



Endocrinology Module Pharynx & Esophagus (SGD)



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DI MEDIC

Motto Vision ;The Dream/Tomorrow



- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine

Prof. Umar's Model of Teaching Strategy Self Directed Learning Assessment Program

Objectives : To cultivate critical thinking, analytical reasoning, and problem-solving competencies.

To instill a culture of self-directed learning, fostering lifelong learning habits and autonomy.

How to Assess?

➤Ten randomly selected students will be evaluated within the first 10 minutes of the lecture through 10 multiple-choice questions (MCQs) based on the PowerPoint presentation shared on Students Official WhatsApp group, one day before the teaching session.

➤ The number of MCQs from the components of the lecture will follow the guidelines outlined in the Prof. Umar model of Integrated Lecture.

Component	Core	Horizontal	Vertical	Spiral
of LGIS	Knowledge	Integration	Integration	Integration
No. of MCQs	6-7	1-2	1	1

20% Surgery & Medicine Reference books Digital Library, Web Resources, **Clinical Subjects** NTEGRATION HORIZONTAL NTEGRATION VERTICAL Research 60% VERTICAL 5% 2% **INTEGRATION** CORE SUBJECT Physiology **biochemistry** 05% Research & Bigethics Research & Bioethics 07% 08% **8**% VERTICAL 7% **INTEGRATIO** VERTICAL Ν **INTEGRATION** CORE Clinical Pathology 20% 20% integration SUBJECT HORIZONTAL INTEGRATION pharmacolo Same Year Subjects 60% gу 5% SOLIDOUR & PURSON Silisoft & Blochics VERTICAL INTEGRATION Research, professionalis m **Ethics** INTEGRATION **Different Year Basic Sciences** VERTICAL Subjects **Digital library** 8%

Professor Umar Model of Integrated Lecture

TRUTH

Learning objectives

- Tabulate muscles of pharynx with origin, insertion, nerve supply & action
- Discuss the nerve supply of pharynx
- Discuss esophagus (revisit)
- Related Physiology and Biochemistry (Horizontal Integration)
- Related clinical/congenital abnormalities (Vertical integration)
- Professionalism/ Communication Skills
- Bioethics
- Research article related to topic
- HEC Digital Library
- Learning Resources



INTERACTIVE SESSION

Zenker's Diverticulum (Sac)

Pharynx



Relations of the pharynx

Anteriorly:

• Nasal cavity, mouth and larynx.

Posteriorly:

• Vertebral column, prevertebral fascia and muscles.

Superiorly:

• Sphenoid and basilar part of occipital bones.

Inferiorly:

• It is continuous with esophagus.



Divisions of Pharyn eal opening of pharyngotympanic al sinus Pharyn eal opening of pharyngotympanic (auditory, eustachian) tube Frontal sinus

Sphenoidal sinus-

Nasal septum-

Nasopharynx~

Soft palate

Palatine glands

Hard palate.

Oral cavity.

Incisive canal

Palatine tonsil

Body of tongue.

Oropharynx -

Foramen cecum

Lingual tonsil-Genioglossus

muscle-Root of tongue-

Epiglottis

Mandible~

Geniohyoid muscle

Mylohyoid muscle

Hyoid bone Hyo-epiglottic ligament

Thyrohyoid membrane

Laryngopharynx Laryngeal inlet (aditus)-

Thyroid cartilage-

Vocal fold-

Transverse arytenoid muscle-

Cricoid cartilage

Trachea

Esophagus-

Spheno-occipital synchondrosis

See. 3

Pharyngeal tonsil

62

C3

C4

C5

C6

C7

TI

100

Pharyngeal tubercle of occipital bone

Pharyngeal raphe

Anterior longitudinal ligament

Anterior atlanto-occipital membrane

Apical ligament of dens

Anterior arch of atlas (C1 vertebra) Dens of axis (C2 vertebra) Pharyngeal

constrictor muscles

Buccopharyngeal fascia

Retropharyngeal space

Prevertebral fascia and anterior longitudinal ligament

ctivate

Subdivision of the Pharynx

I. Naso-pharynx

 It extends from the base of the skull to the upper surface of the soft palate.

- It communicates anteriorly with the nose through the posterior nasal aperature.

- It communicates inferiorly with the oropharynx through the *pharyngeal isthmus*.



Core Knowledge Pharyngobasilar fascia



Pharyngeal Fascia



TENSOR VELI PALATINI

LEVATOR VELI -

SALPINGOPHARYNGEUS

PTERYGOID -HAMULUS

Superior pharyngeal constrictor muscle •



Cartilaginous part of pharyngotympanic (auditory) tube

Oropharynx

- It is the middle part of the pharynx.
- It extends from soft palate to upper border of epiglottis.
- It communicates with the mouth through the *oropharyngeal isthmus*.



II. Oro-pharynx

 It extends from the lower surface of the soft palate to the upper border of the

epiglottis at.

- It communicates anteriorly with the oral cavity by an opening called the *oropharyngeal isthmus* made by the palatoglossal arch on each side (each arch is made by palatoglossus muscle covered by mucous membrane).

- It also contains the palatopharyngeal arch (made by palatopharyngeus muscle covered by mucous membrane).

- Between the palatoglossal and palatopharyngeal arches there is the **"palatine tonsil".**





WALDEYER'S RING

An interrupted circle of protective lymphoid tissue at the upper ends of the respiratory and alimentary tracts





Tonsillar Bed

- Following structures form the tonsillar bed (from inside outwards):
- Pharyngobasilar fascia.
- Superior Constrictor muscle.
- Buccopharyngeal fascia.



Wall of the pharynx

- From inside outwards, the wall of the pharynx is formed by:
- 1. Mucosa.
- Inner fibrous coat (pharyngobasilar fascia). From base of skull to esophagus
- 3. Muscles.
- 4. Outer fibrous coat (buccopharyngeal fascia)

Core Knowledge Muscles of Pharynx



Core Knowledge Killian's dehiscence



Killian's dehiscence cont.,





SINUS OF MORGAGNI



- Space between base of skull & sup.connstictor.
- Through it enters-
- Eustachian tube
- Tensor &Levator veli palatini muscle
- Asc. Palatine artery(facial artery)

a-mucosa b-pharyngobasilar fascia c-muscular coat d-buccopharyngeal fascia

PASSAVANT'S RIDGE: Fibres of palatopharyngeus and superior constrictor form a U shaped muscle. loop in posterior pharyngeal wall under mucosa





Table 12.11 Pharynx Muscles

MUSCLE	ORIGIN	INSERTION	NERVE SUPPLY	ACTION
Superior constrictor	Medial pterygoid plate, pterygoid hamulus, pterygomandibular ligament, mylohyoid line of the mandible	Pharyngeal tubercle of the occipital bone, raphe in midline posteriorly	Pharyngeal plexus (vagus nerve)	Aids soft palate in closing off nasal pharynx, propels bolus downward
Middle constrictor	Lower part of stylohyoid ligament, lesser and greater cornu of hyoid bone	Pharyngeal raphe	Pharyngeal plexus (vagus nerve)	Propels bolus downward
Inferior constrictor	Lamina of thyroid cartilage, cricoid cartilage	Pharyngeal raphe	Pharyngeal plexus (vagus nerve)	Propels bolus downward
Cricopharyngeus	Lowest fibers of inferior constrictor muscle			Sphincter at lower end of the pharynx
Stylopharyngeus	Styloid process of the temporal bone	Posterior border of the thyroid cartilage	Glossopharyngeal nerve	Elevates the larynx during swallowing
Salpingopharyngeus	Auditory tube	Blends with palatopharyngeus	Pharyngeal plexus (vagus nerve)	Elevates pharynx
Palatopharyngeus	Palatine aponeurosis	Posterior border of the thyroid cartilage	Pharyngeal plexus (vagus nerve)	Elevates wall of the pharynx, pulls palatopharyngeal arch medially

Internal view of Pharynx



Piriform fossa



Blood supply of the pharynx:

• <u>Arterial:</u>

- 1. Ascending pharyngeal artery.
- 2. Ascending palatine artery.
- 3. Facial artery.
- 4. Lingual artery.
- 5. Pharyngeal branch of maxillary artery.
- Venous drainage:

Pharyngeal plexus of veins into internal jugular vein.

Nerve Supply





- 1. Upper deep cervical lymph nodes.
- 2. Lower deep cervical lymph nodes.
- 3. Retropharyngeal lymph nodes.
- 4. Para tracheal lymph nodes.

Esophagus



Curvatures:

- Anterior Curvature:
- It Follows antero-
- posterior curve of
- vertebral column
- through neck, thorax
- (posterior mediastinum)
- & upper abdomen





Natural Constrictions:

Site	Vertebral Level	Distance from central incisor	A verage L	C	Upper central incisor
Cricopharynx	C 6	15 cm	e n g t h	15	Cricopharyny sphincter
Aortic arch	Т 4	25 cm	i n o m	25 28	Arch of aorta Left
Lt main bronchus	T 5	28 cm			bronchus
Oesophageal hiatus	T 10	40 cm		40	Diaphragm

2. THORACIC OESOPHAGUS:

- Extends from the suprasternal notch → diaphragmatic hiatus.
- Passes posterior to the trachea, the tracheal bifurcation, and the left main stem bronchus.



Fig. 34.2. Scheme to show that the oesophagus is crossed by the *left* principal bronchus and the *right* pulmonary artery.

3. ABDOMINAL OESOPHAGUS:

- Extends from the diaphragmatic hiatus → orifice of the cardia of the stomach.
- Forms a truncated cone, about 1 cm long.



 Two high-pressure zones prevent the backflow of food:

The upper and
 The lower esophageal sphincter.



Core Knowledge UPPER OESOPHAGEAL SPHENCTER

- Between pharynx and the cervical oesophagus.
- Located at C5-C6 level.
- The UES is a musculocartilaginous structure.
- This is formed by fibers of cricopharyngeus, part of the inferior constrictor, which encircles the oesophageal entrance



 The cricopharyngeus muscle is a striated muscle.

 produces maximum tension in the A.P direction and less tension in lateral direction.

• composed of a mixture of fast- and slow-twitch fibres.

 This muscle forms the main component of UES.





- The lower esophageal sphincter is a high-pressure zone located where the esophagus merges with the stomach.
- Mean pressure here is approx. 8mm Hg.

 The LES is a functional unit composed of an intrinsic and an extrinsic component.

INTRINSIC -> oesophagel muscle fibers and is under neurohormonal influence

EXTRINSIC→diaphragm muscle.



Attachments of esophagus

1.Attachment of cranial end of oesophagus Longitudinal muscle attaches to the lamina of the cricoid cartilage by means of a tendon – CRICOOESOPHAGEAL tendon

©2.Attachment of tubular oesophagus

 Attached to trachea, pleura, and prevertebral fascia by several fibrous strands

3.Attachments of distal end

- Two diaphragmatic crura
- Phrenooesophageal ligament

OPhernooesophageal ligament:

- Created by blending of the subdiaphragmatic fascia and the endothoracic fascia
- Also known as LIMER'S FASCIA, or ALLISON'S MEMBRANE
- Two sheaths- upper inserts into oesophageal tunica muscularis and submucosa: lower inserts into gastric serosa, and mesentry



Relations



11.NERVE SUPPLY

- Parasympathetic nerve supply: (SENSORY MOTOR, SECR ETOMOTOR)
- > Upper ½→rec.laryngeal nerve.
- > Lower ½→oesophageal plexus formed by the 2 vagus plexus.
- The sympathetic nerve supply(VASOMOTOR)
- > Upper ½→by fibres from mid cervical ganglion.
- > Lower ½→directly from upper four thoracic ganglia.





Core Knowledg Esophageal Venous Plexus Drainage

Cervical Region: *Esophageal br. of the

inferior thyroid v.

<u>Thoracic Region:</u> blood drains to the azygos system (systemic)

Abdominal Region:

<u>*</u>Esophageal br. drain mainly to tributaries of the **portal vein** (left gastric v.)



Note: Submucosal veins in distal esophagus can drain either portally or systemically (discussed further in Liver Lab); rupture can be life-threatening



Vertical Integration Adenoid Facies



Clinical presentation

- Nasal congestion
- Adenoid facies (open mouth, high arched palate, narrow midface, malocclusion)
- chronic or recurrent otitis media
- Speech anomalies (hyponasal speech)
- Rhinorrhea
- sleep-disordered breathing



Vertical Integration

Applied Aspects

Acute Tonsillitis-

 Palatine tonsils are frequent sites of acute infection.

Age group-

School-going children.

Etiology-

Mostly viral.

Acute Follicular Tonsillitis-

Infection spreads into crypts.





Vertical Integration

Applied Aspects contd...

Tonsillectomy-

- Surgical removal of tonsil.
- If paratonsillar vein gets damaged during tonsillectomy, severe bleeding occurs from tonsillar fossa.
- To check bleeding, blood clots should be removed because they interfere with retraction of walls of vein.
- Blood clots prevent the contraction of surrounding muscles.
- After tonsillectomy, postoperative edema of tonsillar bed can affect the Glossopharyngeal nerve.





Left lateral view

Vertical Integration

These areas are where most oesophageal foreign bodies become entrapped.

- The most common site of oesophageal impaction is at the thoracic inlet
- The cricopharyngeus sling at C6 is also at this level and may "catch" a foreign body.
- About 70% of blunt foreign bodies that lodge in the oesophagus do so at this location.
- Another 15% become lodged at the mid oesophagus, in the region where the aortic arch and carina overlap the oesophagus on chest radiograph.
- The remaining 15% become lodged at the lower oesophageal sphincter (LES) at the gastroesophageal junction.





Vertical Integration Coin in esophagus



Polyp in esophagus







Spiral Integration

Family Medicine

Barrett's Esophagus Prevention



Barrett's oesophagus can be prevented by addressing the underlying cause; heartburn or GERD symptoms. In addition to this:

- Avoid smoking and chewing tobacco
- Avoid drinking alcohol
- Maintain a healthy body weight
- Avoid food that trigger GERD symptoms
- Sleeping with your head slightly elevated
- Diet with fruits and vegetables rich in vitamins

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Spiral Integration





Framework^a

Principle	Description
Respect for Autonomy	Respect for the individual patient and his or her ability to make decisions with regard to own health and future; right to self-determination
Beneficence	Doing and promoting good; preventing and removing evil or harm
Nonmaleficence	Doing no harm; avoiding harming
Justice	Maximizing benefit to patients and society while emphasizing equality, fairness, and impartiality

^a Adapted from Beauchamp and Childress.³

Spiral Integration

Research Article

The Effects of Smoking on Human Pharynx Microbiota Composition and Stability

DOI: https://doi.org/10.1128/spectrum.02166-21

The toxic substances contained in cigarette smoke, as well as oxygen deprivation, have been hypothesized to contribute to the altered microbiota in smokers.

Observational and interventional studies have found that the composition of the intestinal microbiota is also altered in smokers, with some taxa occurring in higher abundances (e.g., Parvimonas, Fusobacterium, *Campylobacter*, Bacteroides, and *Treponema*), while others have been shown to decrease in abundance (e.g., Veillonella, Neisseria, and *Streptococcus*).

However, there are also indications that the increased infection risk in smokers could be more directly linked to the changes in the oropharyngeal microbiota

How To Access Digital Library

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- You can find a Journal by clicking on JOURNALS AND DATABASE and enter a keyword to search for your desired journal.

Video



