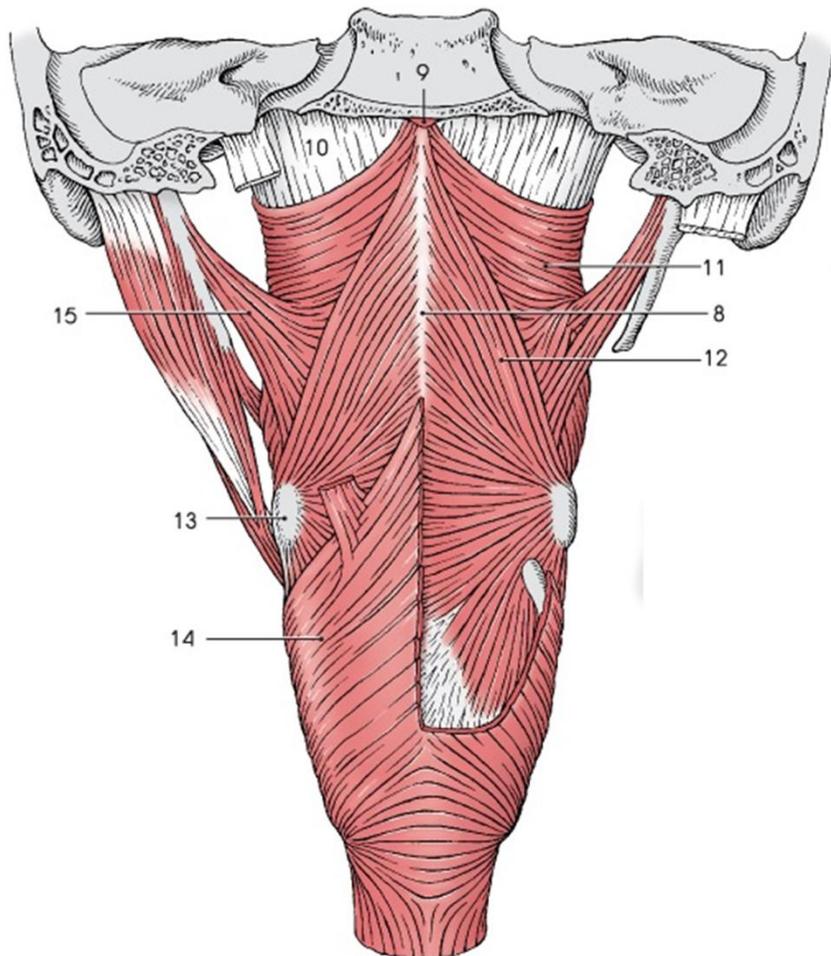


Anatomy Of Pharynx



Μυώδες τοίχωμα
του φάρυγγα

Dimitrios Filippou, MD, PhD

Ass. Professor, Medical School, NKUA

Gen. Surgeon

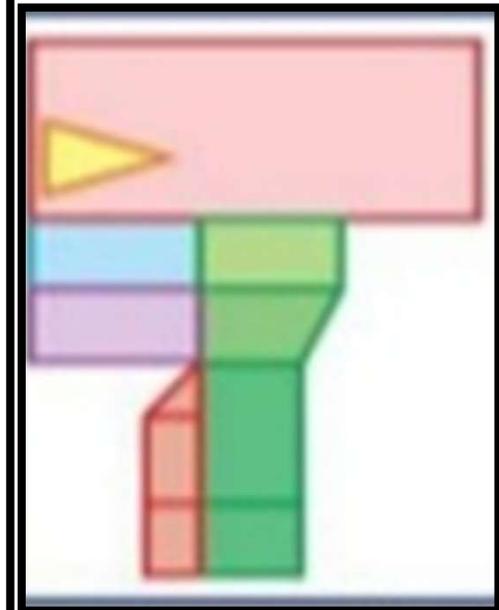
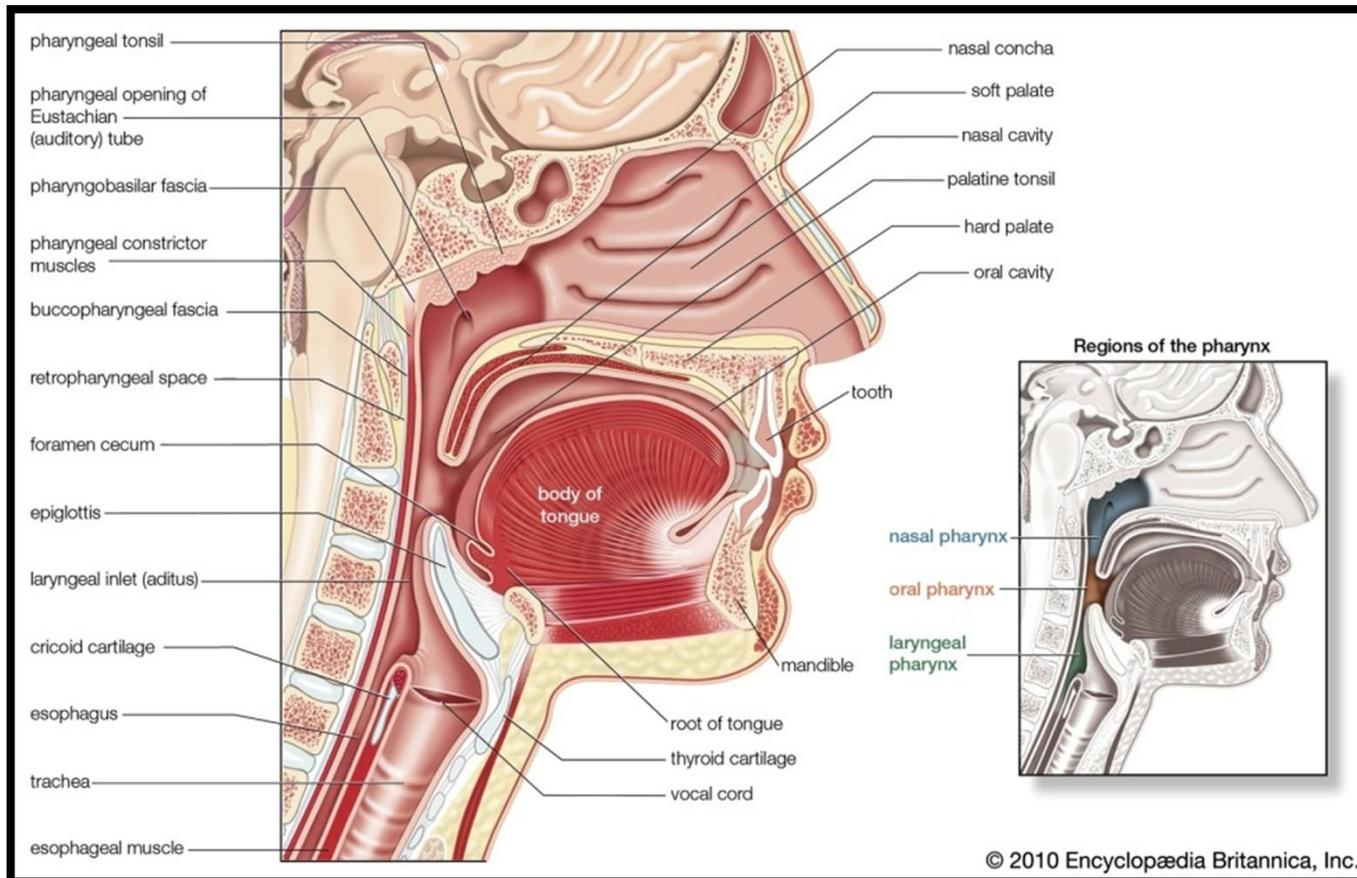
Introduction

- Pharynx is a fibromuscular tube.
- It is a common channel for both food and air.

Location- Behind the cavities of nose, mouth and the larynx.

Shape - funnel shaped.

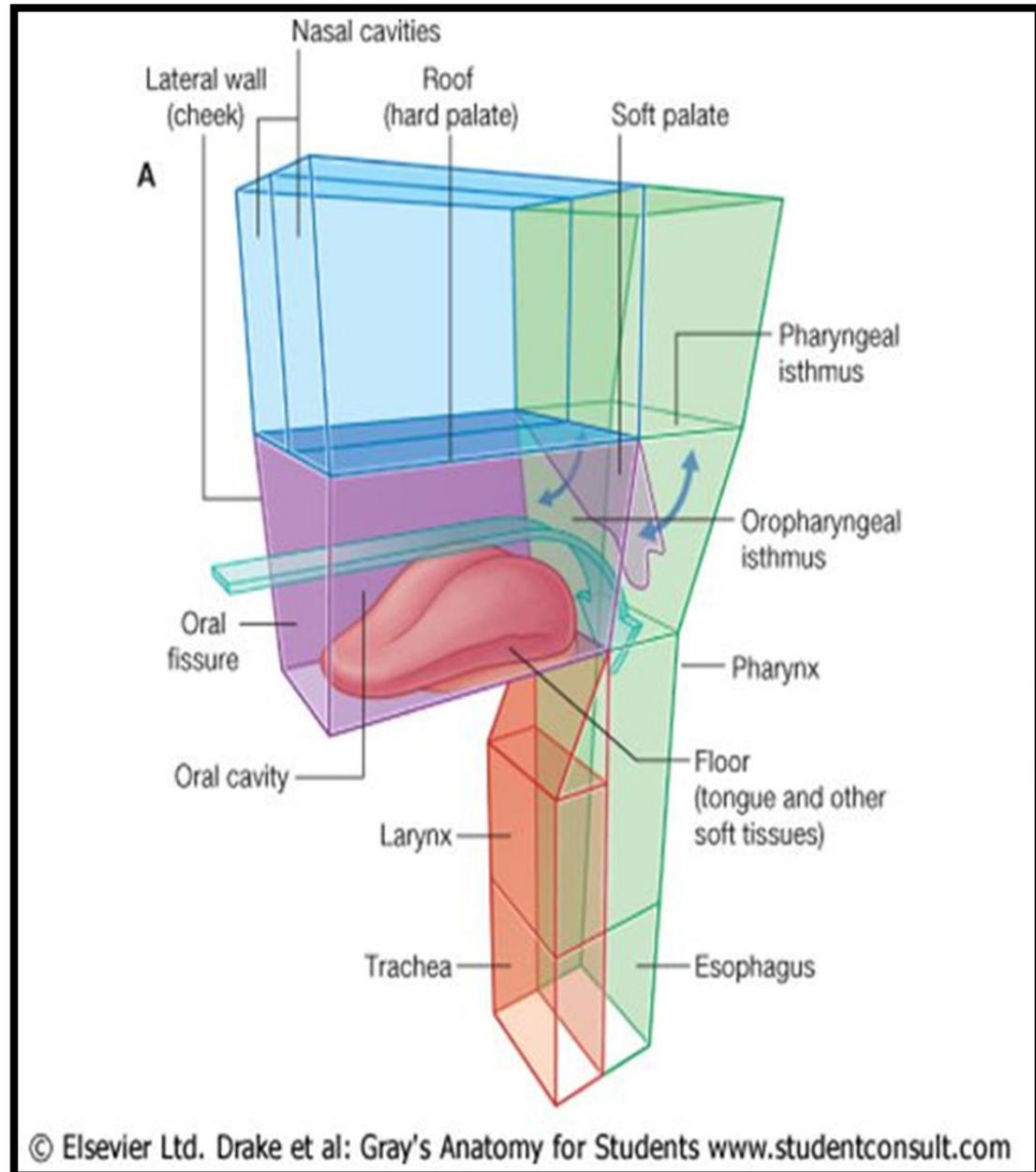
Extent- From the base of the skull to the esophagus.



Introduction

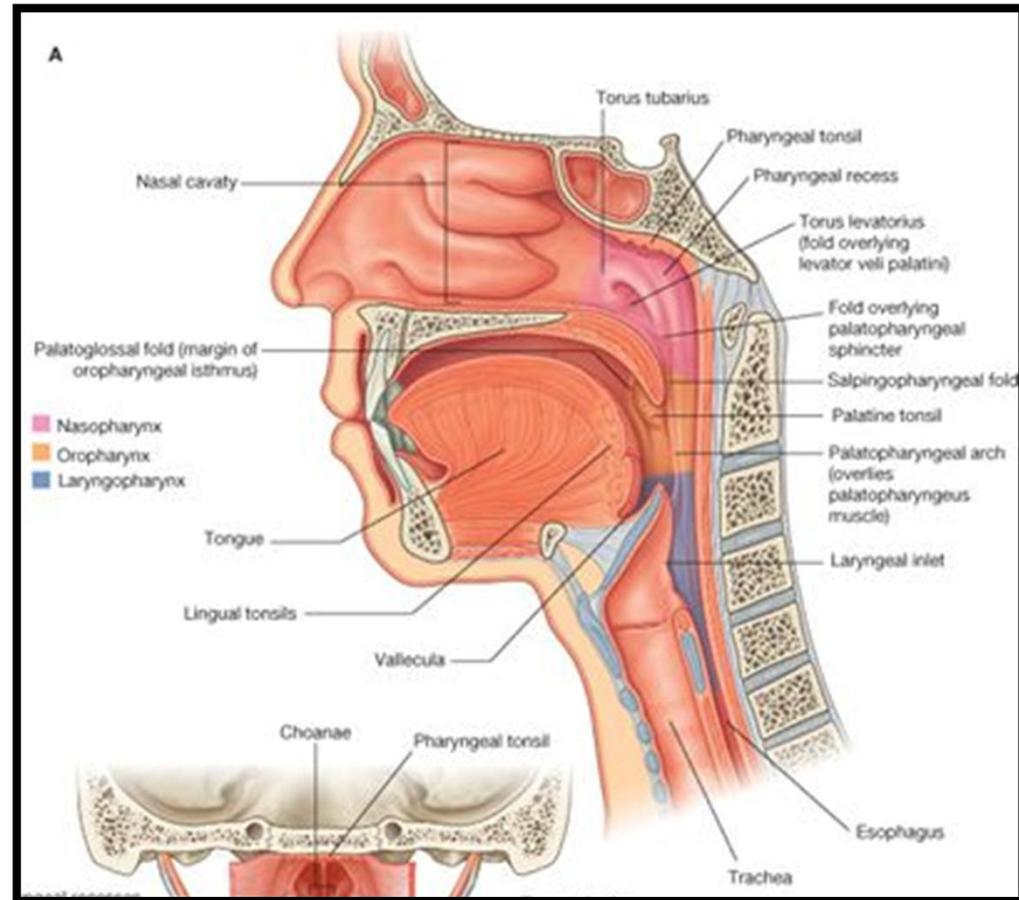
Dimensions-

- ❖ Length- 12-14 cm
- ❖ Width-
 - At base- 3.5 cm
 - At pharyngo-esophageal junction- 1.5 cm



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.**



Boundaries contd...

Posterior-

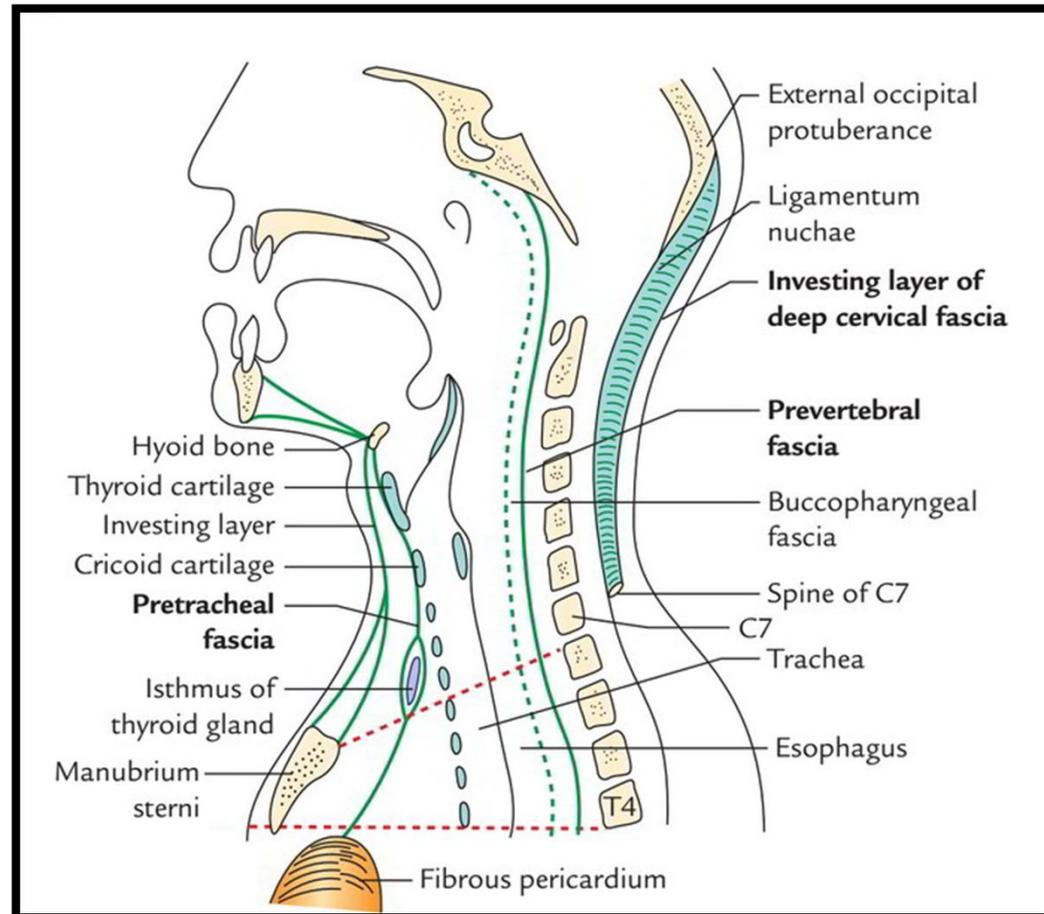
- Prevertebral fascia.

Anterior-

- Opens into cavities of nose, mouth and larynx.

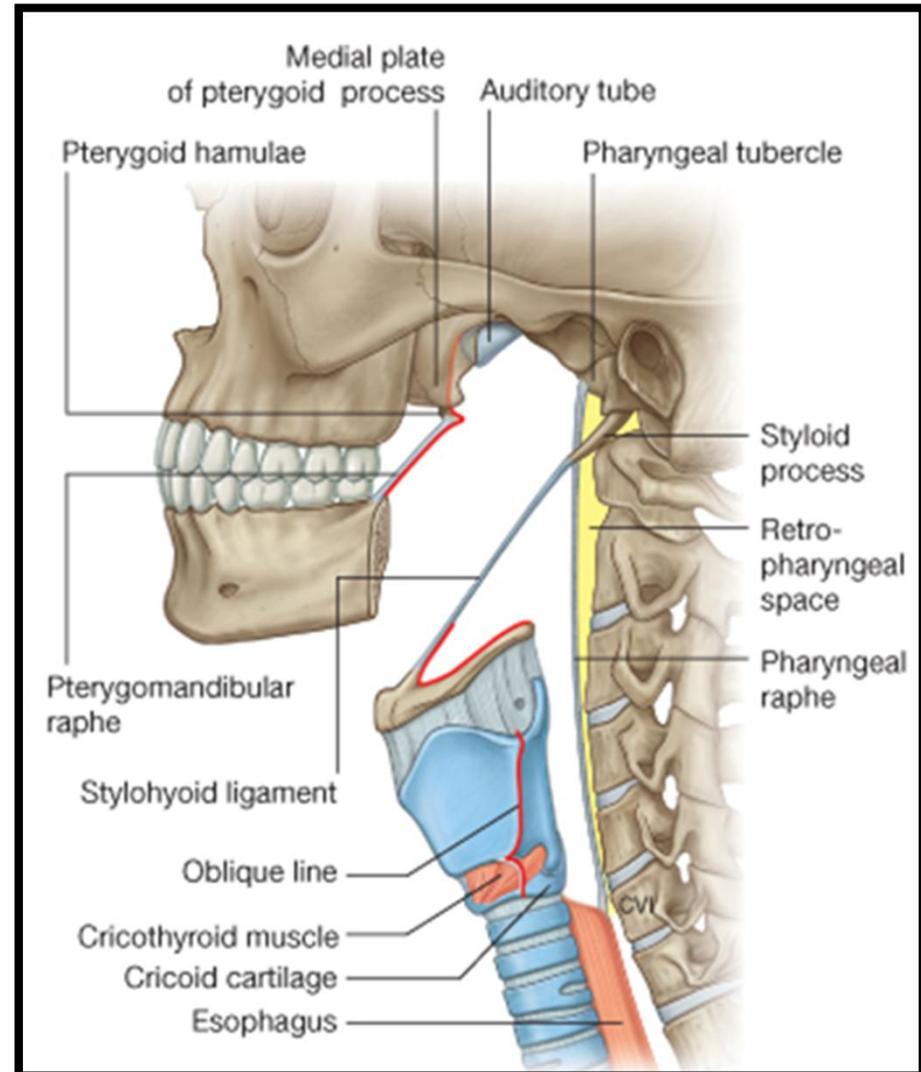
Lateral-

- Neurovascular bundle of neck.
- Styloid process with its attached muscles and ligaments.



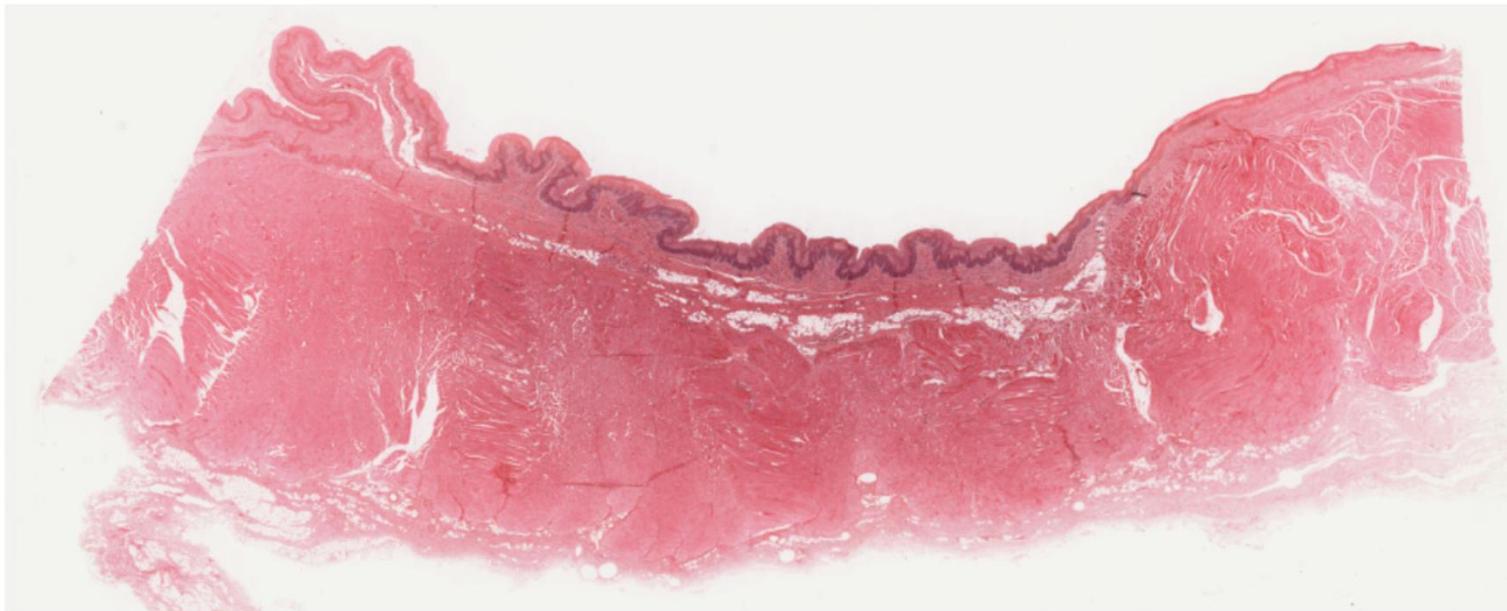
On each side

- i) It is attached to the
 - m**edial **p**terygoid plate
 - p**terygo **m**andibular raphe
 - m**andible
 - t**ongue
 - h**yoid bone
 - t**hyroid 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**



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.



Subdivisions

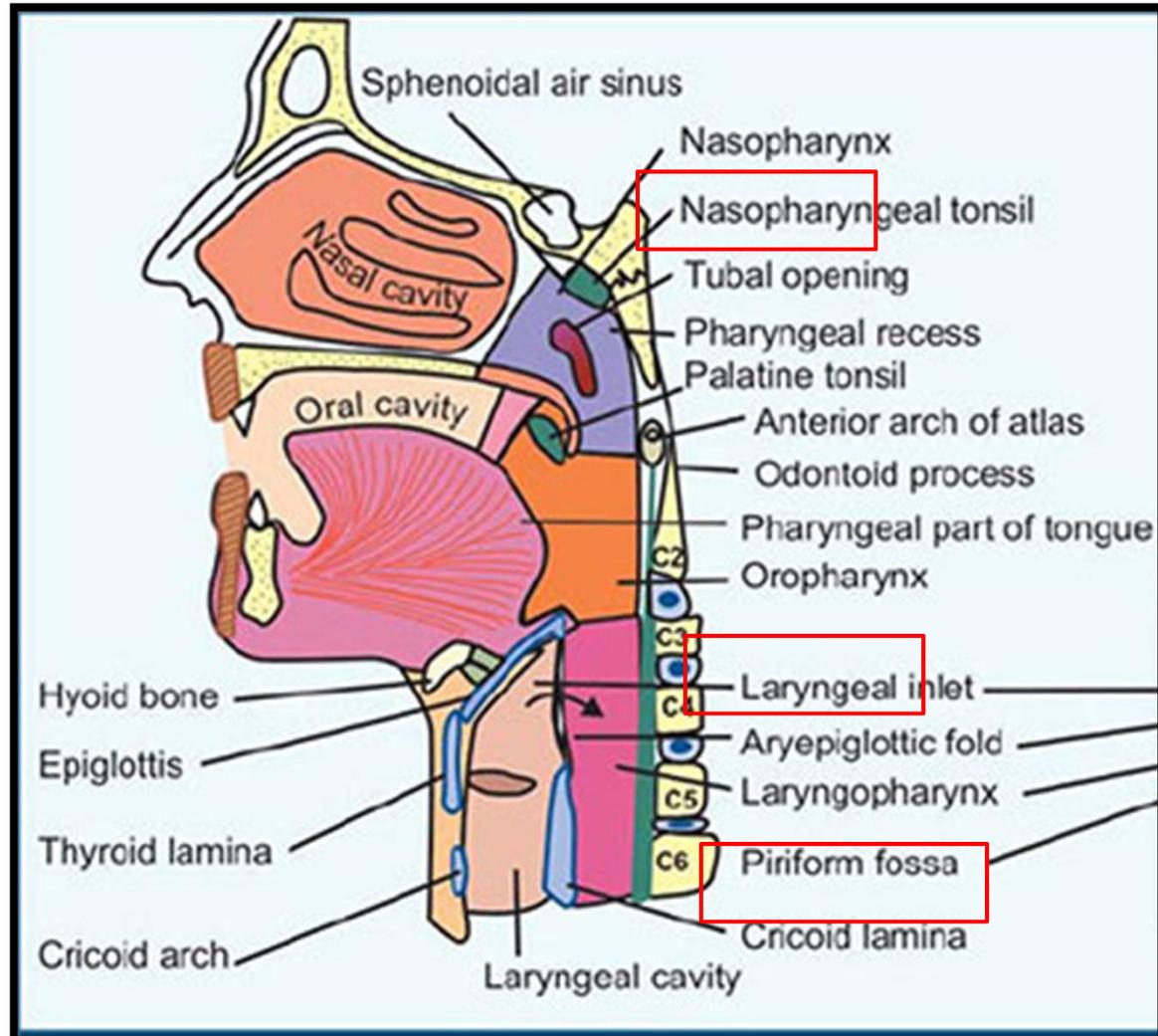
❖ 3

❖ From above downwards:

- 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)



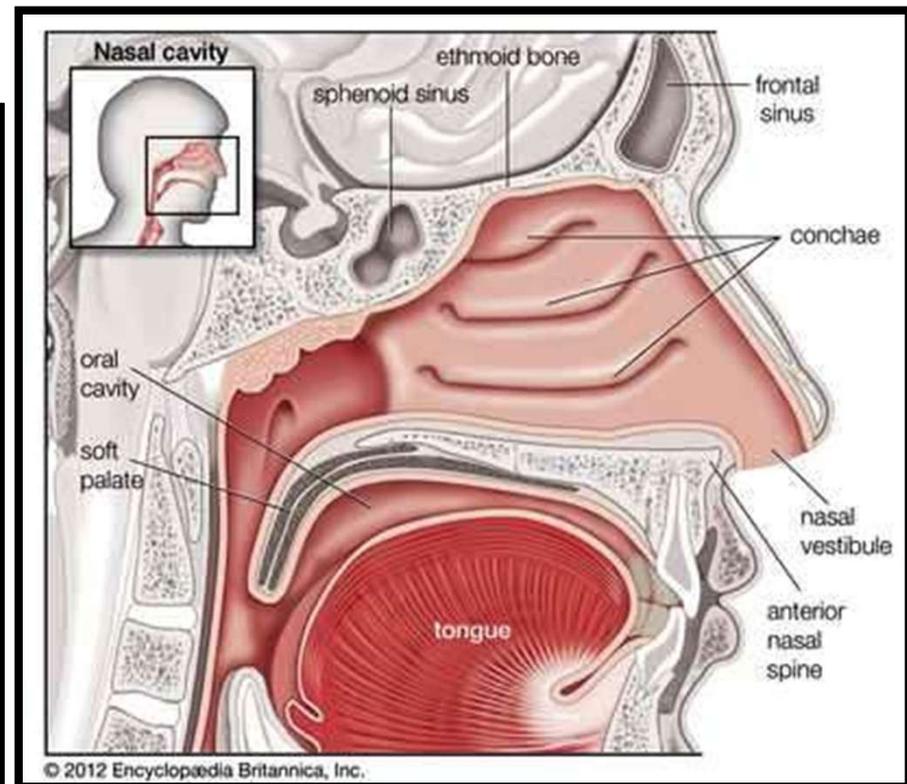
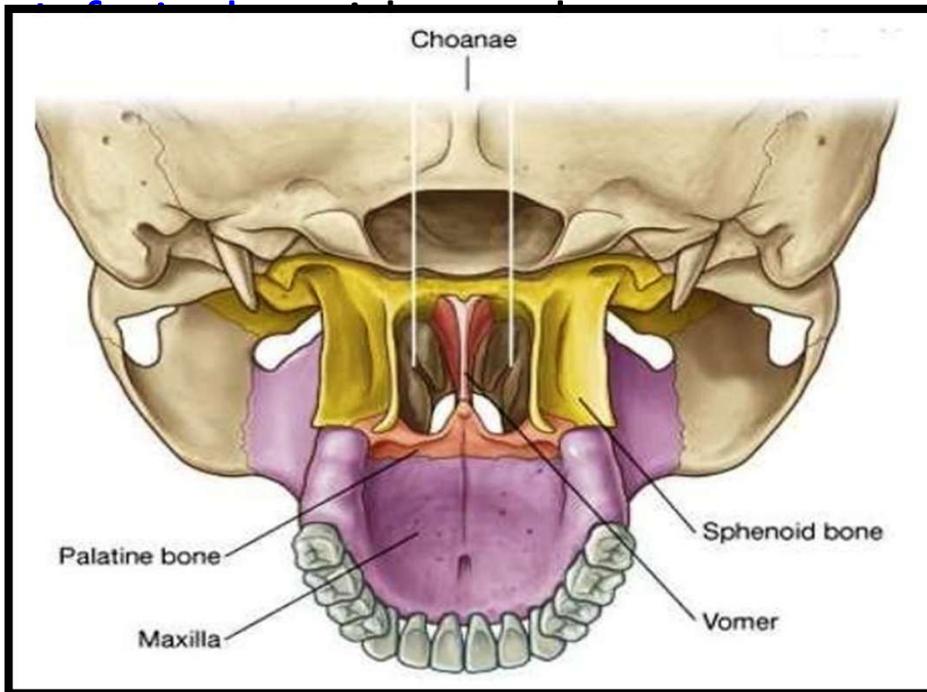
Nasopharynx

Location-

- Behind choanae (posterior nasal apertures) and above soft palate.

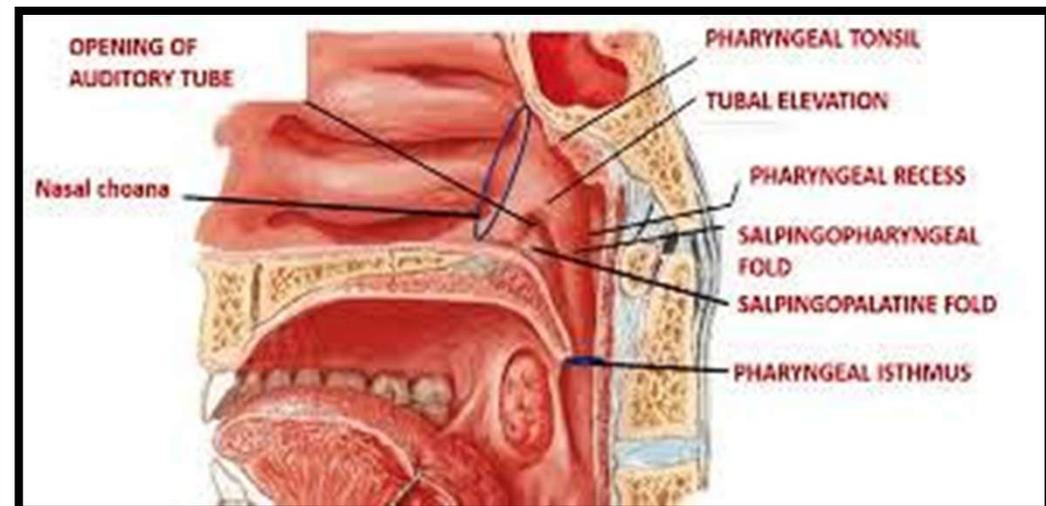
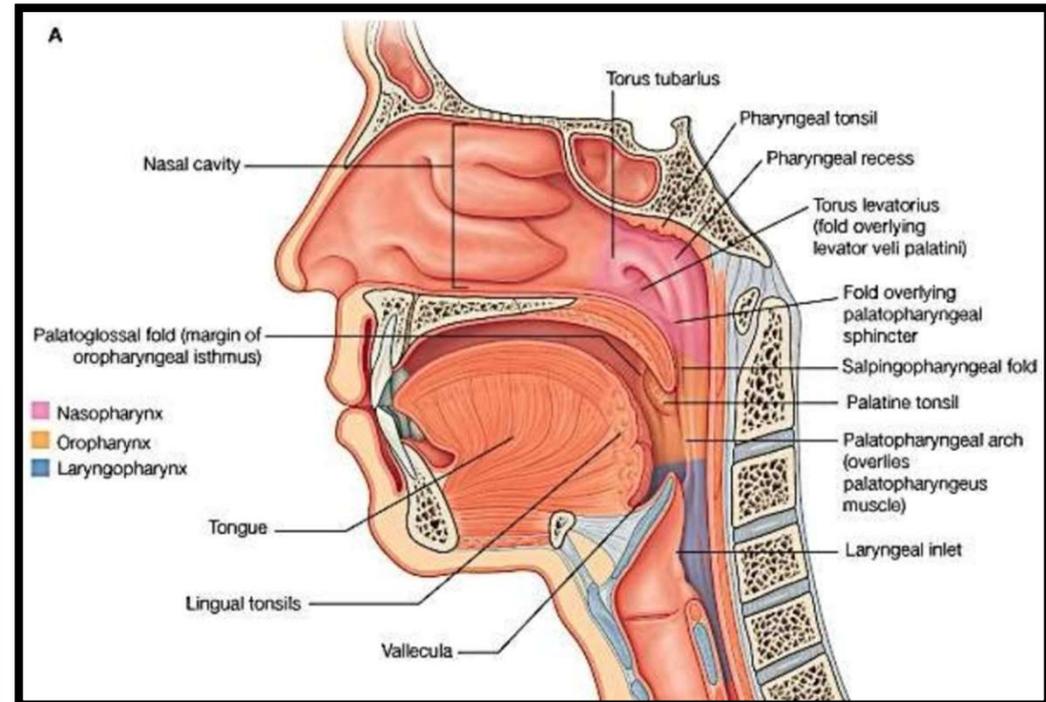
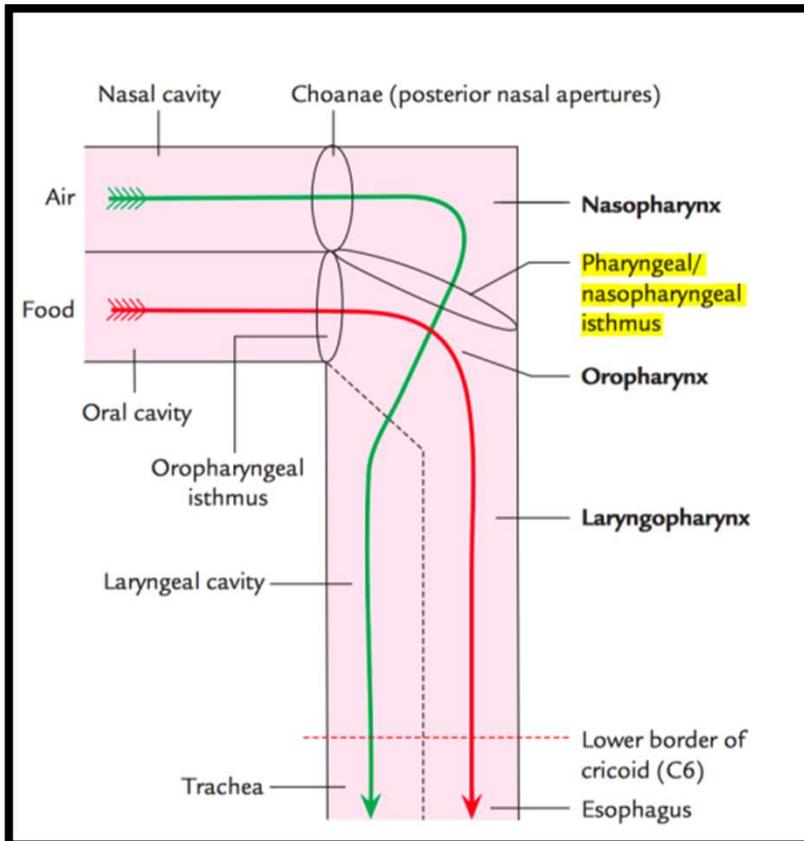
Communications-

Anteriorly- with nasal cavities.



Pharyngeal Isthmus [Nasopharyngeal Isthmus]

- An opening bounded anteriorly by the soft palate and posteriorly by the posterior wall of pharynx (Passavant's ridge).



Nasopharynx contd...

Features:

- Nasopharyngeal (Pharyngeal) Tonsil).
- Orifice of Pharyngo-tympanic tube (Auditory tube or Eustachian tube).
- Tubal elevation.
- Tubal tonsil.
- Salpingopharyngeal fold.
- Salpingopalatine fold.
- Pharyngeal recess (Fossa of Rosenmüller).

Nasopharyngeal (Pharyngeal) Tonsil [Adenoids]-

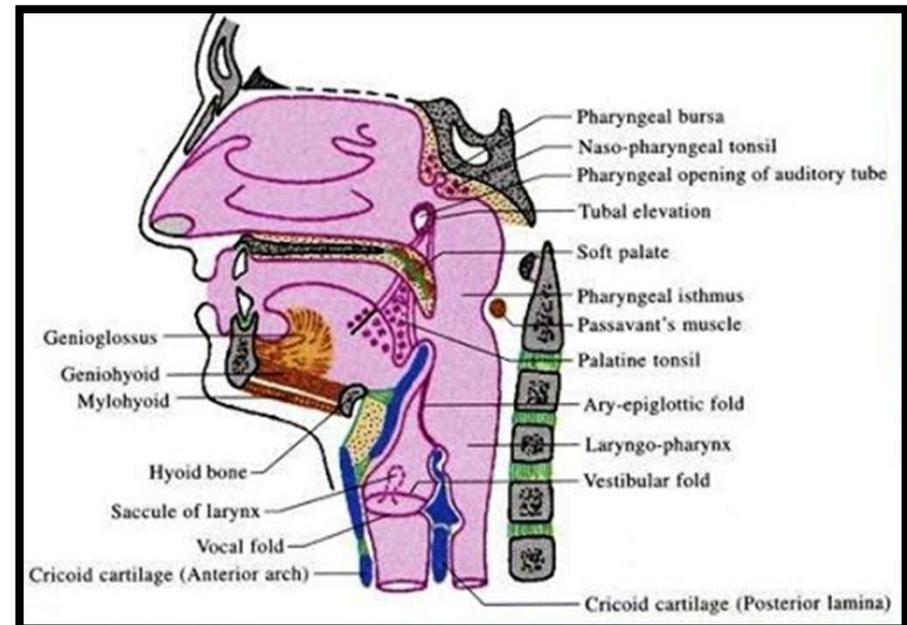
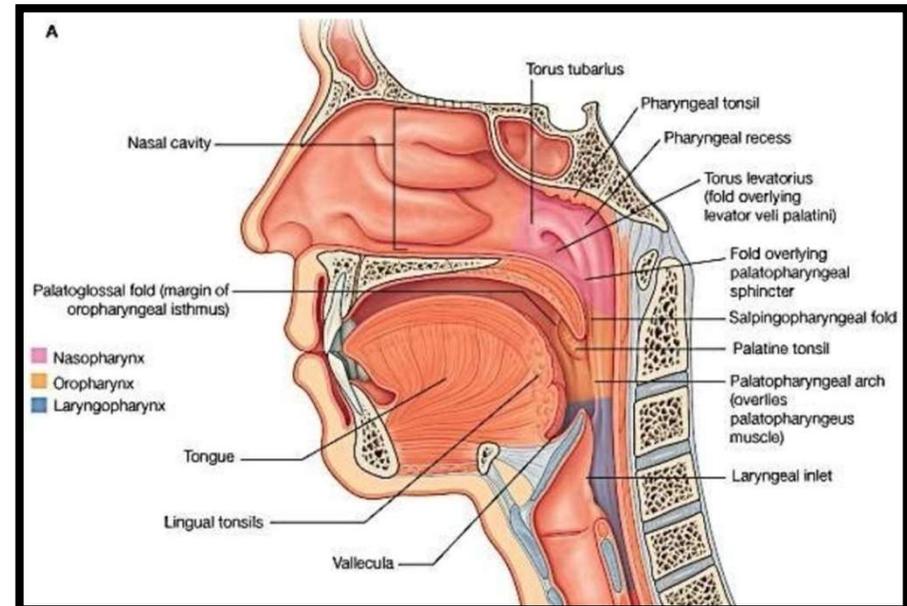
- A collection of lymphoid tissue.

Location- At the junction of roof and posterior wall of nasopharynx.

- Contains nasopharyngeal bursa.

Nasopharyngeal (Pharyngeal) bursa [Pouch of Luschka]-

- A mucous diverticulum which extends upwards into the substance of pharyngeal tonsil from its apex.
- It is developed due to adhesion of notochord to the dorsal wall of pharyngeal part of foregut.



Nasopharynx contd...

Orifice of Pharyngo-tympanic tube (Auditory tube or Eustachian tube)-

Location-

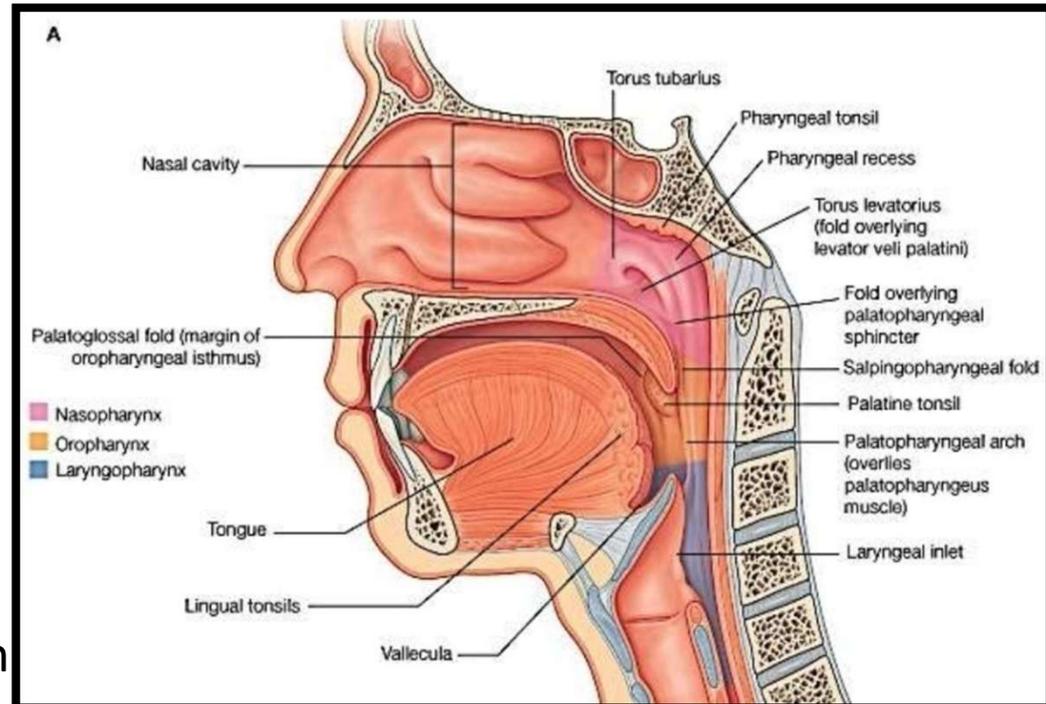
- On lateral wall of nasopharynx, approximately **1.25 cm** behind inferior nasal concha.

Tubal elevation-

- Upper and posterior margins of orifice of eustachian tube are elevated due to collection of lymphoid tissue.
- These elevated margins are known as tubal elevation.

Tubal tonsil-

- Collection of lymphoid tissue in tubal elevation is known as tubal tonsil.



Nasopharynx contd...

Salpingopharyngeal fold-

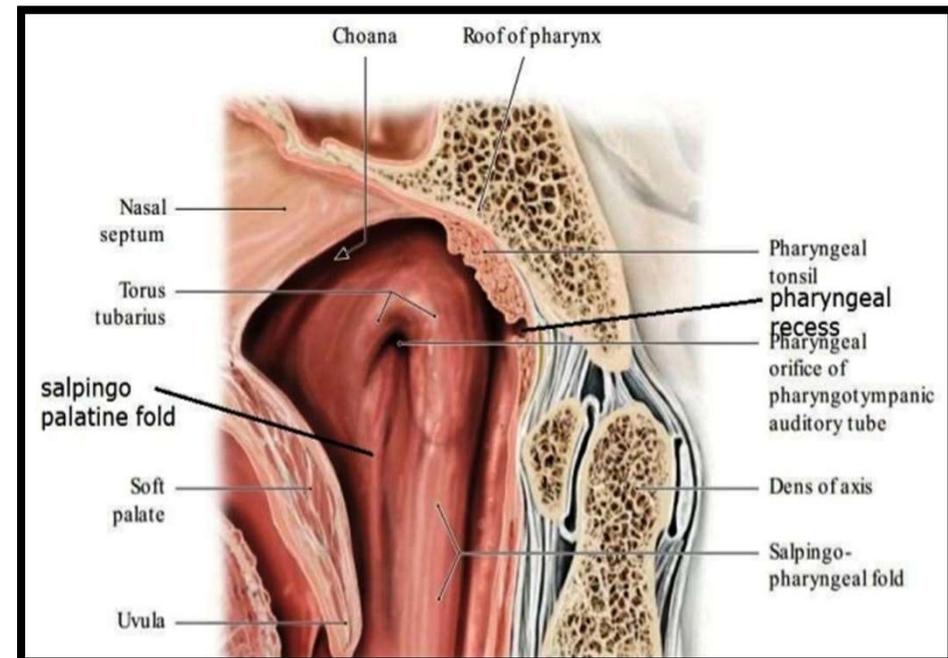
- A mucous fold which extends vertically downwards on the side wall of pharynx from tubal elevation.
- It contains **Salpingopharyngeus** muscle.

Salpingopalatine fold-

- A mucous fold which extends downwards and forwards to the soft palate from tubal elevation.
- It contains **Levator Palati** muscle.

Pharyngeal recess (Fossa of Rosenmüller).

- It is a deep depression behind the tubal elevation.

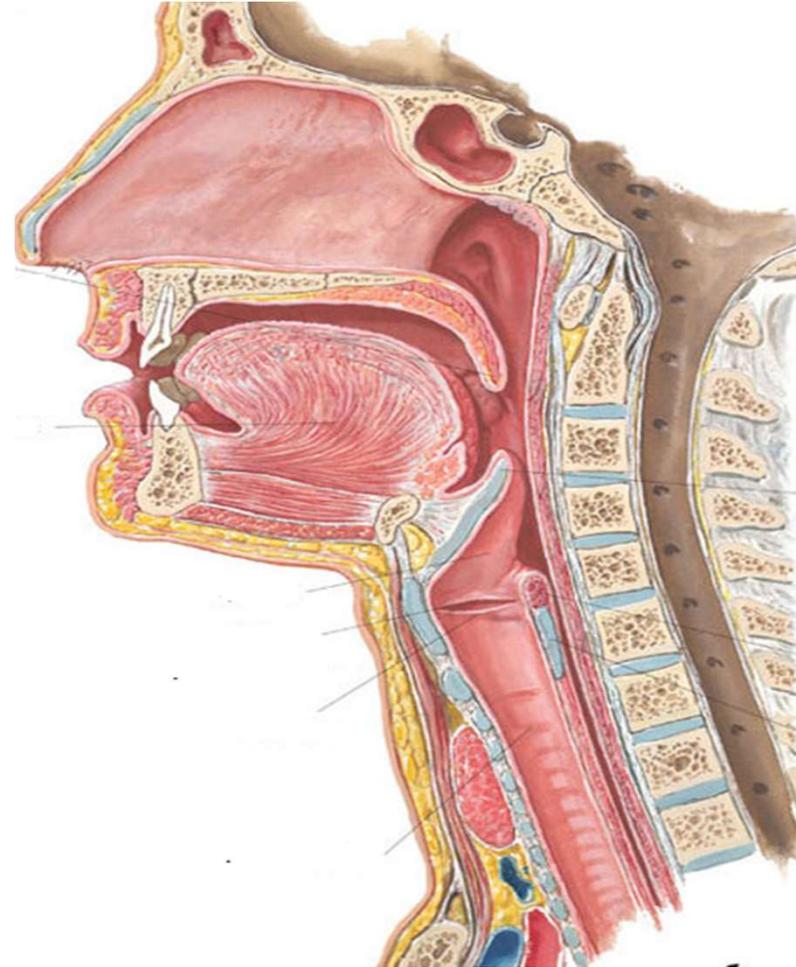


Nasopharynx Cont

Sinus of Morgagni-space between skull and upper free border of superior constrictor muscle. Structures passing through this gap-

- Levator veli palatini
- Ascending palatine artery
- Tensor veli palatini
- Eustachian tube

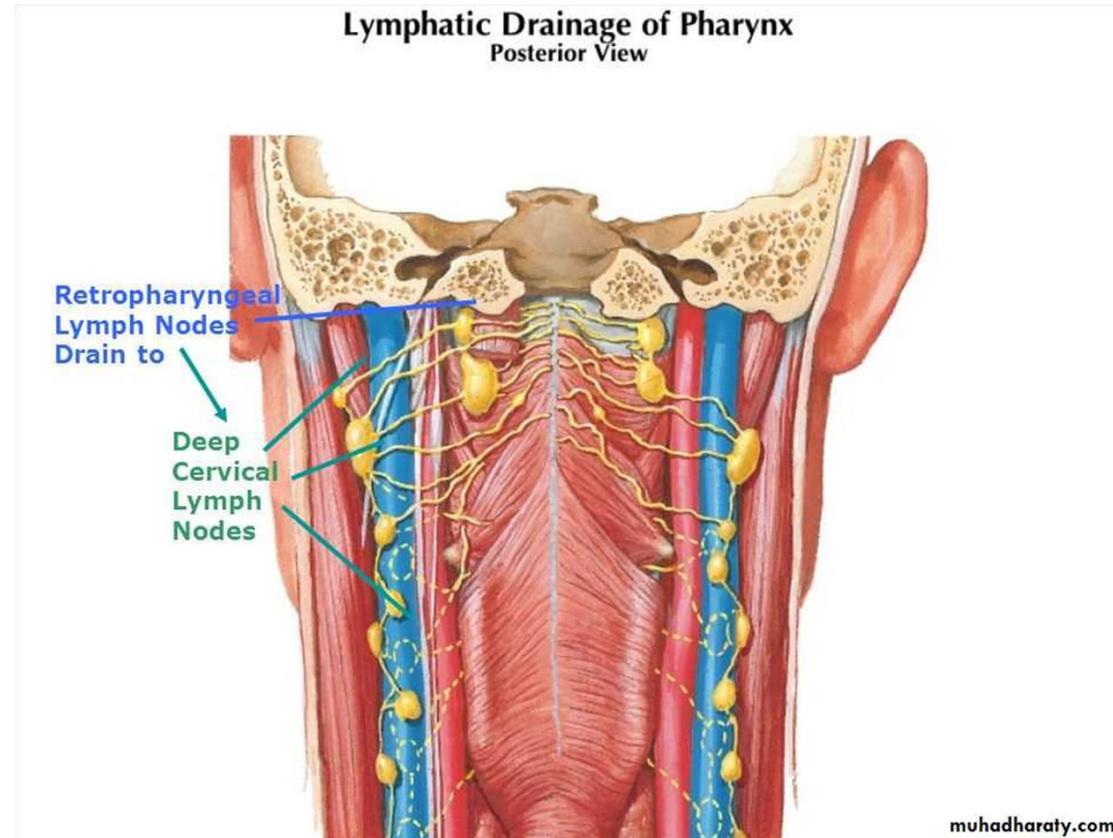
Passavant's Ridge-mucosal ridge raised by fibres of **Palatopharyngeus**. It encircles posterior and lateral walls of nasopharyngeal isthmus. Soft palate during its contraction makes firm contact with this ridge to cut off nasopharynx from oropharynx during deglutition or speech



Nasopharynx is lined by **Pseudostratified Ciliated Columnar** epithelium.

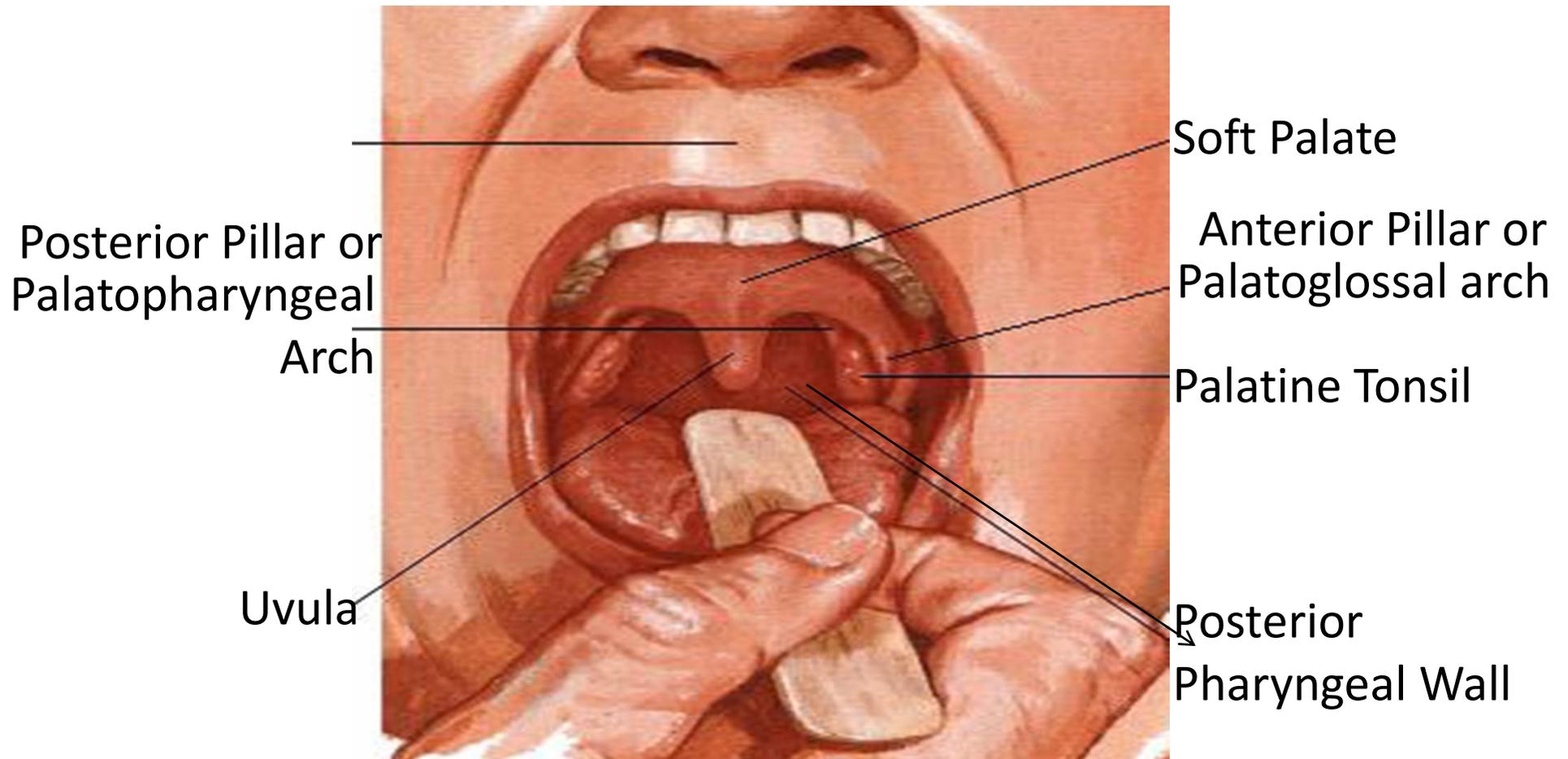
Lymphatic drainage-

- Deep cervical nodes
- Spinal accessory chain of nodes
- Contralateral lymph nodes



OROPHARYNX

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



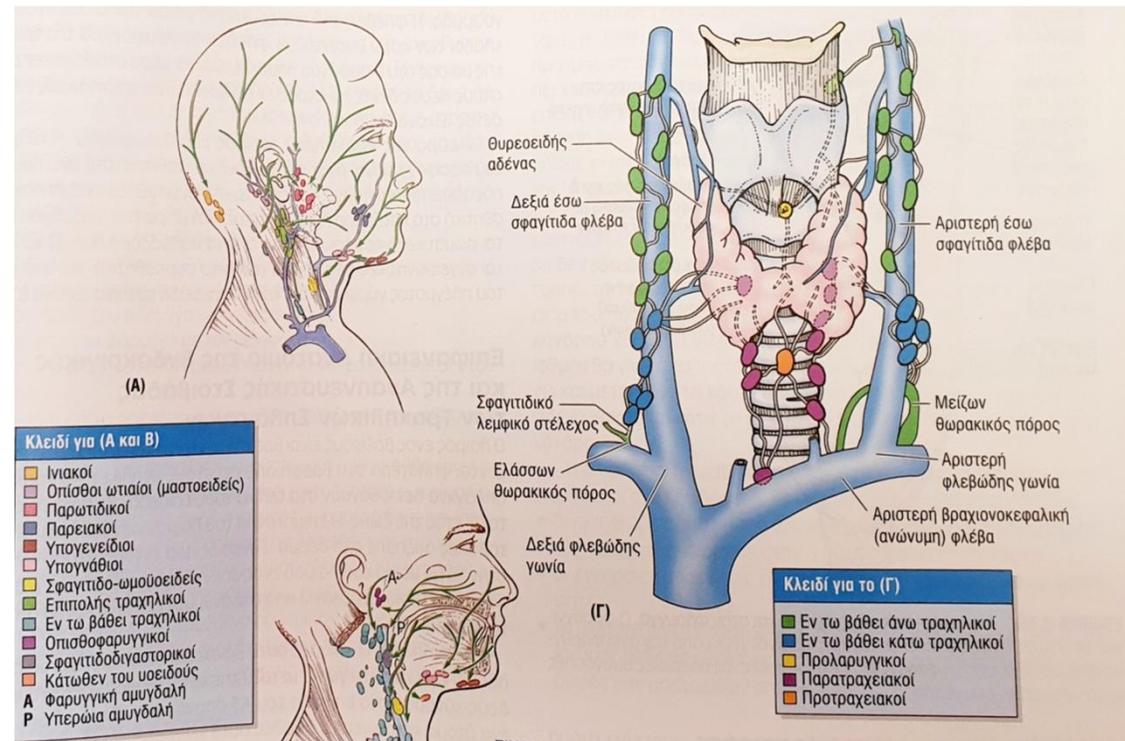
Boundaries

- **Above**- communicates with nasopharynx through nasopharyngeal isthmus.
- **Below**- opens into laryngopharynx.
- **Anterior wall**-
 - upper part- deficient, oropharynx communicates with oral cavity through Oropharyngeal isthmus/ Isthmus of Fauces.
 - lower part- base of tongue
 - lingual tonsils
 - valleculae
- **Posterior wall**- Third cervical vertebrae.
- **Lateral wall**- Palatine/Faucial tonsil
 - Anterior pillar (Palatoglossus muscle)
 - Posterior pillar (Palatopharyngeus muscle)

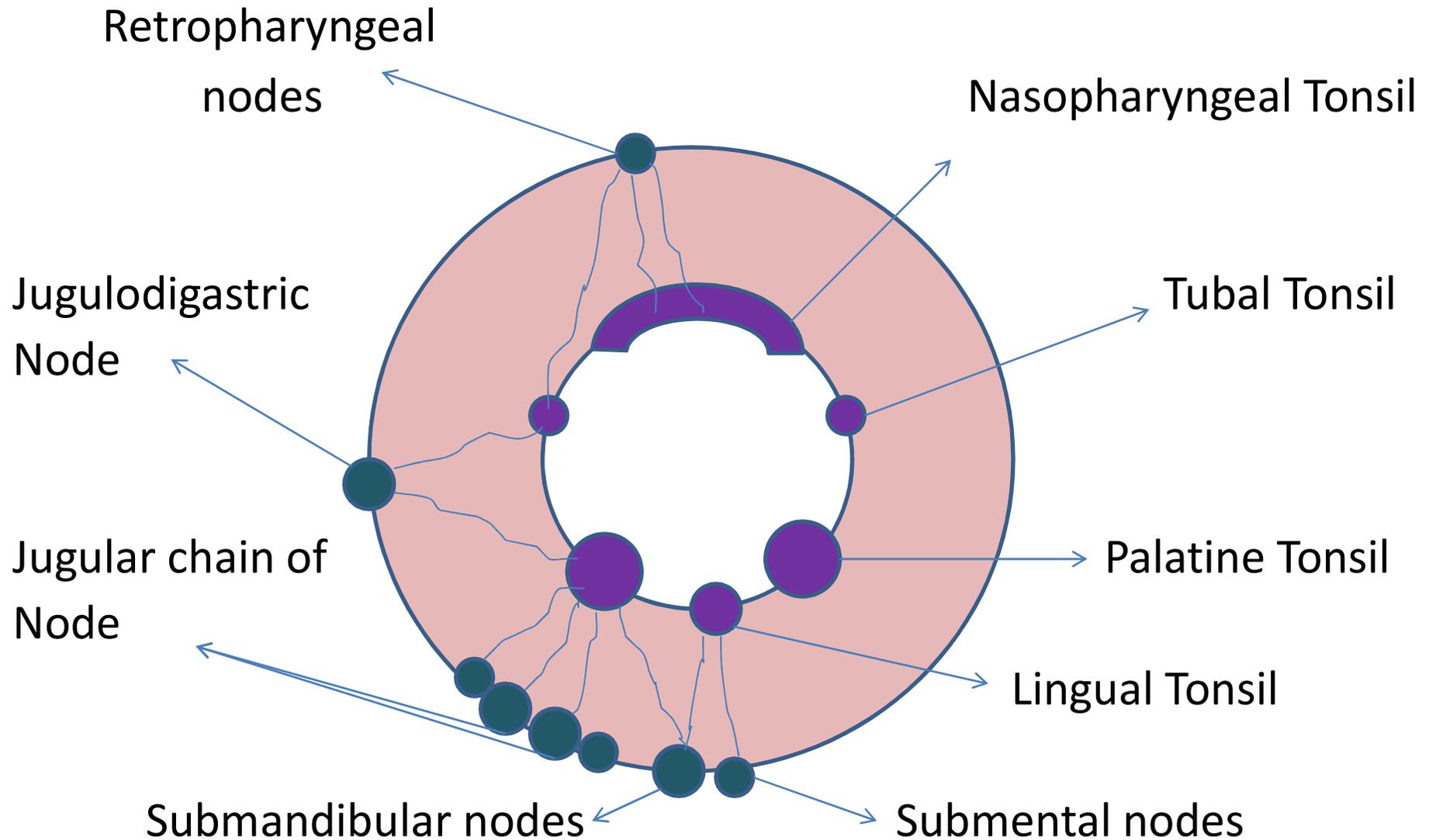
Lymphatic drainage

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.**



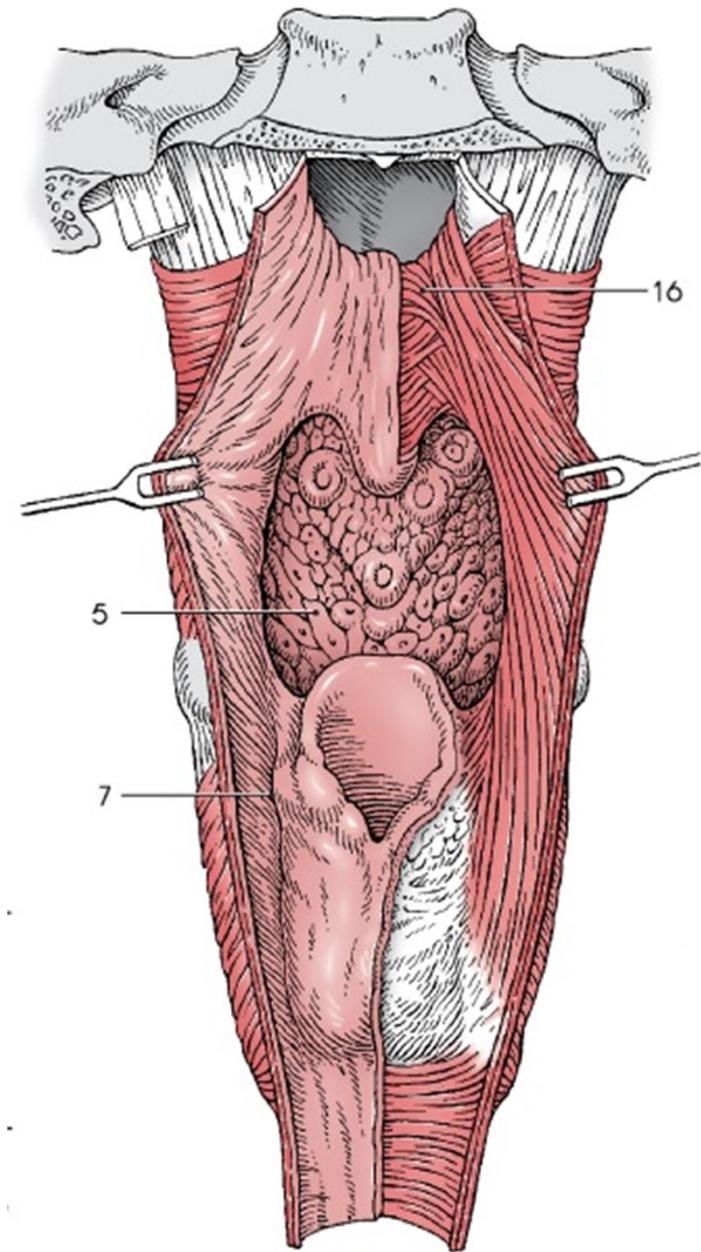
Laryngopharynx

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-

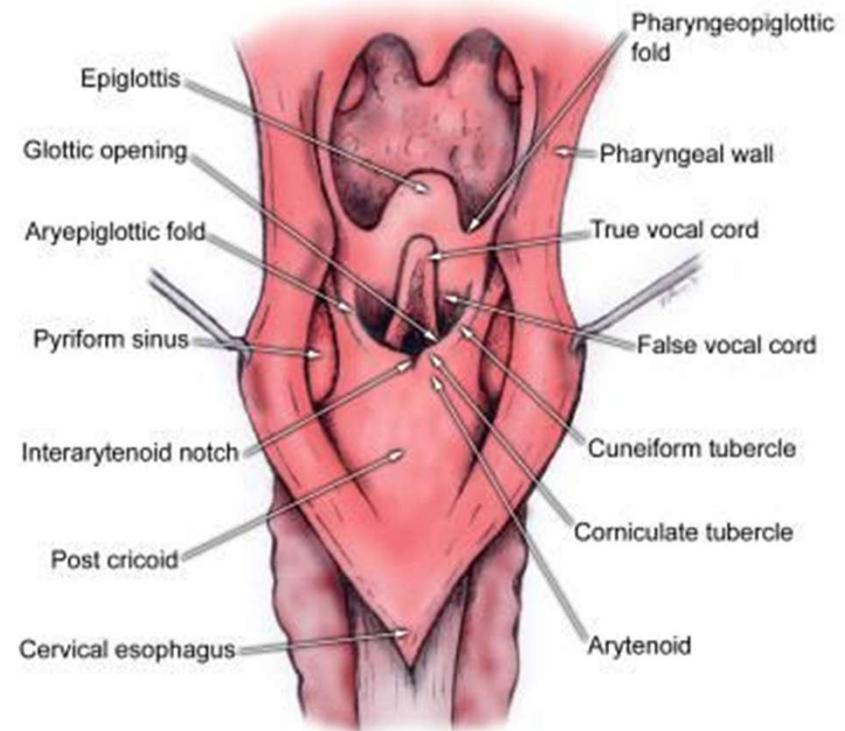
1. Pyriform Sinus (fossa)
2. Post-cricoid region
3. Posterior Pharyngeal wall



Οπίσθια άποψη
του φάρυγγα, ανοιγμένος

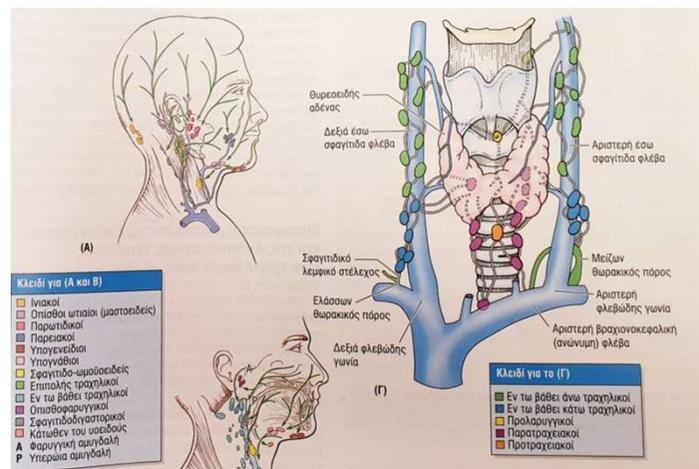
Pyiform Sinus

- 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.



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

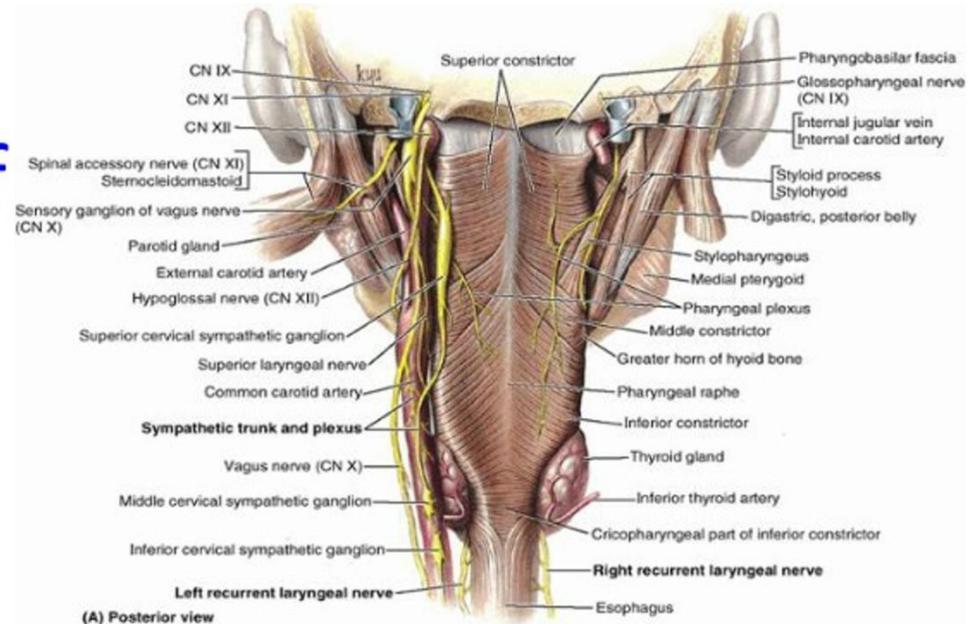
Pharyngeal plexus of nerves formed by-

- pharyngeal branch of vagus nerve
- pharyngeal branches of glossopharyngeal nerve.
- pharyngeal branches of superior cervical sympathetic ganglion

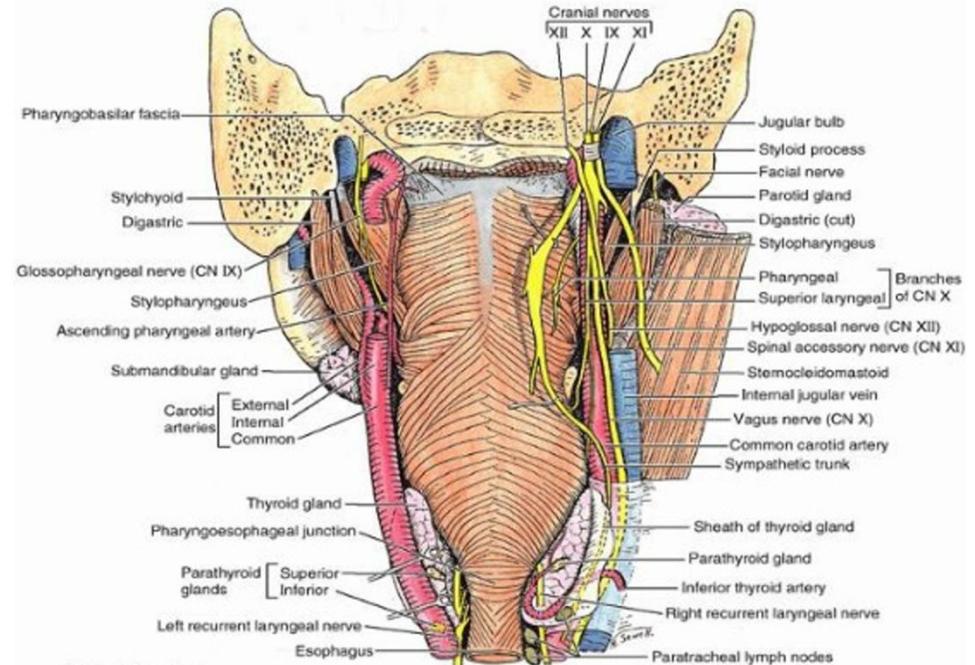
- ☐ Motor fibres-Vagus N. – supply all muscles of pharynx except Stylopharyngeus (glossopharyngeal N.)
- ☐ Sensory fibres-Glossopharyngeal N. and Vagus N.

Nerve supply of the pharynx

- **Pharyngeal Plexus**
- Situated in the buccopharyngeal fascia surrounding the pharynx
- Supplies most innervation to pharynx; composed of **CN IX** (*sensory*), **CN X** (*motor*) & *sympathetics* from **superior cervical ganglion** .
- except the stylopharyngeus (derives motor innervation from the glossopharyngeal nerve)



(A) Posterior view



(B) Posterior view

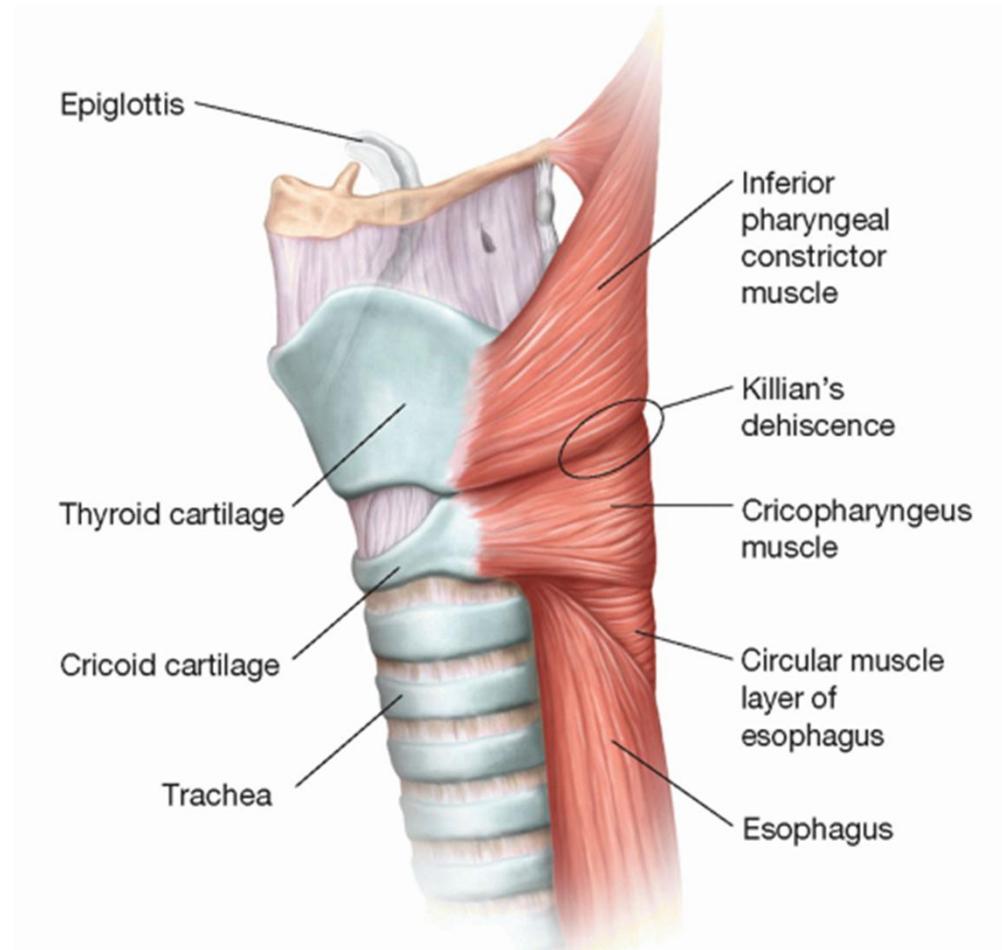
Killian's Dehiscence

Inferior constrictor muscle has 2 parts:

1. **Thyropharyngeus:** has oblique fibres
2. **Cricopharyngeus:** has transverse fibres

Potential gap between these 2 parts is **KILLIAN'S DEHISCENCE** or **Gateway of Tears**.

This is the site for herniation of pharyngeal mucosa in cases of pharyngeal pouch.



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

Pharyngeal Spaces

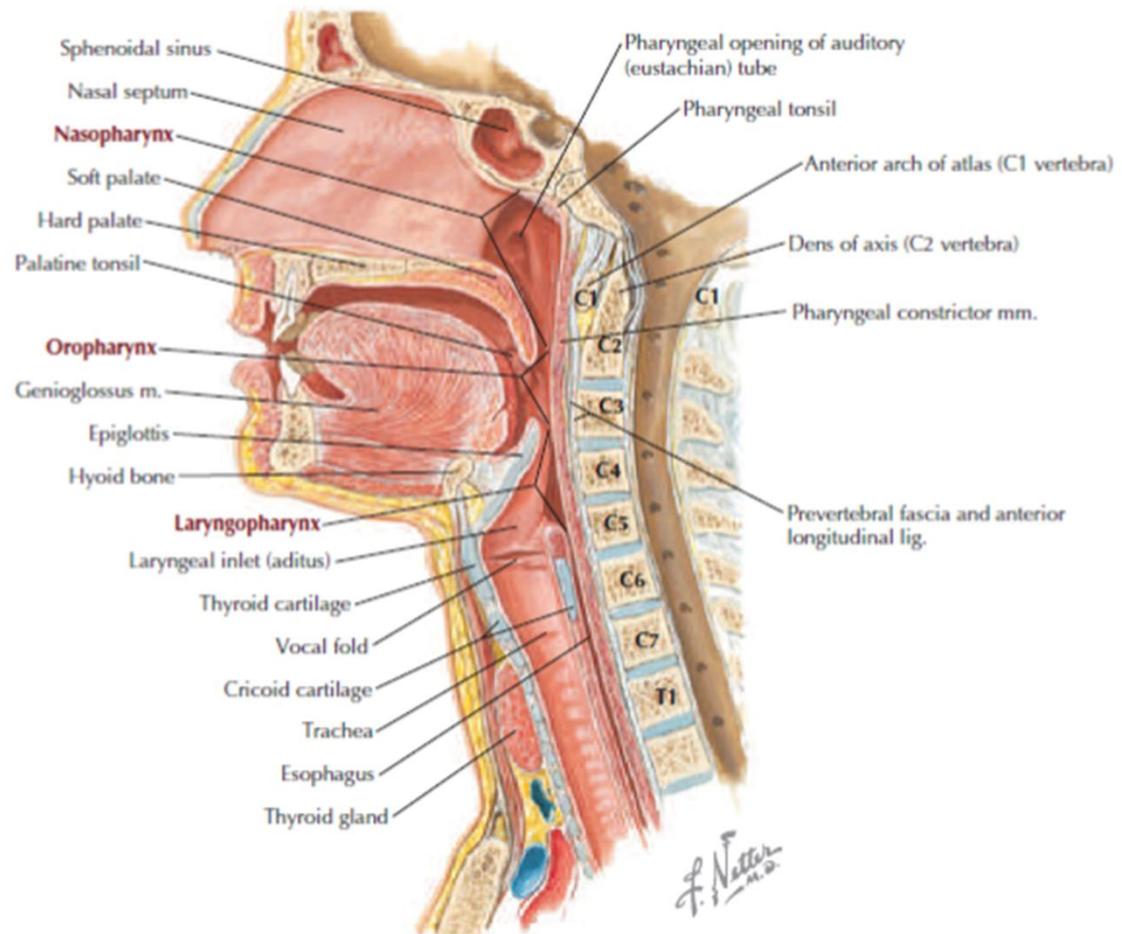


FIGURE 8.55 Subdivisions of the Pharynx. (From *Atlas of human anatomy*, ed 77, Plate 77.)

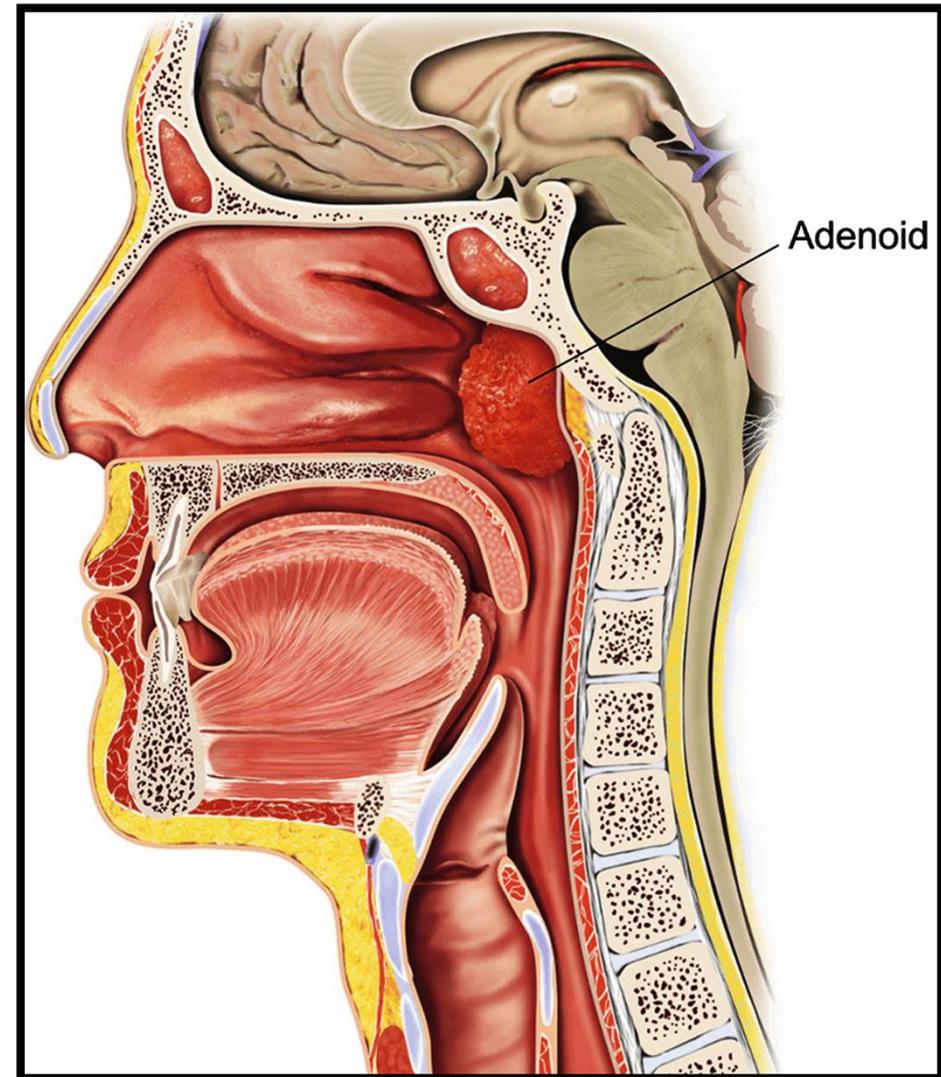
Clinical Points

Adenoids-

- Enlarged nasopharyngeal tonsils due to infection.
- Block the posterior nares.

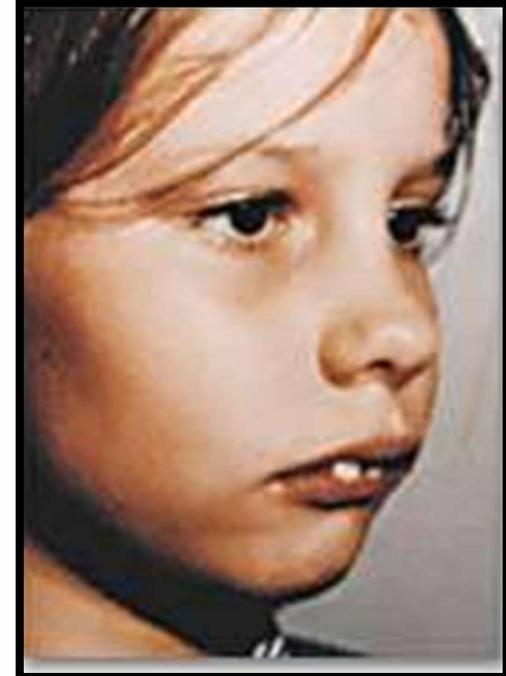
Clinical Features-

- Nasal obstruction.
 - Nasal discharge.
 - Mouth breathing.
 - Snoring.
 - Protrusion of tongue.
 - Toneless voice
 - Small nose.
 - Epistaxis (Nose Bleeding).
-
- Nasopharyngeal tonsils are prominent in children up to the age of 6 years.
 - They gradually undergo atrophy at puberty.
 - They completely disappear by the age of 20 years.



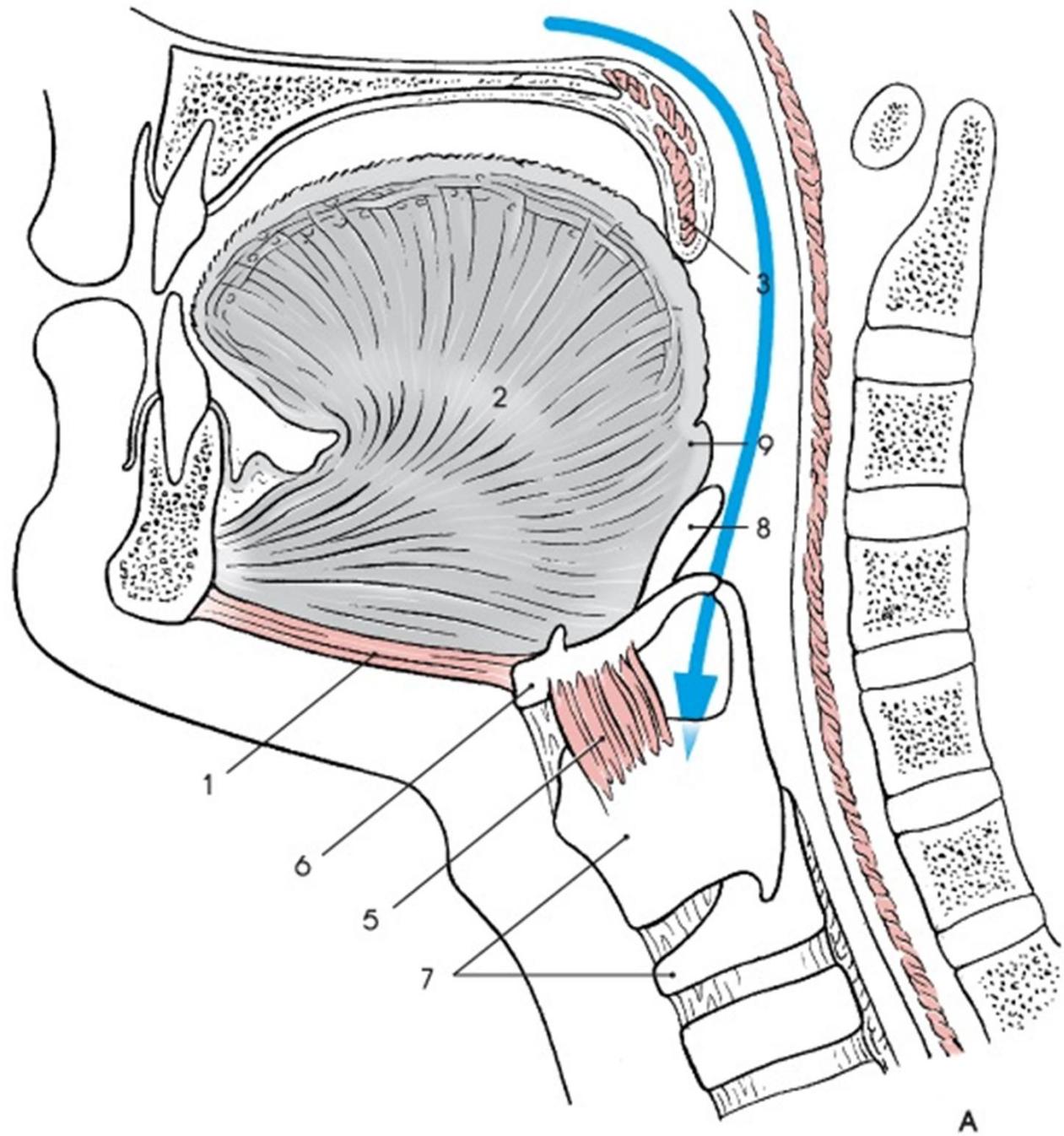
Adenoid Facies [Long Face Syndrome]

- Long, open-mouthed face of children with adenoid hypertrophy.
- These children are 'Obligatory Mouth Breathers'.
- Persistent mouth breathing may be associated with development of craniofacial anomalies.
- The **characteristic facial appearance** consists of:
 - Underdeveloped thin nostrils
 - Short upper lip
 - Prominent upper teeth
 - Crowded teeth
 - Narrow upper alveolus.
 - High-arched palate
 - Hypoplastic maxilla



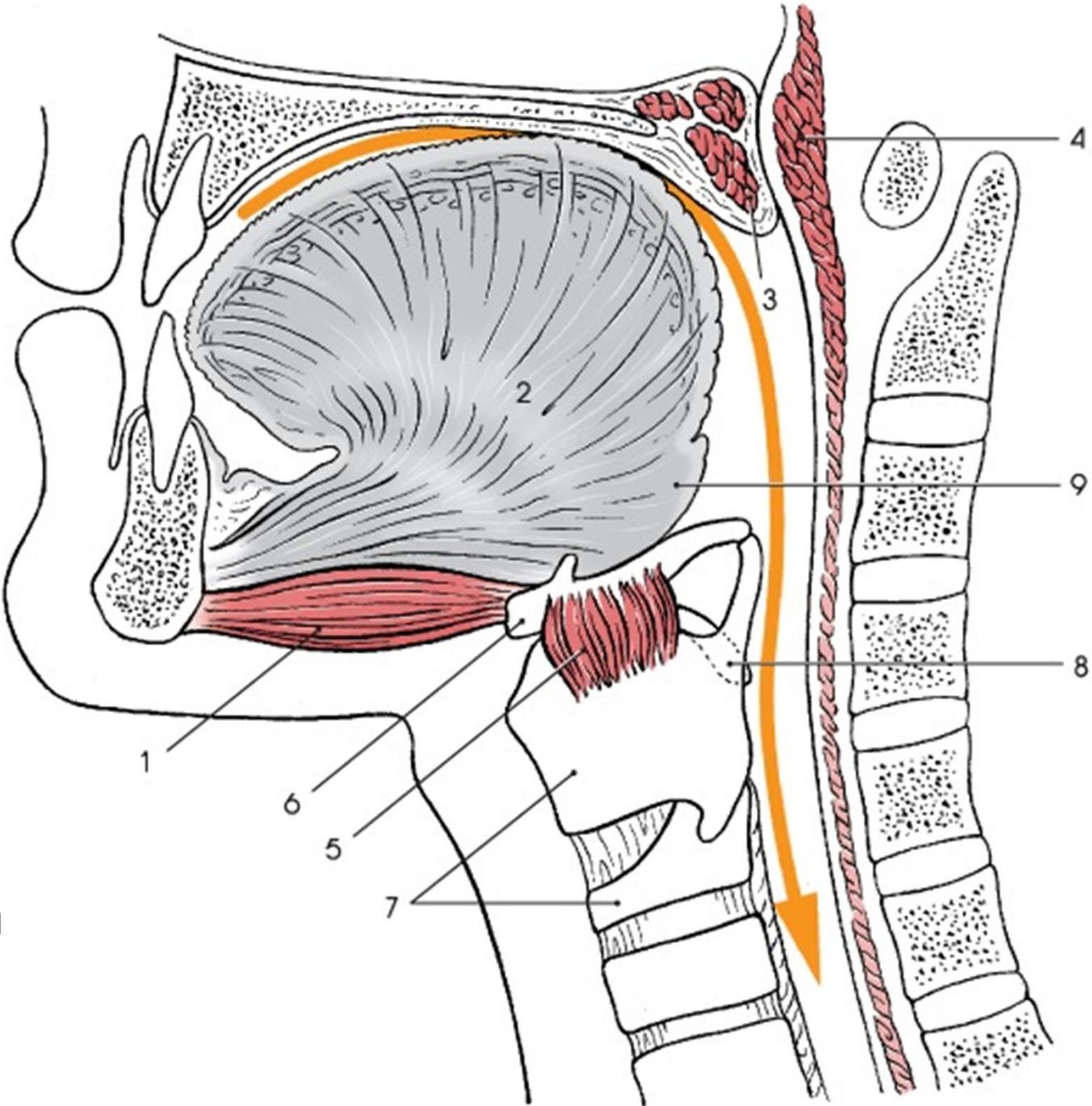
Deglutition

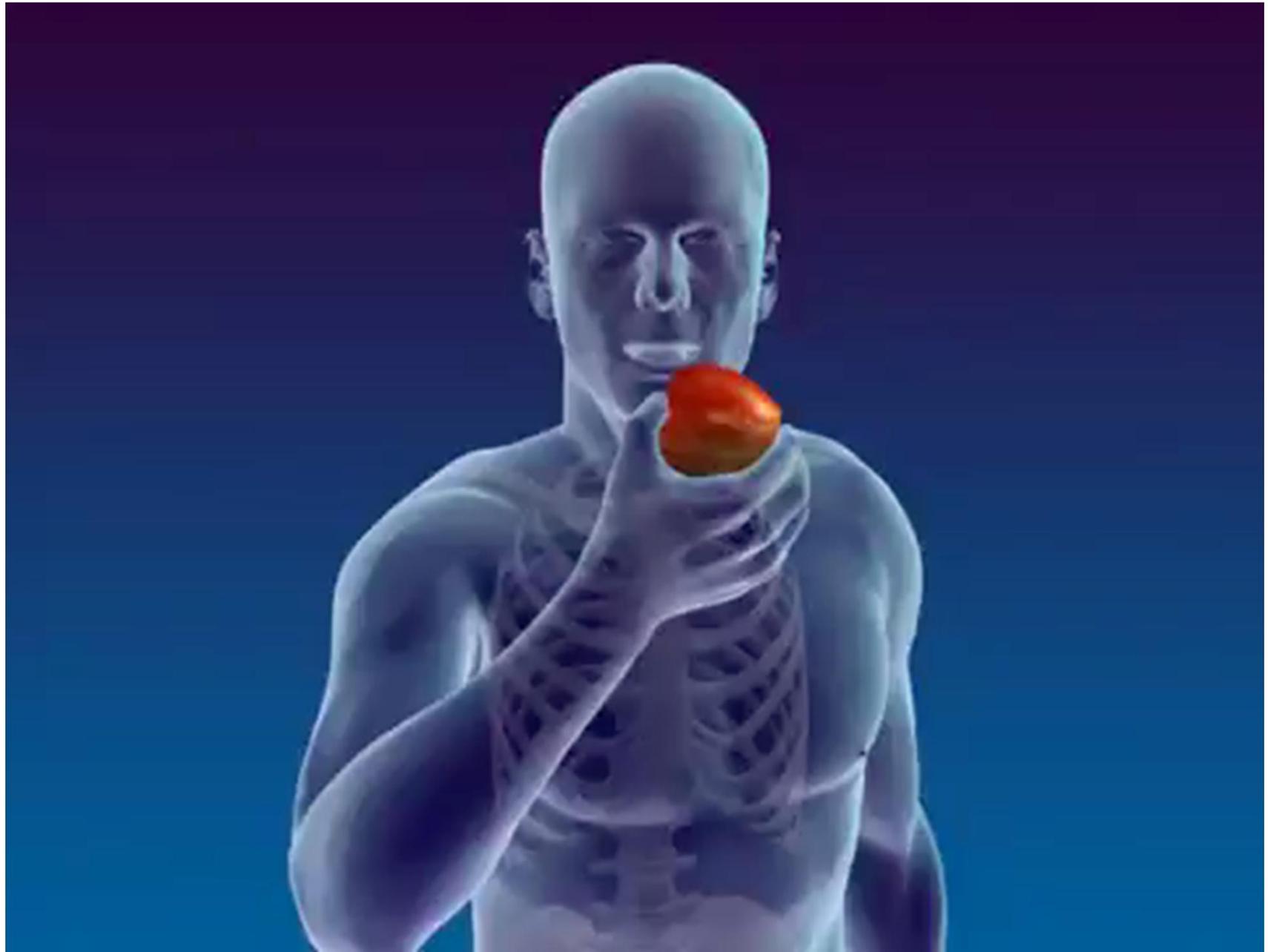
Swallowing

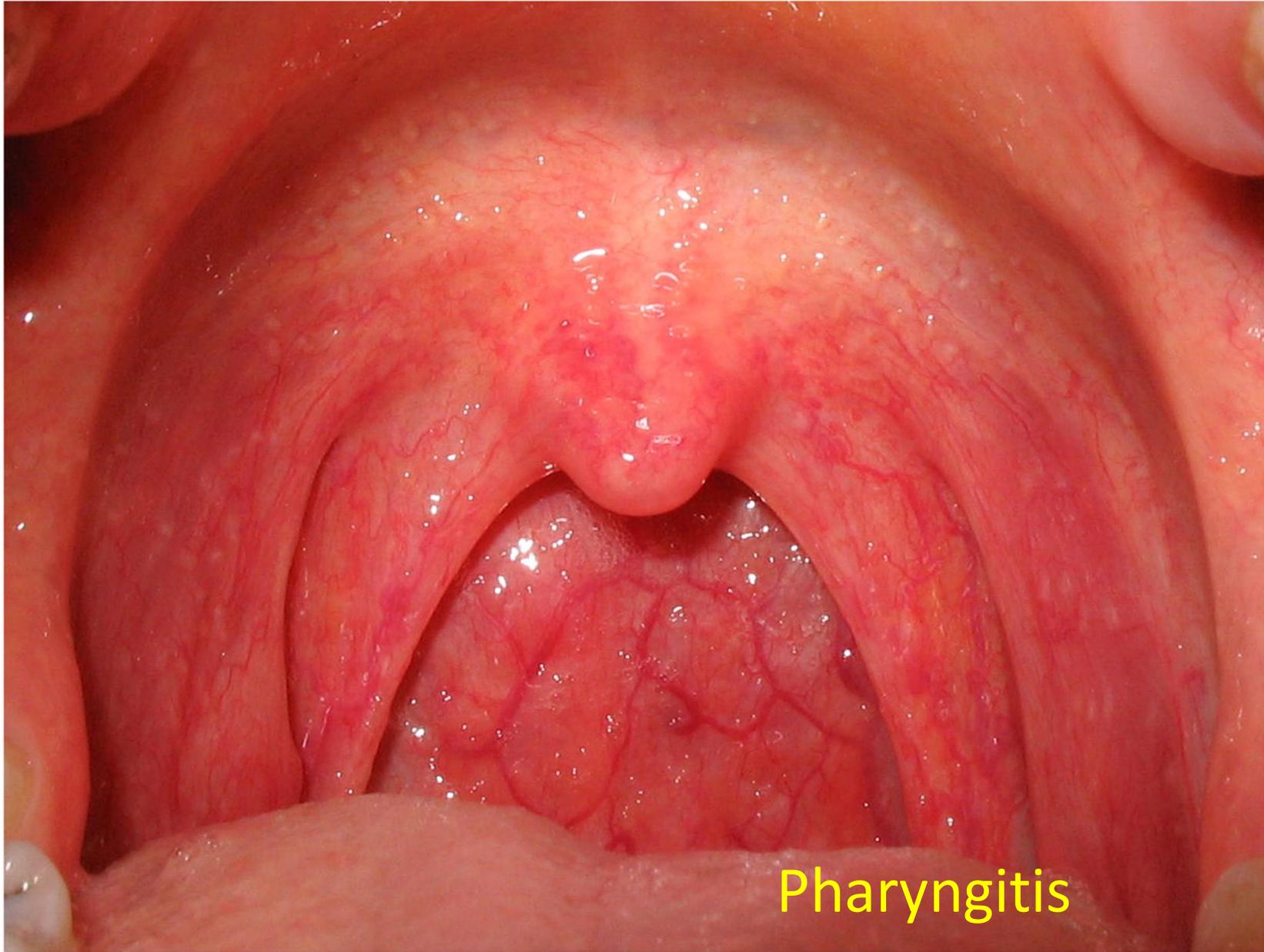


Deglutition

Swallowing



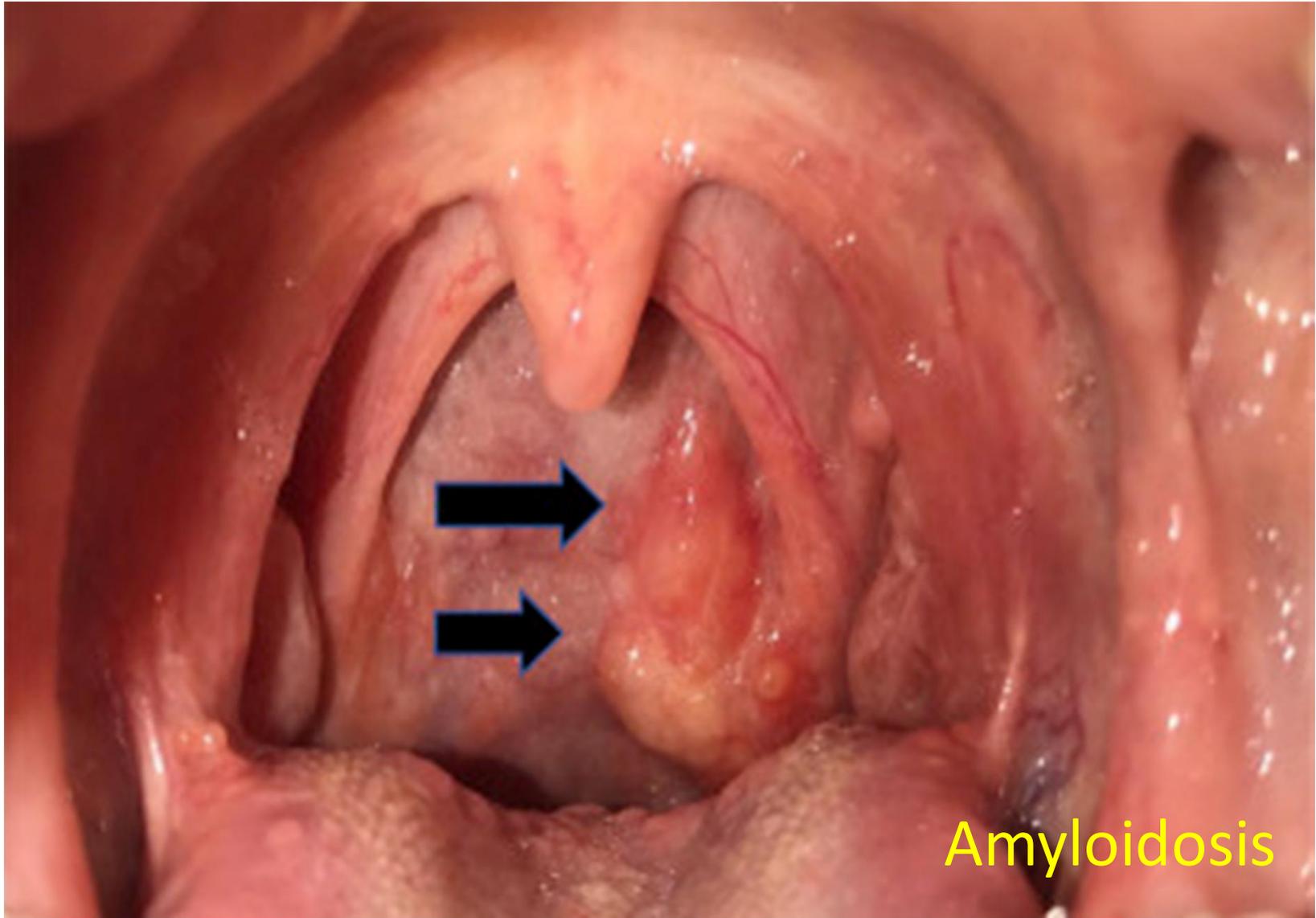




Pharyngitis

Tonsillitis

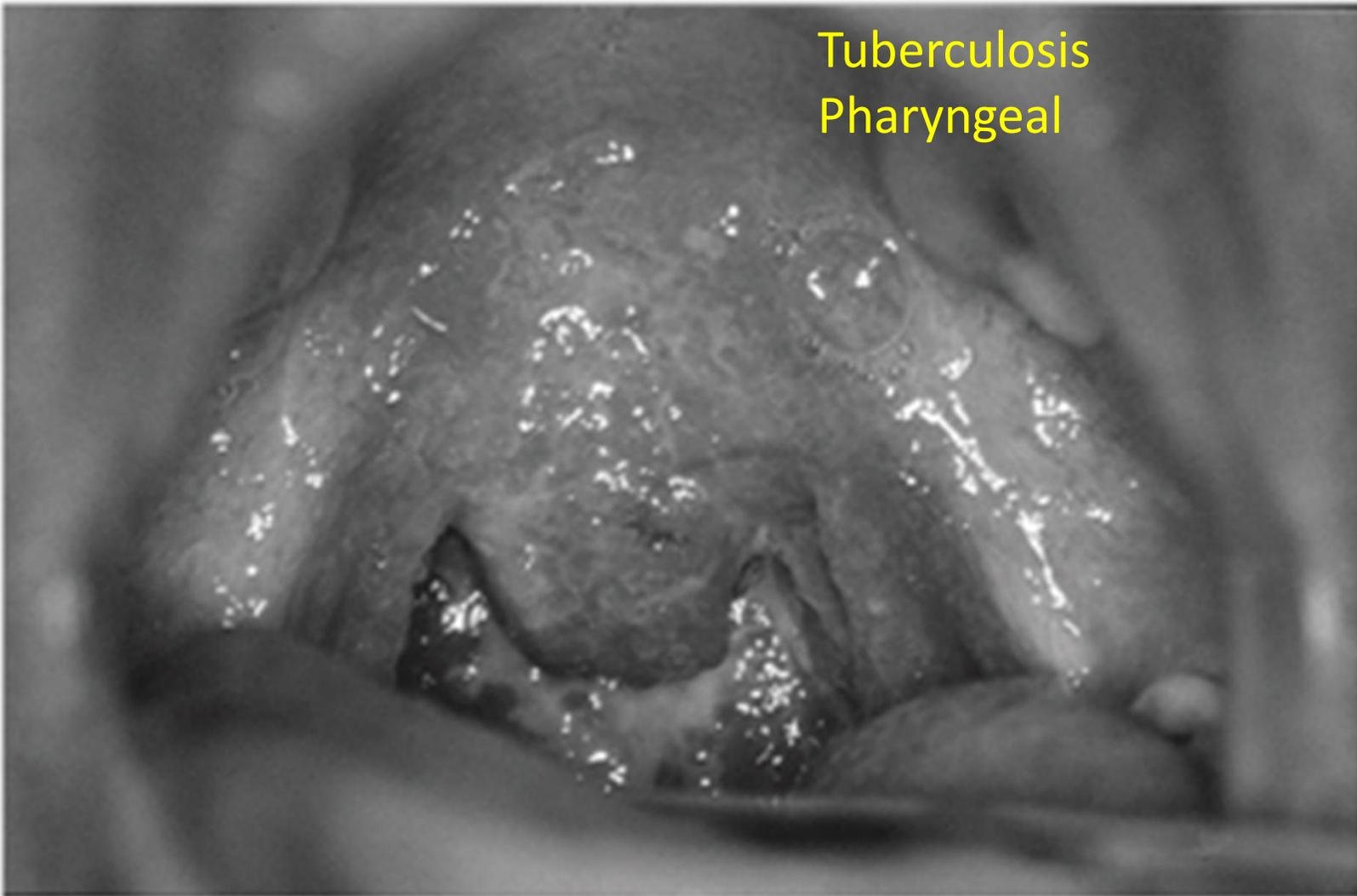




Amyloidosis

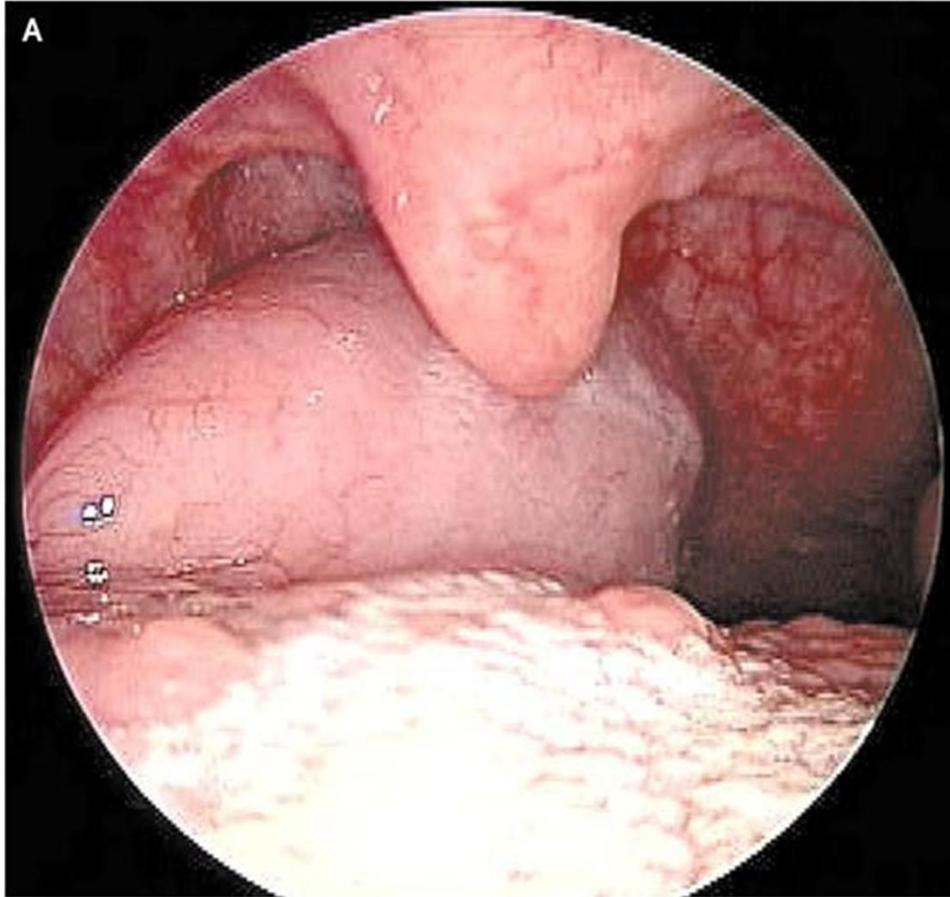
Streptococcal
tonsilitis





Tuberculosis
Pharyngeal

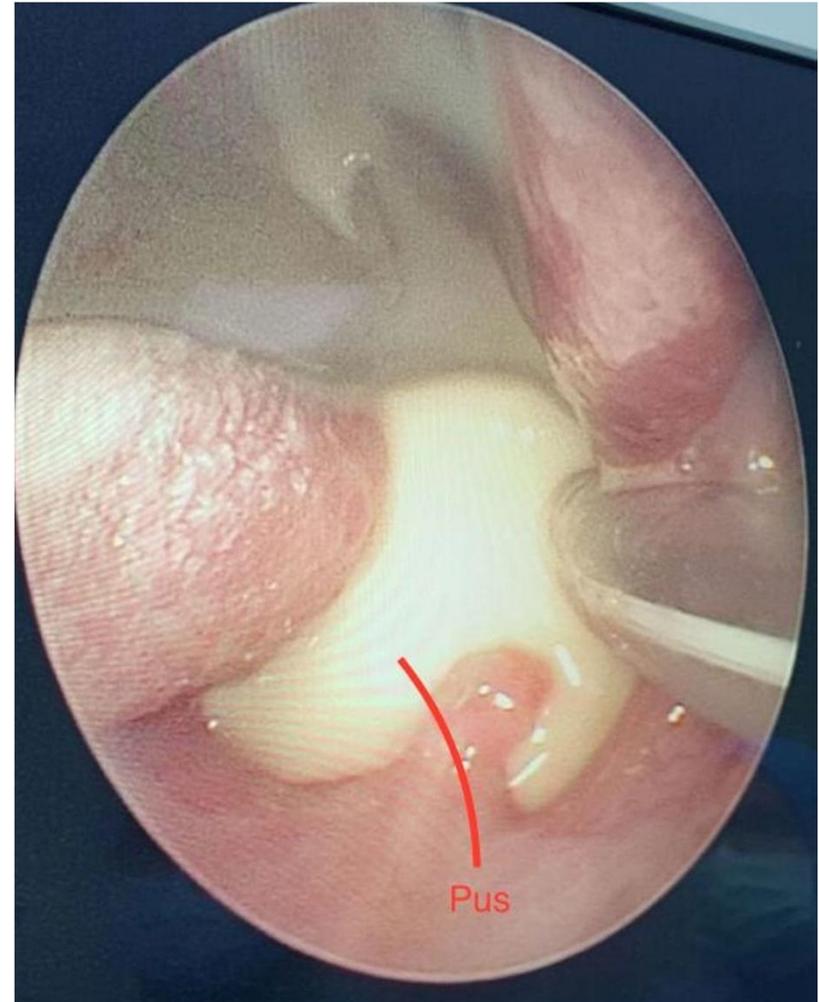
Figure 1. Granulomatous infiltrate in the oropharynx.



Pharyngeal lymphoma

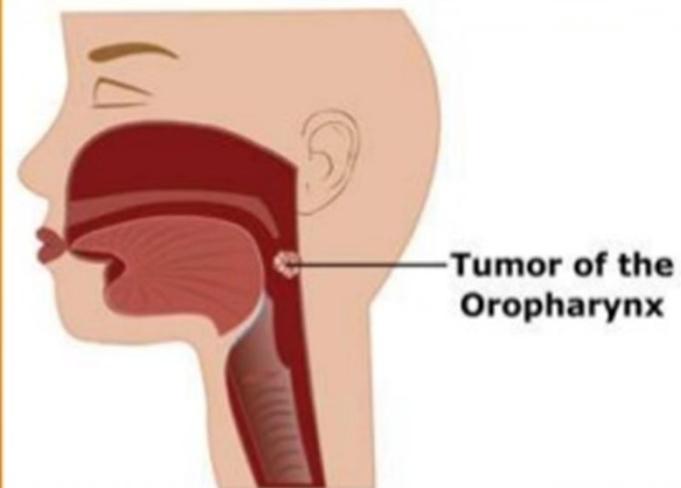
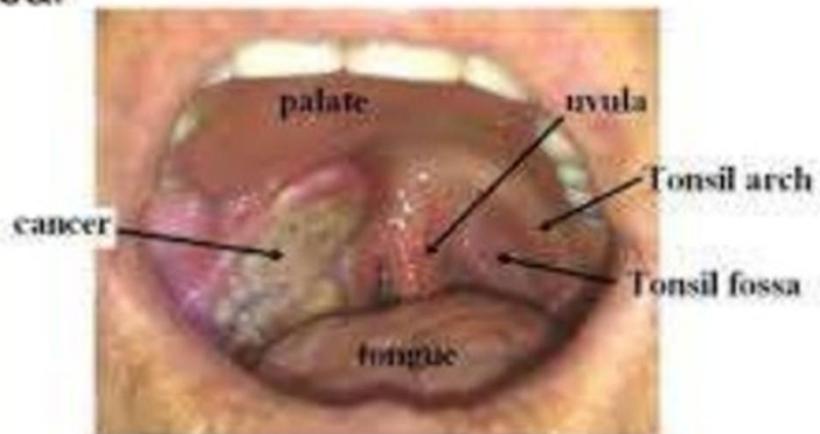


Parapharyngeal
abscess

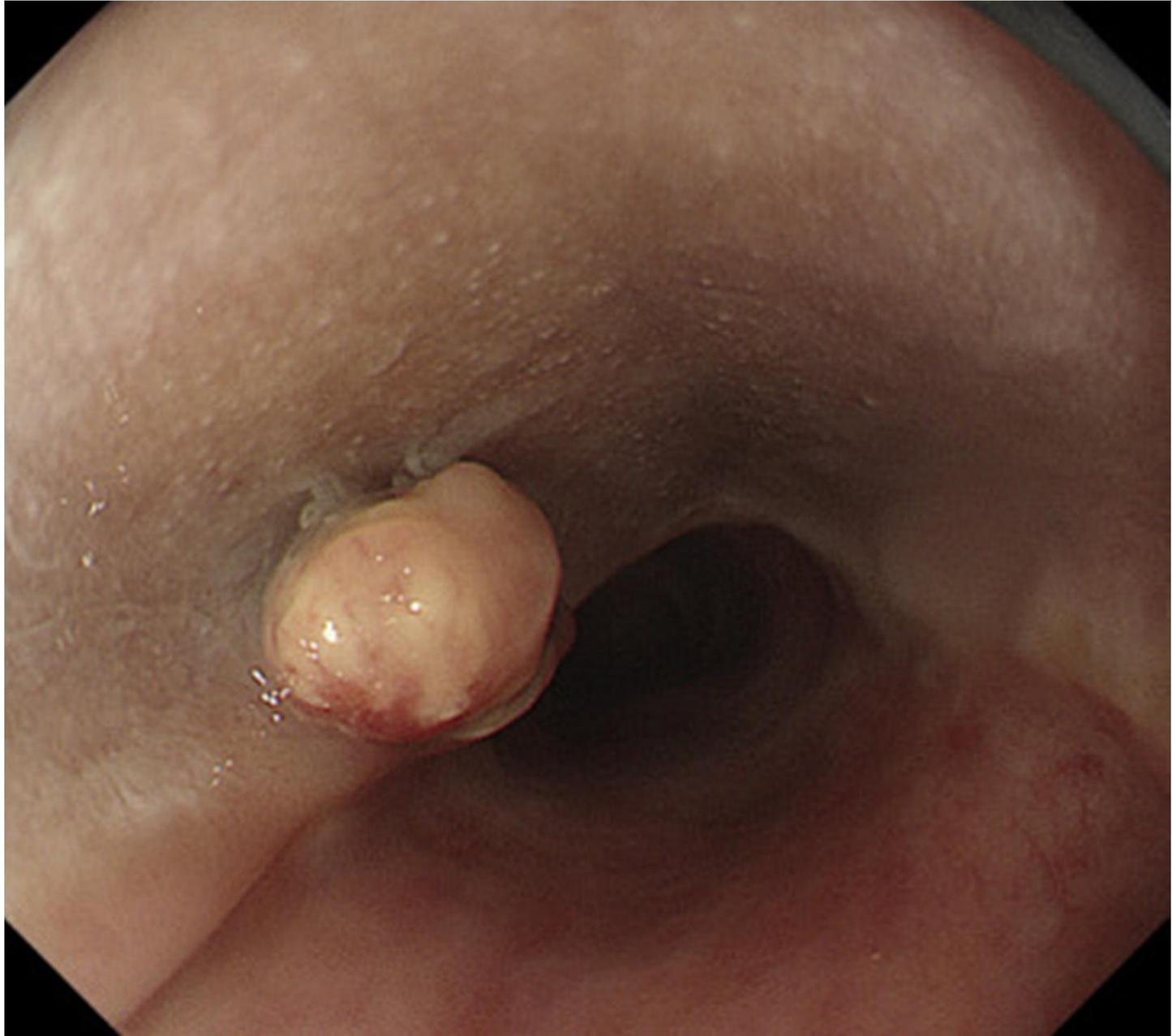


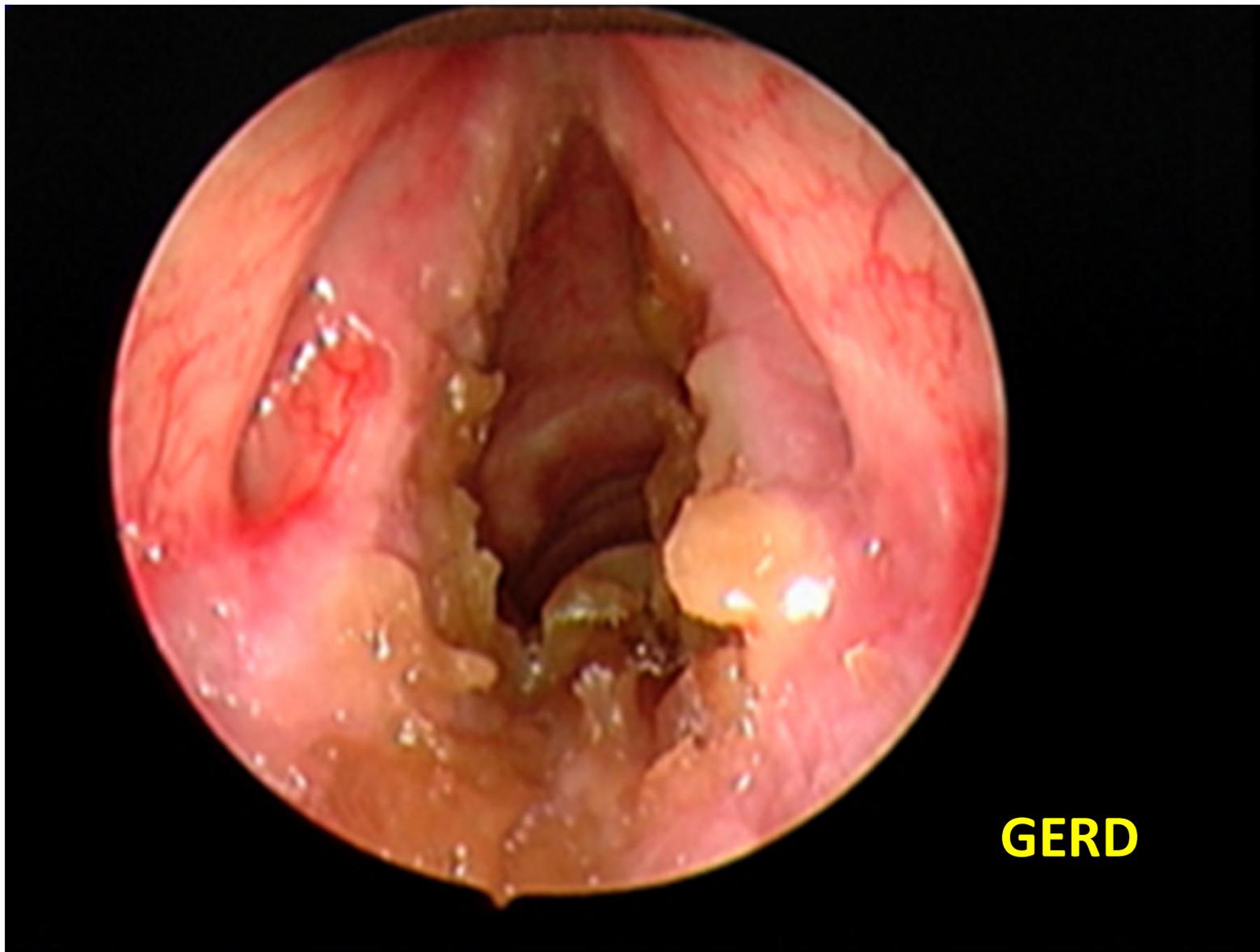
Cancers

Typical **smoking** related oropharynx cancer, presented with months of throat pain radiating into ear



SCC



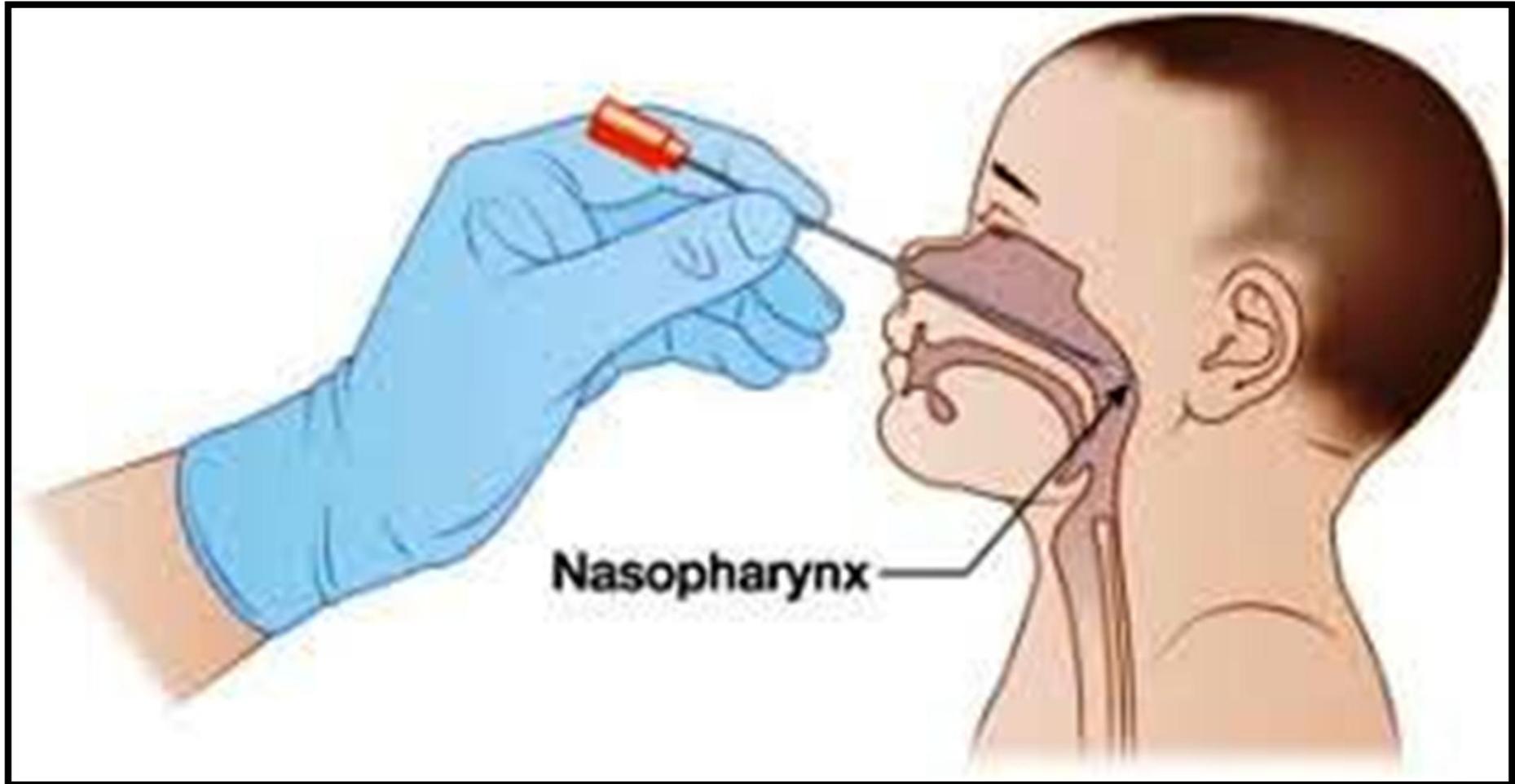


GERD



Lipoma

Nasopharyngeal Swab



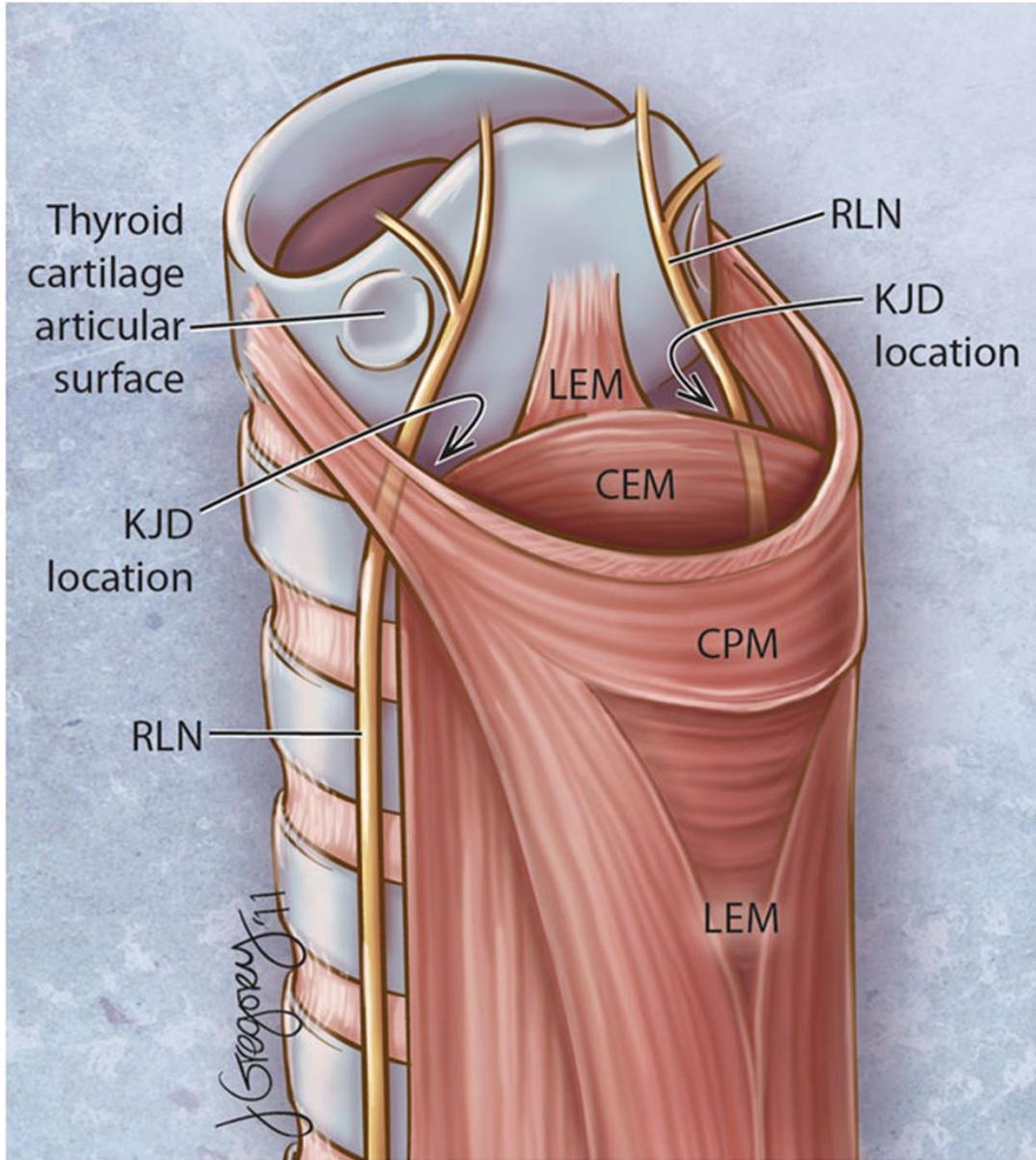


Fig. 3. Illustration of the location of the Zenker's diverticulum.

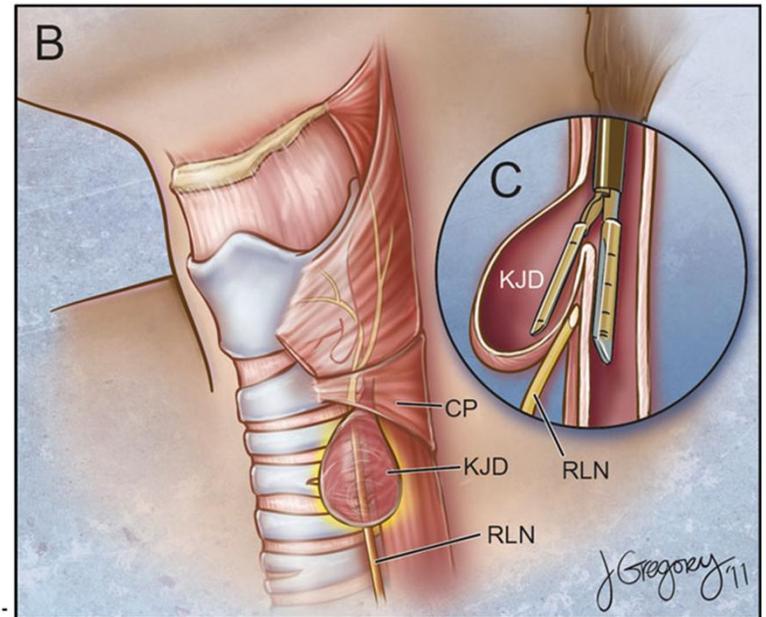
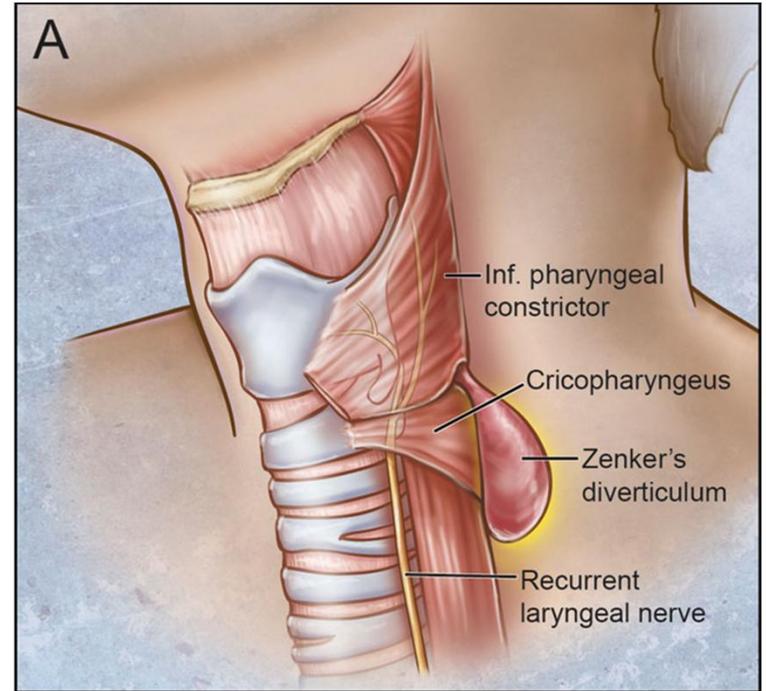


Fig. 4. (A) Illustration depicting the classic location of a Zenker's

