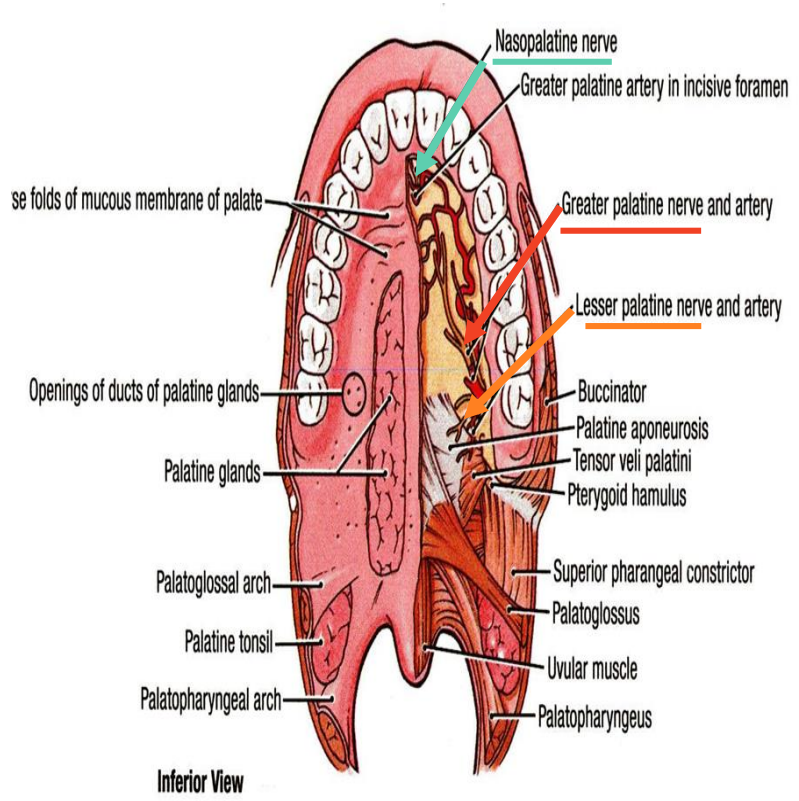


Extra diagram

Oral Cavity

Soft Palate (Innervation)

Motor	Sensory
• All muscles of the palate are supplied by **pharyngeal plexus*** of nerves EXCEPT **tensor veli palatini** (by mandibular nerve).	1. Maxillary nerve through: • Greater **palatine** nerve • Lesser **palatine** nerve • Naso**palatine** nerve
• Motor innervation of soft palate can be tested by saying 'Ah', normally soft palate rises upward and the uvula moves backward in the middle line.	2. Glossopharyngeal nerve.



*__pharyngeal plexus__: made up from cranial nerves 9, 10, cranial part of 11, and superior cervical sympathetic ganglion.

- Motor part: from 10 and cranial part of 11
- Sensory part: from 9
- Sympathetic part: from superior cervical sympathetic ganglion

Oral Cavity

Soft Palate (Movement)

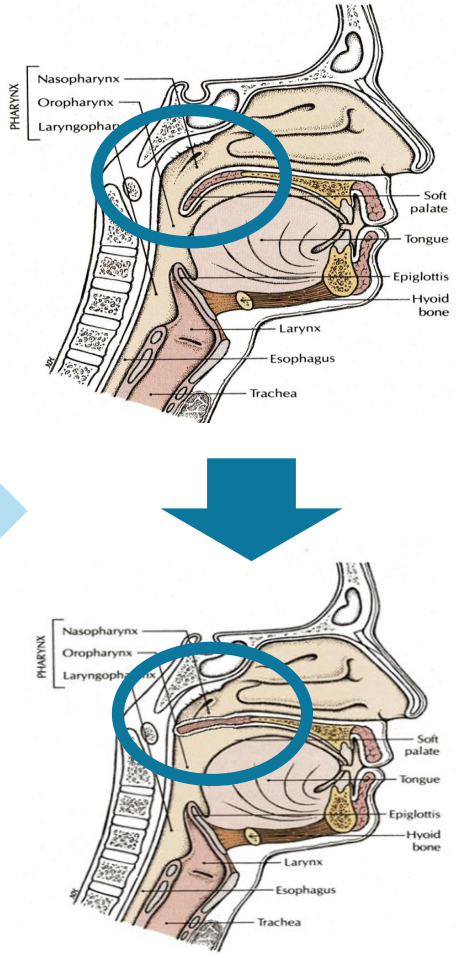
*Different form the oropharyngeal isthmus.

- Pharyngeal isthmus*: (It is the communication between the **nasal** and **oral** parts of the pharynx).
- Closure occurs during:
  a) the production of explosive consonants in speech.
  b) swallowing.
- It is closed by raising the soft palate upward:

1. Soft palate is raised by the contraction of the **levator veli palatini** and **Palatopharyngeus**.

2. At the same time, the posterior wall of the pharynx is pulled forward (by superior constrictor).

3. The **palatopharyngeus muscles** on both sides also contract so that the palatopharyngeal arches are pulled medially, like side curtains.

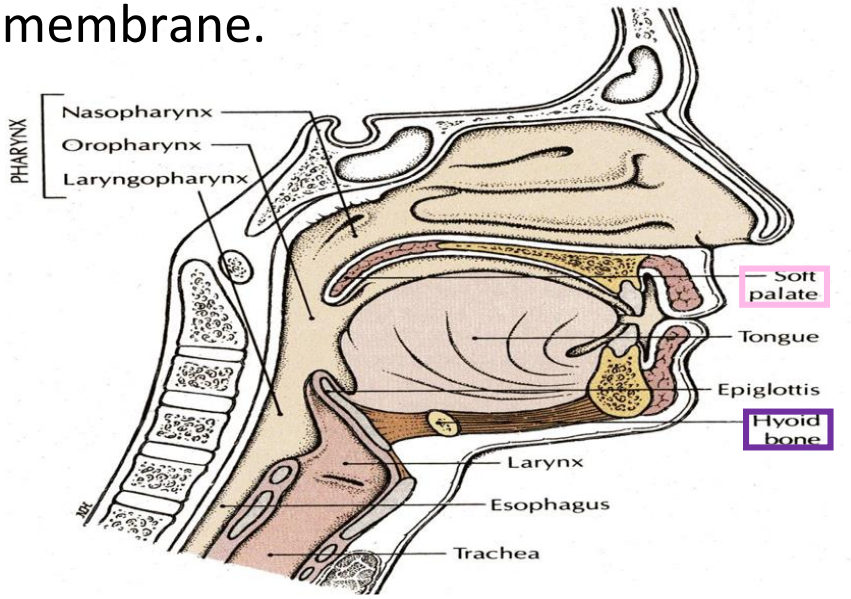


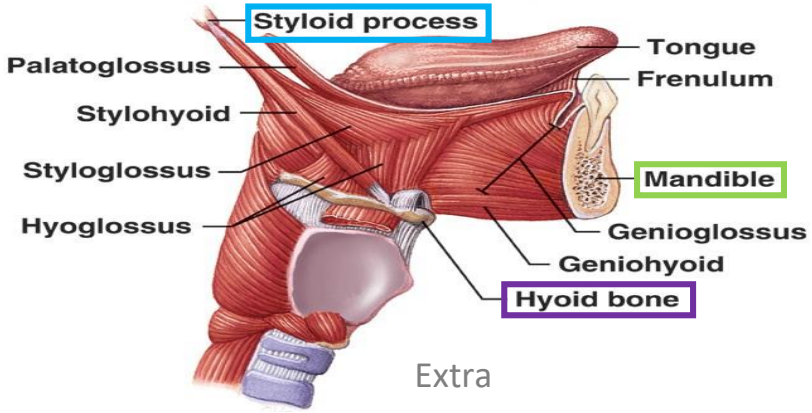
- By this means the nasal part of the pharynx is closed off from its oral part.

Oral Cavity

Tongue

- The tongue is a mass of striated muscle covered with mucous membrane.
  - Its **anterior 2/3** lies in the mouth (oral part).
  - Its **posterior 1/3** lies in the pharynx (pharyngeal part).
- It is attached by muscles:
  - Above to → styloid process & soft palate
  - Below to → mandible and hyoid bone
- The tongue is essential for several Important **Functions**:
  1. Normal articulation of the jaw,
  2. Manipulation of food,
  3. **Swallowing,**
  4. **Taste.**
  5. **Production of normal Speech**.





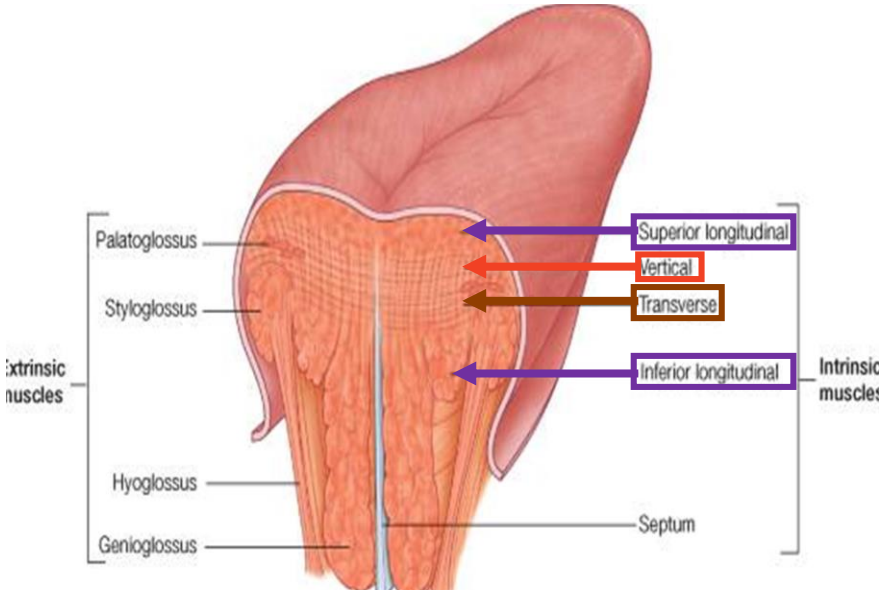
Extra

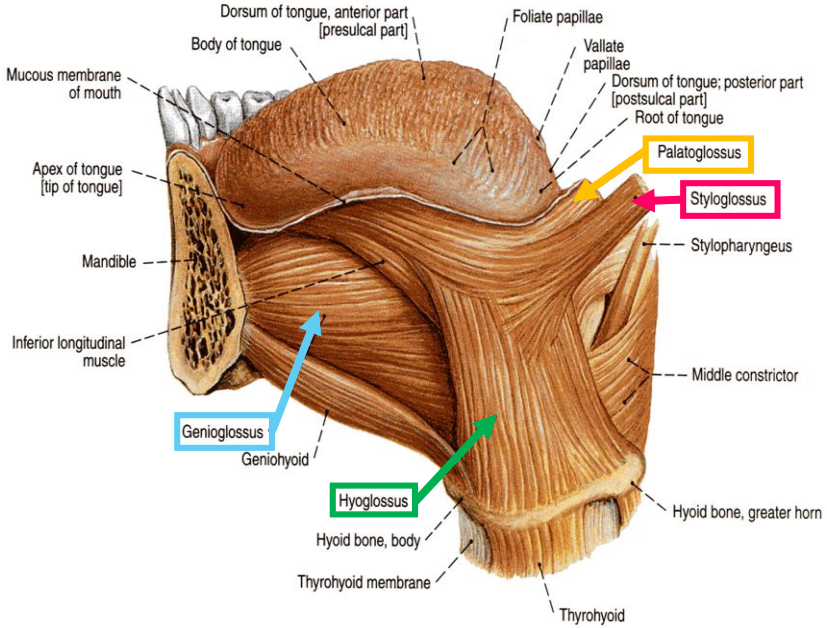
Oral Cavity

Tongue (Muscles)

Muscles of the tongue are divided into two types:

Intrinsic muscles	Extrinsic muscles
The intrinsic muscles are restricted to the tongue and are not attached to bone.	Attached to bones and the soft palate.
They consist of : • Longitudinal fibers (superior & inferior) • Transverse fibers • Vertical fibers	There are 4 pairs: • Palatoglossus (from the soft palate) • Styloglossus (from the styloid process) • Genioglossus (from the mandible) • Hyoglossus (from the hyoid bone)
Action: Alter the shape of the tongue while it lies in the mouth cavity.	Action: protrude, retract, depress, and elevate the tongue.

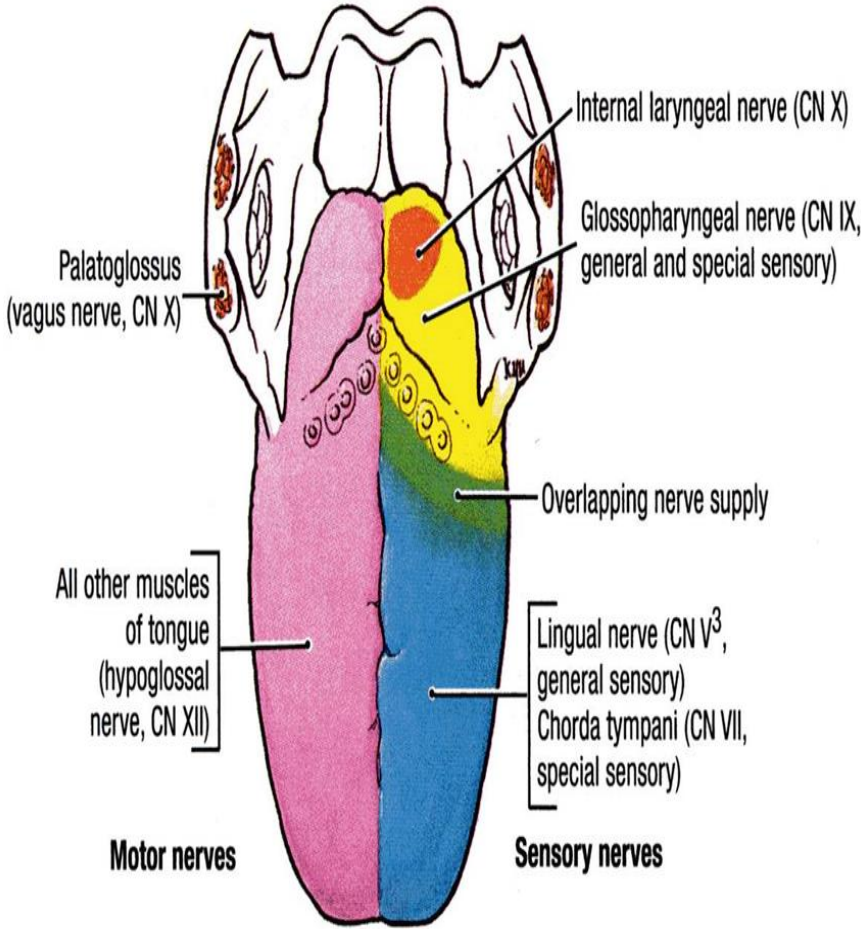




Oral Cavity

Tongue (Innervation)

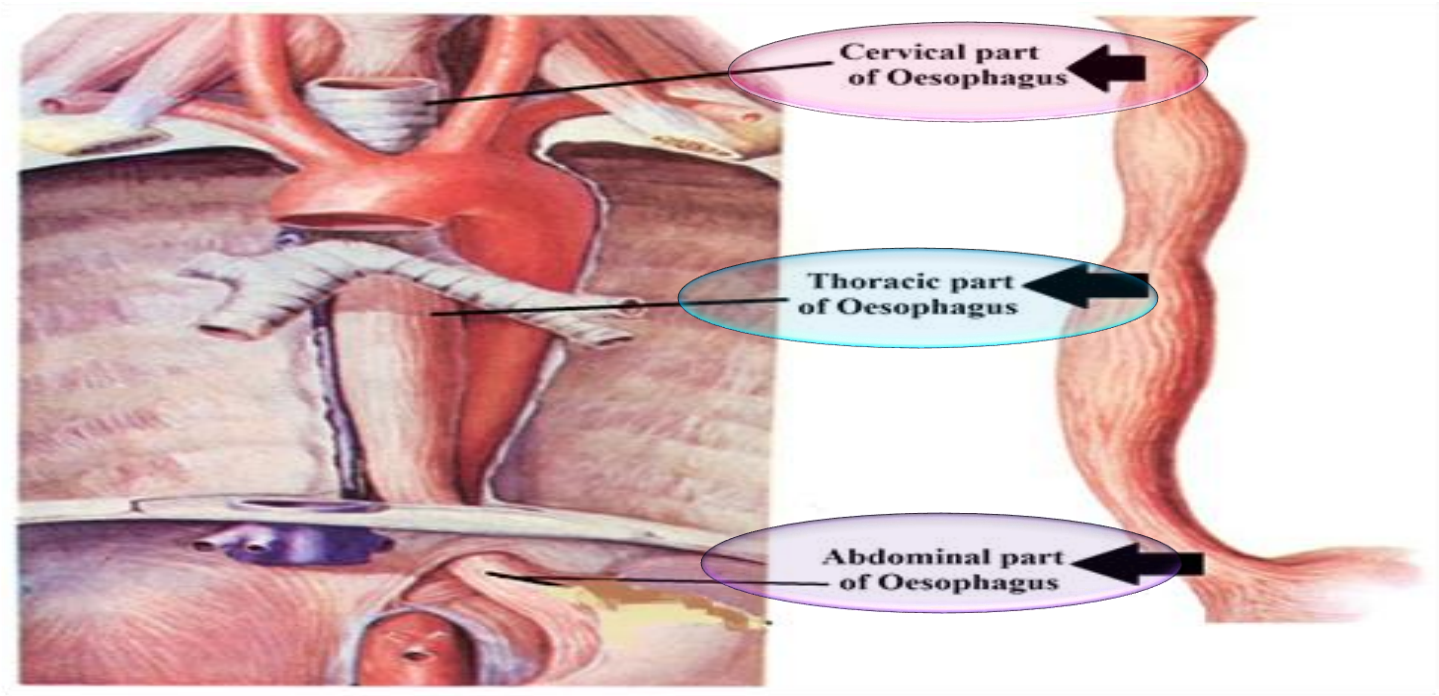
Motor	Sensory
• All muscles of the tongue are supplied by the **Hypoglossal** nerve. • EXCEPT **Palatoglossus** which is supplied by the **Pharyngeal plexus**.	1. Anterior 2/3: a) **General sensations**: **Lingual nerve** (from trigeminal). b) **Taste:** through Chorda Tympani of the **Facial nerve**, EXCEPT the vallate papillae. 2. Posterior 1/3: (including the vallate papillae): • **General & taste sensations: Glossopharyngeal nerve**. 3. Root of the tongue and Epiglottis: • **General & taste** sensations are carried by the **Vagus nerve**.



Esophagus

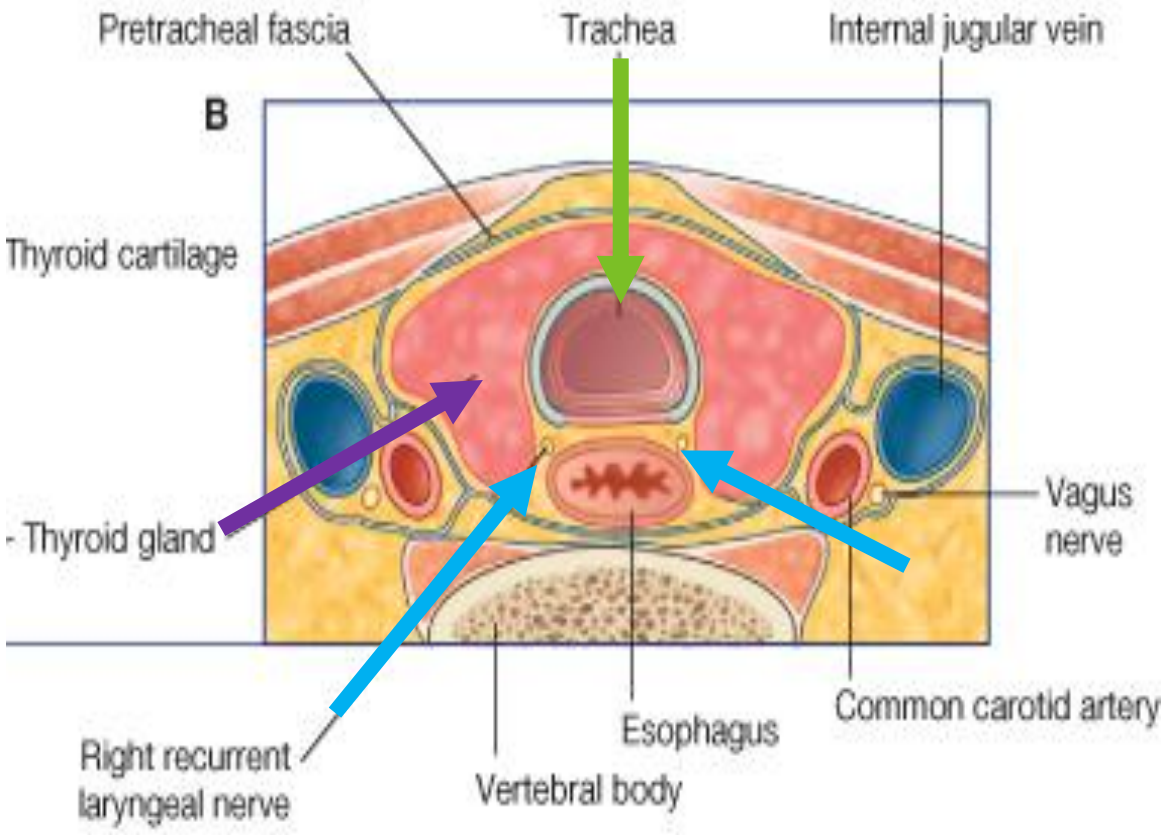
- It is a tubular structure about 25 cm long.
- It begins as the continuation of the pharynx at the level of the **6th** cervical vertebra.
- It pierces the diaphragm at the level of the **10th** thoracic vertebra to join the stomach.
- It terminates at the level of **11TH** thoracic vertebra

- **It is formed of 3 parts:**
  1. Cervical
  2. Thoracic
  3. Abdominal

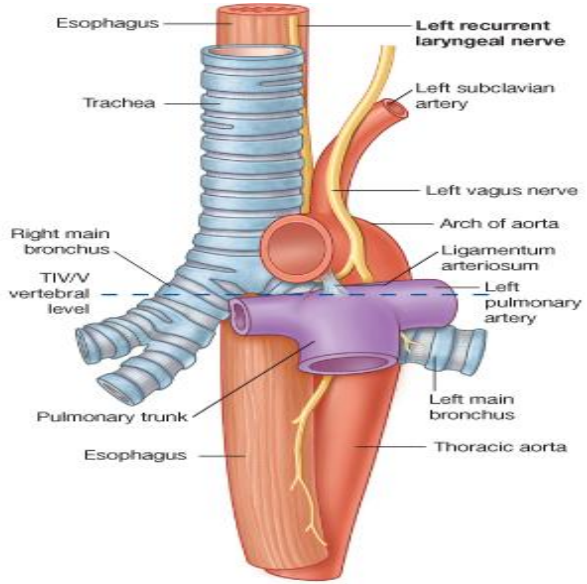


Esophagus
I. Cervical Part

Relations	
Anterior	• Trachea • Recurrent laryngeal nerves
Laterally	• Lobes of the thyroid gland.
Posterior	• Vertebral column.



Esophagus
II. Thoracic Part

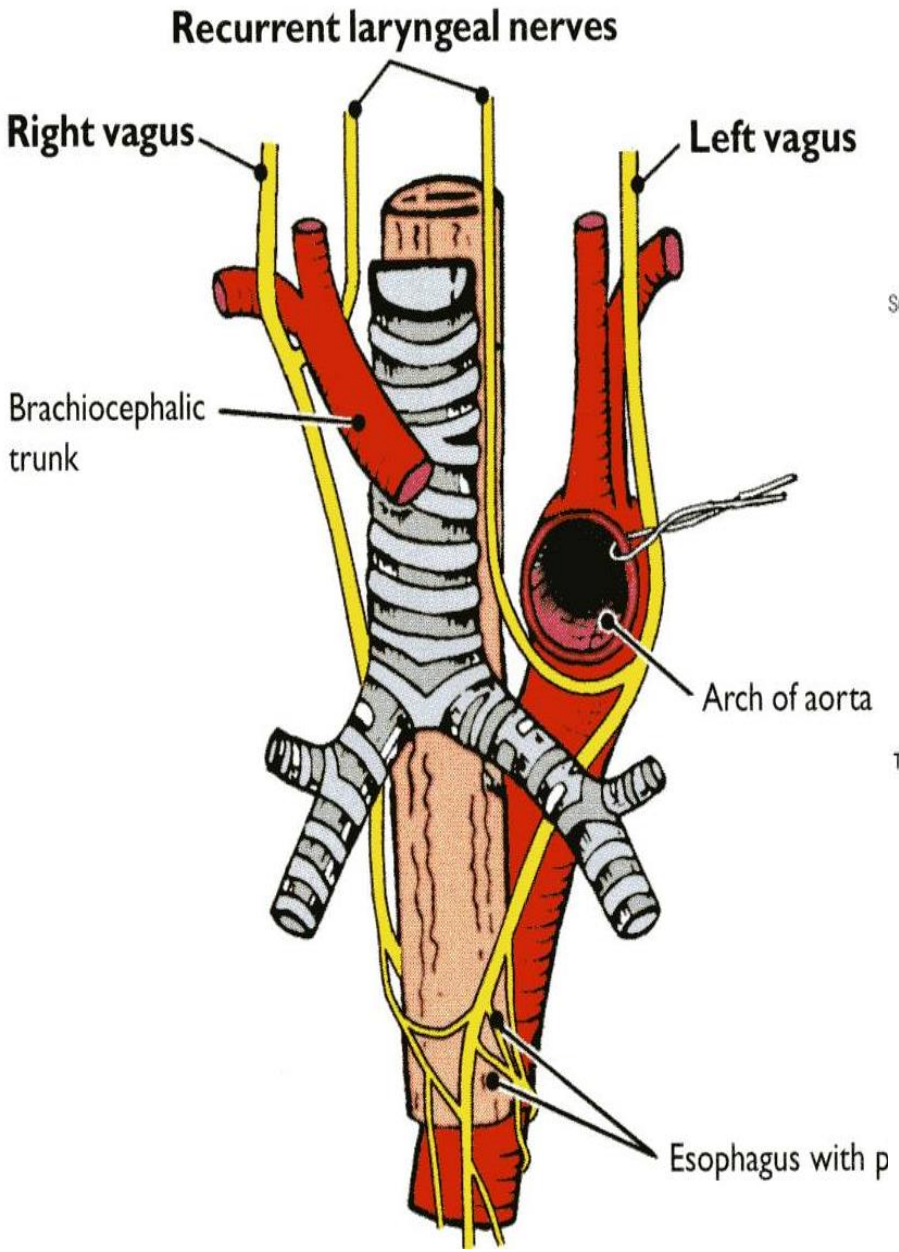


- In the thorax, it passes downward and to the **left** through superior and then to posterior mediastinum
- At the level of the **sternal angle** (T4), the **aortic arch** and **left main bronchus** push the esophagus again to **the midline.**
- **Relations:**

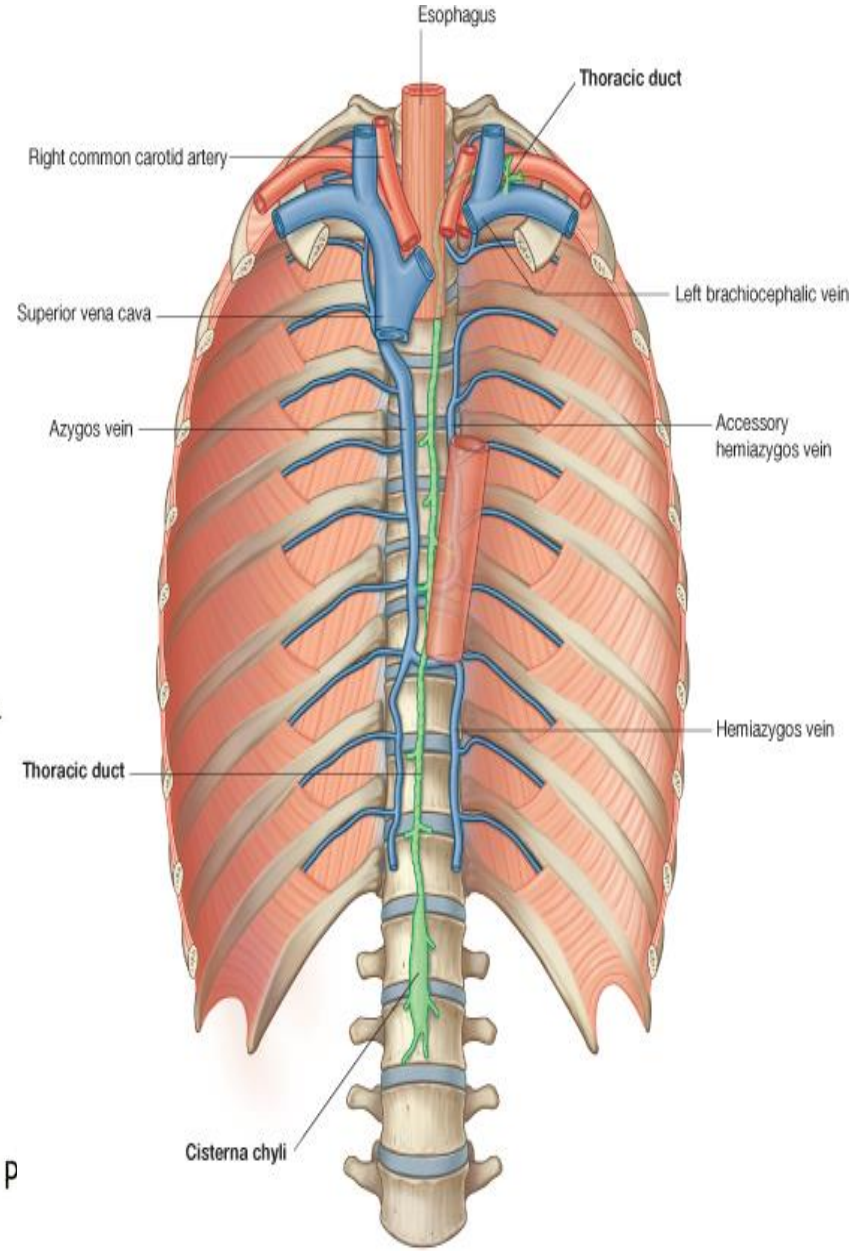
Anterior	Posterior	Lateral	
		Right Side	Left Side
• Trachea. • **Left** recurrent laryngeal nerve. • **Left** principal bronchus. • Pericardium. • **Left** atrium.	• Bodies of the thoracic vertebrae. • Thoracic duct. • Azygos vein. • **Right** posterior intercostal arteries. • Descending thoracic aorta (at the lower end).	• **Right** pleura. • Terminal part of the azygos vein.	• **Left** pleura. • **Left** subclavian artery. • Aortic arch. • Thoracic duct.

remember that both recurrent laryngeal nerves are found in the cervical portion of the esophagus, while only the left recurrent laryngeal is found in the thoracic part of the esophagus

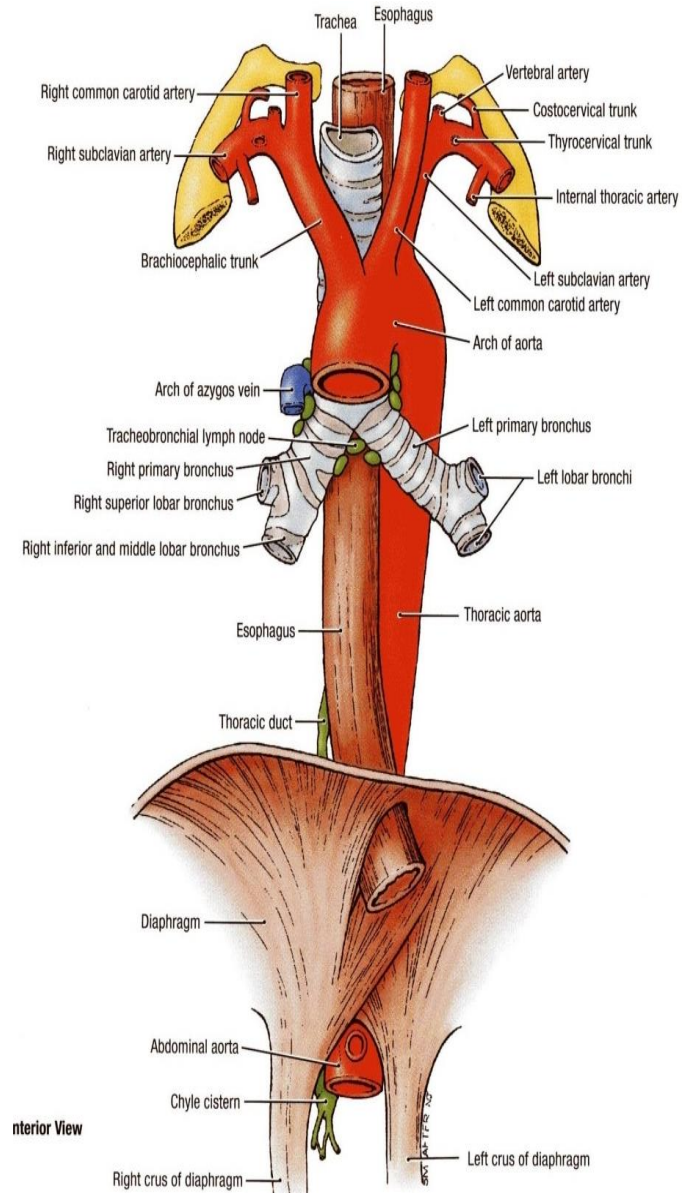
ANTERIOR



POSTERIOR



LATERAL

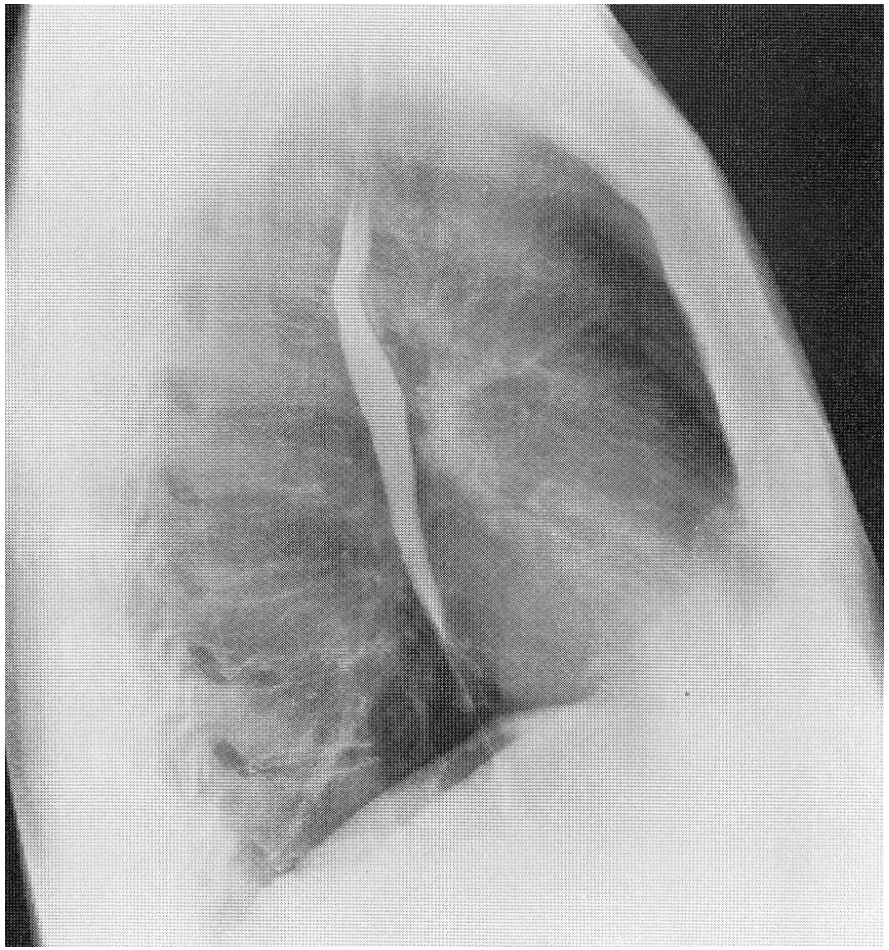


Esophagus
Left Atrium

- There is a close relationship between the left atrium of the heart and the esophagus.

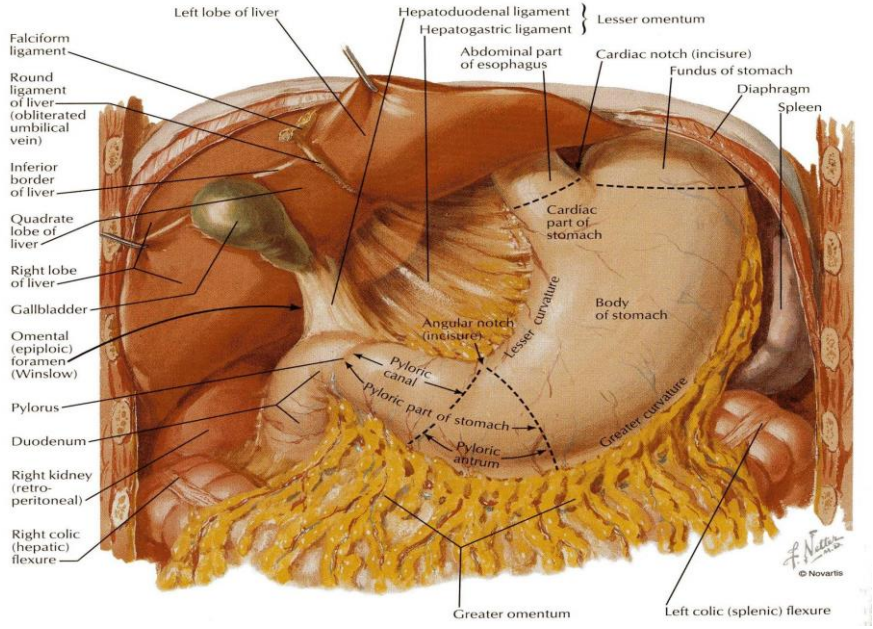
- **What is the clinical application?**

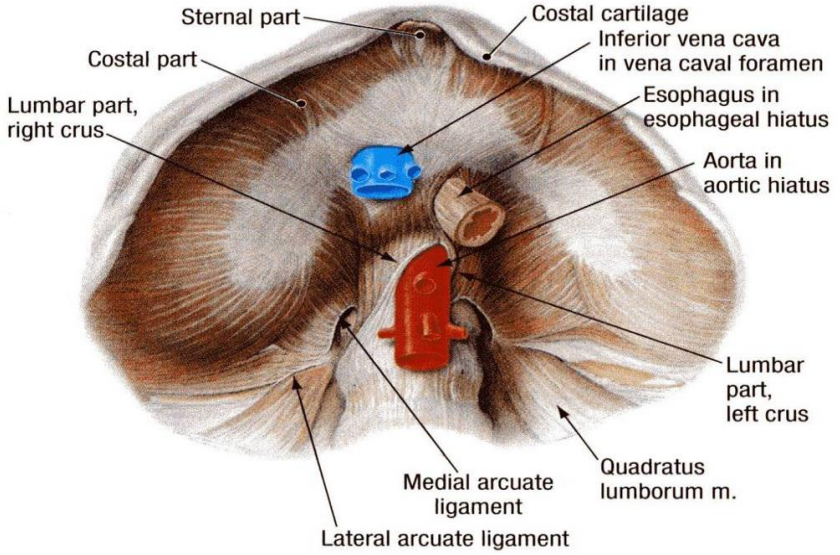
- A *barium swallow* will help the physician to **assess the size of the left atrium, (Dilation)** as in case of a heart failure, or long standing mitral stenosis.



Esophagus
III. Abdominal Part

- In the abdomen, the esophagus descends for 1.3 cm and joins the stomach.
- Relations:
  - **Anteriorly**, it is related to the left lobe of the liver.
  - **Posteriorly**, it is related to the left crus of the diaphragm.
- Fibers from the right crus of the diaphragm form a sling around the esophagus.
- At the opening of the diaphragm, the esophagus is accompanied by:
  1. The two vagi
  2. Branches of the left gastric vessels
  3. Lymphatic vessels.





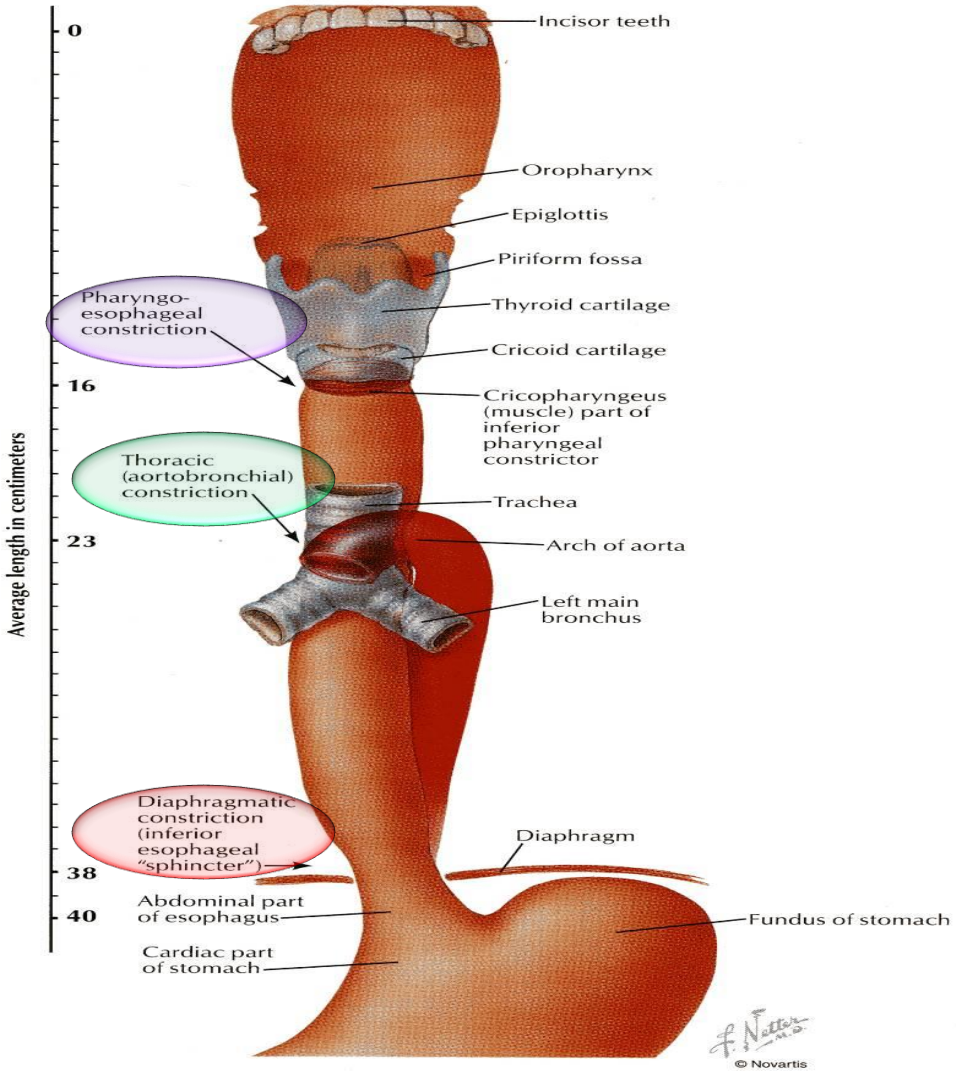
Esophagus
Constriction

The esophagus has **3** anatomic constrictions.

- The first (pharyngo-esophageal) is at the junction with the pharynx.
- The second (aortobronchial) is at the crossing with the aortic arch and the left main bronchus.
- The third (diaphragmatic) is at the junction with the stomach.

They have a considerable clinical importance.

Why? explained on next slide

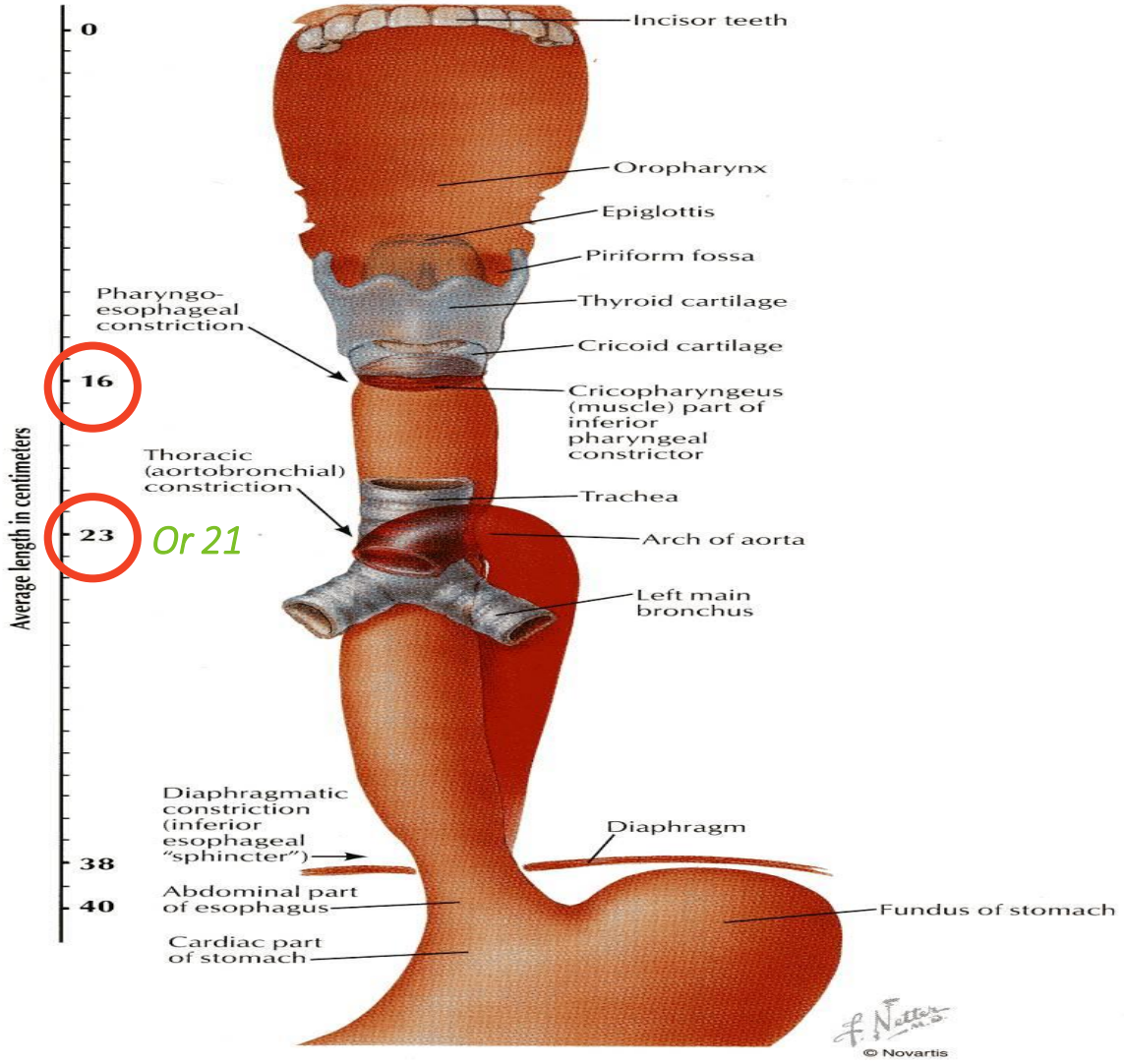


Esophagus
Strictures

1. They may cause difficulties in passing an *esophagoscope.*
2. In case of swallowing of caustic liquids (mostly in children), this is where the burning is the worst and **strictures** develop.
3. The esophageal strictures are a common place of the development of **esophageal carcinoma.**

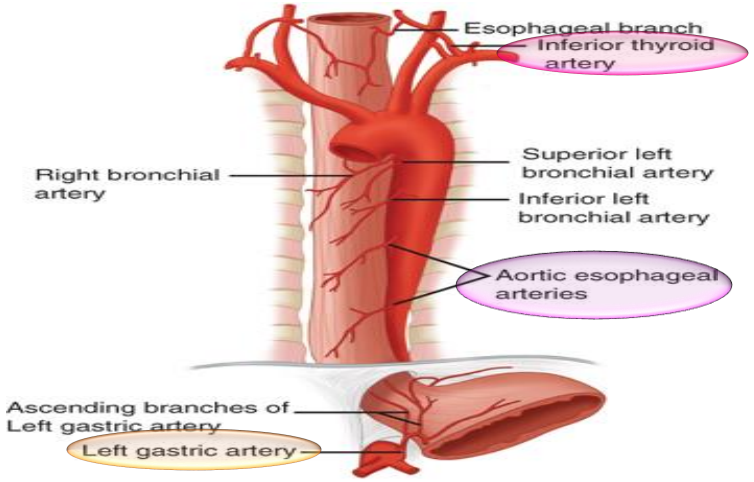
In this picture what is the importance of the scale?

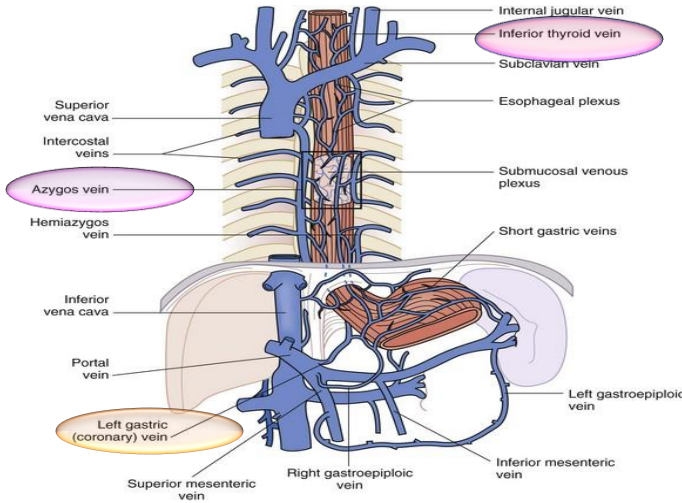
Ans: to know where and when you have resistance on passing esophagoscope.

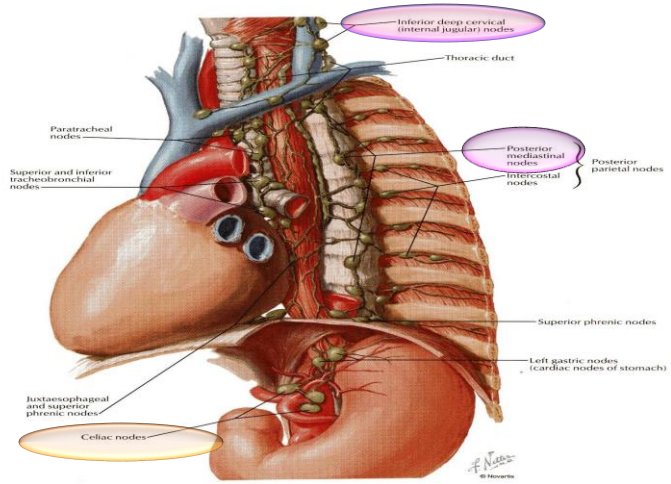


Esophagus
Supply

Part	*Arterial supply*	*Venous Drainage*	*Lymphatic Drainage*
Upper third	**inferior thyroid** artery	**inferior thyroid** veins	**deep cervical** nodes
Middle third	**thoracic aorta**	**azygos** veins	**superior** and **inferior mediastinal** nodes
Lower third	**left gastric** artery	**left gastric** vein (tributary of the portal vein)	**celiac** lymph nodes (in the abdomen)

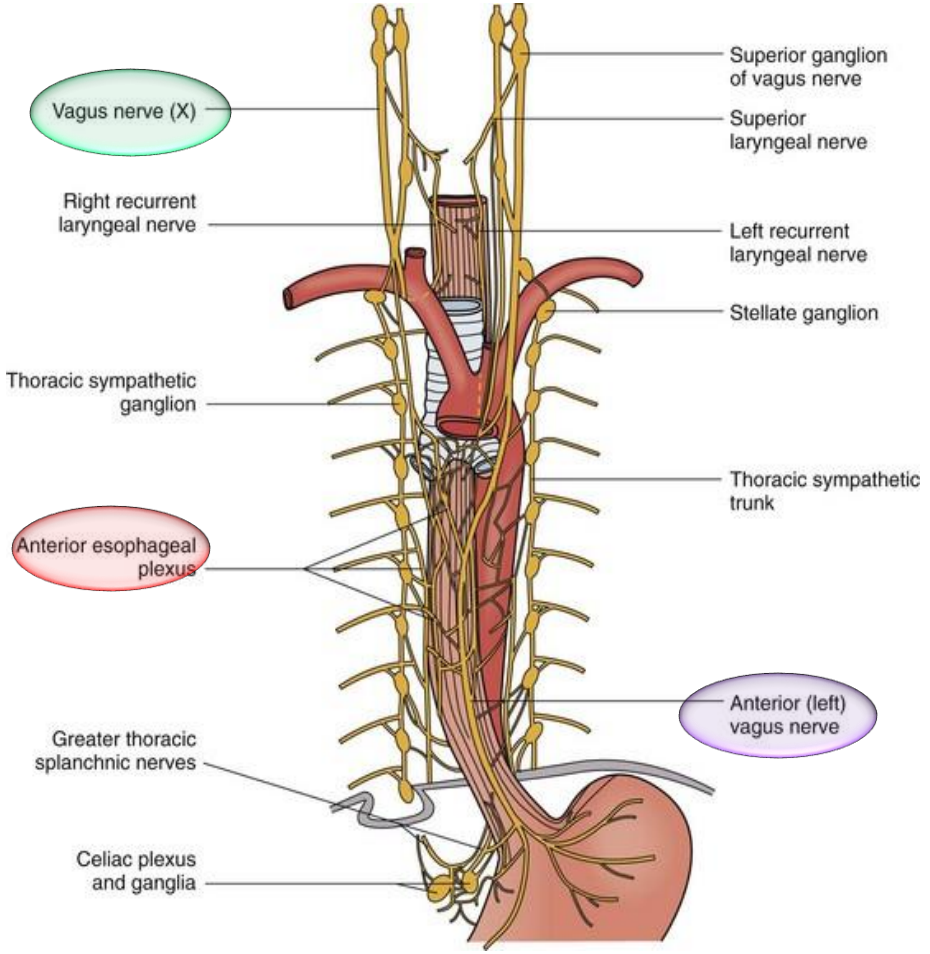






Esophagus
Supply

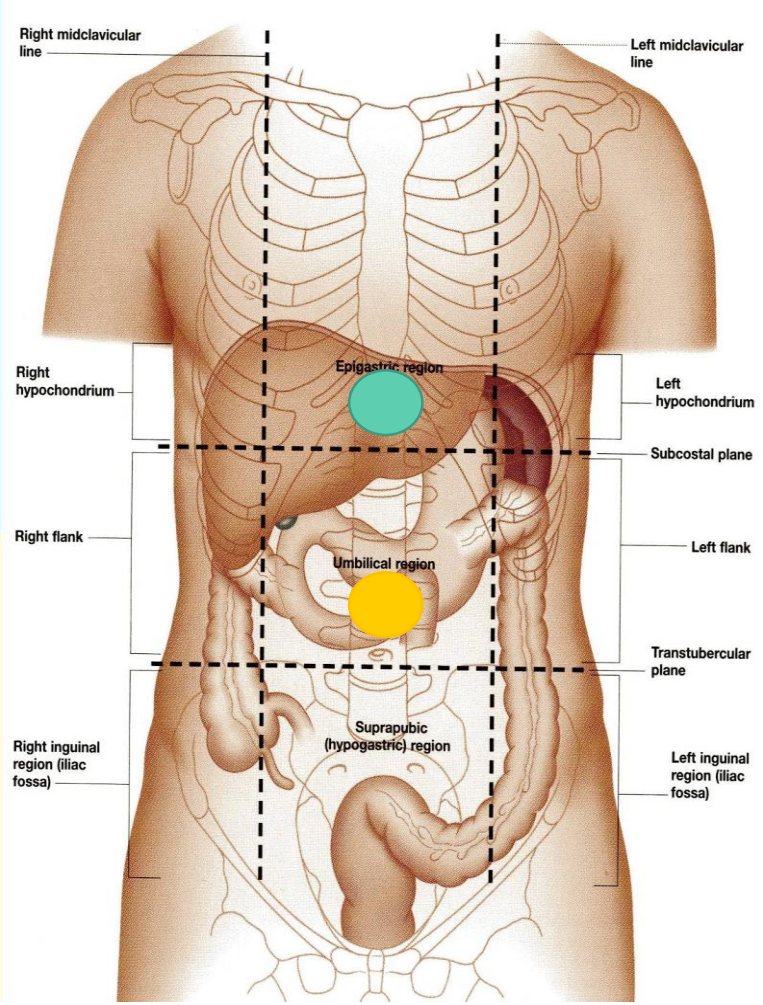
Sympathetic	Parasympathetic
• It is supplied by sympathetic fibers from the **sympathetic trunks**.	• The parasympathetic supply comes form the **vagus** nerves. • Inferior to the roots of the lungs, the vagus nerves join the sympathetic nerves to form the esophageal plexus. • The **left vagus** lies anterior to the esophagus. • The **right vagus** lies posterior to it.

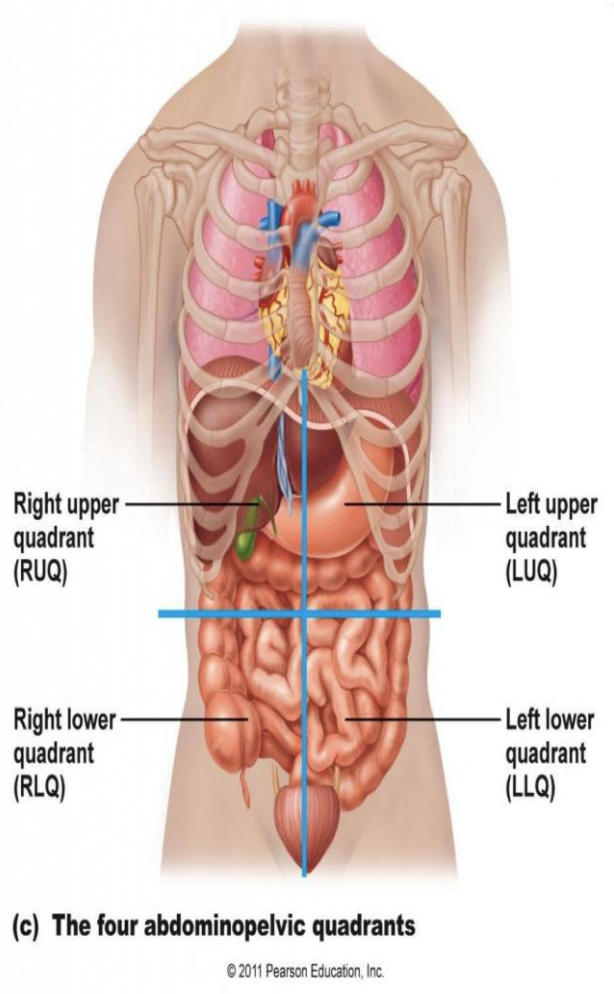


Stomach

Location :

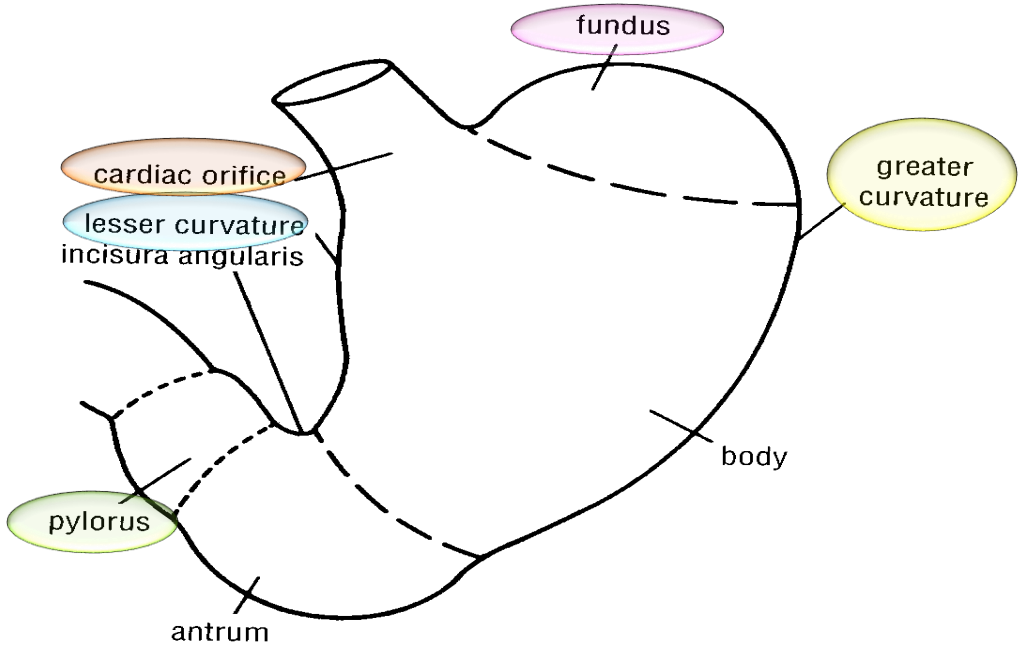
- The stomach is a dilated part of the **alimentary canal**.
- It is located in the **upper part** of the abdomen
- It extends from beneath the left costal region into the **epigastric** and **umbilical** regions.
- Much of the stomach is protected by the lower ribs.
- It is roughly J-shaped.

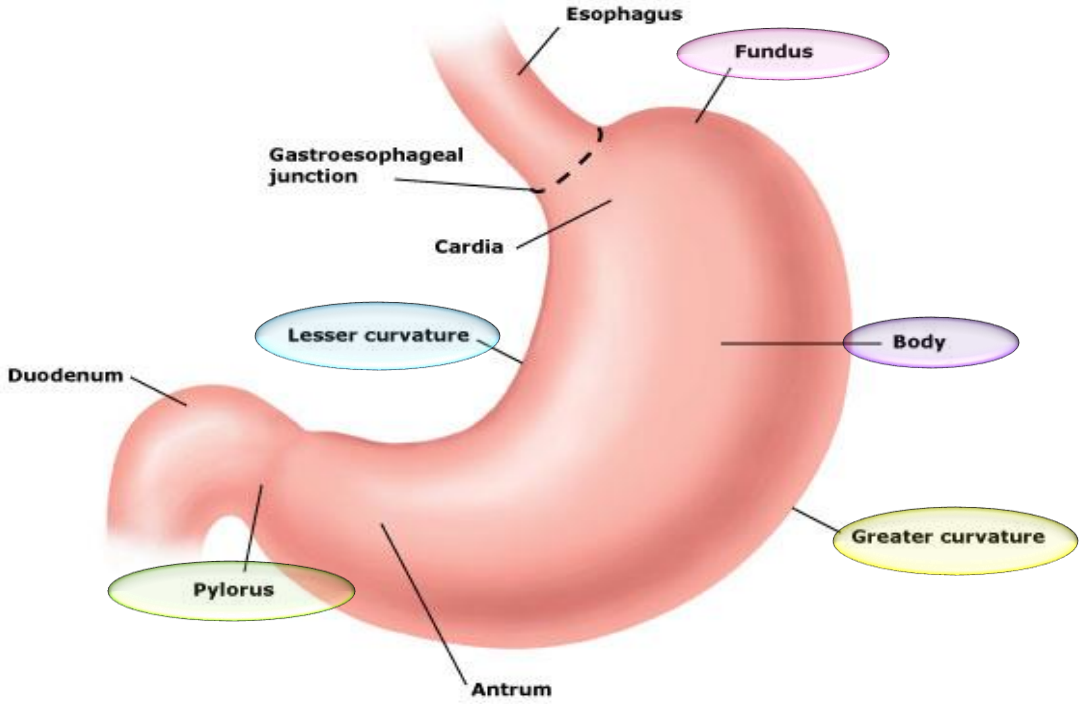




Stomach
Parts

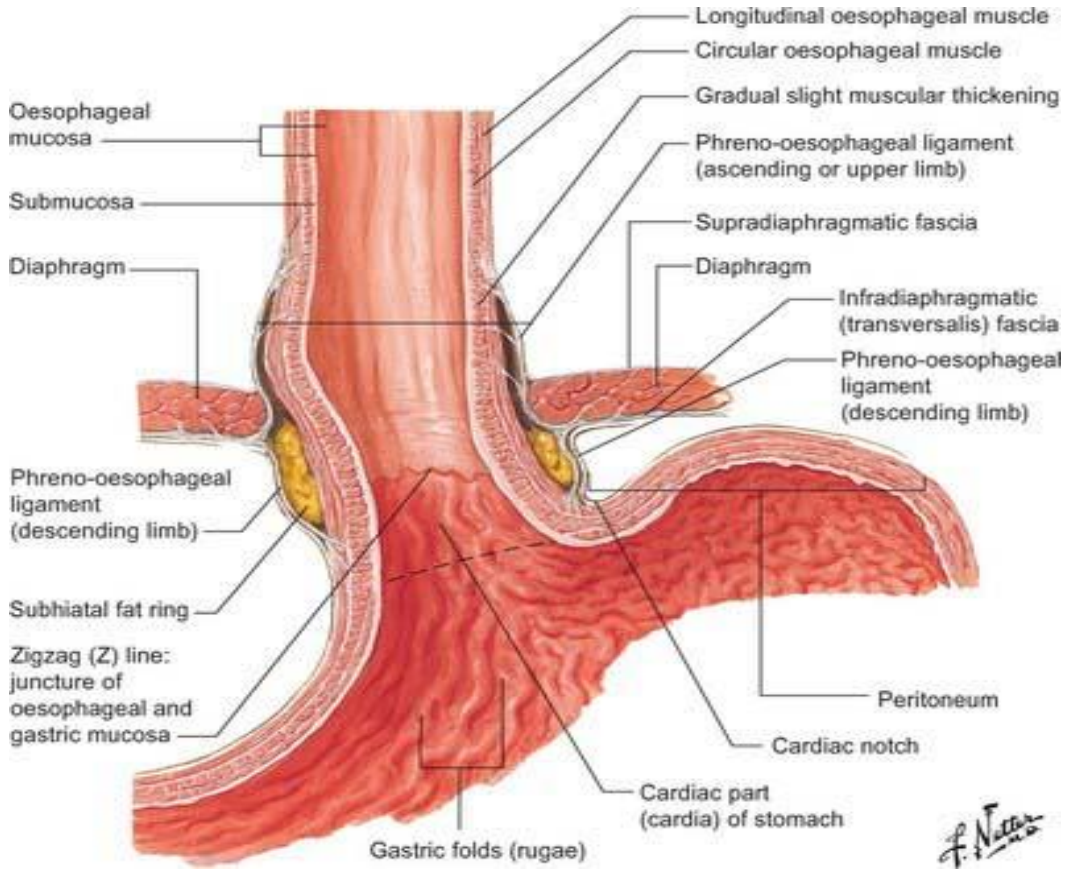
2 orifices	Cardiac orifice.
	Pyloric orifice
2 borders	Lesser curvature
	Greater curvature
2 surfaces	Anterior surface
	Posterior surface
3 parts	Fundus
	Body
	Pylorus
Pylorus is formed of 3 parts	Pyloric antrum
	Pyloric canal
	Pyloric sphincter





Stomach
Cardiac Orifice

- It is the site of the **gastro- esophageal sphincter.**
- It is a physiological sphincter rather than an anatomical sphincter.
- Consists of **circular layer** of smooth muscle (under vagal and hormonal control).
- Lies opposite **left seventh costal cartilage** 2.5 cm from the sternum **T10.**
- Function: Prevents esophageal regurgitation (reflux) حرقان.

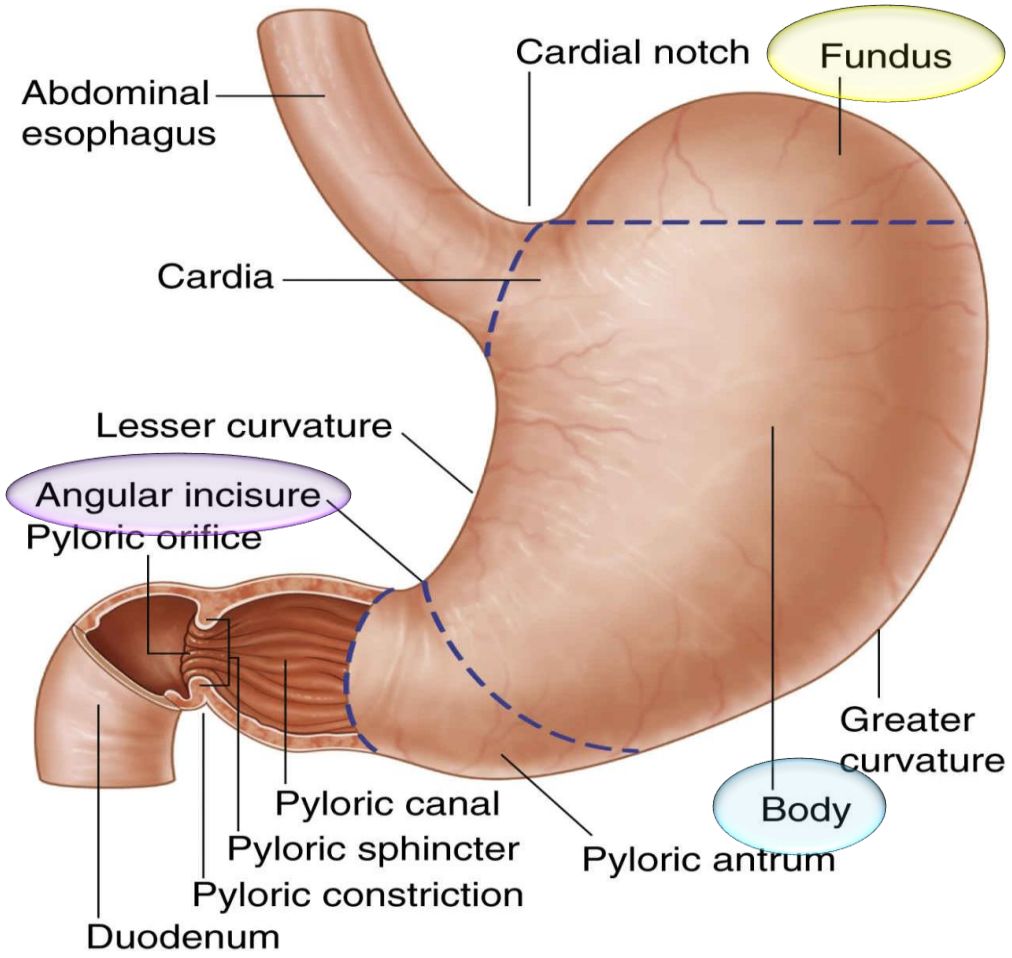


Stomach

Fundus

- *Dome-shaped.*
- Located to the left of the cardiac orifice.
- Usually full of gazes.
- It reaches to the left **fifth** intercostal space a little below the apex of the heart.

the fundus of the stomach is separated from the heart by the diaphragm



Body

- Extends from:
  – The level of the fundus, to
  – The level of **Incisura angularis**.
  (This is a constant notch on the lesser curvature)

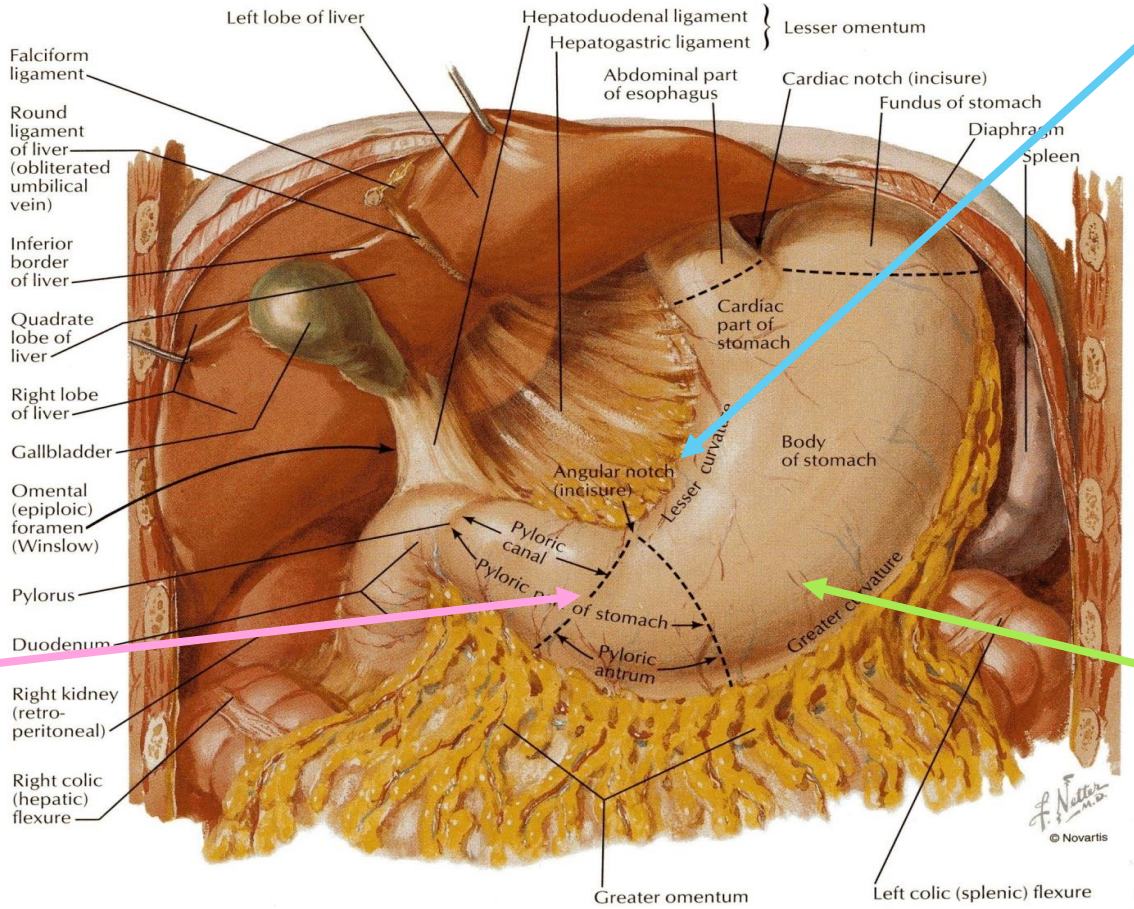
Stomach

Pyloric antrum

- The pyloric antrum extends from Incisura angularis to the pylorus.

Pylorus

- The pylorus is a tubular part of the stomach.
- It lies in the transpyloric plane (L1), 1 cm. to the right of the middle line.
- It has a thick muscular end called **pyloric sphincter.**
- The cavity of the pylorus is the **pyloric canal.**



Lesser curvature

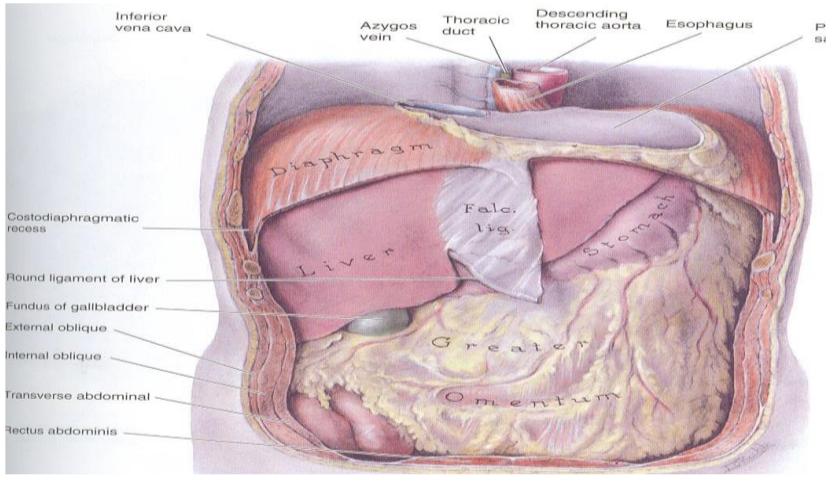
- Forms the <u>right border</u> of the stomach.
- Extends from the cardiac orifice to the pylorus.
- Attached to the liver by the lesser omentum, (gasrtohepatic ligament)

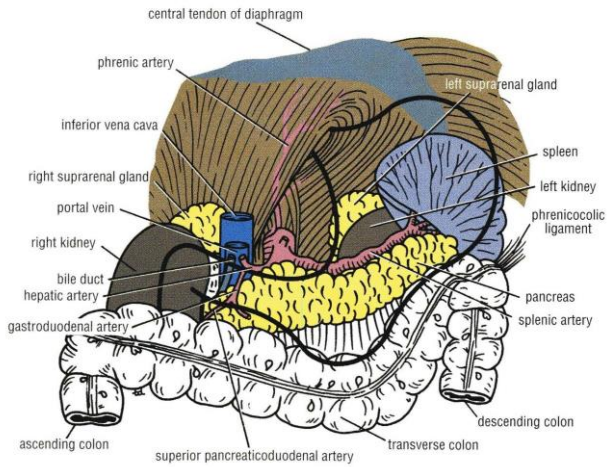
Greater curvature

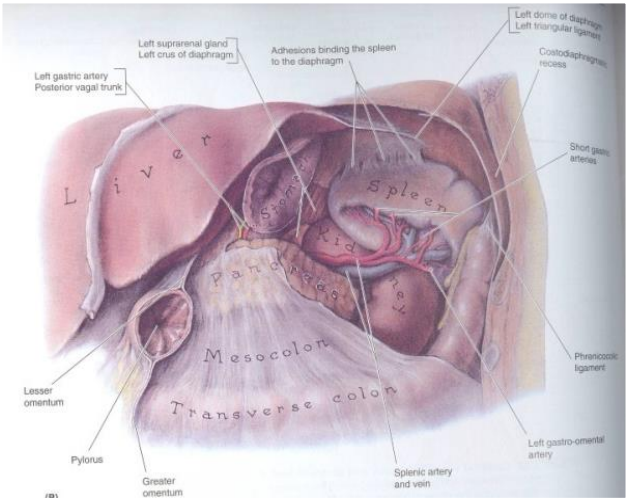
- Forms the <u>left border</u> of the stomach.
- Extends from the cardiac orifice to the pylorus.
- Its upper part is attached to the spleen by **gastrosplenic ligament.**
- Its lower part is attached to the transverse colon by the greater omentum.

Stomach
Relations

Anterior	Posterior (stomach bed)
1. Anterior abdominal wall. 2. Left costal margin. 3. Left pleura & lung. 4. Diaphragm. 5. Left lobe of the liver.	1. Left crus of diaphragm 2. Left suprarenal gland 3. Part of left kidney 4. Spleen 5. Splenic artery 6. Pancreas 7. Transverse mesocolon 8. Transverse colon 9. Lesser sac • All these structures form **the stomach bed.** • All are separated from the stomach by **peritoneum of lesser sac** except the **spleen** by greater sac.

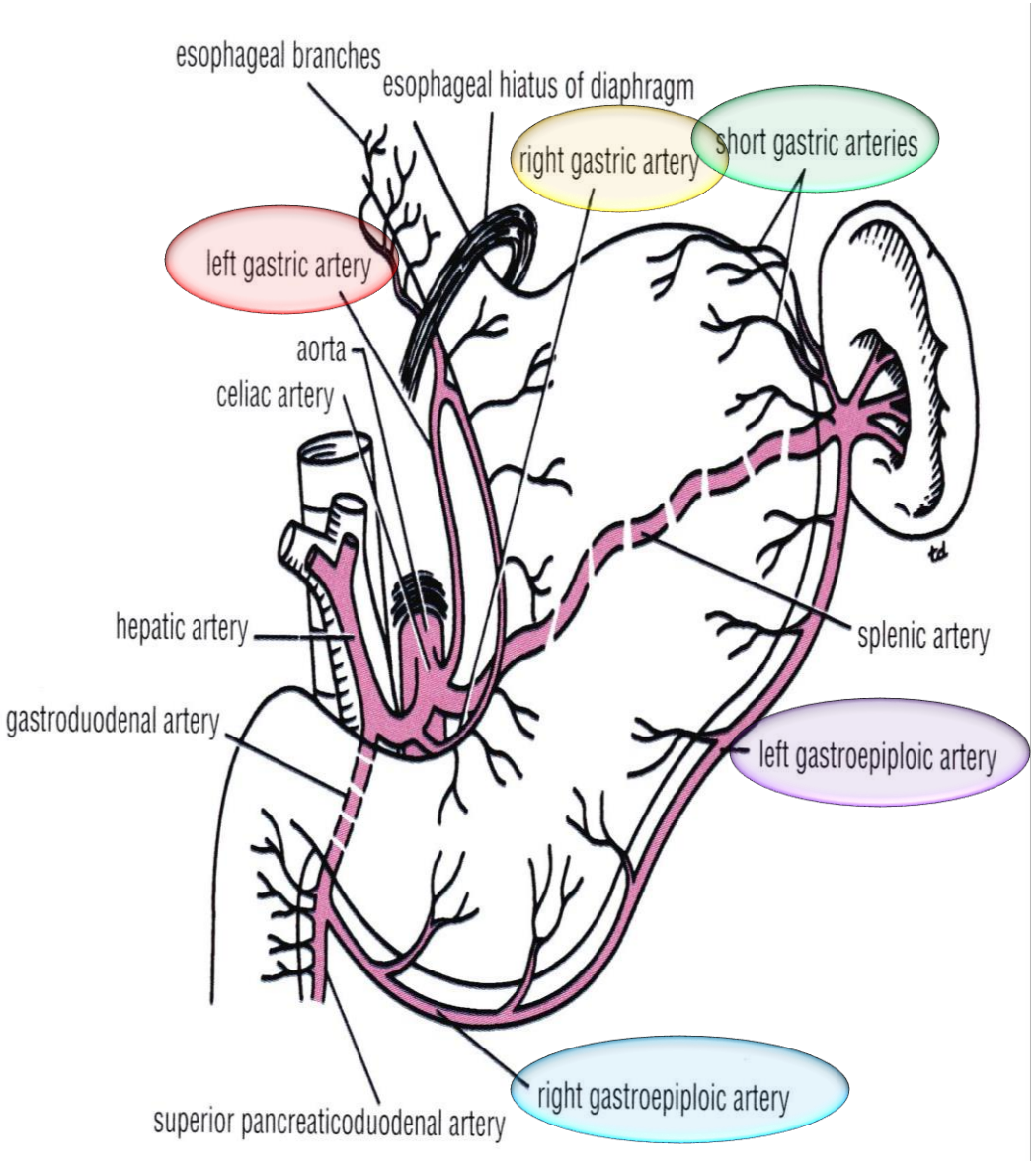






Stomach
Supply (Arterial)

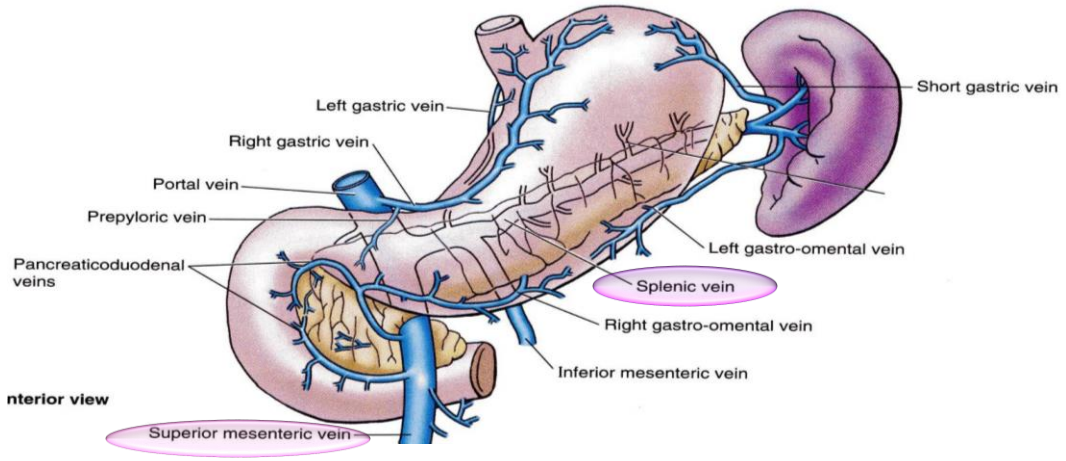
1- Left gastric artery	branch of celiac artery 1st branch of Abdominal Aorta	Runs along the lesser curvature.
2- Right gastric artery	a branch of hepatic artery of celiac	Runs to the left along the lesser curvature
3- Short gastric arteries	a branch of splenic artery	Pass in the **gastrosplenic ligament**.
4- Left gastroepiploic artery	a branch of splenic artery	Pass in the **gastrosplenic ligament**.
5- Right gastroepiploic artery	a branch of gastroduodenal artery of hepatic	Passes to the left along the greater curvature.



Stomach
Supply

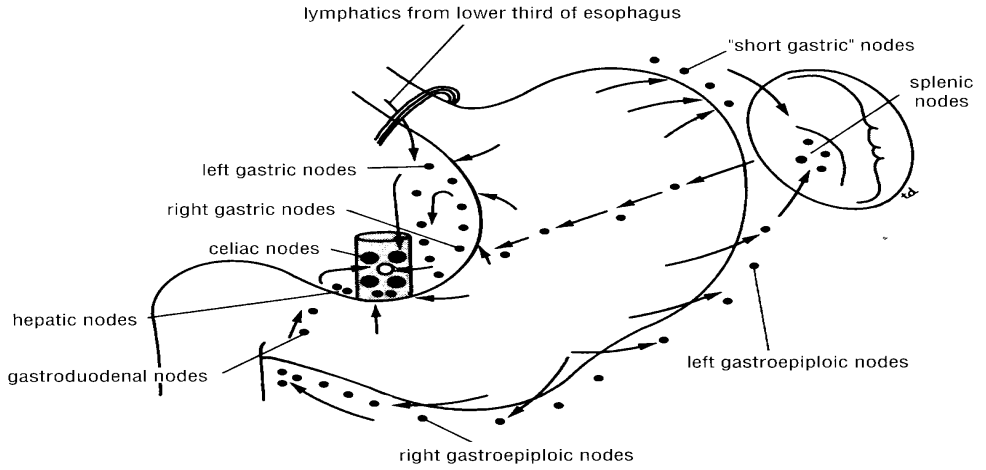
Venous drainage

- All of the veins drain into the **portal circulation**.
- The right and left **gastric** veins drain directly in the **portal** vein.
- The **short gastric** veins and the **left gastroepiploic** vein join the ***splenic vein*****.**
- The **right gastroepiploic** vein drain in the ***superior mesenteric vein***.



Lymphatic drainage

- The lymph vessels follow the arteries.
- They first drain to the:
  - Left and right gastric nodes.
  - Left and right gastroepiploic nodes and
  - Short gastric nodes.
- Ultimately, all the lymph from the stomach is collected at the **celiac nodes**.

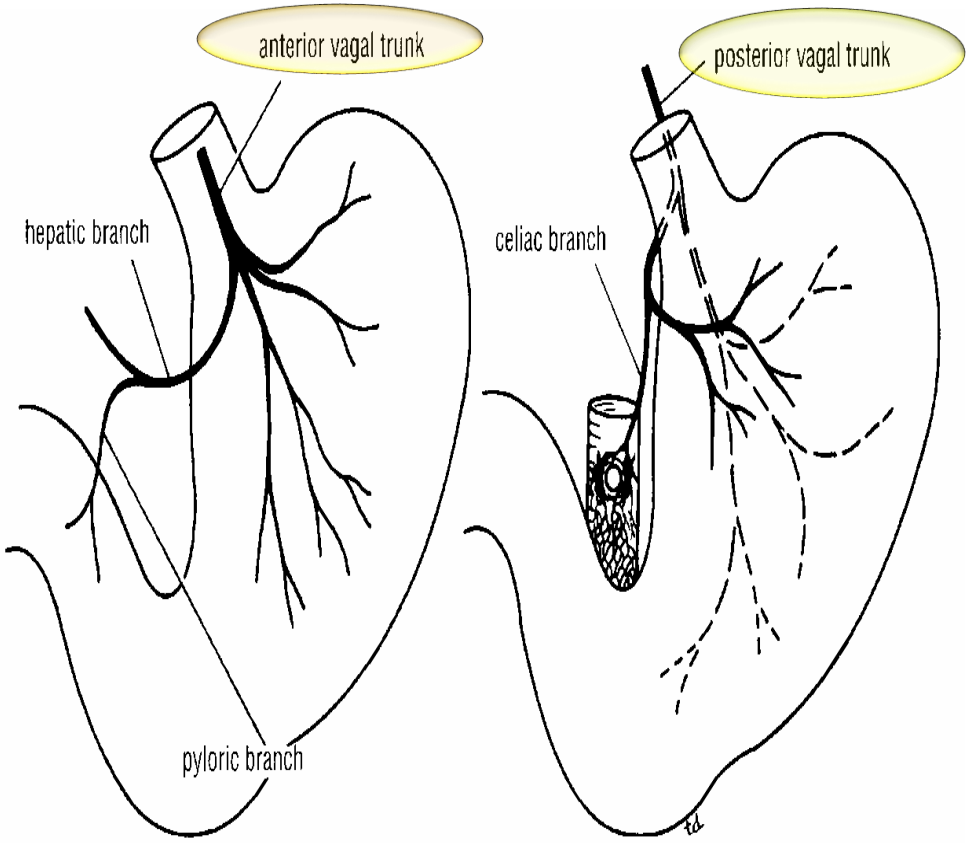


Stomach
Supply (Innervation)

- **Sympathetic** fibers are derived from the **celiac plexus**
- Parasympathetic fibers from both vagi.

Anterior vagal trunk:
- Formed from the left vagus
- Supply the anterior surface of the stomach
- Gives off a hepatic branch and from it - a branch to the pylorus.

Posterior vagal trunk:
- Formed from the right vagus
- Supply the posterior surface of the stomach
- Gives off a large branch to the celiac and the superior mesenteric plexuses.



Oral Cavity	
Hard palate	Formed by (4 bones): 2 Palatine processes of the maxillae, and 2 Horizontal plates of palatine bones posteriorly.
Soft palate	Muscles: **1.** Tensor veli palatini, **2.** Levator veli palatini, **3.** Palatoglossus, **4.** Palatopharyngeus, **5.** Musculus uvulae. Nerve supply: Motor: All by **pharyngeal plexus** EXCEPT **tensor veli palatini** by mandibular nerve. Sensory: Maxillary nerve (Greater palatine, Lesser palatine, and Nasopalatine nerves) and Glossopharyngeal nerve.
Tongue	Attached to: Above (styloid process & soft palate) below (mandible & hyoid bone) Muscles: Intrinsic & extrinsic (palatoglossus, styloglossus, genioglossus, and hyoglossus) Nerve supply: Motor: all by **hypoglossal nerve** EXCEPT **palatoglossus** by pharyngeal plexus.

Esophagus	
Cervical	Anterior: Trachea & Recurrent laryngeal nerves Lateral: Lobes of the thyroid gland. Posterior: Vertebral column
Thoracic	Barium swallow allows assessment of size of **left atrium**
Abdominal	Anterior: left lobe of liver Posterior: left crus of diaphragm Opening of diaphragm: The two vagi, branches of the left gastric vessels, and lymph.
Constrictions	1. Junction with pharynx 2. Crossing of aortic arch and left main bronchus 3. Junction with stomach
Supply	Upper third: **inferior thyroid**. Middle third: **aorta** + **azygos** Lower third: **left gastric** Parasympathetic: vagus

Stomach	
Cardiac orifice	Left seventh costal cartilage (T10)
Fundus	Left fifth intercostal space
Pylorus	Transpyloric plane (L1)
Curvature	Lesser curvature: Attached to the liver by the lesser omentum, (**gasrtohepatic** ligament) Greater curvature: Upper part → attached to spleen by **gastrosplenic** ligament. Lower part → attached to transverse colon by the greater omentum.
Supply	Arterial: Right & left **gastric**, **short gastric** , right & left **gastroepiploic** arteries. Venous: Right & left **gastric** → portal. **Short gastric** & left **gastroepiploic** → **splenic** → portal. Right **gastroepiploic** → **superior mesenteric** → portal Lymph: **celiac** lymph nodes Sympathetic: **celiac** plexus Parasympathetic: **vagus** nerve

MCQs

1) Which of the following is a posterior relation of the stomach ?
A. Anterior abdominal wall.
B. Left costal margin.
C. Left pleura & lung.
D. Splenic artery.

2) Which of the following is a branch of the celiac artery ?
A. Left gastric artery.
B. Right gastric artery.
C. Short gastric artery.
D. Right gastroepiploic artery.

3) The vestibule receive the opening of the parotid gland at the upper side of seconded molar tooth at the same side :
A. Ture
B. False

4) The vestibule lie between :
A. the teeth and gum externaliy and the tounge posteriorly
B. the space in behind the tounge
C. the 2nd molar tooth and the cheeks
D. the teeth & gums internally and lips and cheeks externally

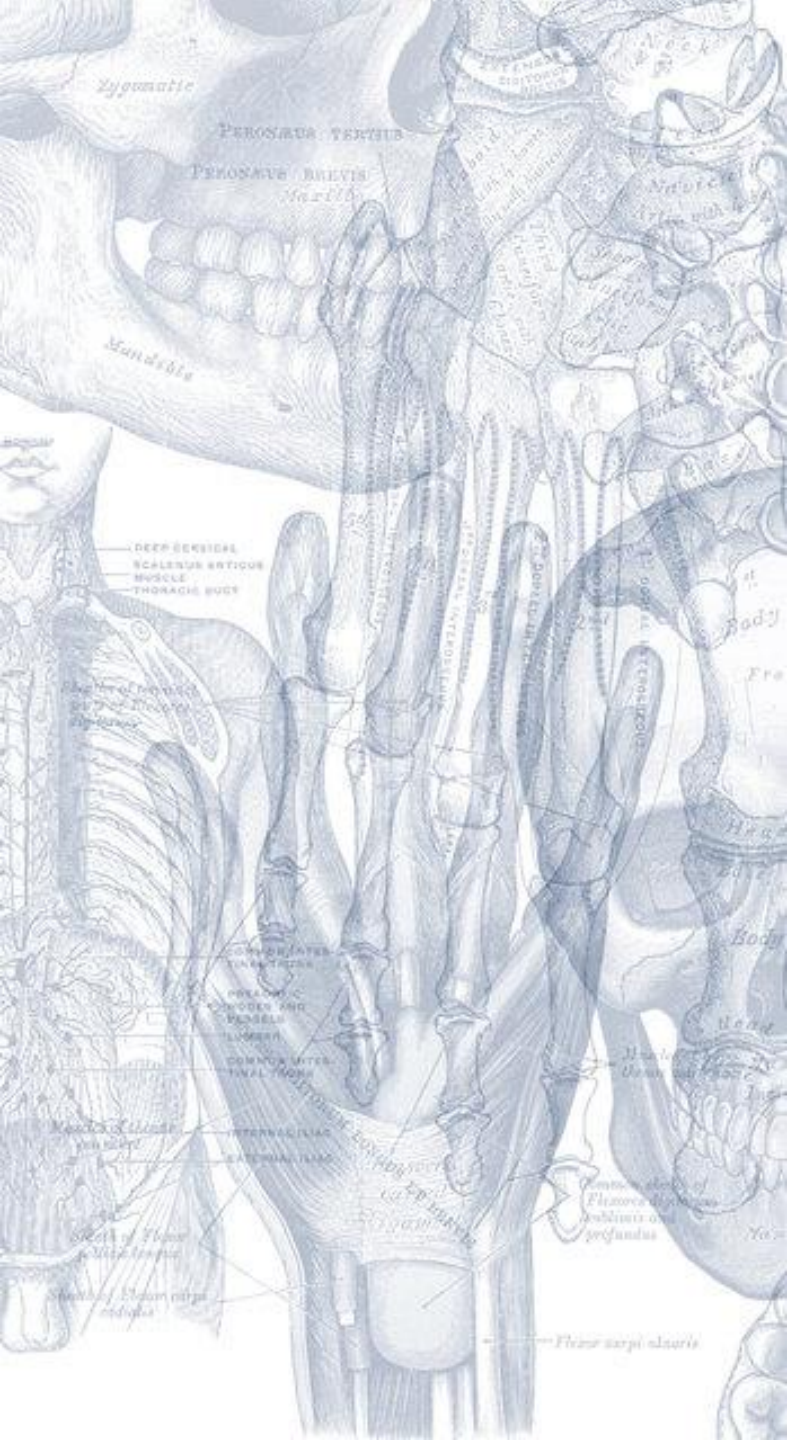
5) The Left gastroepiploic is a branch of which artery
A. Splenic
B. Abdominal Aorta
C. Gastroduodenal
D. Hepatic

6) Where does the right gastroepiploic vein drain?
A. Portal
B. Superior mesenteric
C. Left gastroepiploic
D. Left gastric

7) What is the level of the cardiac orifice?
A. T7
B. T8
C. T10
D. T12

8) Barium swallow asses which of the following?
A. Right atrium
B. Left atrium
C. Right ventricle
D. Left ventricle

Answers: 1- D, 2- A, 3- B, 4- D, 5- A, 6- B, 7-C, 8- B



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