

•Pharynx (البلعوم) : Muscular tube extends from the base of the skull down to the cricoid cartilage at the level of C6 vertebra ; its length is 14 cm .

•Pharynx relations (من الأعلى للأسفل) :

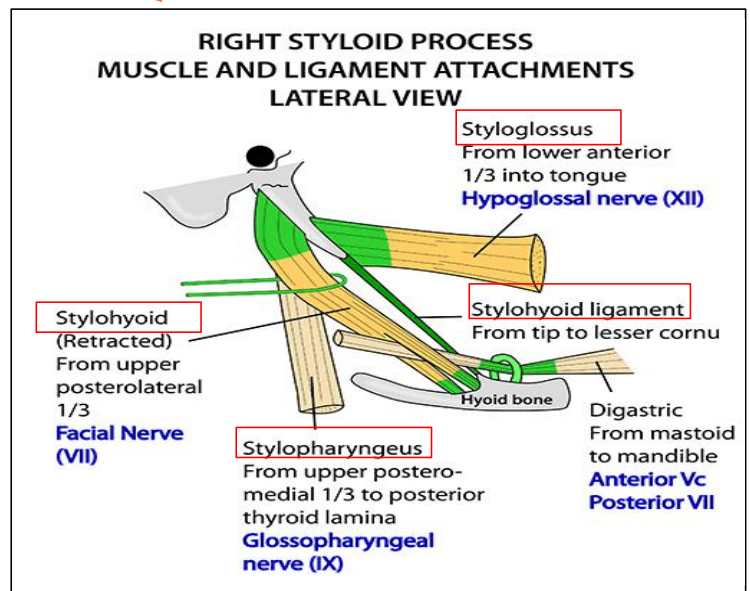
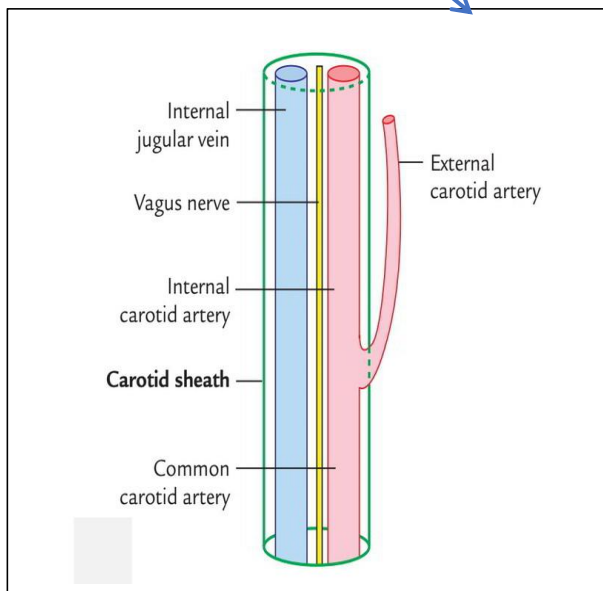
(1) Laterally (Superior --> Inferior)

° Eustachian tube (Auditory tube).

° Styloid process and the muscles attached to it .

° Common carotid sheath .

° Lobes of the thyroid gland .



(2) Superiorly

Sphenoid and occipital bones .

(3) Posteriorly

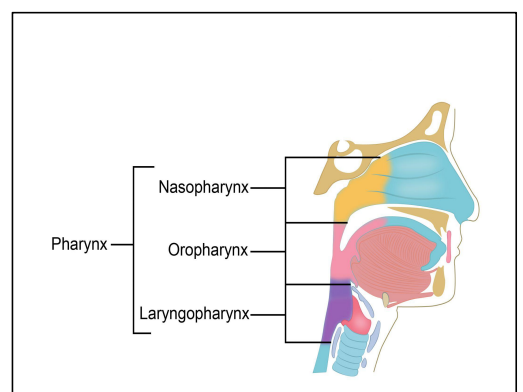
Prevertebral fascia and muscles as well as the upper 6 cervical vertebrae .

•The pharynx is situated posterior to the nasal and oral cavities and posterior to the larynx ;it is therefore divisible into nasal , oral , and laryngeal parts :

(1) Nasopharynx

(2) Oropharynx

(3) Laryngopharynx

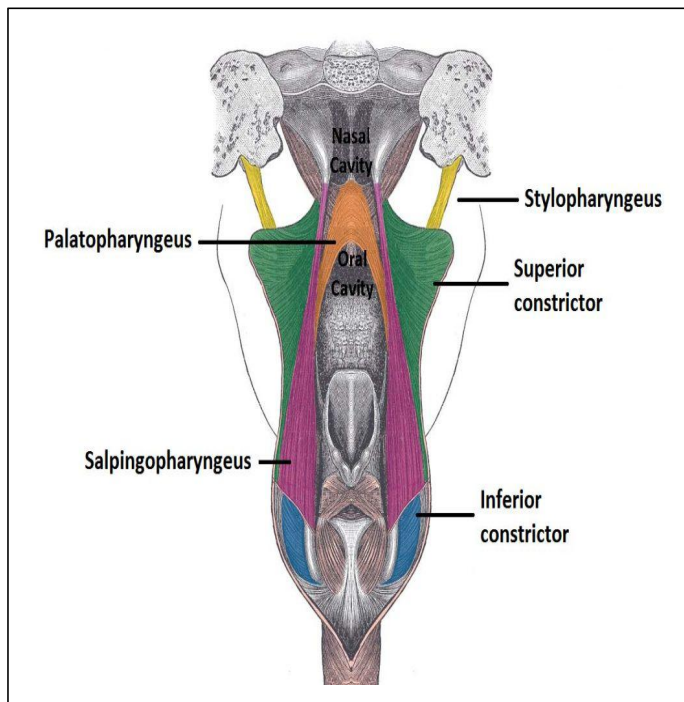


•The pharynx , as to other muscular tubes, consists of :

- (1) Mucosa .
- (2) Submucosa .
- (3) Muscular layer (Double ; **circular** and **longitudinal**).

Muscles of the pharynx

•The wall of the pharynx is composed mainly of 2 layers of skeletal muscles . The **external** , **circular layer** comprises **3 constrictors** . The **internal** , chiefly longitudinal layer consists of 3 levators : **Stylopharyngeus, palatopharyngeus, Salpingopharyngeus.**



The constrictors = **major** muscles of the pharynx .

(Sup , mid , inf)

Overlapping one another from inferior to superior and end in a median tendinous raphe in the posterior midline .

The longitudinal muscles = **minor** muscles of the pharynx .

Pharyngeal Constrictors :

(1) **Superior constrictor**

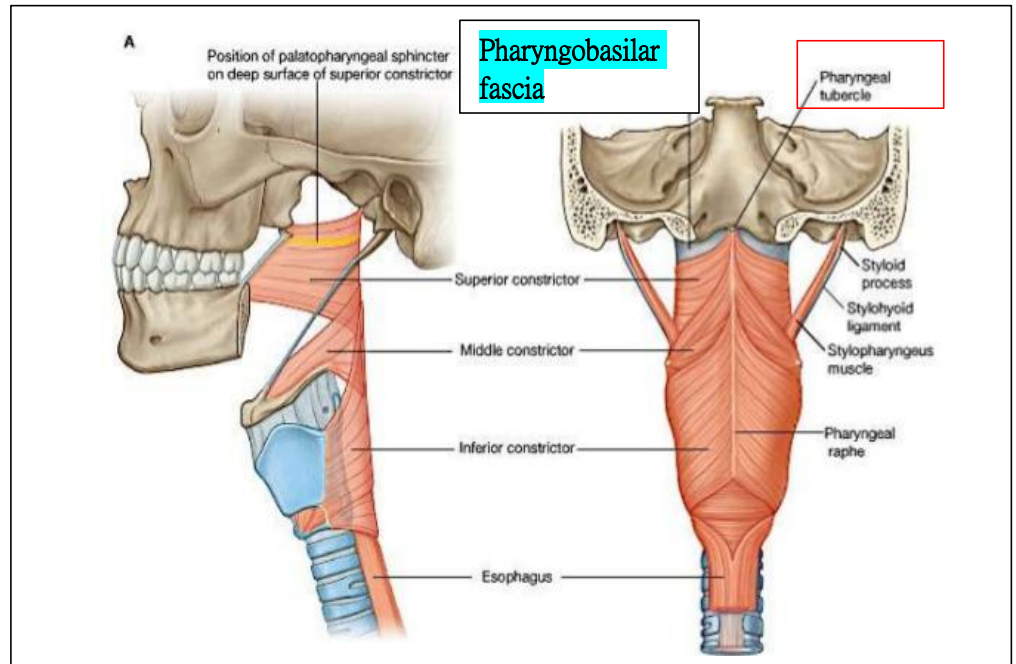
Originates from hamulus of the medial pterygoid plate, retromolar fossa , and a CT called pterygomandibular raphe(aka pterygomandibular lig)

The 2 muscles wrapping around the pharynx (surrounding it) and they(Rt. and Lt.) meet behind(post) in the median raphe .

The median raphe , superiorly is attached to the Pharyngeal tubercle of the occipital bone anterior to the foramen magnum .

Pterygomandibular lig is attached superiorly to the hamulus of medial pterygoid plate and inferiorly to the post end of the mylohyoid line of the mandible (it is b/w the pterygoid plate and the mandible)

B/w the superior constrictor and base of the skull, there is a space that if not closed, food may enter the nasopharynx. By the submucosa (fibrous tissue) pharyngobasilar fascia will develop (highlighted to the rt. in the picture) and closes this defect.



(2) Middle constrictor

Originates from greater horn and lesser horn (where the stylohyoid lig is attached) of the hyoid bone, both (Rt. and Lt.) meet up posteriorly and inserted in the median raphe.

(3) Inferior constrictor

Originates from the oblique line of the thyroid cartilage, the fascia covering the cricothyroid muscle and cricoid cartilage, inserted posteriorly in the median raphe.

Minor muscles (Levators) :

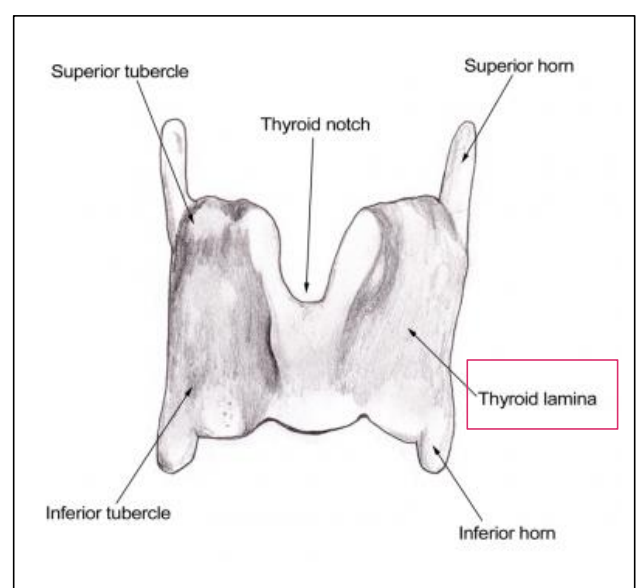
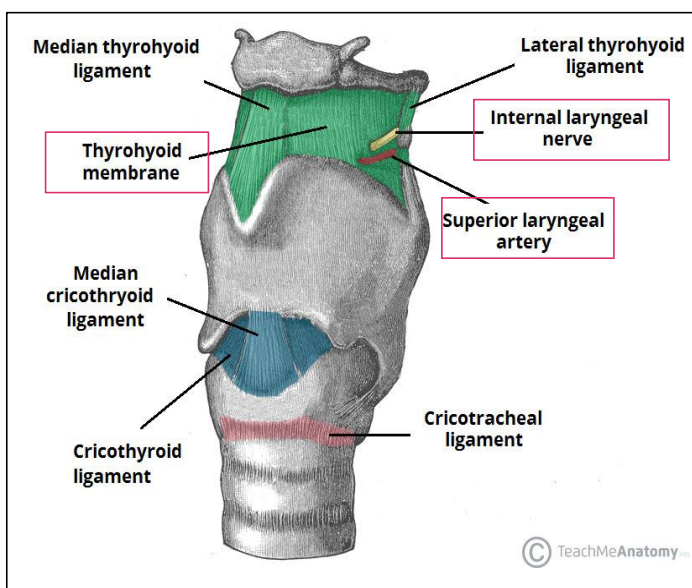
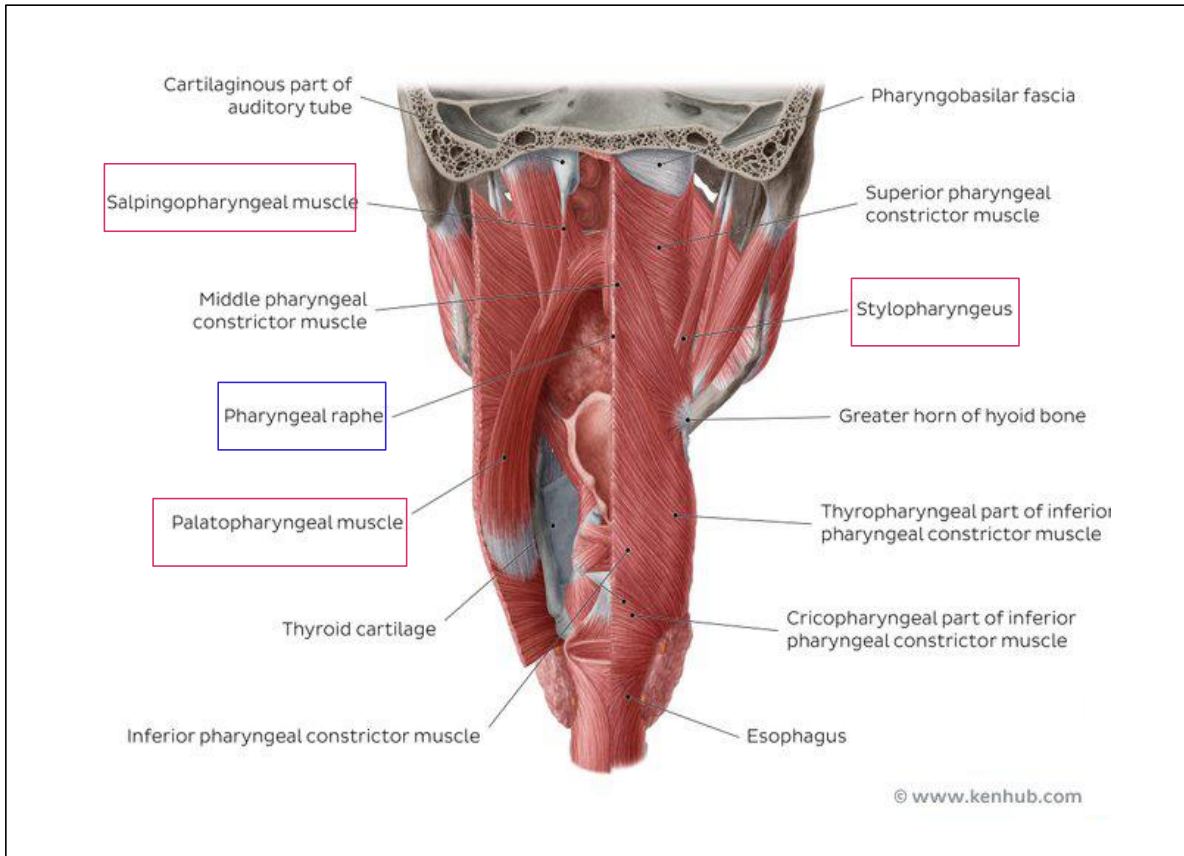
Muscle	Palatopharyngeus	Stylopharyngeus	Salpingopharyngeus
Origin	Soft palate	Styloid process	Eustachian tube

•These 3 muscles passing in b/w the constrictors, finally inserted behind the lamina of the thyroid cartilage, So minor muscles inserted in the posterior border of lamina of the thyroid cartilage.

•Eustachian Tube (Auditory tube) extends from inside of the pharynx ends into the middle ear ;thus the pharynx is connected to the middle ear via Eustachian tube.
(Eustachian tube aka pharyngotympanic tube functions to equalize the pressure b/w the middle ear and the atmosphere along the sides of tympanic membrane.)

•Passing b/w the superior constrictor and the middle constrictor, stylopharyngeus, styloglossus muscles and the glossopharyngeal nerve.

• Passing b/w the middle constrictor and inferior constrictor , internal laryngeal nerve (branch of superior laryngeal nerve which gives the 2 branches external and internal laryngeal nerves , internal branch enters through the opening b/w the thyroid and hyoid bone to the thyrohyoid membrane , supplies inside of the larynx) and superior laryngeal a.



Pharynx Subdivisions

(1) Nasopharynx

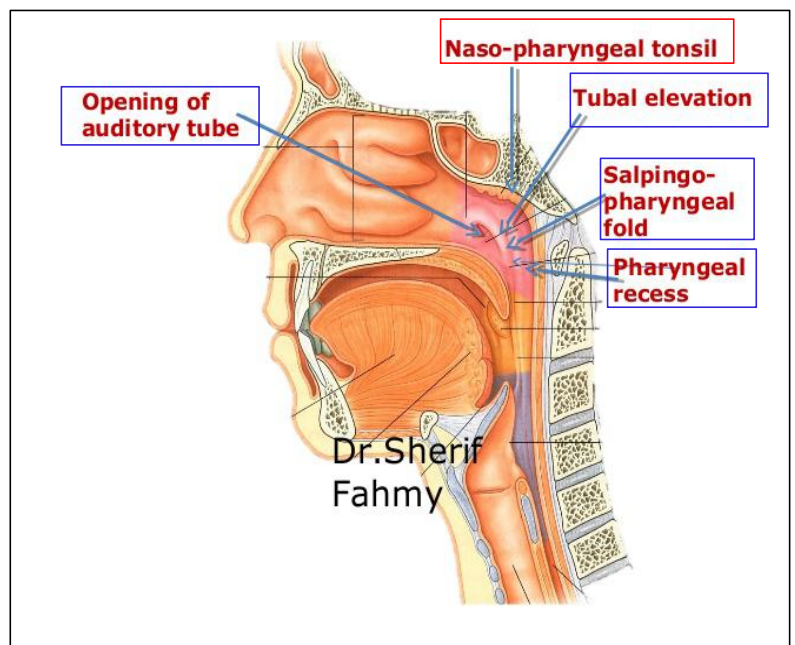
Superiorly (its roof)

- Body of the sphenoid bone .
- Basilar part of occipital bone .

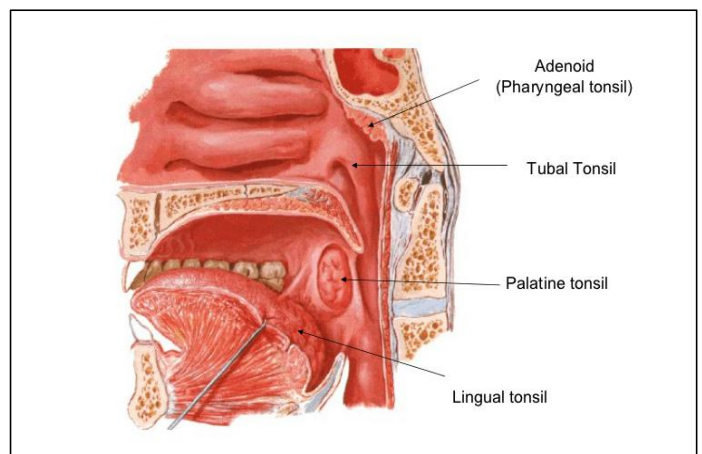
Nasopharynx is situated behind the posterior nasal opening .

Posteriorly , longissimus capitis muscle and cervical vertebrae .

- Inside the nasopharynx , Eustachian tube opening is found , entrance to the middle ear , around which there is an arch (mucous membrane) covering the salpingopharyngeus muscle , called salpingopharyngeal fold .



- The depression found behind salpingopharyngeal fold is called : Pharyngeal recess .
- Tubal Tonsil : posterior to the opening of Eustachian tube .
- (Naso)pharyngeal tonsil , pharyngeal tonsil , or adenoid , lies postero-superior in the nasopharynx .
- Nasopharynx is covered by : Respiratory epithelium (Pseudostratified Columnar ciliated epithelium).



- Nasopharynx ends at the level of soft palate , the nasopharynx communicates with the oropharynx through the pharyngeal isthmus which is bounded by the soft palate, the palatopharyngeal arches and posterior wall of the pharynx .

- Food is prevented from going up to the nasopharynx and forced to pass down , by elevation of this isthmus , thus keeping nasopharynx separated from oropharynx .

(2) Oropharynx

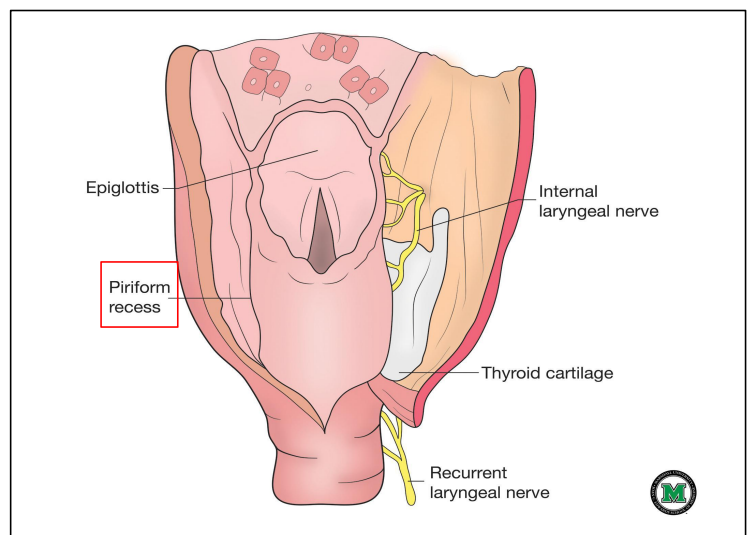
- Remember , oral cavity proper is connected to the oropharynx by an opening called Faucial isthmus(aka oropharyngeal isthmus) ; which is bounded laterally by the palatoglossal arches , posteriorly by the palatopharyngeal arches , superiorly by the soft palate and inferiorly by the tongue .

- The oropharynx is situated behind the faucial isthmus continues down to the top of the epiglottis.
- From the epiglottis downward to the cervical vertebra #6 (C6) this is the laryngopharynx (marks the end of the pharynx and beginning of the oesophagus)

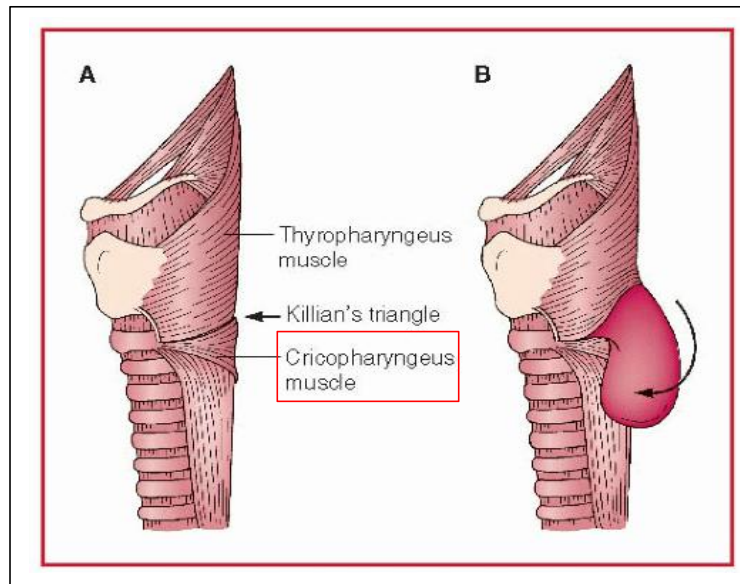
(3) Laryngopharynx

- Extends from the superior border of the epiglottis to the inferior border of the cricoid cartilage (At the level of C6) ;where the pharynx ends and the oesophagus starts .

- Piriform recess - the part of the cavity of the laryngopharynx situated on each side of the inlet of the larynx - laterally and forward b/w the thyroid cartilage , arytenoid cartilage and cricoid cartilage .



- B/w the end of the laryngopharynx and Beginning of oesophagus , cricopharyngeal sphincter is situated , considered to be the narrowest area in GIT .



Pharynx Innervation

- **Sensory supply** ; by **pharyngeal plexus** .

(Pharyngeal plexus is **made by** branches of **Glossopharyngeal nerve** and **Vagus nerve**).

//**Extra** sensory supply for the **upper** part and **lower** part of the pharynx ; as follow //

#Sensory supply of the **nasopharynx** in addition to the pharyngeal plexus , by a **branch of maxillary nerve** .

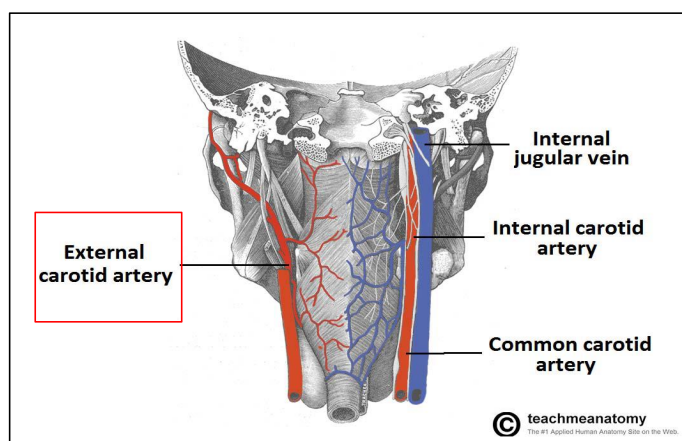
#**Laryngopharynx** is also supplied by **recurrent laryngeal nerve** , in addition to pharyngeal plexus.

- **Motor supply** ;all muscles of the pharynx are supplied by the **Vagus nerve** , exception to that is the **stylopharyngeus muscle** which gets its supply from **glossopharyngeal nerve** .

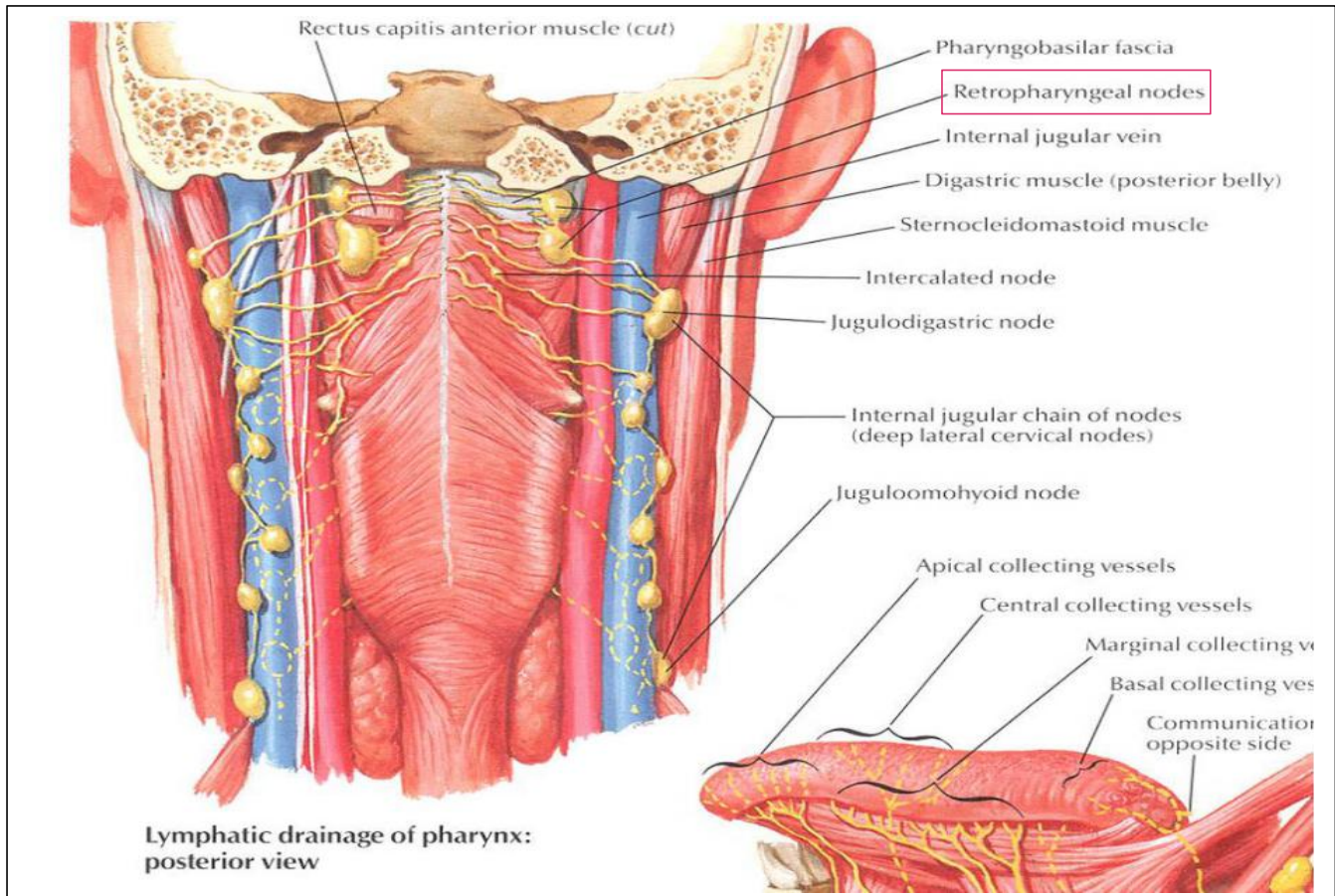
Blood supply of the pharynx

Arterial supply to the pharynx is via branches of the **External Carotid Artery** :

- (1) Ascending Pharyngeal a.
- (2) Branches of Facial a.
- (3) Branches of Lingual a. and maxillary a.



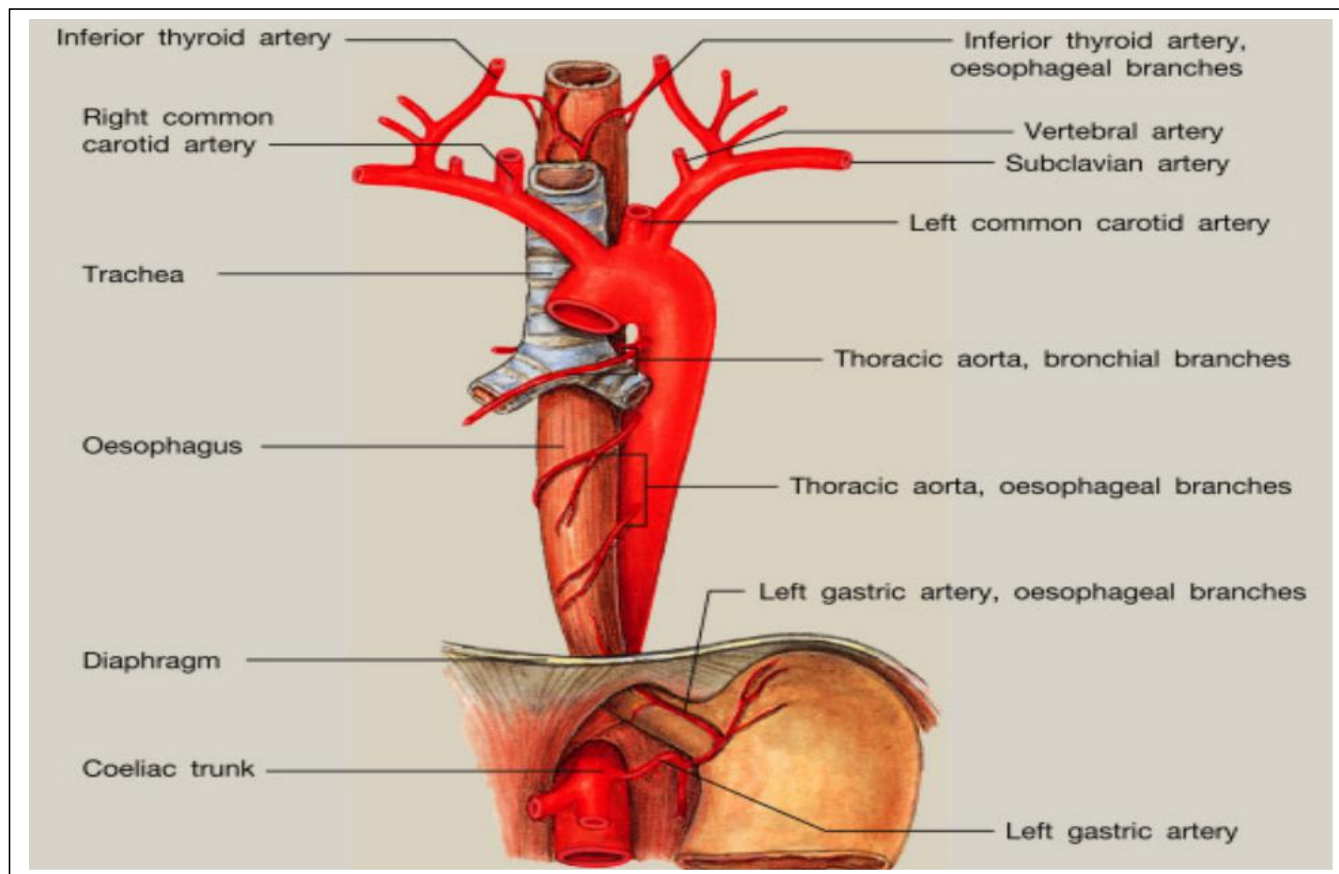
Lymphatic Drainage of the pharynx



- (1) Nasopharynx : by retropharyngeal LNs (post to the pharynx).
- (2) What remains of the pharynx is drained into deep cervical LNs .

Oesophagus

- Muscular tube ; its length 10in // 25 cm starts from the cricopharyngeal sphincter , extends downward and pierces the diaphragm and ends with Lower esophageal sphincter where it meets the stomach .
- Oesophagus pierces the diaphragm and meets with the stomach at the level of T10 .
- It runs into the neck behind the trachea , surrounded on both sides (Lt. and Rt.) by SC arteries .
- Passing down in the chest , where it deviates to the Lt. side , inferiorly it descends forward , downward (no longer passes in front of vertebrae) in front of the aorta , all the way down till it's at the level of T10 where it pierces the diaphragm (oesophageal opening) through the Rt. crus of the diaphragm , posterior to central tendon .



•In the chest , oesophagus is related to LA of the heart , thus oesophageal tumors directly affect the LA , which appears as bulging when performing X-rays .

Blood Supply

(1) Cervical oesophagus :

Branches of inferior thyroid a.

(2) Thoracic oesophagus :

Branches from bronchial arteries and the aorta .

(3) Abd. oesophagus :

Branches from Lt. gastric a. and inferior phrenic a.

Sites of portacaval anastomosis :

- (1) Lower 1/3 of oesophagus
- (2) Paraumbilical area .
- (3) Upper end of anal canal .
- (4) Retroperitoneal .
- (5) Intrahepatic.

Venous Drainage

•Venous drainage is also segmental just like the arterial supply .

(1) Proximal and distal oesophagus : Azygous system .

(2) Mid oesophagus : collaterals of lt. gastric vein .

Collectively ; from azygous vein --> SVC , this is one of the sites of **portal-systemic anastomosis** (aka **portacaval anastomosis**)

Histology of the oesophagus

•The oesophagus has a folded appearance(**Oesophageal mucosa** is thrown **into folds** which is characteristic histologic appearance). When swallowing food, it is able to distend, and accomodate the food being swallowed on its way to the stomach .



Type of epithelial lining : **Non-K stratified squamous epithelium** .

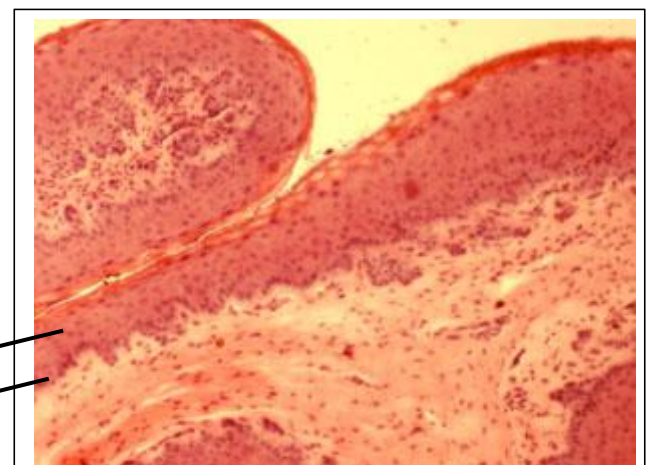
- The **mucosa** consists of :
 - (1) The **epithelium**.
 - (2) Underlying **lamina propria**.
 - (3) **Muscularis mucosa**.

The lamina propria :

contains lymphatic capillaries, blood capillaries, and loose connective tissue. The darkly staining cells in the lamina propria are **lymphoid aggregations**

The muscularis mucosa :

is a thin, double layer of smooth muscle, more substantial in the lower part of the oesophagus.



Mucosa

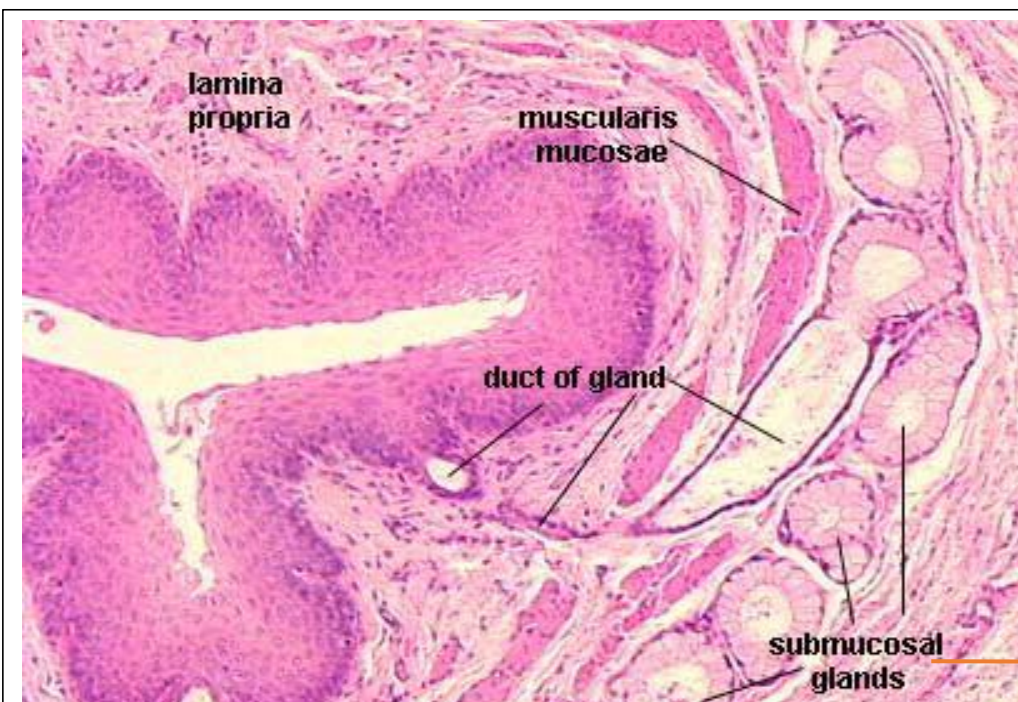
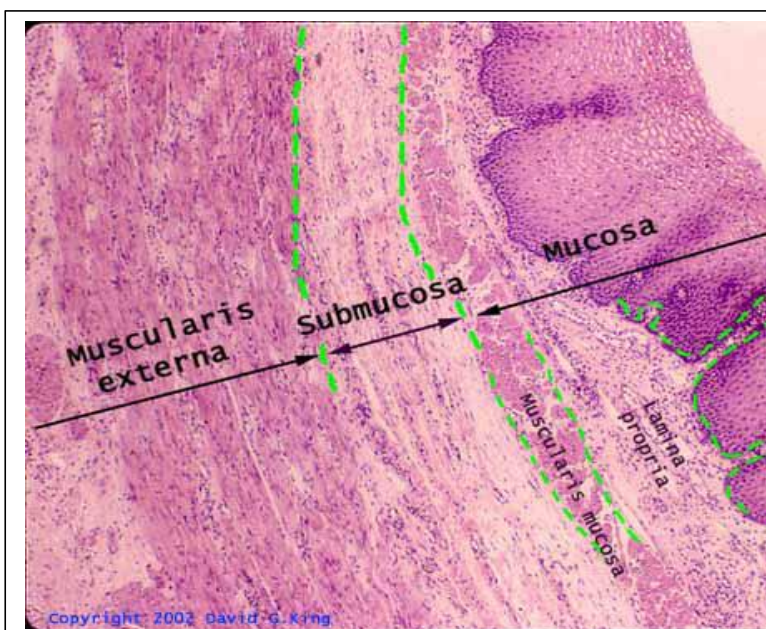
Muscularis Mucosa

The submucosa (Underneath the mucosa)

- highly vascular, and contains loose connective tissue.
- It contains oesophageal glands, that secrete mucus to help ease the passage of swallowed food.

The muscularis externa (Differs from muscularis mucosa)

- layer in the **top third** of the oesophagus contains skeletal muscle.
 - in the **middle third**, it is a mixture of smooth and skeletal muscle.
 - in the **bottom third** it is entirely smooth.
- Oesophagus outermost layer consists of a connective tissue adventitia which merges with the adjacent connective tissue associated with nearby structures



Mucous
glands