

PHARYNX I & II

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PHARYNX

- Introduction
- Sites
- Histology
- Anatomy
- Applied anatomy
- Diseases & management

ANATOMY

INTRODUCTION

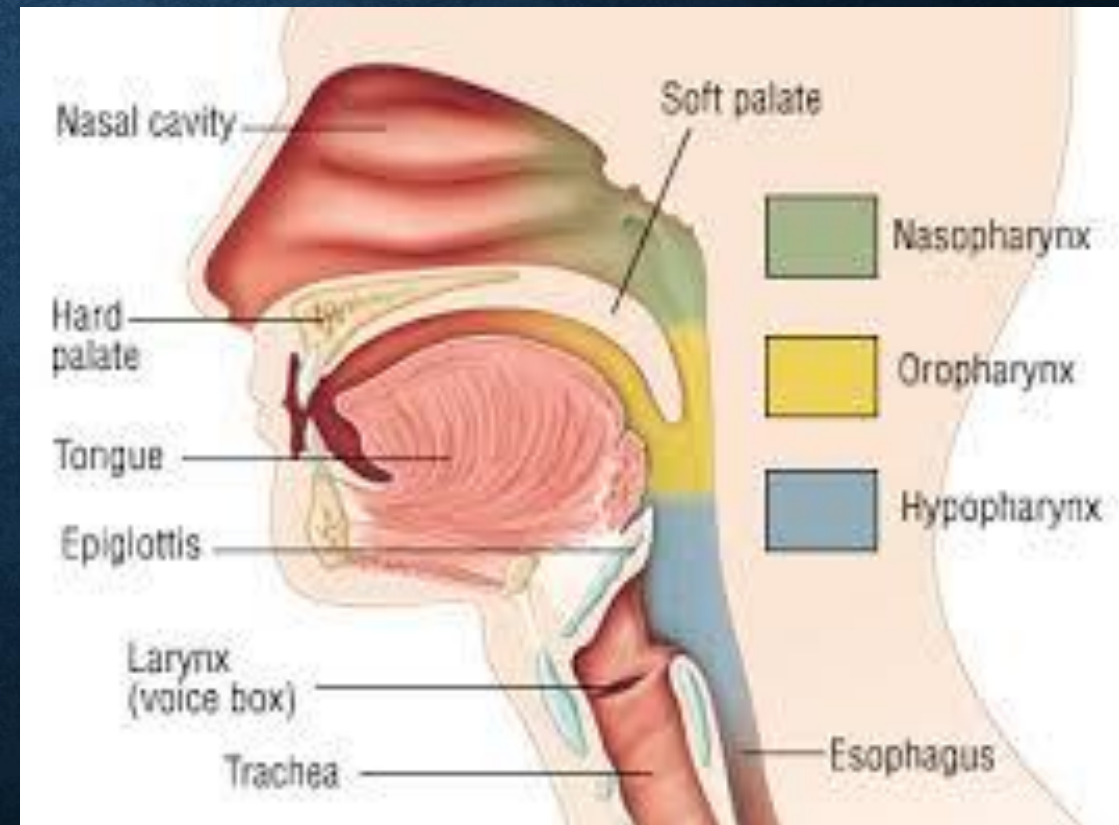
- The pharynx is situated behind the nasal cavities, the oral cavity and the larynx.
- It divided into nasal, oral, and laryngeal parts.
- Its upper end , wider end lying under the skull.
- Its lower, narrow end becoming continuous with the oesophagus opposite the sixth cervical vertebra.

ANATOMY SITES

➤Nasopharynx

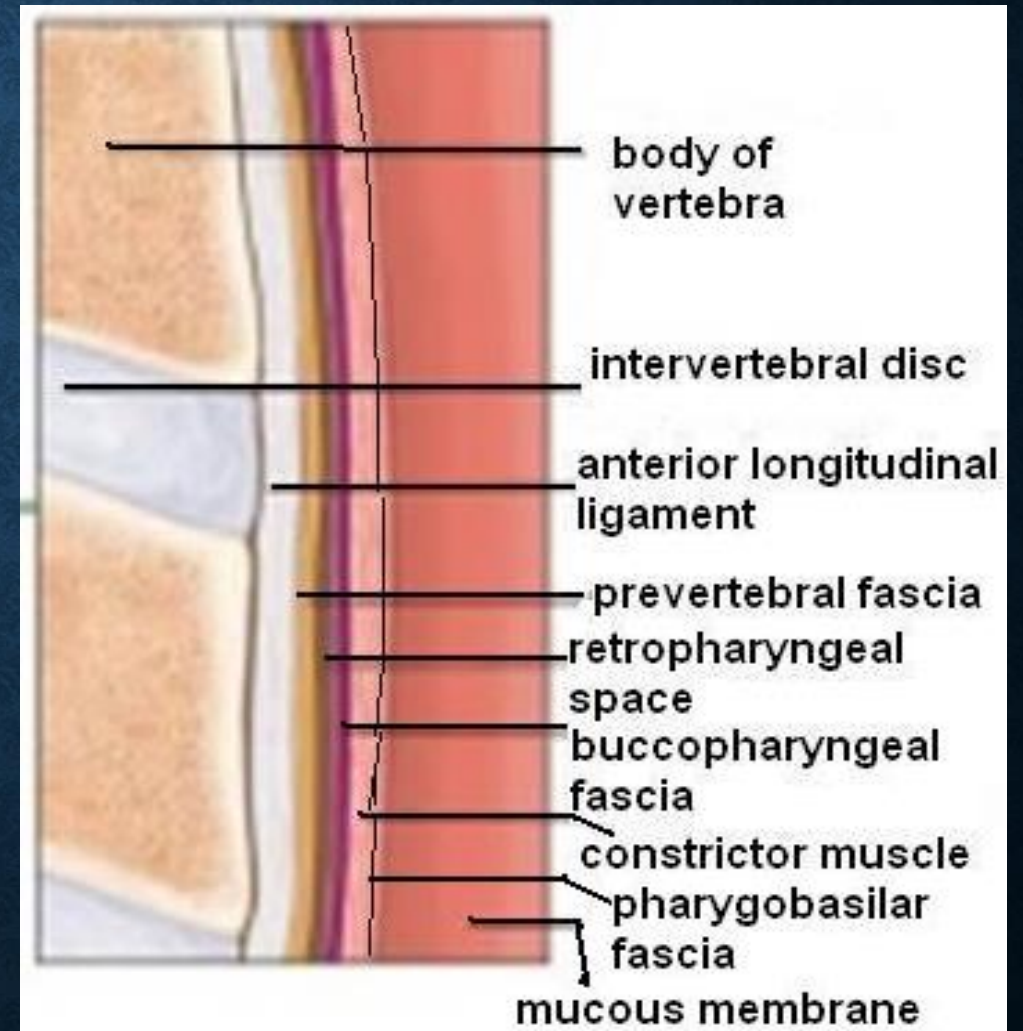
➤Oropharynx

➤Hypopharynx



ANATOMY HISTOLOGY

- It is a musculo-membranous wall, composed of:
 - Mucosa & submucosa.
 - Pharyngobasilar fascia.
 - Muscles: circular & longitudinal.
 - Buccopharyngeal fascia (middle layer of deep cervical fascia).
- ** Pathology might originate from above mentioned layers



ANATOMY HISTOLOGY

Mucosa :

➤ Epithelium :

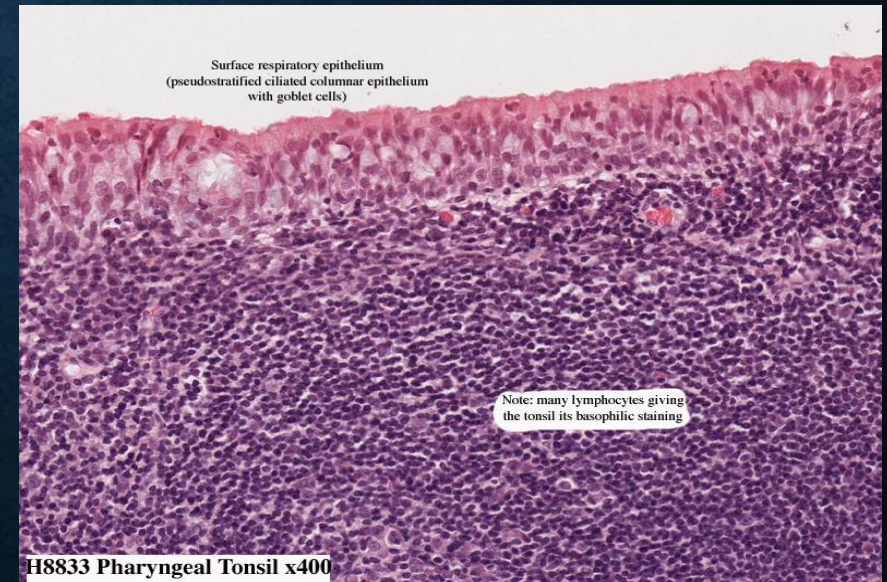
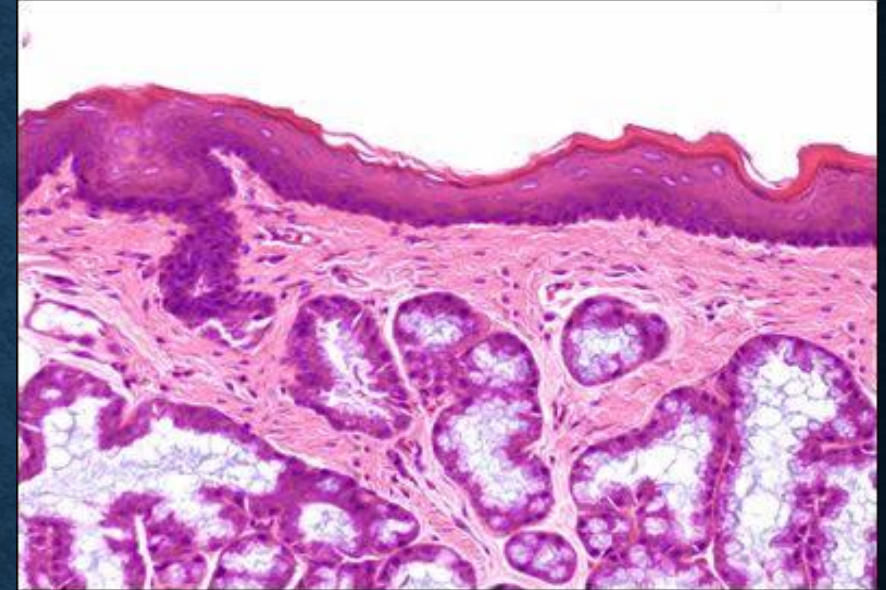
- Stratified squamous epithelium
- pseudostratified ciliated columnar with goblet cells (pharyngeal tonsil i.e adenoid)

➤ Lamina propria :

- Minor salivary gland
- Lymphoid tissue (adenoid , tonsil)

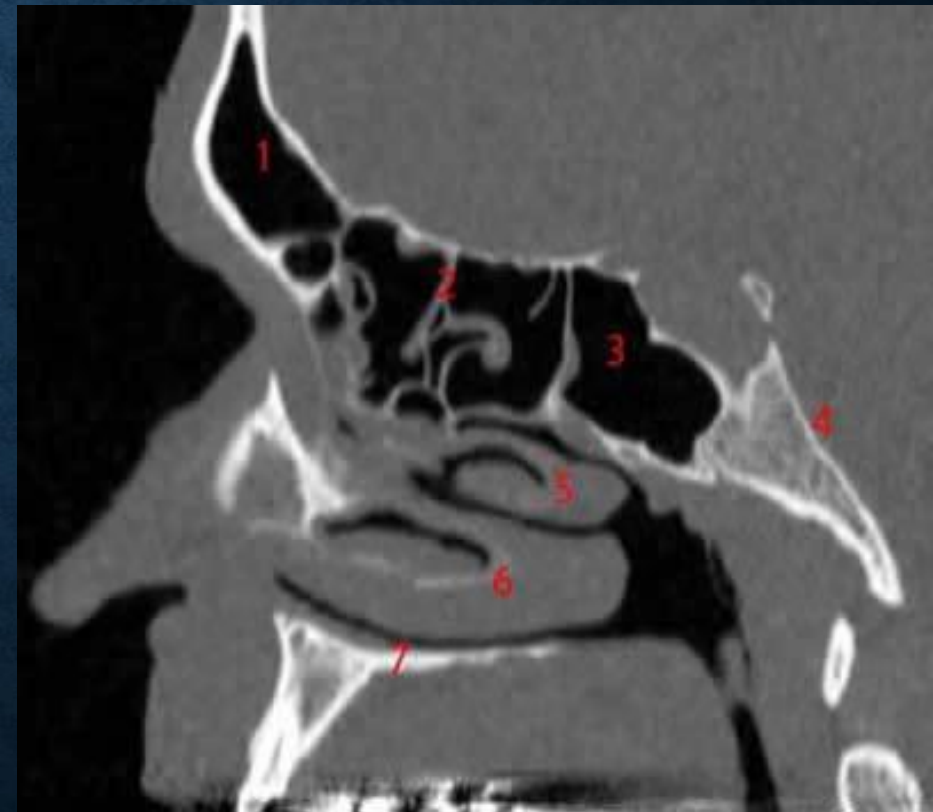
Pathology : SCC, Adenocarcinoma

Lymphoma , salivary gland tumors.



ANATOMY NASOPHARYNX BOUNDARIES

- Anterior : **nasal cavity** at the choanae
- Inferior : **oropharynx** at the lower border of the soft palate.
- Superior : **body of sphenoid** & basal part of the occipital bone , contain **adenoid** .
- Posterior : supported by anterior arch of **atlas (C1)**.

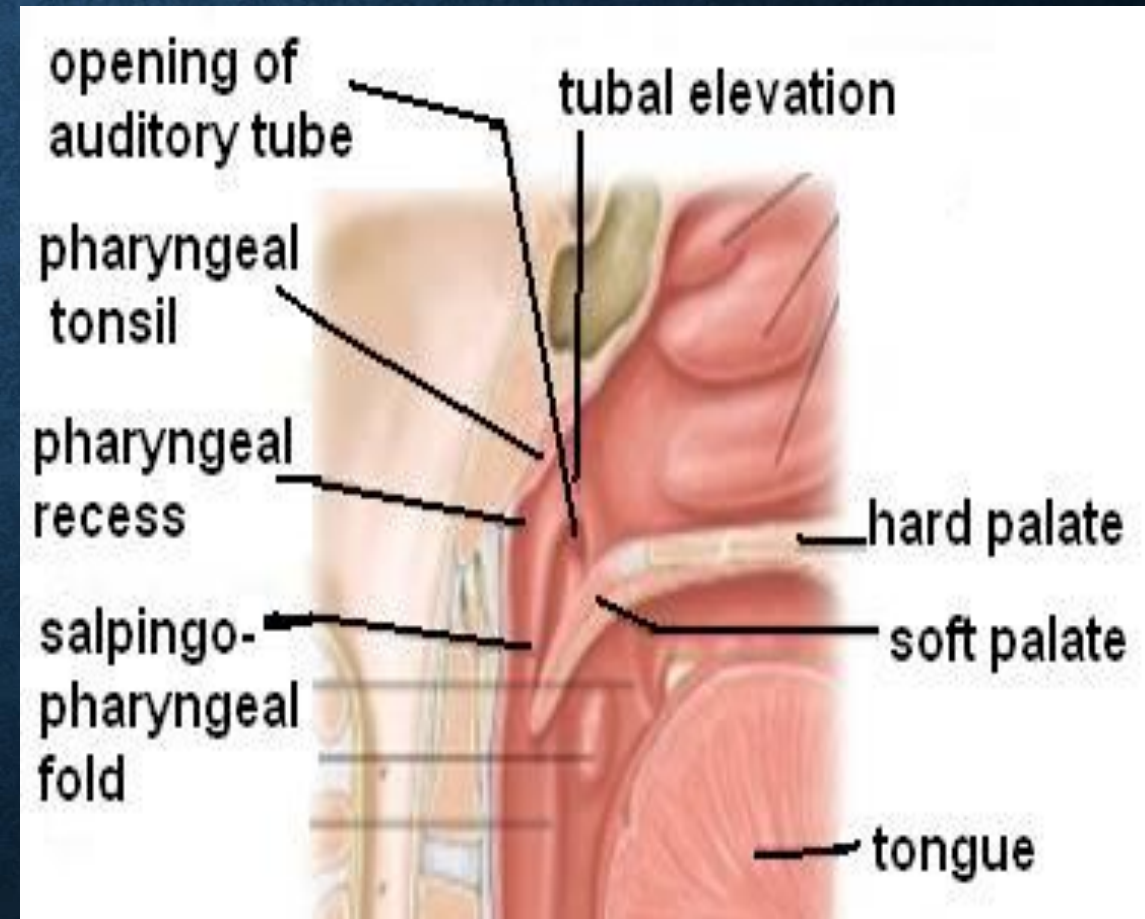


ANATOMY

NASOPHARYNX

LATERAL WALL

- Opening of auditory tube
- Tubal elevation (produced by posterior margin of tube)
- Pharyngeal recess
- Tubal tonsil
- Salpingopharyngeal fold (raised by salpingo-pharyngeus muscle)
- Nerve supply:
Maxillary division of trigeminal (CNV)

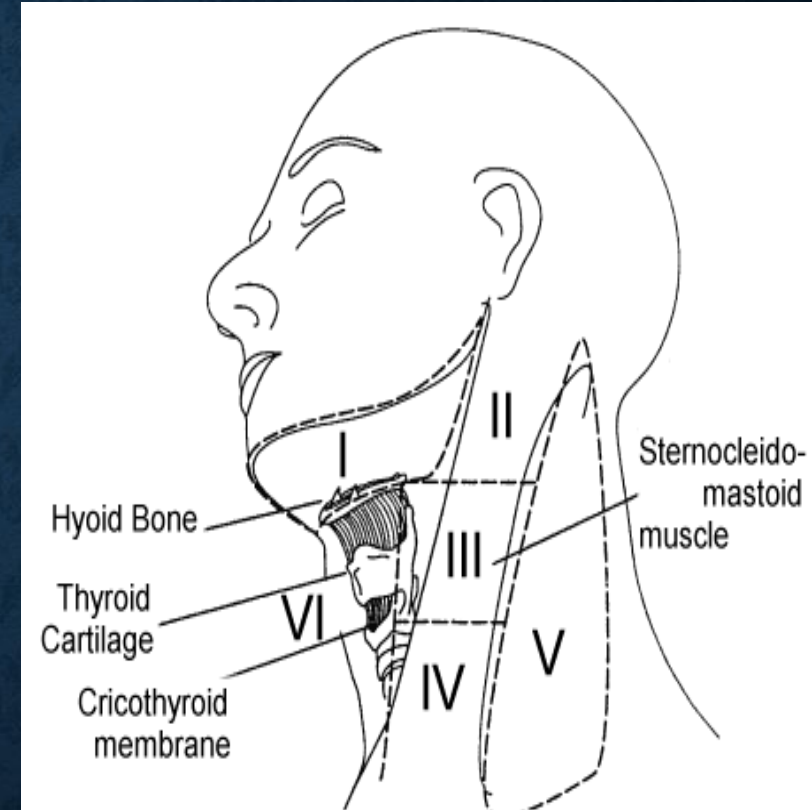


NASOPHARYNX LYMPHATIC DRAINAGE

- Parotid LN
 - Retropharyngeal LN
 - Level II & V
- ** NP carcinoma metastatic LN**
- Neck mass .



Retropharyngeal LN

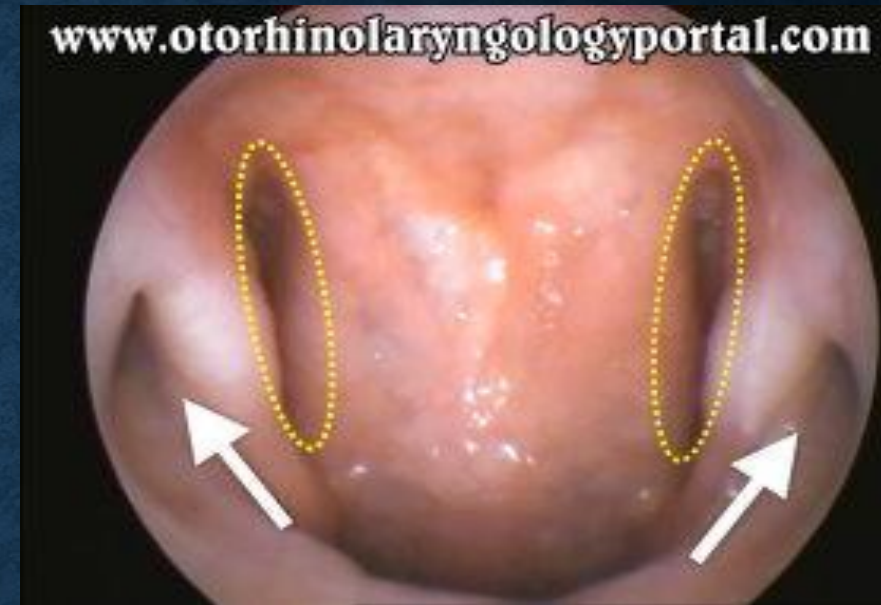


ANATOMY NASOPHARYNX SUBSITES

- Posterior wall
- Lateral wall
- Soft palate

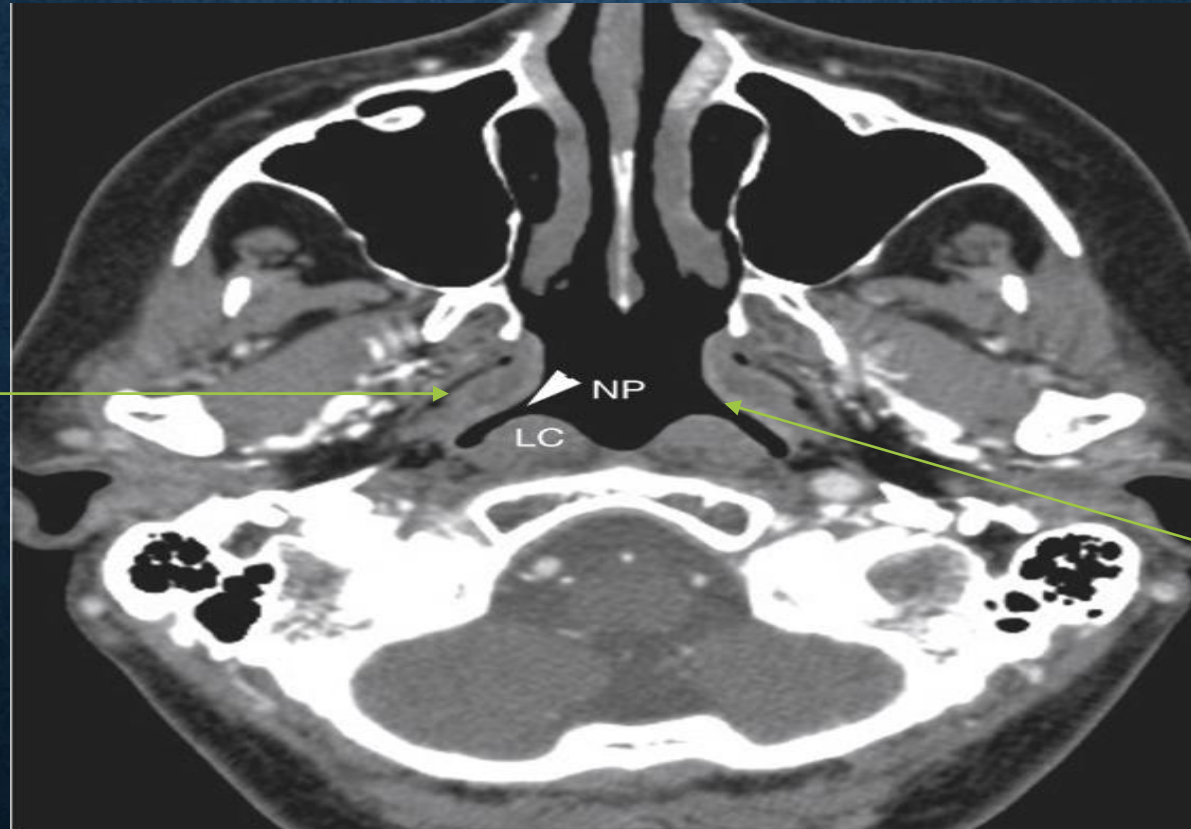
Landmarks :

- Eustachian tube. (Serous otitis media, adenoid hypertrophy).
- The fossa of Rosenmuller,
(most common site of NP carcinoma)



ANATOMY NASOPHARYNX SUBSITES

Eustachian tube



fossa of
Rosenmuller

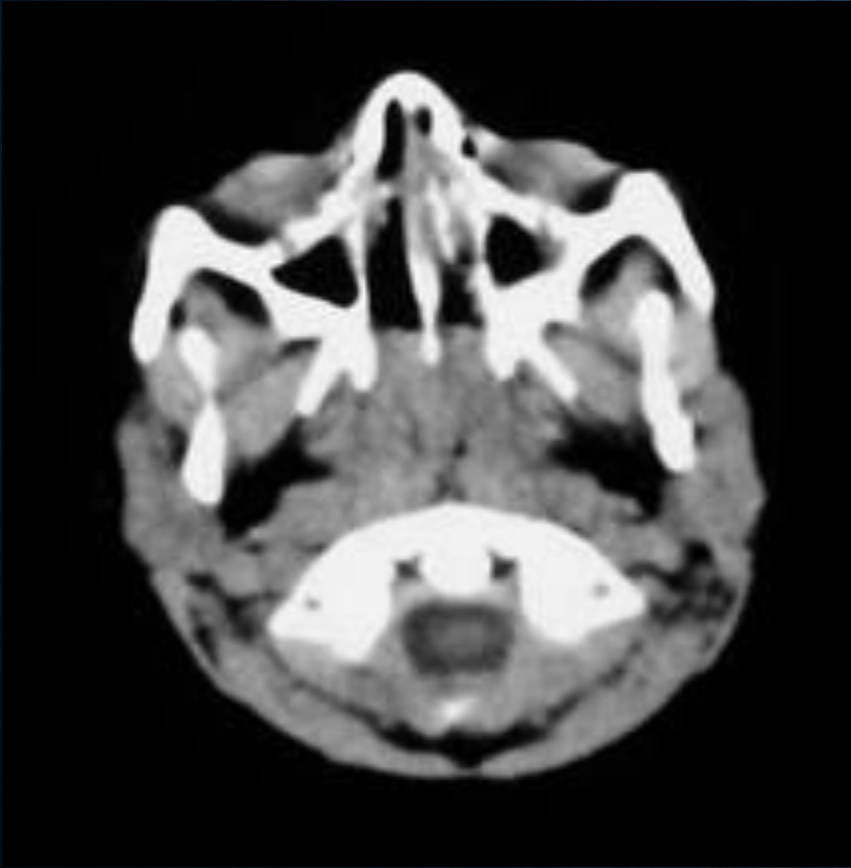
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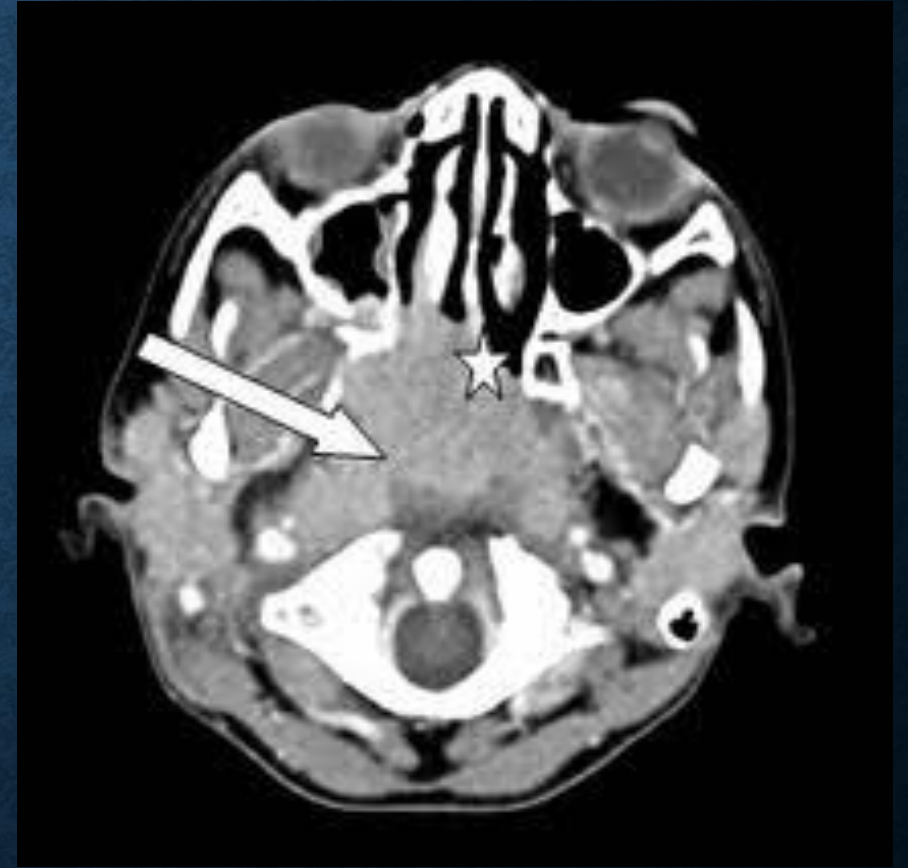
ANATOMY

NASOPHARYNX

SUBSTIES



Adenoid hypertrophy

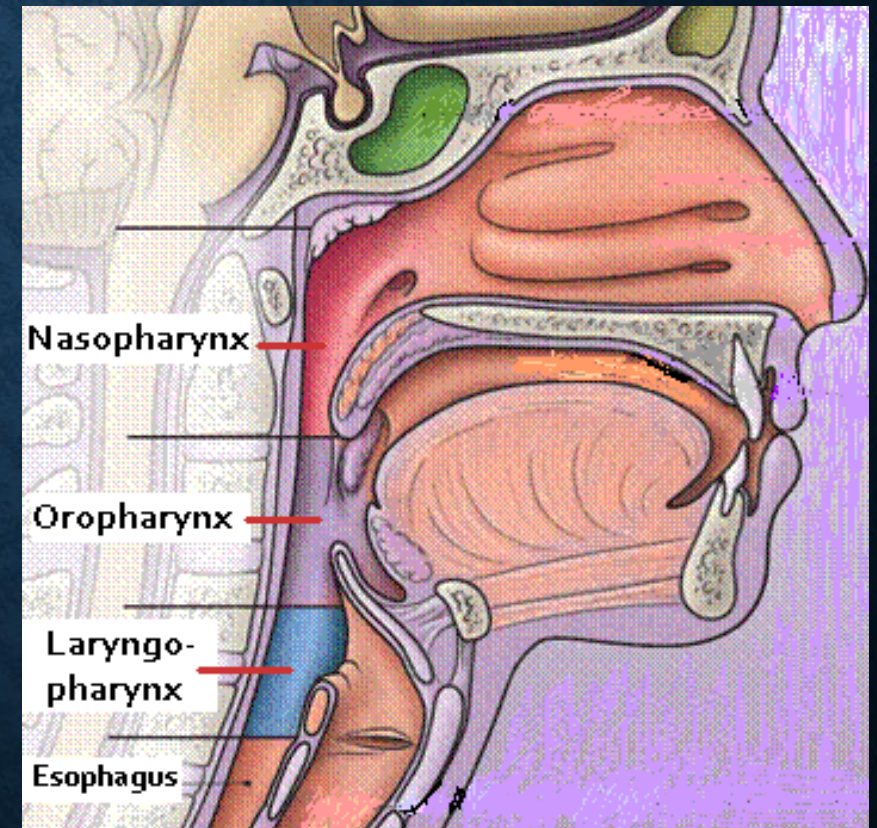


Nasopharyngeal CA

ANATOMY

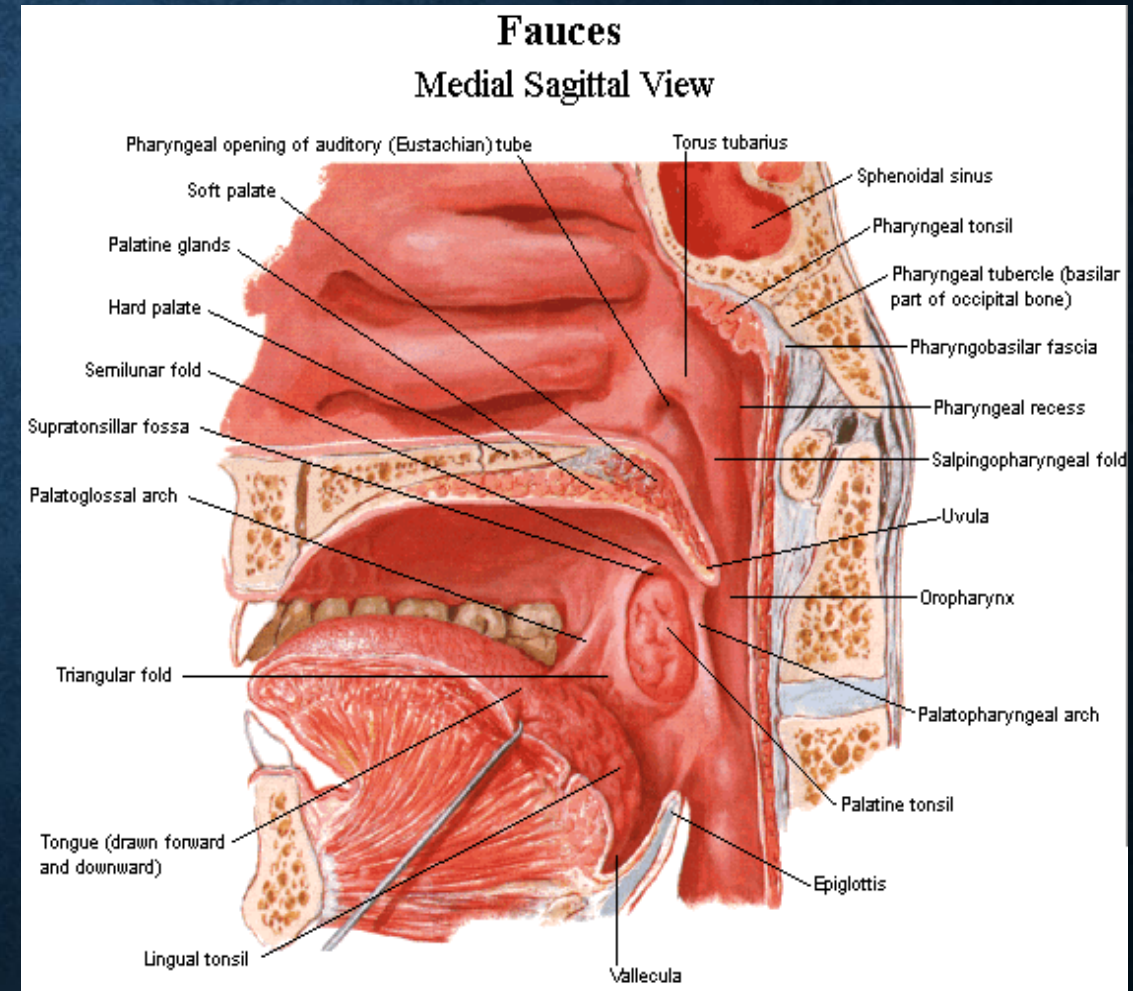
OROPHARYNX

- Extends from soft palate to upper border of epiglottis.



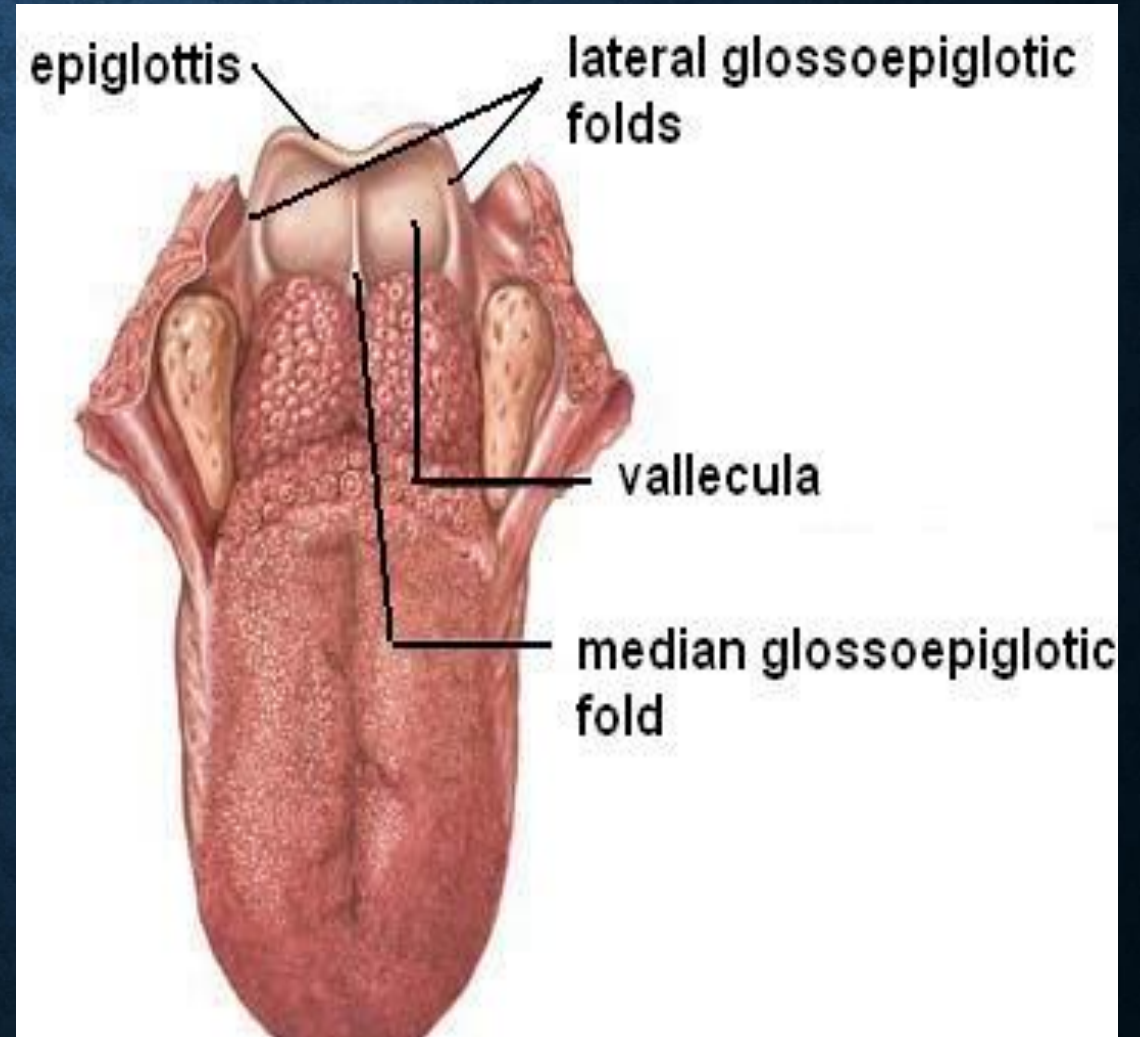
ANATOMY OROPHARYNX BOUNDARIES

- Anterior wall: opening of the oral cavity.
- Posterior wall: supported by body of C2 and upper part of body of C3 vertebra.
- Superior : soft palate and pharyngeal isthmus.



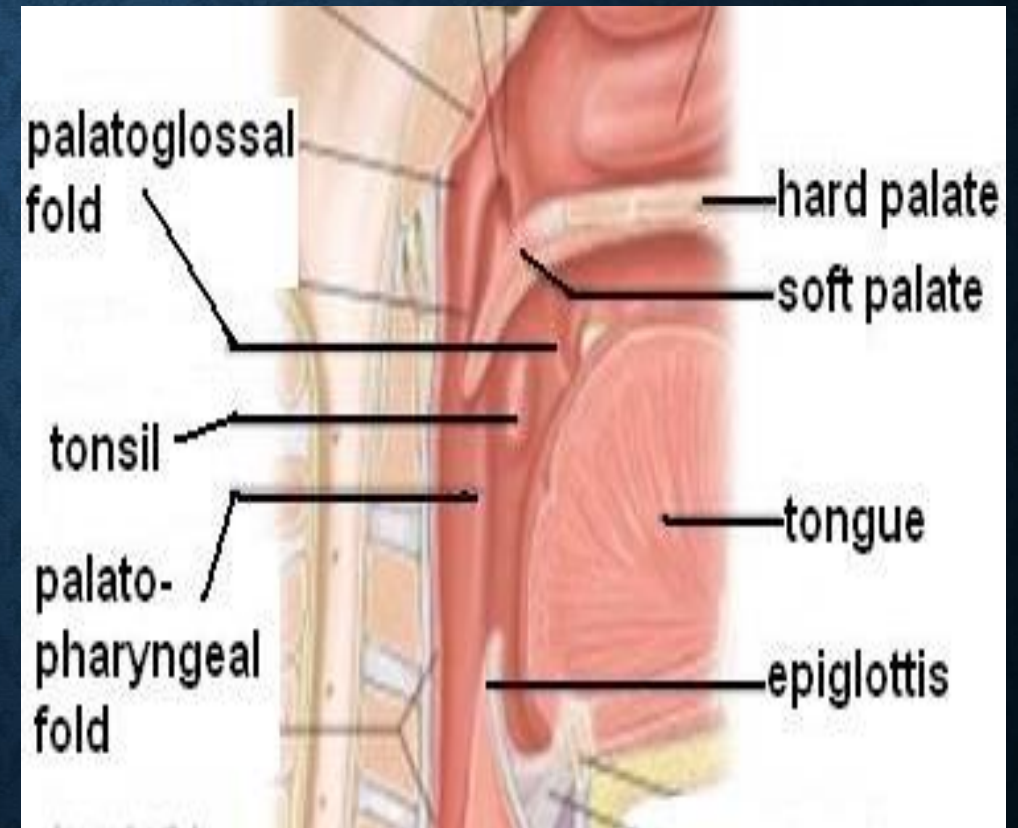
ANATOMY OROPHARYNX BOUNDARIES

- Inferior :
 - Posterior one third of tongue.
 - Median & lateral glossoepiglottic folds.
 - Valleculae.



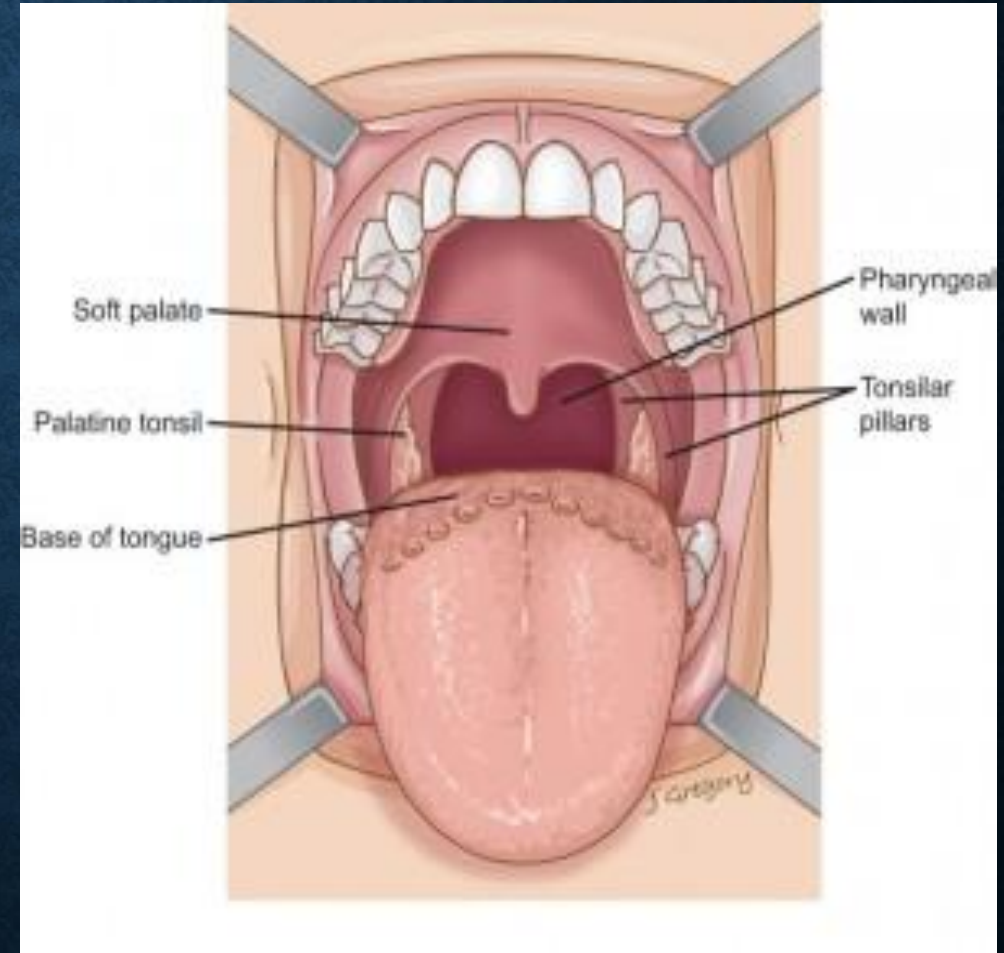
ANATOMY OROPHARYNX BOUNDARIES

- Lateral wall
 - Palatopharyngeal folds.
 - Palatoglossal folds.
 - Palatine tonsil.



ANATOMY OROPHARYNX SUBSITES

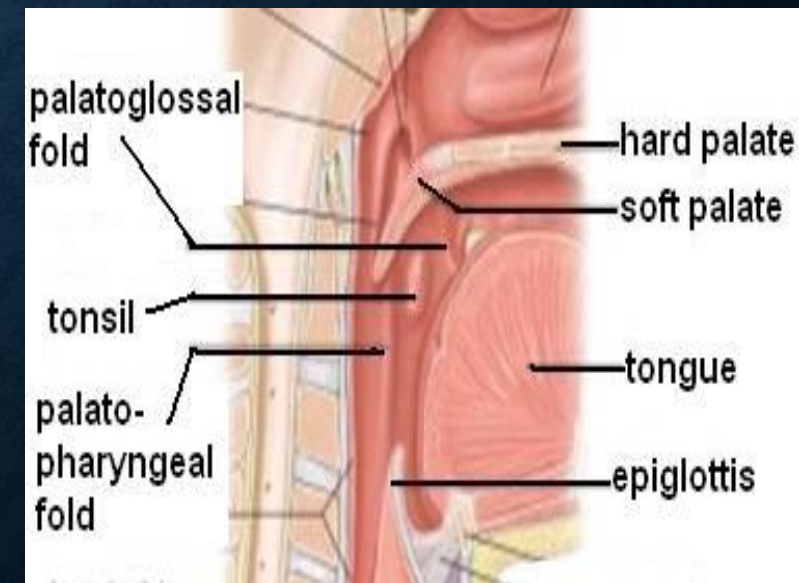
- Soft Palate.
 - Tongue base
 - Tonsil:
 - Tonsillar hypertrophy
 - Most common site of oropharyngeal Carcinoma.
 - Lateral Pharyngeal Wall.
 - Posterior Pharyngeal Wall.
- **Nerve supply : glossopharyngeal (CN IX).**



OROPHARYNX

PALATINE TONSIL

- Subepithelial lymphoid tissue.
- Located in the palatine fossa, in the lateral wall of the oropharynx.
- Reaches its maximum size during early childhood, but after puberty diminishes in size .
- Lateral surface: covered by a fibrous capsule. **(peritonsillar space)



OROPHARYNX

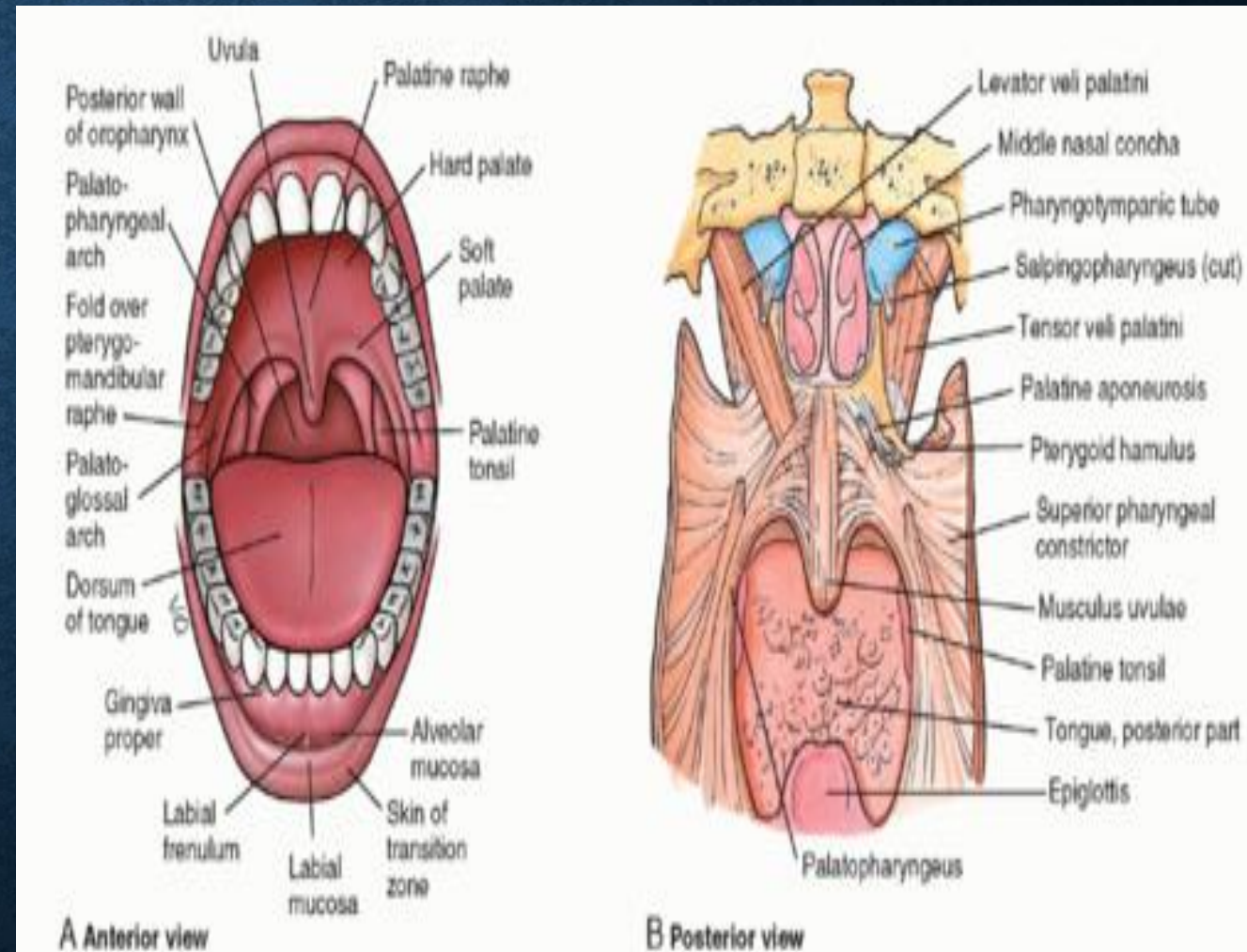
SOFT PALATE

Palatine aponeurosis: skeleton where muscle inserted .:

- Tensor veli palatine.
- Levator veli palatine.
- Uvular.
- Palatoglossus.
- Palatopharyngeal.

**** Cleft palate .**

**** Nasal regurgitation & aspiration**



OROPHARYNX

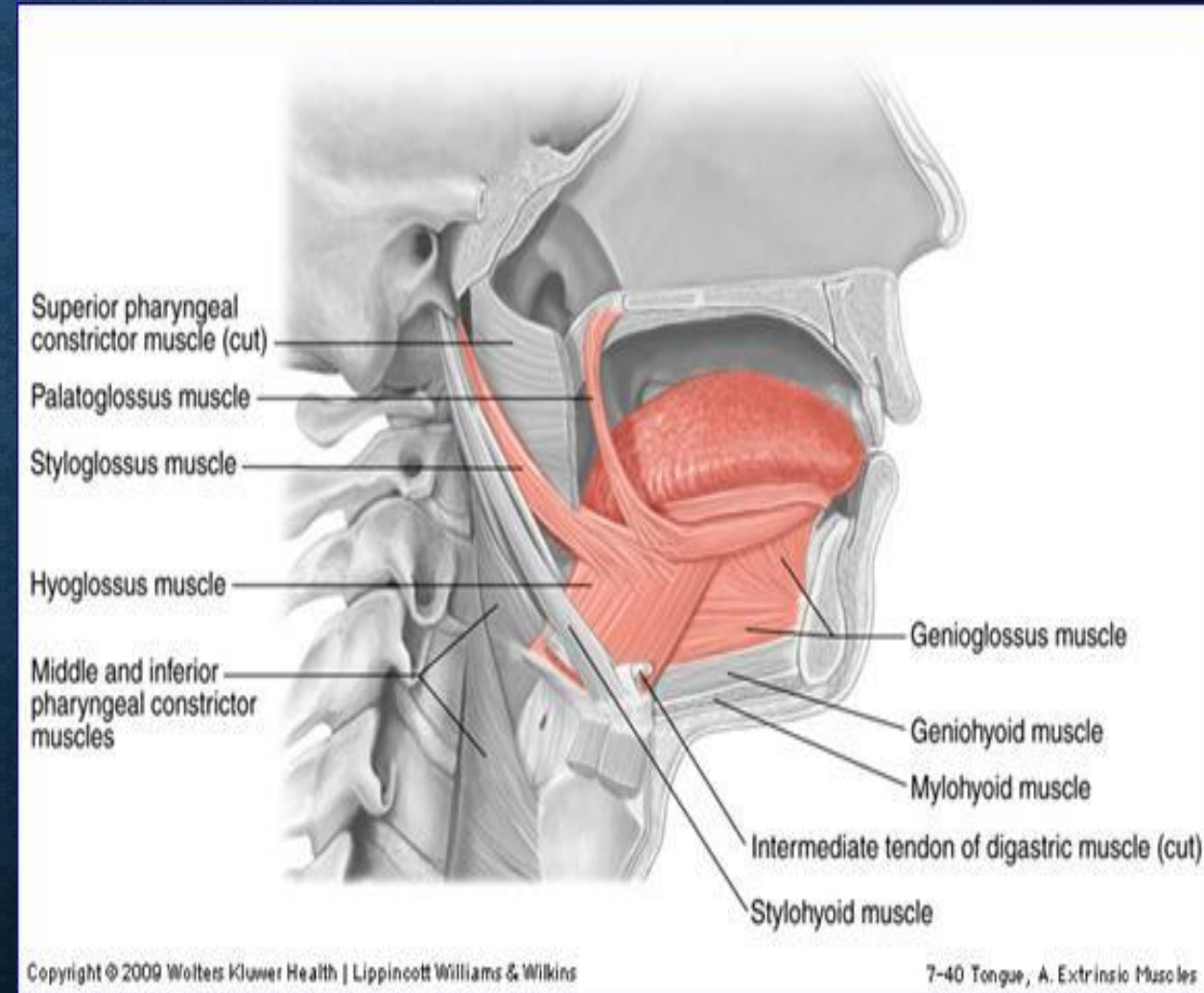
BASE OF TONGUE (BOT)

Tongue muscles(extrinsic) :

- Palatoglossus.
- Styloglossus.
- Genioglossus.
- Hyoglossus.

Deep invasion by tumor :

- Tongue movement restriction
- Advanced tumor stage



OROPHARYNX

NERVE SUPPLY

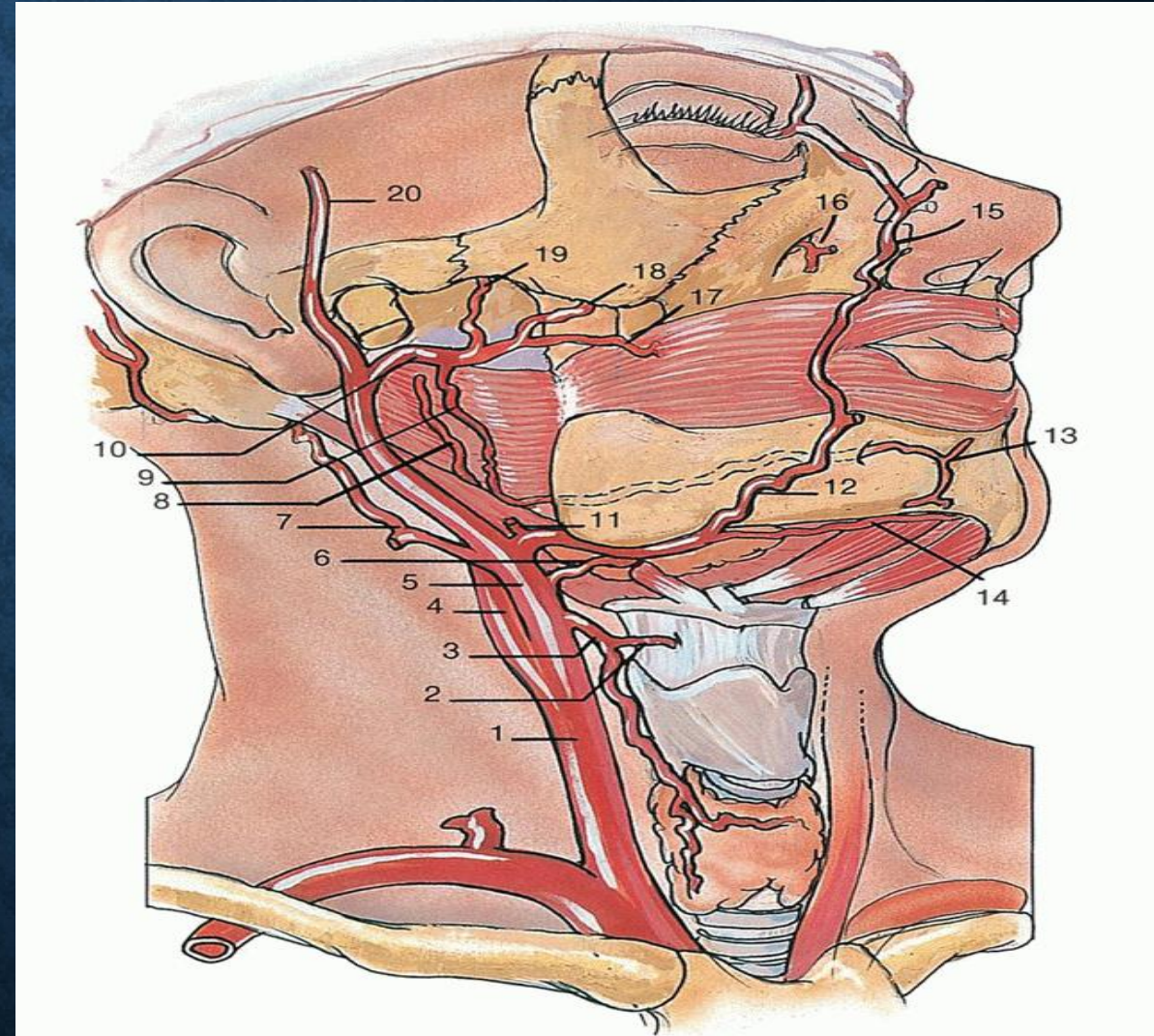
- Palate muscles supplied by(CN IX & X)
 - Tensor veli palatine by (CN V3)
- Tongue muscles supplied by (CN XII)
 - Palatoglossus (CN IX & X)

****Referred otalgia**

OROPHARYNX BLOOD SUPPLY

ECA :

- Superior thyroid
- Lingual
- Occipital
- Facial
- Ascending pharyngeal
- Post auricular
- Internal maxillary
- Superficial temporal;



OROPHARYNX BLOOD SUPPLY

- Surgical ligation or embolization
 - Post tonsillectomy bleeding
- Lymphatics
 - (jugulodigastric node)

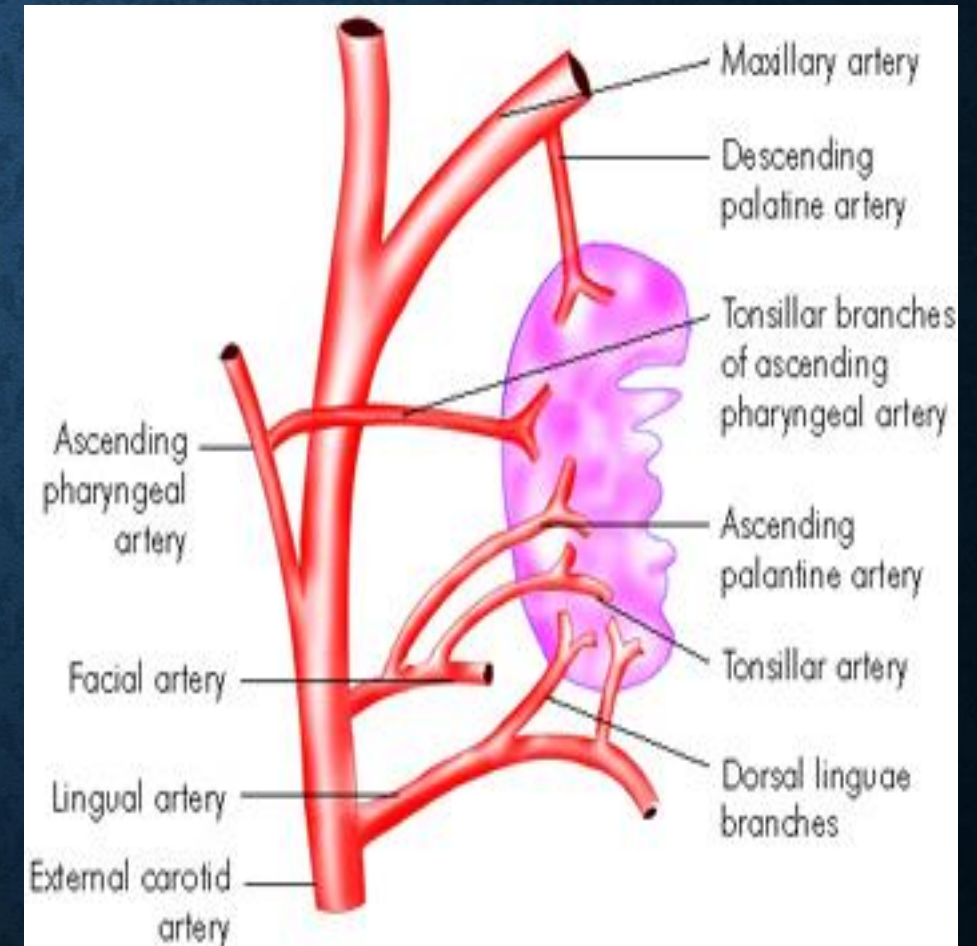
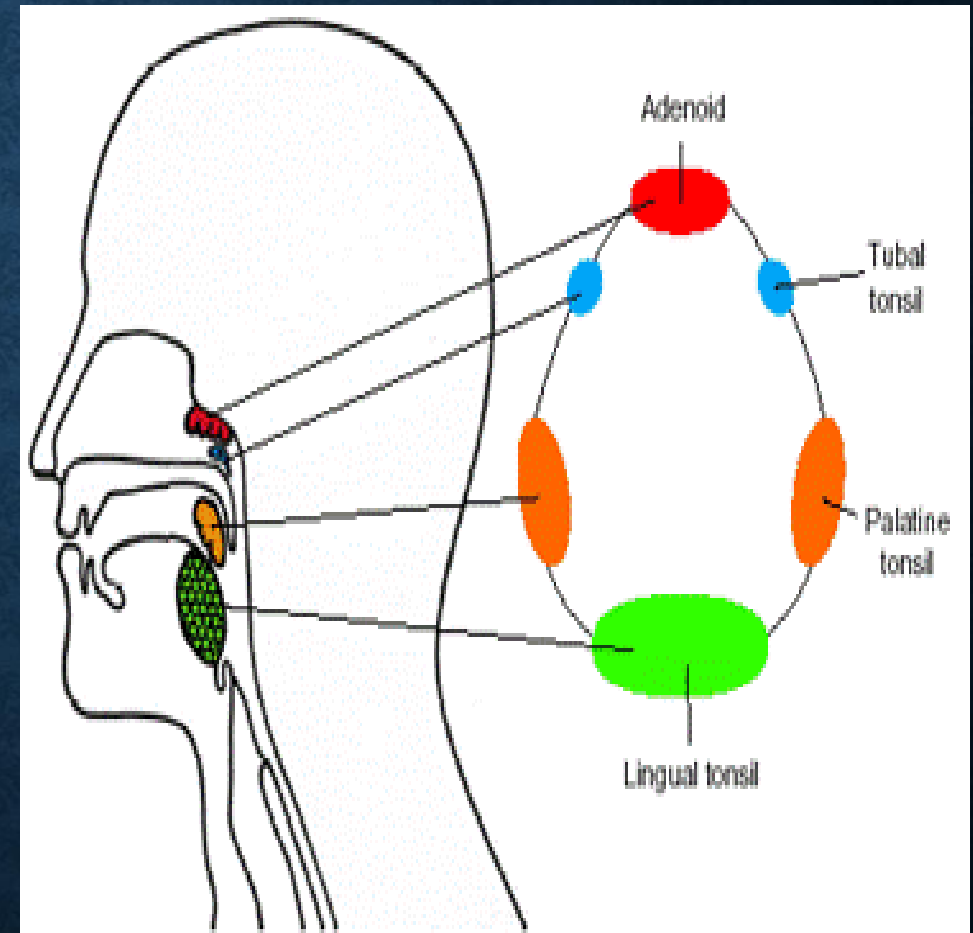


Fig. 50.3 Arterial supply of tonsil.

WALDEYER'S RING

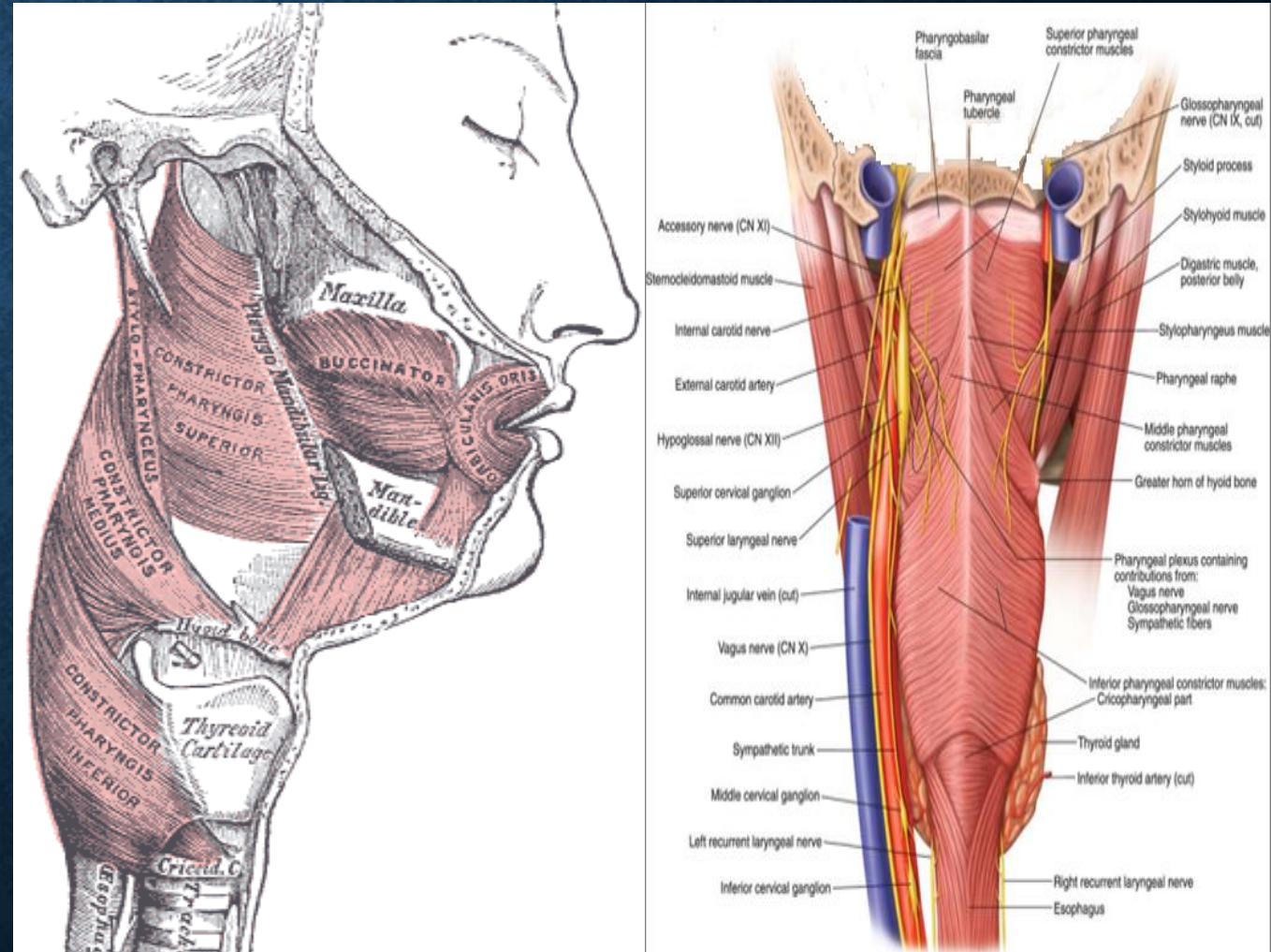
- It is a lymphoid tissue ring located in the pharynx.
- Function as a barrier to infection especially in the first few years of life.
- Consists :
 - Adenoids (pharyngeal tonsils)
 - Tubal tonsil
 - Palatine tonsil
 - Lingual tonsil

**** Tonsillary hypertrophy**



PHARYNX MUSCLES

- Superior, Middle & Inferior.
- Extend around the pharynx and are inserted posteriorly into a fibrous raphe that extends from the pharyngeal tubercle on the occipital bone to the esophagus.
- propel the bolus of food down into the esophagus



PHARYNX

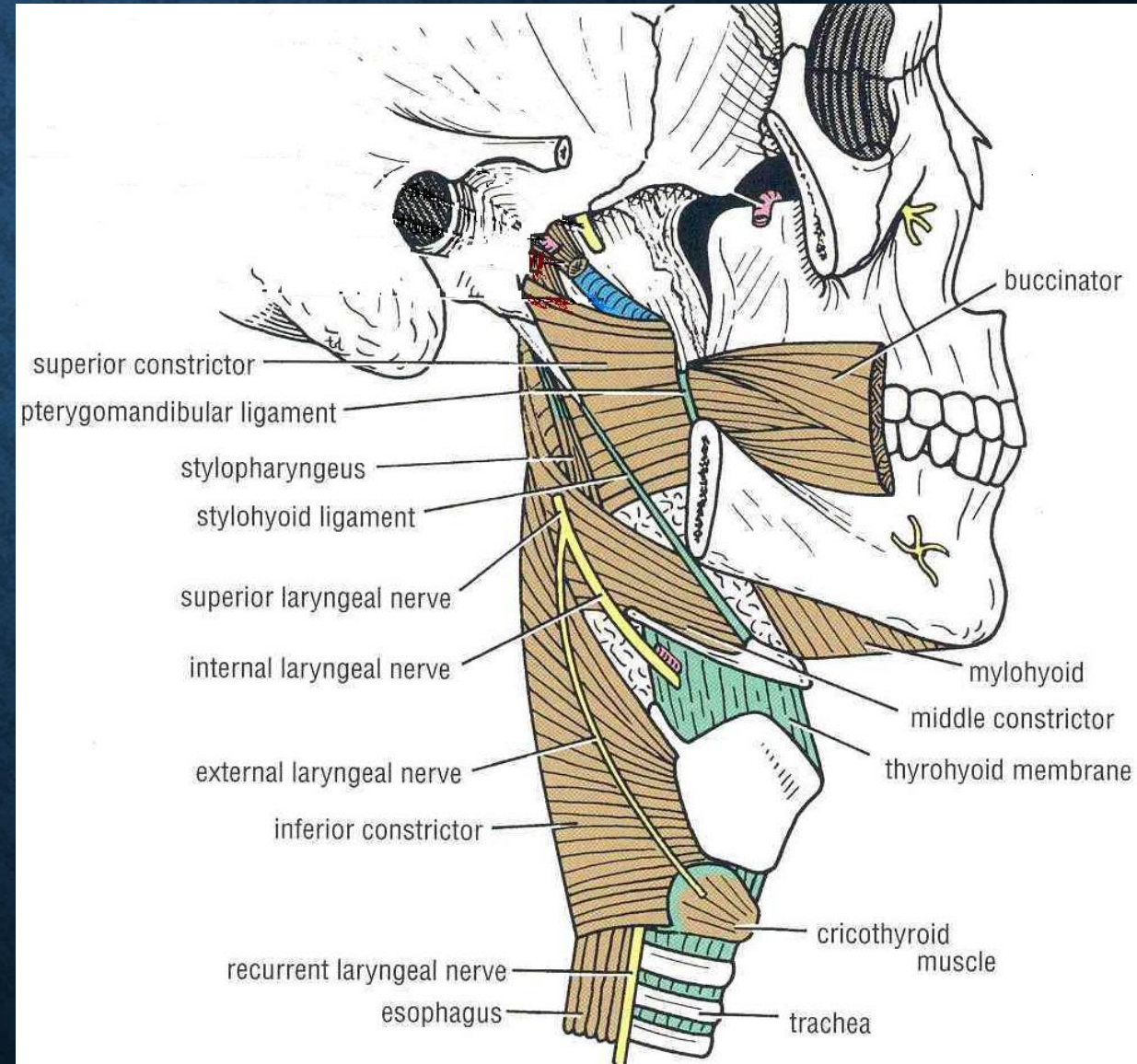
INFERIOR CONSTRICTOR MUSCLE

- **Origin:** lamina of thyroid cartilage, cricoid cartilage
- **Insertion:** pharyngeal raphe

➤ **Cricopharygeus** (lower fibers of the inferior constrictor)

- act as a Upper esophageal sphincter.
- preventing the entry of air into the esophagus between the acts of swallowing.

** CP spasm , dysphagia in elderly .



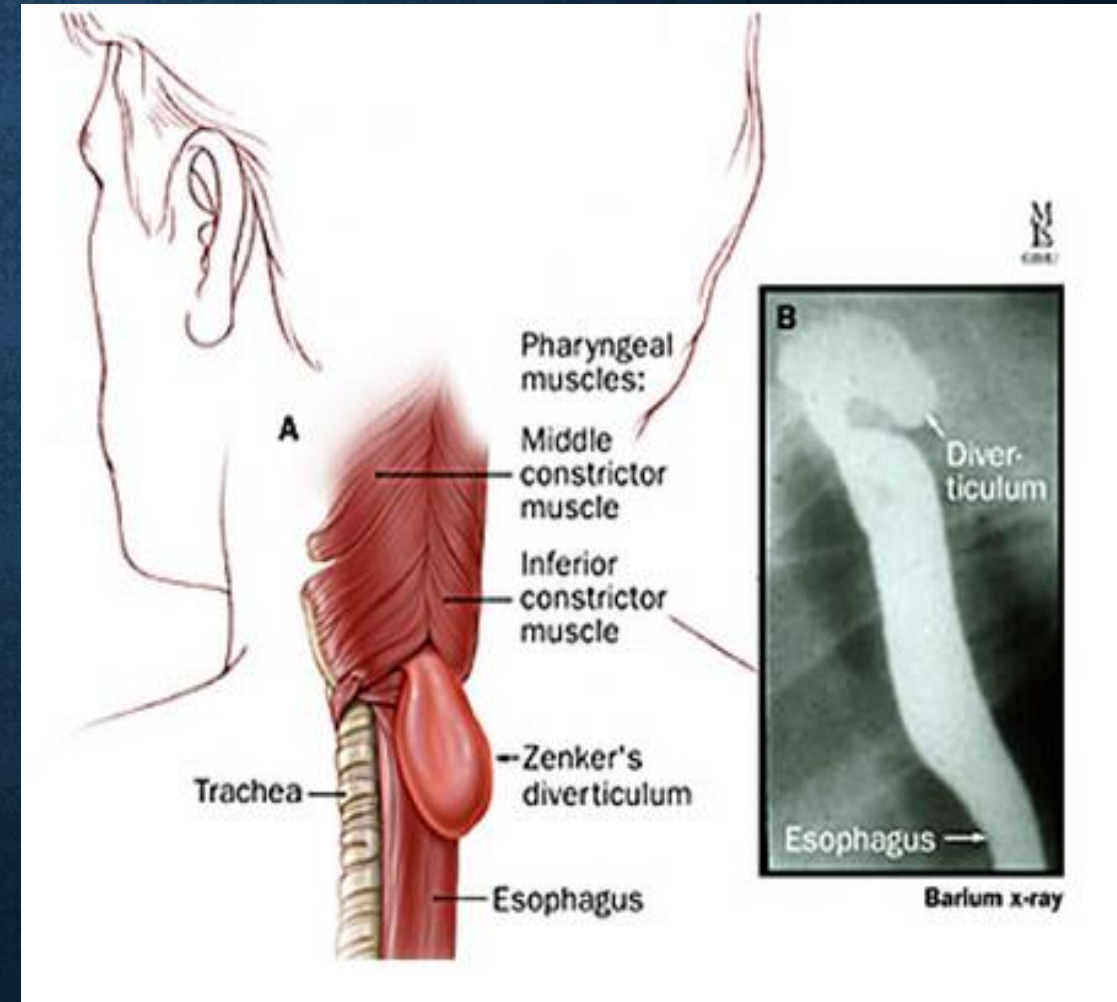
PHARYNX

INFERIOR CONSTRICTOR MUSCLE

- Area of weakness :

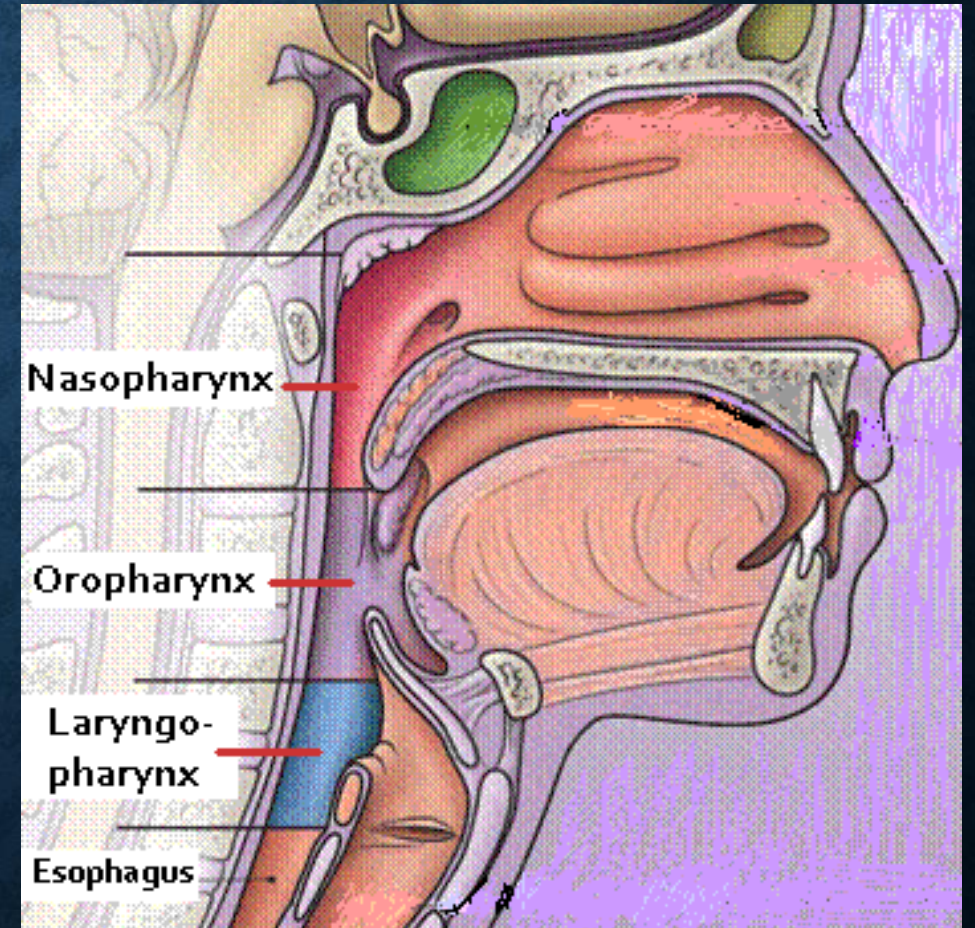
Killian's Triangle : Zenker's Diverticulum

➤ dysphagia & aspiration in elderly



HYPOPHARYNX

- Extends from upper border of epiglottis to lower border of cricoid cartilage (C6).
- Narrowed to become esophagus .
- Nerve supply
 - Internal laryngeal branch (SLN) of the vagus nerve (CNX)



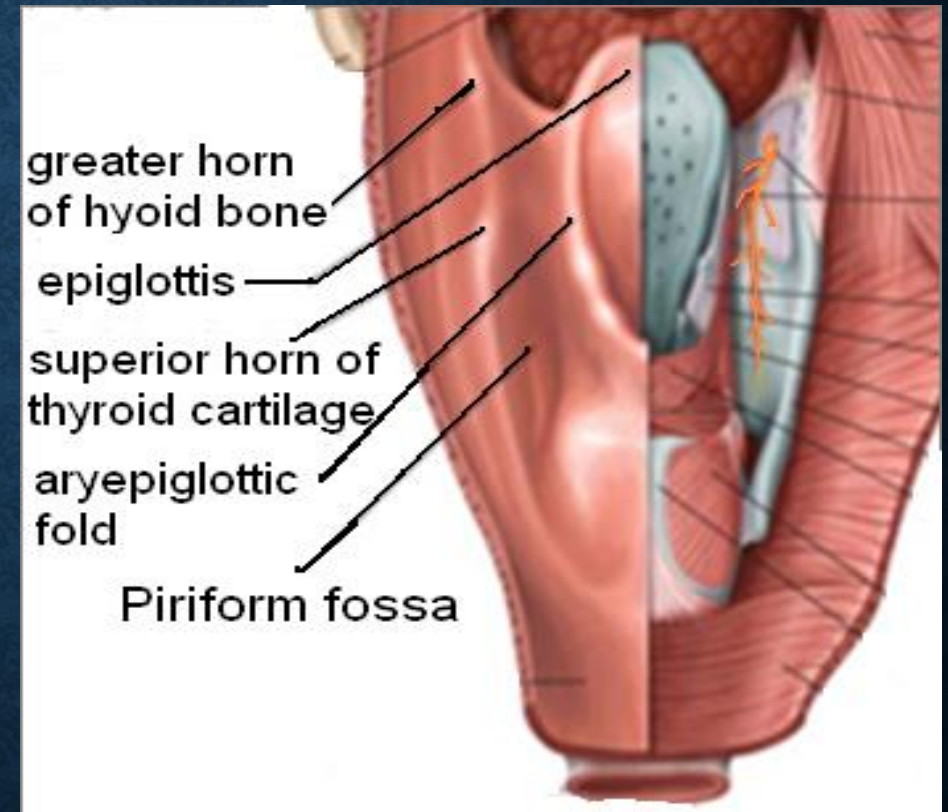
HYPOPHARYNX BOUNDRIES

- **Anterior :**
 - Opening of the larynx (upper part)
 - Mucosa covering the posterior surface of larynx(lower part)
- **Posterior :**
 - supported by bodies of C3, 4, 5, 6 vertebrae



HYPOPHARYNX BOUNDARIES

- Lateral wall:
 - Thyroid cartilage and thyrohyoid membrane.
 - The piriform fossae

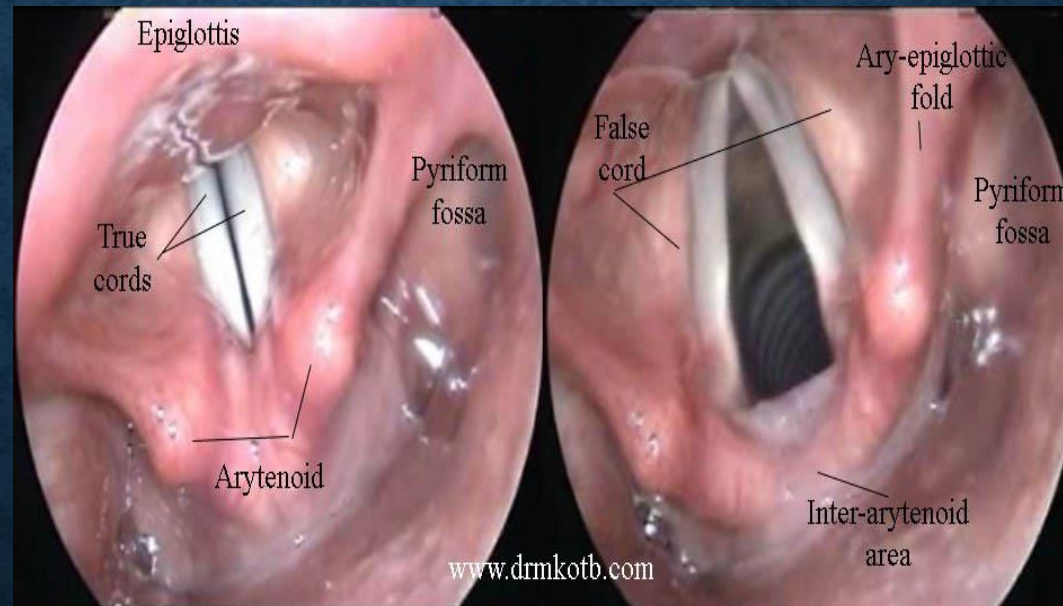


HYPOPHARYNX SUBSITES

➤ **Pyriform Sinus:**

➤ **Posterior Pharyngeal Wall**

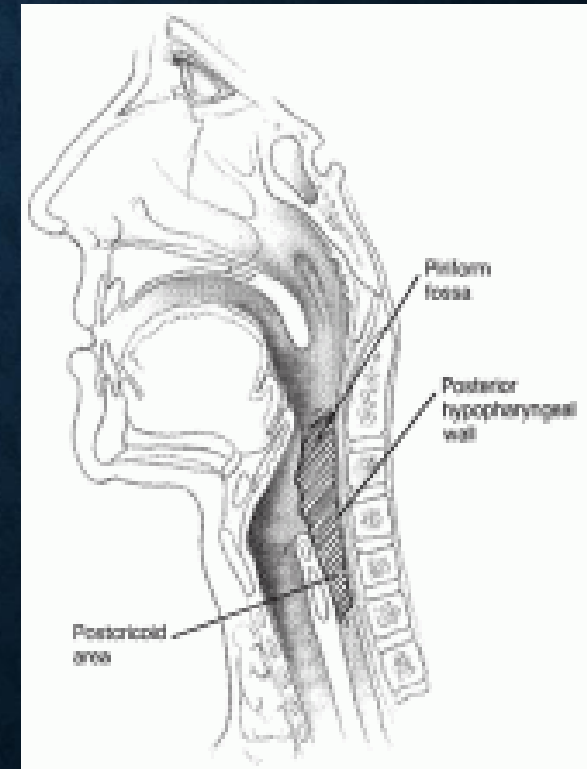
➤ **Postcricoid Region.**



Larynx in adduction

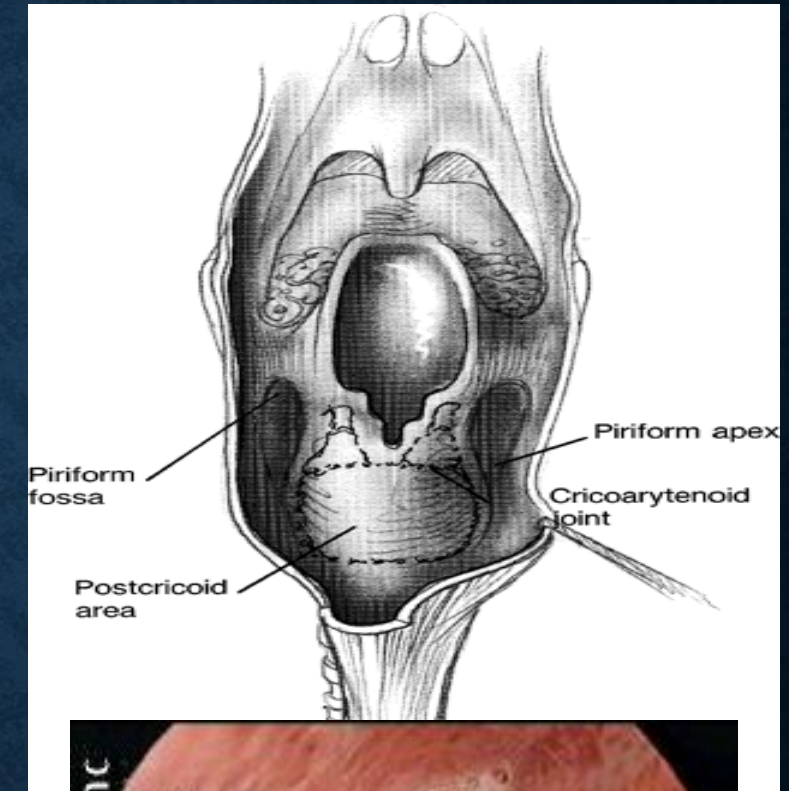
Larynx in abduction

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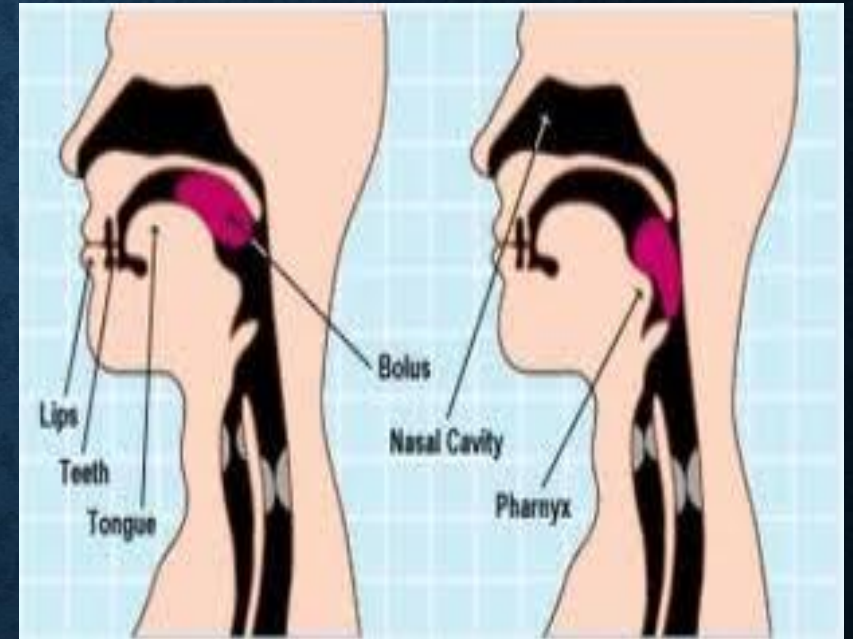
HYPOPHARYNX PIRIFORM SINUS

- Most common site for hypopharyngeal cancer.
- Most common site of FB impaction (hypopharynx).
- Hypopharyngeal Lesion
 - Vocal cord paralysis (CA joint involvement)
 - Pooling of secretion proximally .
 - Referred otalgia (CNX involvement) .



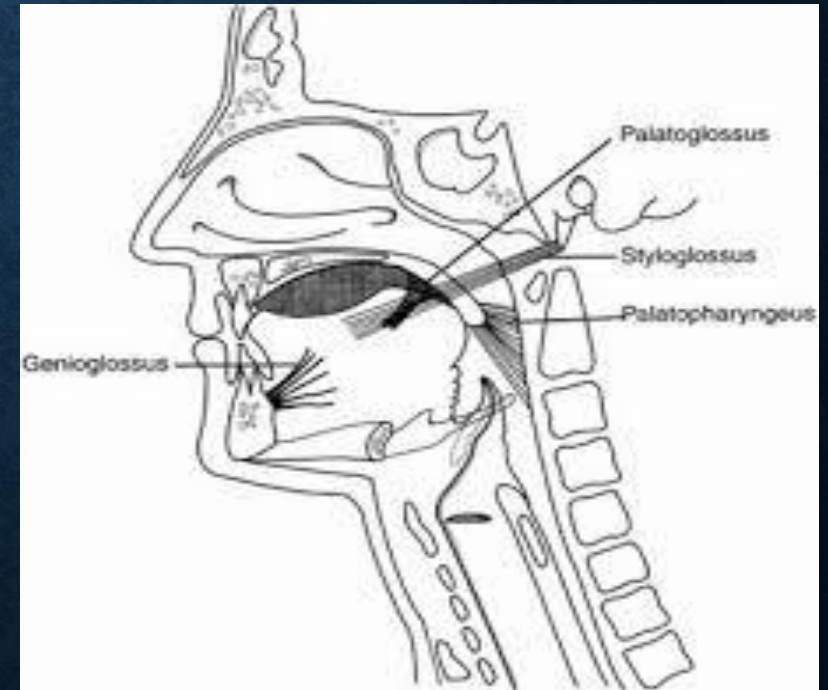
SWALLOWING PHARYNGEAL PHASES

- Reflexive phase
 - (posterior pharyngeal wall receptors, CN IX and CN X)
- Transient time <1 sec in normal subjects



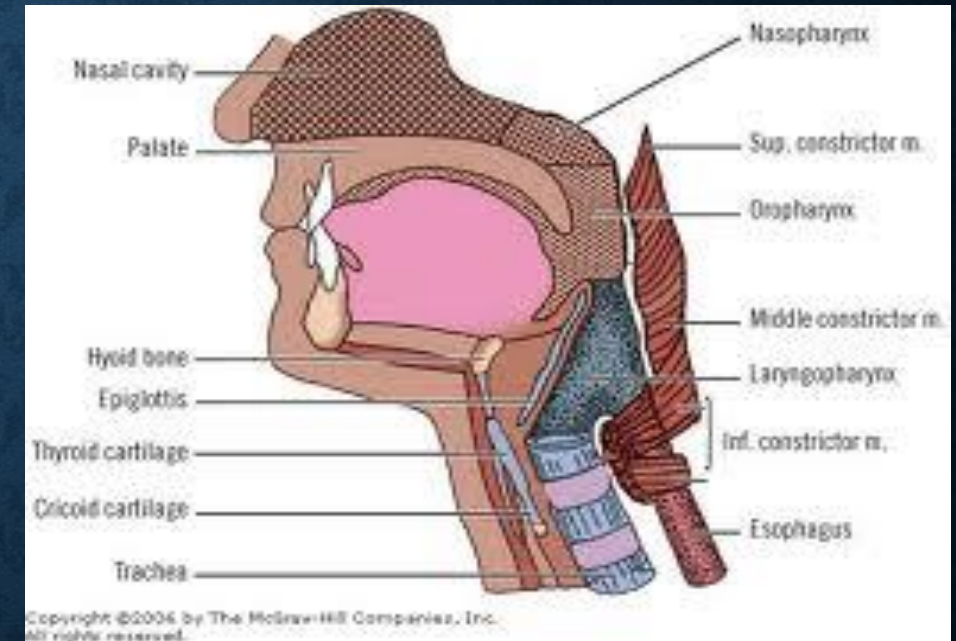
SWALLOWING NASOPHARYGEAL PHASE

- Levator veli palatini
 - **Lifts** the soft palate
- Palatopharyngeous
 - **Tightens and raises** the pharynx and narrows the oropharyngeal inlet.
- Superior pharyngeal muscle contraction



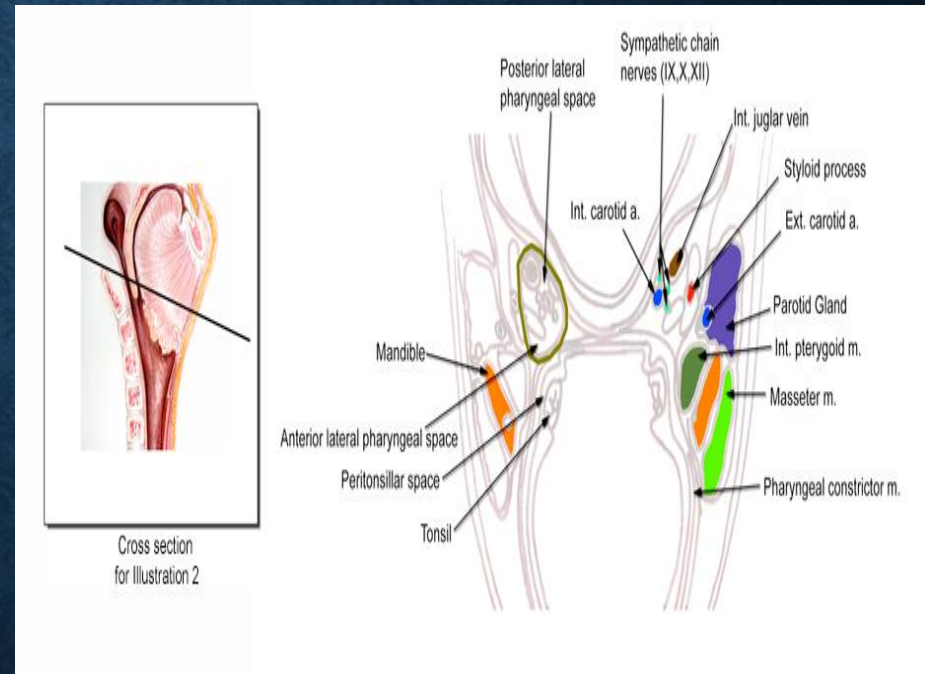
SWALLOWING OROPHARYNGEAL PHASE

- Base of Tongue Propels Bolus Past Vallecula
 - squeezes against posterior pharynx
- **Glossectomy patients have difficulty with bolus propulsion



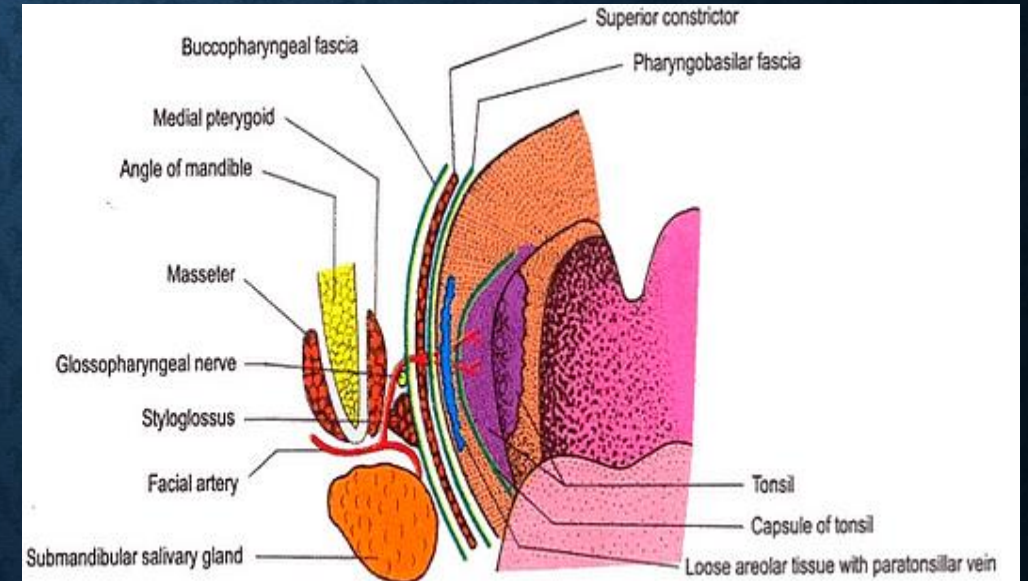
DEEP NECK SPACES

- Potential space containing fat , lymph nodes , neurovascular structure:
- Peritonsillar area
- Retropharyngeal area
- Parapharyngeal area



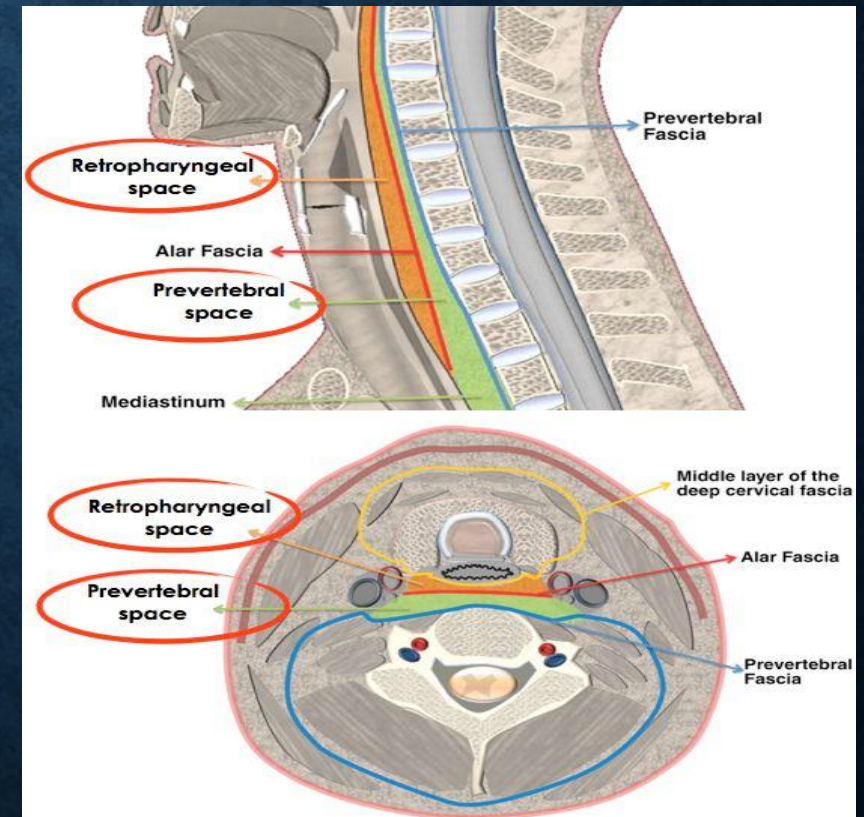
PERITONSILLAR AREA

- Boundaries :
- Medial: palatine tonsil
- Lateral: superior constrictor muscle
- Content :
- Loose connective tissue
- Tonsillar branches of the lingual, facial, ascending pharyngeal vessels



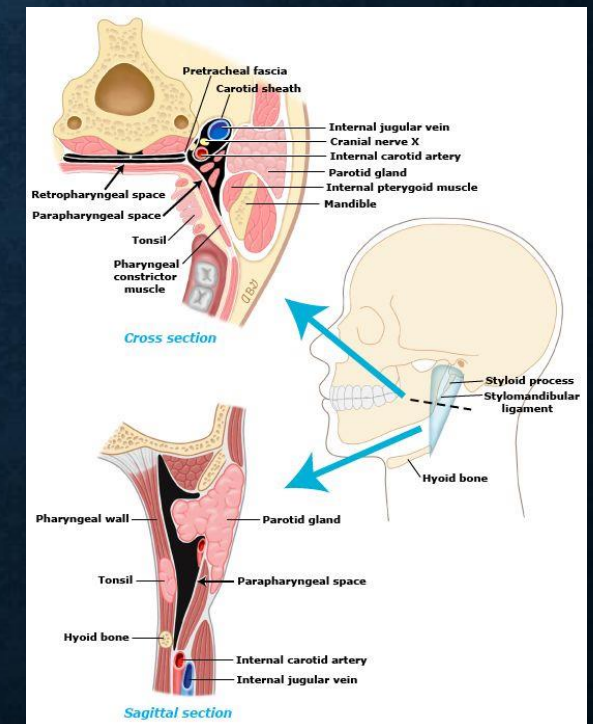
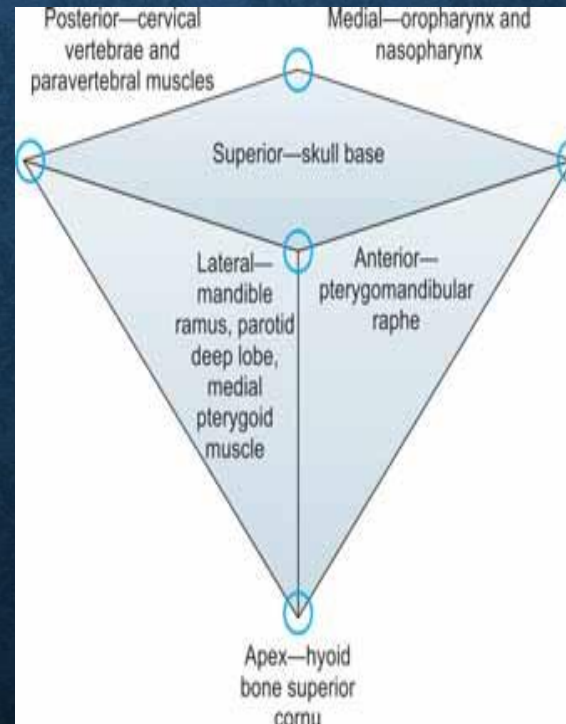
RETROPHARYNGEAL SPACE

- Boundaries :
- Superior: base of skull
- Inferior: superior mediastinum
- Anterior: pharynx, esophagus
- Posterior: alar fascia
- Medial: midline raphe of superior constrictor
- Lateral: carotid sheath
- Content :
- Lymph nodes
- Connective tissue



PARAPHARYNGEAL SPACE

- Boundaries :
- Superior: base of middle fossa
- Inferior: hyoid bone
- Anterior: pterygomandibular raphe
- Posterior: prevertebral fascia
- Medial: superior constrictor
- Lateral: deep lobe parotid, medial pterygoid



PARAPHARYNGEAL SPACE

- Content :
- Fat
- Lymph nodes
- Int. max. artery
- Auriculotemporal, Lingual & inferior alveolar nerve
- Pterygoid muscles
- Deep lobe parotid
- Carotid
- Internal jugular
- Superior sympathetic
- CN IX, X, X, XII

Disease & management

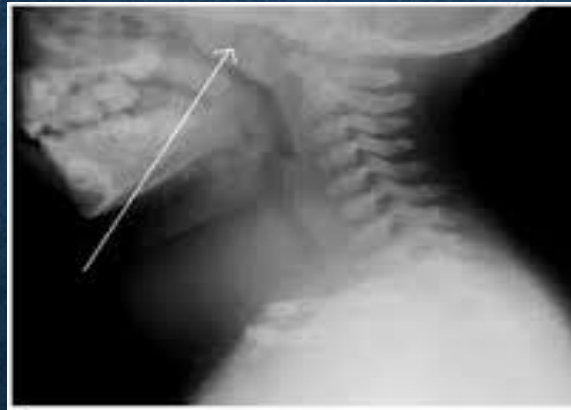
NASOPHARYNX

- **Adenoid hypertrophy:**
- Child
- Snoring & Mouth breathing
- Nasal Tone of speech
- Bilateral Otitis media with effusion
- Bilateral nasal obstruction & discharge
- Adenoid face : Overbite • Long face • Crowded incisors

ADENOID HYPERTROPHY DIAGNOSIS



Adenoid face



Lateral neck X ray



Nasal endoscopy

ADENOID HYPERTROPHY MANAGEMENT

- Treat underlying allergies
- Nasal steroid spray
 - Mild symptoms
 - Adenoid obstructing less than 50% of posterior nasal choana
- Adenoidectomy

ADENOIDECTOMY INDICATIONS

- Obstruction , sleep apnea
- Serous otitis media
- Chronic sinusitis in children

OROPHARYNX

TONSIL

- Tonsillitis
- Tonsillar hypertrophy

OROPHARYNX TONSILLITIS

- Viral (most common)
- Bacterial
- Infectious mononucleosis
- Malignancy: lymphoma, leukemia, carcinoma
- Diphtheria
- Vincent angina
- Scarlet fever
- Agranulocytosis

*** Prescribe Antibiotics (culture proven bacterial infection)



TONSILITIS BACTERIAL

- S/S : Dysphagia, • Headache, • Painful cervical lymphadenitis, • Fever • Exudate, • Absence of cough, and hoarseness.
- Microbiology :
- Strept pyogenes (Group A beta-hemolytic)
GABHS • H.influenza • S. aureus • Streptococcus pneumoniae



BACTERIAL TONSILITIS

- Complication

- Systemic complications :

- Rheumatic heart disease (RHD)
 - Glomerulonephritis (GN)
 - Sepsis

- Local complications:

- airway obstruction

- Aspiration

- Deep neck space infection (retropharyngeal abscess , peritonsillar abscess , Para pharyngeal abscess

TONSILLITIS

LOCAL COMPLICATIONS

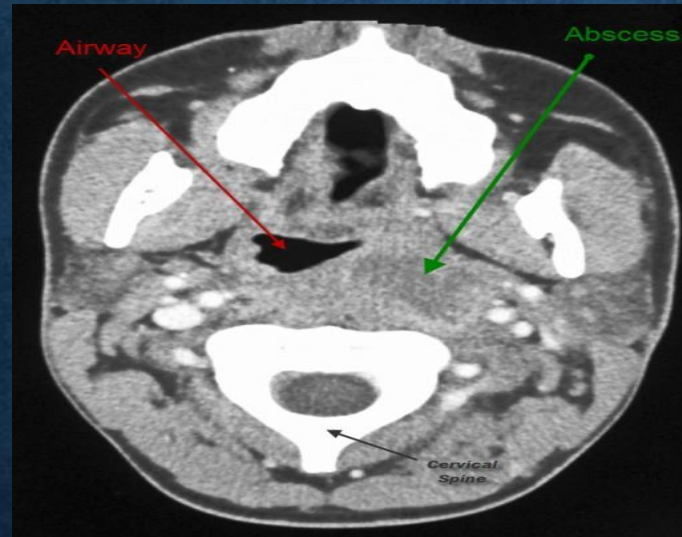
- Persistent Fever, sore throat , dysphagia despite medical treatment .
- Drooling of saliva & dysphagia
- Dyspnea
- Stridor
- Neck mass
- Trismus
- Torticollis

TONSILLITIS

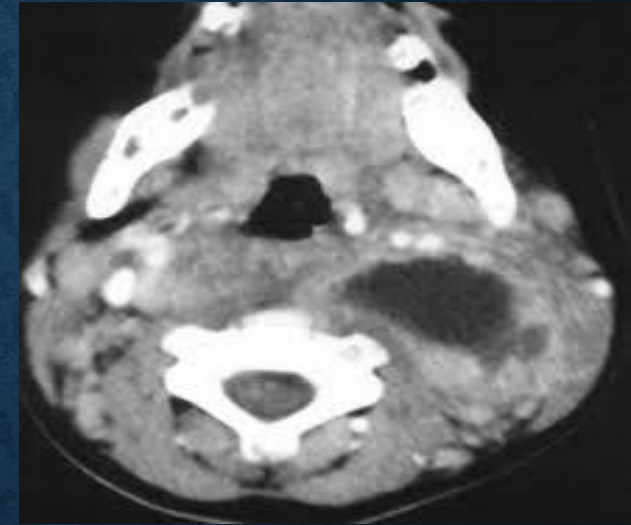
LOCAL COMPLICATION



Peritonsillar abscess



Retropharyngeal abscess



Para pharyngeal abscess

BACTERIAL TONILITIS MANAGEMENT

- Throat swab is mandatory in each case
- CBC
- Blood culture , if sepsis is concerned
- CT Neck with contrast (if local complications is suspected)
- Infectious disease referral

TONSILLITIS MANAGEMENT

- Oral [penicillin V](#) is the agent of choice for treatment of GAS pharyngitis given its proven efficacy, safety, narrow spectrum, and low cost
- The appropriate duration is 10 days of therapy;
- This approach is extrapolated from studies performed in the 1950s demonstrating that treatment of streptococcal pharyngitis with intramuscular penicillin prevents acute rheumatic fever.
- [Amoxicillin](#) is often used in place of oral penicillin in children, since the taste of the amoxicillin suspension is more palatable than that of penicillin. Some data suggest that oral amoxicillin may be marginally superior to penicillin

TONSILITIS MANAGEMENT COMPLICATION

- Abscess Incision & drainage
 - Transoral (peritonsillar/retropharyngeal abscess)
 - Transcervical (parapharyngeal abscess)
 - Intravenous antibiotics (broad spectrum coverage)
 - Cardiology consultation
 - Nephrology consultation
- systemic complication

TONSILLECTOMY INDICATION

- Obstruction --- sleep apnea
- Malignancy
- Recurrent bacterial infections
- Recurrent peritonsillar abscess
- Prophylaxis (rheumatic fever)

INFECTIOUS MONONUCLEOSIS

- Fever
- Fatigue
- Cervical LN
- Jaundice
- Microbiology : Epstein-Barr virus •
- CBC : Atypical lymphocytes
- Dx : “Monospot ”
- Treatment : supportive



VINCENT ANGINA

- Acute oropharyngeal ulcerative
- Poor oral hygiene (fetid breath)
- malnutrition
- fatigue
- Cervical lymphadenopathy
- Pseudomembranous ulceration
- Microbiology : G-ve anaerobic
- Dx: Throat swab C/S
- Treatment : Penicillin and metronidazole



SCALRET FEVER

- Sore throat
- Fever
- Strawberry appearance tongue
- Forchheimer spots (fleeting small, red spots on the soft palate)
- Microbiology : *Streptococcus* exotoxins
- Dx : clinical history , exam & elevation of antisteptolysin O titer
- Treatment : penicillin , macrolide



DIPHTHERIA

- upper respiratory tract illness with sore throat
- Low-grade fever
- Airway obstruction
- An adherent, dense, grey pseudomembrane covering the posterior aspect of the pharynx
- Microbiology : *Corynebacterium diphtheriae*
- Dx: throat swab
- Treatment :
 - Secure airway
 - Penicillin G
 - Quinvaxem



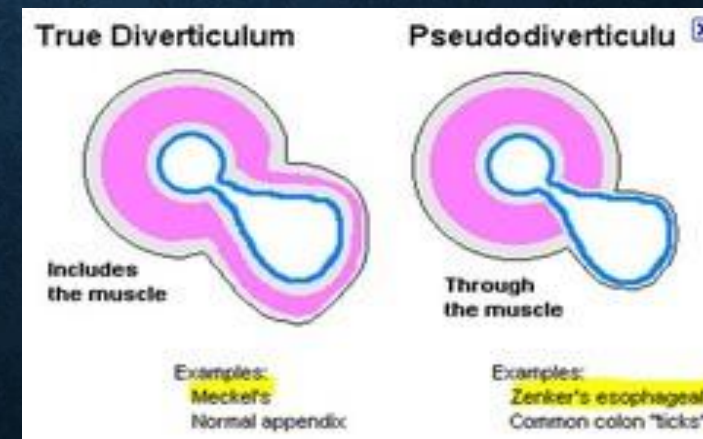
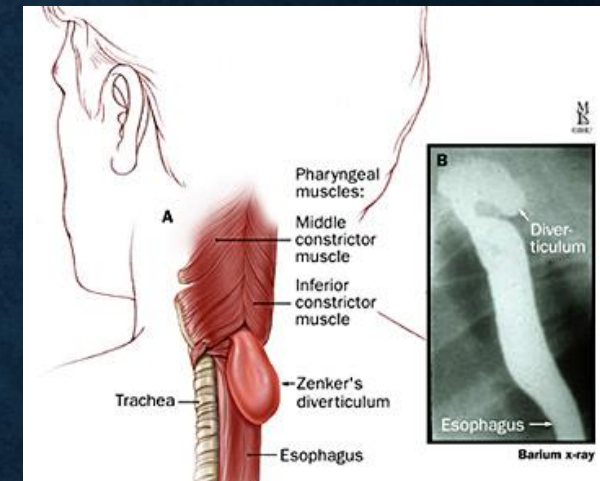
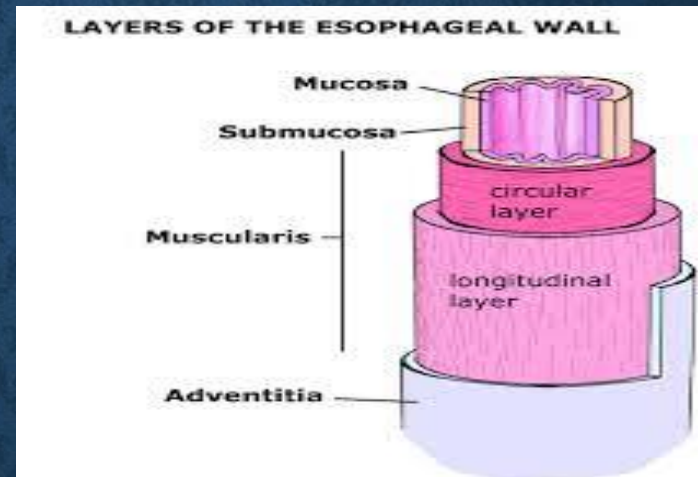
ZENKER DIVERTICULUM

- Outpouching of :

- Mucosa , sub mucosa (false)
- Mucosa , sub mucosa & muscle (true)

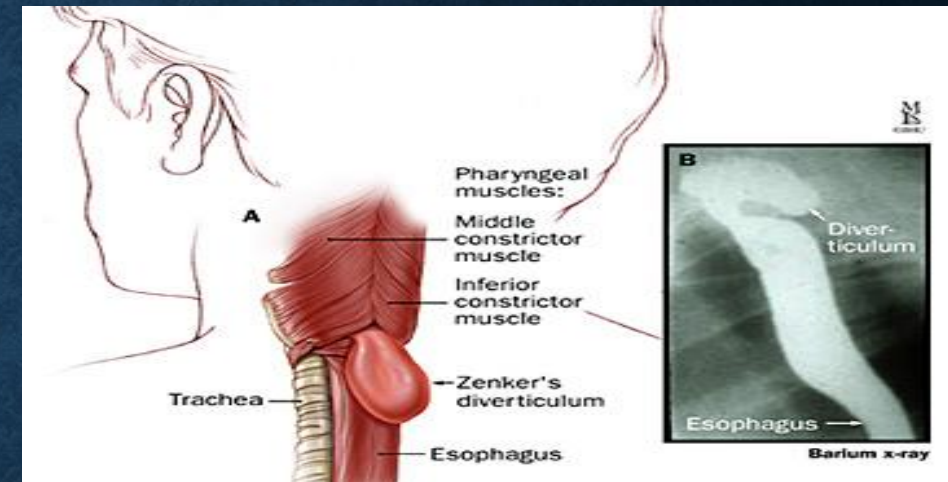
- Etiology :

- Intrinsic factors : luminal pressure
- Extrinsic factors : adhesion outside esophagus



ZENKER DIVERTICULUM

- Location : pharyngeoesophageal junction
- Site : left, posterior
- Etiology : increase intraluminal pressure (pulsion)



ZENKER DIVERTICULUM

- Diagnosis :
- Elderly (F>M)
- Dysphagia to solid
- Weight loss
- Vomiting of undigested food
- Aspiration pneumonia
- Asymptomatic (detected on CT neck)
- Radiology :
- Barium swallow :



ZENKER DIVERTICULUM

- Observation
 - Asymptomatic
 - Unfit for surgery(NG feeding or gastrostomy)
 - Diet modification
- Surgical intervention (cricopharyngeal myotomy +/- diverticulectomy)
 - Endoscopic
 - External approach

CONCLUSION

- The pharynx has complicated anatomy to optimize physiology & function .
- Each site & subsites has its own function.
- Missing site or subsites will compromise the function leading to aspiration , dysphagia , speech impairment .
- Understanding surgical anatomy will lead to delectated surgical dissection.

Thank you