

Anatomy of the pharynx

- The pharynx is muscular tube for airway and foodway extends from base of skull down to level of **cricoid cartilage(C6)**. It is situated behind and opens anteriorly into three openings ,so its cavity is divided into nasopharynx,oropharynx and laryngopharynx.12cm long, it widest diameter is 5cm at the base of the skull and its narrowest diameter is 1.5cm at upper oesophagus,so it is somewhat **funnel shaped**.

Anatomy-of-pharynx

Boundaries –

- a. **Superiorly-Base of skull** including posterior part of body of sphenoid and the basilar part of the occipital bone.
- b. **Inferiorly**-pharynx continues with **oesophagus** at the level of 6th cervical vertebra/ lower border of cricoid cartilage.
- c. **Posteriorly-Prevertebral fascia** separating it from cervical spine
- d. **Anteriorly**-Communication with **Nasal cavity, Oral cavity, and Larynx.**

e. On each side-

i) It is attached to the

medial **p**terygoid plate

pterygo **m**andibular raphe

mandible

tongue

hyoid bone

thyroid and cricoid cartilages

ii) Communication with middle ear through

eustachian tube

iii) **Styloid process** and muscles attached to it

iv) Common, Internal and External **Carotid Artery**

Wall of the pharynx

Pharyngeal wall looks like •
four cups one inside the
other.

1-The innermost and highest
is pharyngobasilar fascia
which is attached to the base
of skull.

2-The next three are
pharyngeal
constrictors(**intrinsic muscles
of the pharynx**).

Each constrictor muscle •
has an anterior small
origin from which its
fibers fan out posteriorly
to meet its fellow in the
posterior midline forming
the pharyngeal
ligament(**posterior
pharyngeal raphe**) which
extends from the base of
the skull to the lower
border of thyroid
cartilage.

Structure of Pharyngeal wall from within outwards

1. **Mucous membrane**-lined by Stratified Squamous epithelium.
2. **Pharyngeal aponeurosis/ Pharyngobasilar fascia**-it is a fibrous layer lining the muscular coat.
3. **Muscular coat**-consist of-
 - a. **Outer Circular Layer** consist of 3 muscles-
 - > **Superior constrictor** > **Middle constrictor** > **Inferior constrictor**
 - b. **Inner Longitudinal Layer** consist of 3 muscles-
 - > **Stylopharyngeus** > **Salpingopharyngeus** > **Palatopharyngeus**
4. **Buccopharyngeal fascia**-covers the outer surface of constrictor muscles.

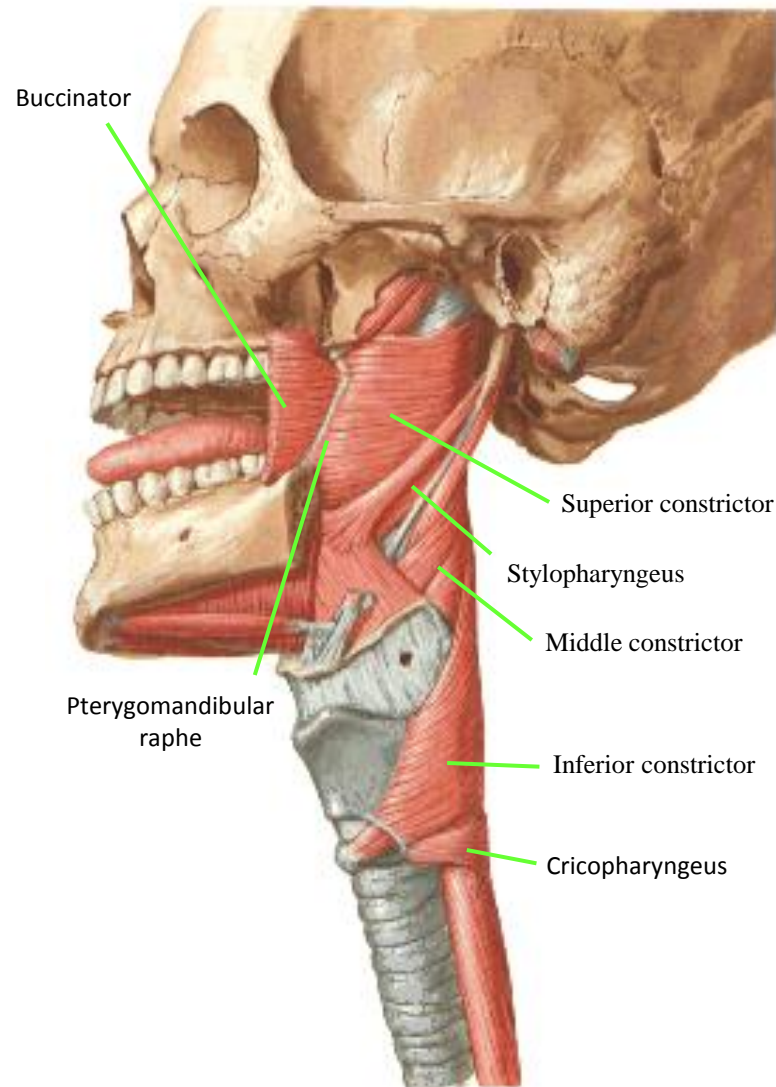
The pharyngobasilar fascia

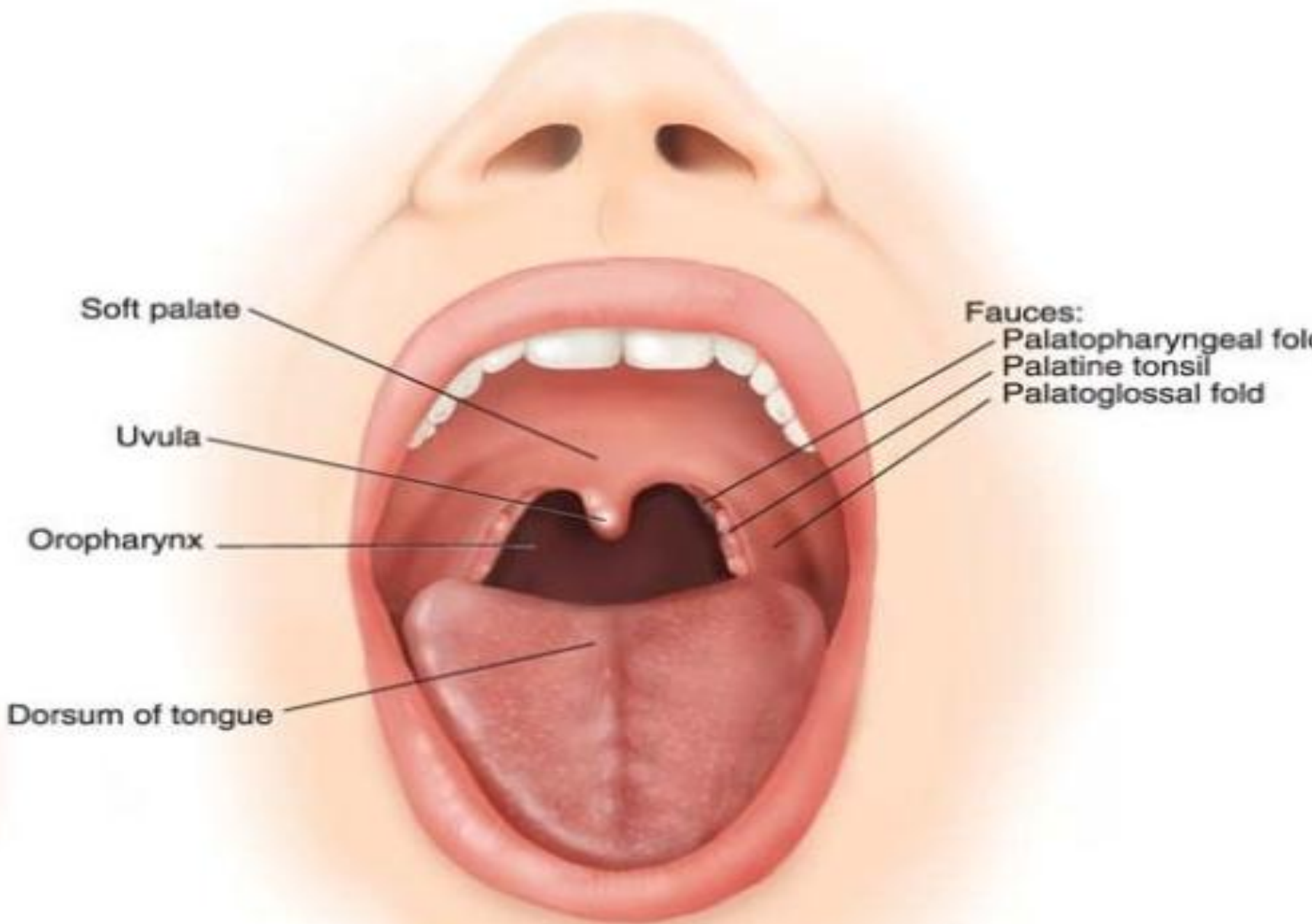
- Strong fascia lines the muscular layer of the nasopharynx and it extends from the base of skull to the hard palate(C1 vertebra) . **Origin :from pharyngeal tubercle in the base of the skull the line of origin goes laterally to reach petrous apex then it passes to the base of medial pterygoid plate where it passes over the cartilagenous part of the auditory tube and it takes origin from posterior border of the medial pterygoid plate medial to the superior pharyngeal constrictor where its origin ends at the level of pterygoid hamulus.** It is responsible for keeping the nasopharynx always open for respiration.

The pharyngeal constrictor muscles

Muscle	Origin	Insertion
SPC	From the Posterior border of the medial pterygoid plate below the cartilagenous part of the auditory tube- pterygoid hamulus- pterygomandibular raphe-posterior border of mylohyoid line.	Fibers fan so that upper fibers ascend ,middle fibers go horizontally and lower fibers go down (all inserted posteriorly in the pharyngeal raphe.
MPC	From the Angle between the lesser and greater horns of the hyoid bone and lower part of stylohyoid ligament.	Fibers fan so that upper fibers ascend ,middle fibers go horizontally and lower fibers go down (all inserted posteriorly in the pharyngeal raphe.
IPC	1-Thyropharyngeus:From the oblique line of thyroid cartilage and area above. 2-Cricopharyngeus:Circular muscle arise from cricoid cartilage and it is continous with the upper part of the oesophagus.There is a gap between it and thyropharyngeus part .	1-Fibers asend up and medially to be inserted into midline pharyngeal raphe. 2-It is continuous with its opposite fellow.

The pharyngeal constrictor muscles





Soft palate

Uvula

Oropharynx

Dorsum of tongue

Fauces:

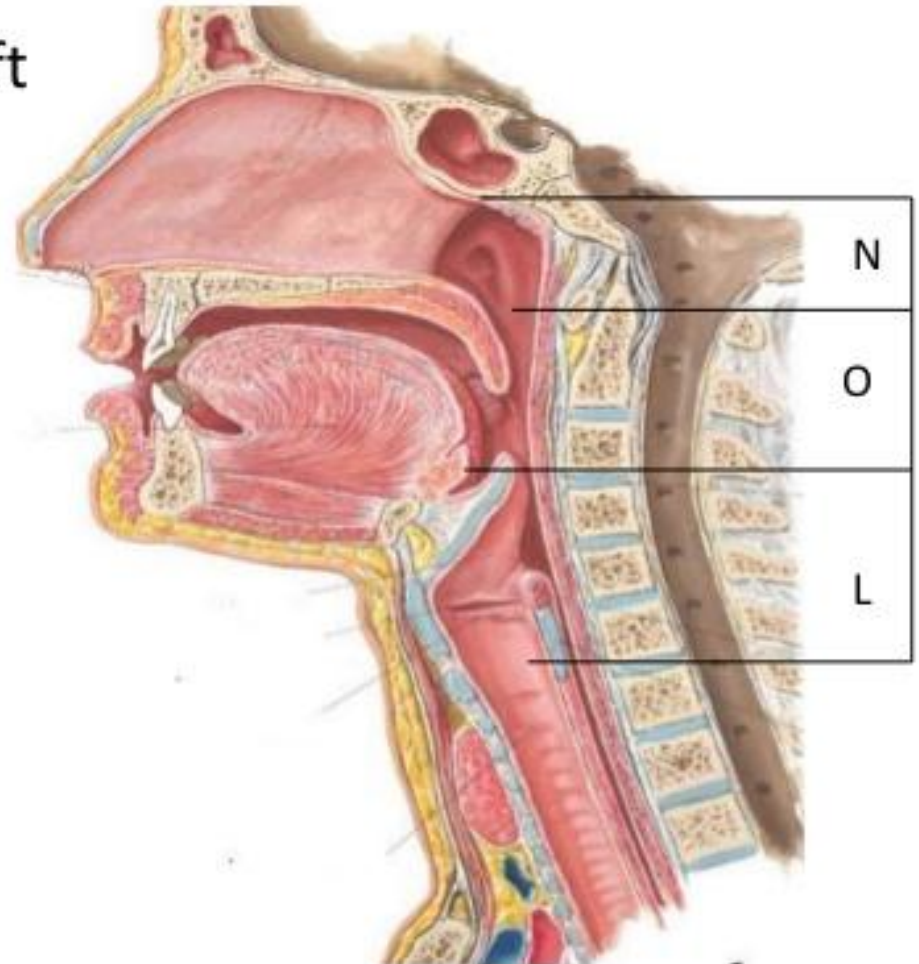
Palatopharyngeal fold

Palatine tonsil

Palatoglossal fold

Division of Pharynx

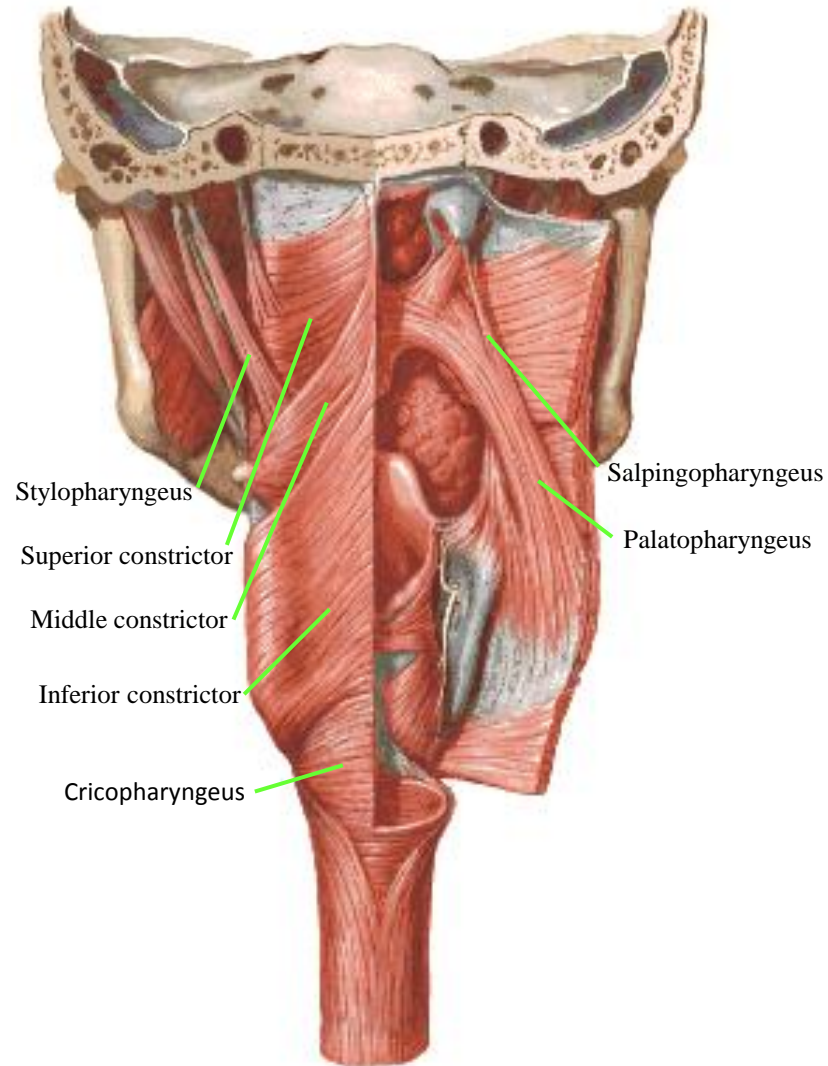
- The nasal part – **NASOPHARYNX/ EPIPHARYNX**
(extends from base of skull to soft palate)
- The oral part – **OROPHARYNX**
(extends from hard palate to hyoid bone)
- The laryngeal part – **LARYNGOPHARYNX/ HYPOPHARYNX**
(extends from upper border of epiglottis to lower border of cricoid cartilage)



The extrinsic muscles of the pharynx

Muscle	Origin	Insertion
Stylopharyngeus	From the back of the root of styloid process	The slender muscle passes with 1x & pharyngeal branch of x between ICA&ECA to be inserted in posterior border of thyroid cartilage in front of palatopharyngeus.
Palatopharyngeus	Nasal side of palatine aponeurosis and posterior part of hard palate.	posterior border of thyroid cartilage
Salpingopharyngeus	From the lower border of auditory tube.	Back of the thyroid cartilage

The extrinsic muscles of the pharynx



Relations of the pharynx

- **Upper part:** Laterally, carotid sheath containing (ICA, CCA, IJV) & the last 4 cranial nerves. Posteriorly: retropharyngeal space containing sympathetic trunk posterolaterally. Anteriorly, nasal cavity
- **Lower part:** Laterally, carotid sheath containing (CCA, IJV & X nerve). Posteriorly: same relations. Anteriorly: larynx.

Nasopharynx

It is the upper most part.
It lies behind the nasal cavity.

Roof: part of sphenoid bone and basilar part of the occipital bone.

Anterior wall- posterior nasal apertures(choanae).

Posterior wall- arch of atlas vertebrae covered by prevertebral muscles and fascia.

The nasopharyngeal tonsils (adenoids) collection of lymphatic tissue in the posterior wall near the nasopharynx roof.

- Lateral wall on both sides : opening of Eustachian tubes near the roof connecting it to the tympanic cavity.

.Tubal opening bounded by tubal elevation (collection of subepithelial lymphoid tissue).

Salpingopharyngeal fold : a mucosal fold raised by salpingopharyngeus muscle extending from the back of tubal orifice downward.

Lateral pharyngeal recess (fossa of rosenmuller lies posterolateral in the wall, it contains the levator palati muscle & immediately lateral to it lies the ICA . Inferiorly : It communicates with oro pharynx .

- Nasopharynx is lined by **Pseudostratified Ciliated Columnar** epithelium.
- Lymphatic drainage-
 - Deep cervical nodes
 - Spinal accessory chain of nodes
 - Contralateral lymph nodes

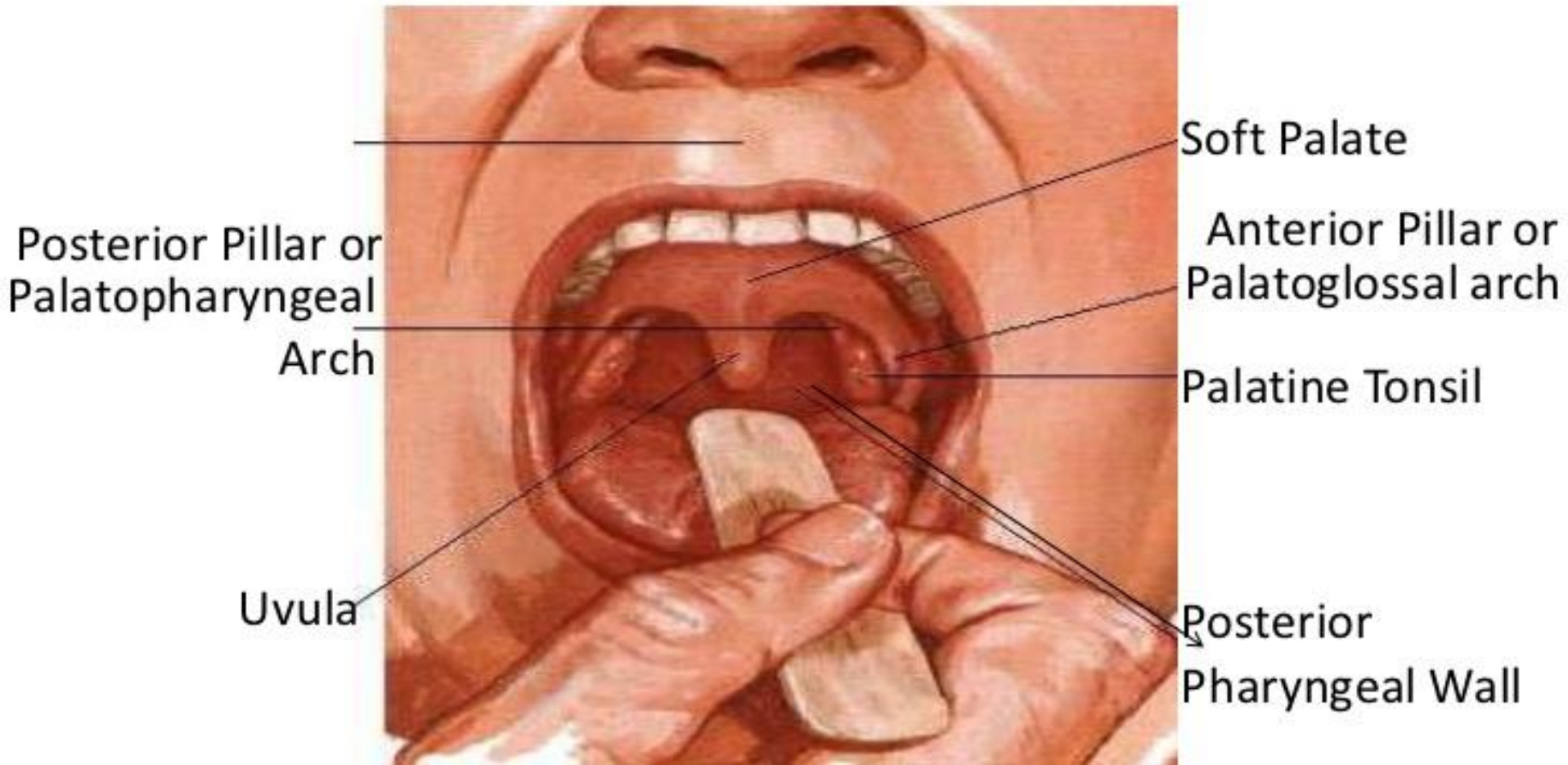
Oropharynx

Is common respiratory and digestive path. Opens anteriorly to the oral cavity and superiorly to the nasopharynx. Structures in this part are :

- 1-palatoglossal fold:a mucosal fold raised by the underlying palatoglossus muscle separating oral cavity from the oropharynx .
- 2-palatopharyngeal fold:a mucosal raised by the underlying palatopharyngeus muscle.
- 3-palatine tonsils: Two big collections of lymphoid tissue between palatoglossal and palatopharyngeal folds .
- 4- Lingual tonsils: in the posterior 1/3 of the tongue.

OROPHARYNX

It is the middle part of the pharynx situated behind the oral cavity.

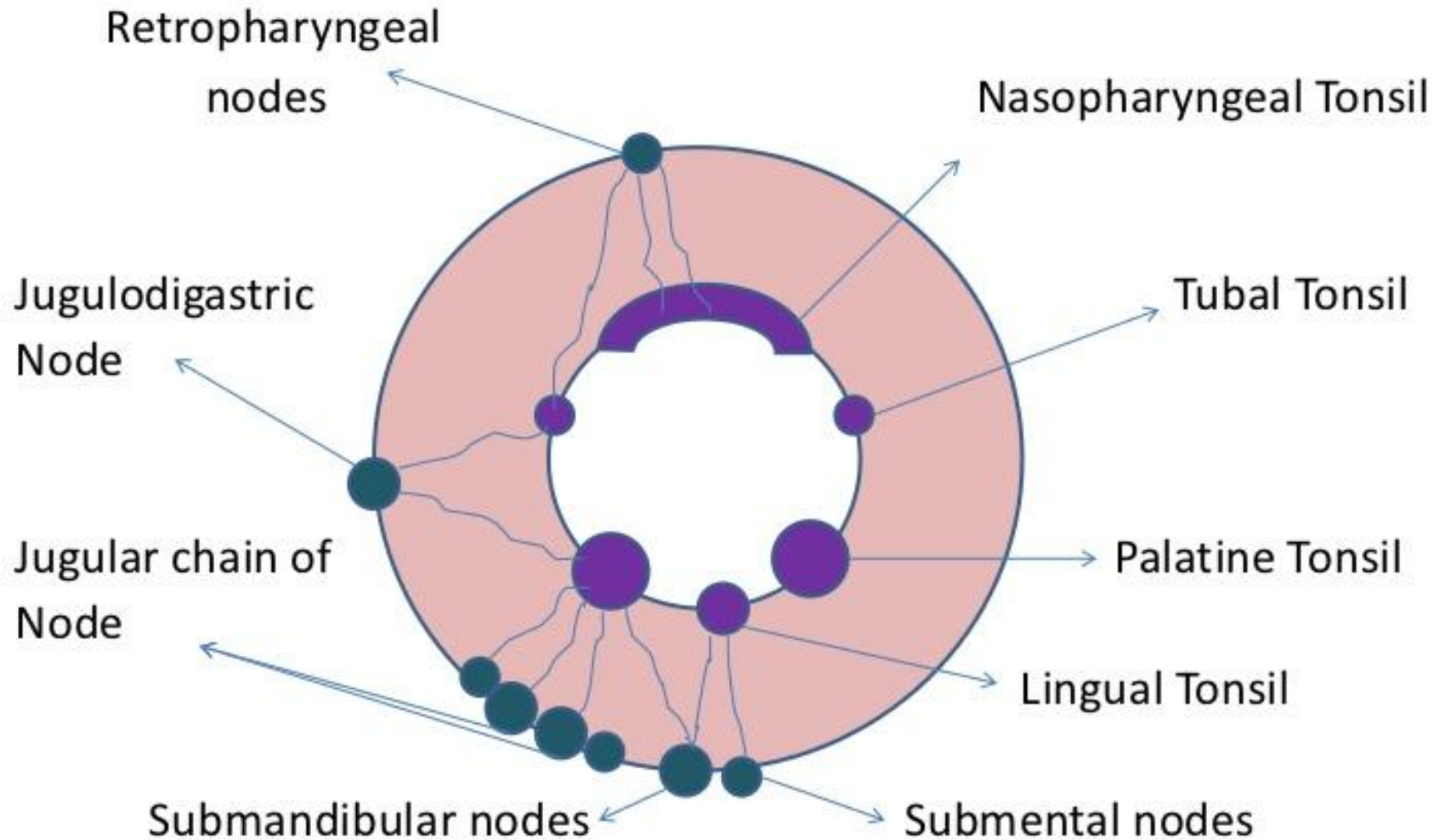


Lymphatic drainage

Oropharynx- Into Upper Jugular chain particularly Jugulodigastric (tonsillar) node.

Soft palate, Lateral and Posterior pharyngeal walls and base of Tongue- into retropharyngeal and parapharyngeal nodes.

In relation to Oropharyngeal Isthmus there are several aggregations of Lymphoid Tissue that constitute **WALDEYER'S LYMPHATIC RING**.



Laryngopharynx

Lower part of pharynx situated behind and partly on sides of the larynx.

Hypopharynx lies opposite to 3rd, 4th, 5th, 6th cervical vertebrae.

Clinically it is divided into 3 regions-

1. Pyriform Sinus (fossa)
2. Post-cricoid region
3. Posterior Pharyngeal wall

Pyriiform Sinus

- Lies on either side of larynx.
- Extends from Pharyngoepiglottic fold to upper end of Oesophagus.
- Internal Laryngeal Nerve runs submucosally in the lateral wall of sinus (local anaesthesia)
- Bounded by-

Laterally-thyrohyoid membrane and thyroid cartilage

Medially-Aryepiglottic fold, posterolateral surfaces of arytenoid and cricoid.

Post-cricoid Region

It is a part of anterior wall of laryngopharynx.

Posterior Pharyngeal Wall

It extends from level of Hyoid bone to the level of cricoarytenoid joint.

Lymphatics

- Pyriform Sinus → upper Jugular chain.
- Posterior wall → Lateral nodes → deep cervical lymph nodes.
- Post-cricoid region → Parapharyngeal nodes → nodes of supraclavicular and paratracheal chain.

Nerve supply of Pharynx

Pharyngeal plexus of nerves formed by-

- pharyngeal branch of vagus nerve
 - pharyngeal branches of glossopharyngeal nerve.
 - pharyngeal branches of superior cervical sympathetic ganglion
-
- Motor fibres-Vagus N. – supply all muscles of pharynx except Stylopharyngeus (glossopharyngeal N.)
 - Sensory fibres-Glossopharyngeal N. and Vagus N.

Pharyngeal Spaces

Potential spaces in relation to pharynx where abscess can form-

1. **Retropharyngeal space**- lies behind pharynx, extend from base of skull to bifurcation of trachea.
2. **Parapharyngeal space**- present on one side of pharynx, contains (a) Carotid vessels, (b) Jugular vein, (c) last 4 Cranial Nerves (d) Sympathetic chain

Applied anatomy

- **Enlarged adenoid**-nasal blockage-block auditory tube-recurrent ear infections and reduced hearing.
- **Pharyngeal diverticulum**: Herination of food-containing mucosal pouch through the gap between two parts of inferior constrictor seen as a swelling at the side of the neck.