ANATOMY AND PHYSIOLOGY OF THE PHARYNX AND LARYNX

BY

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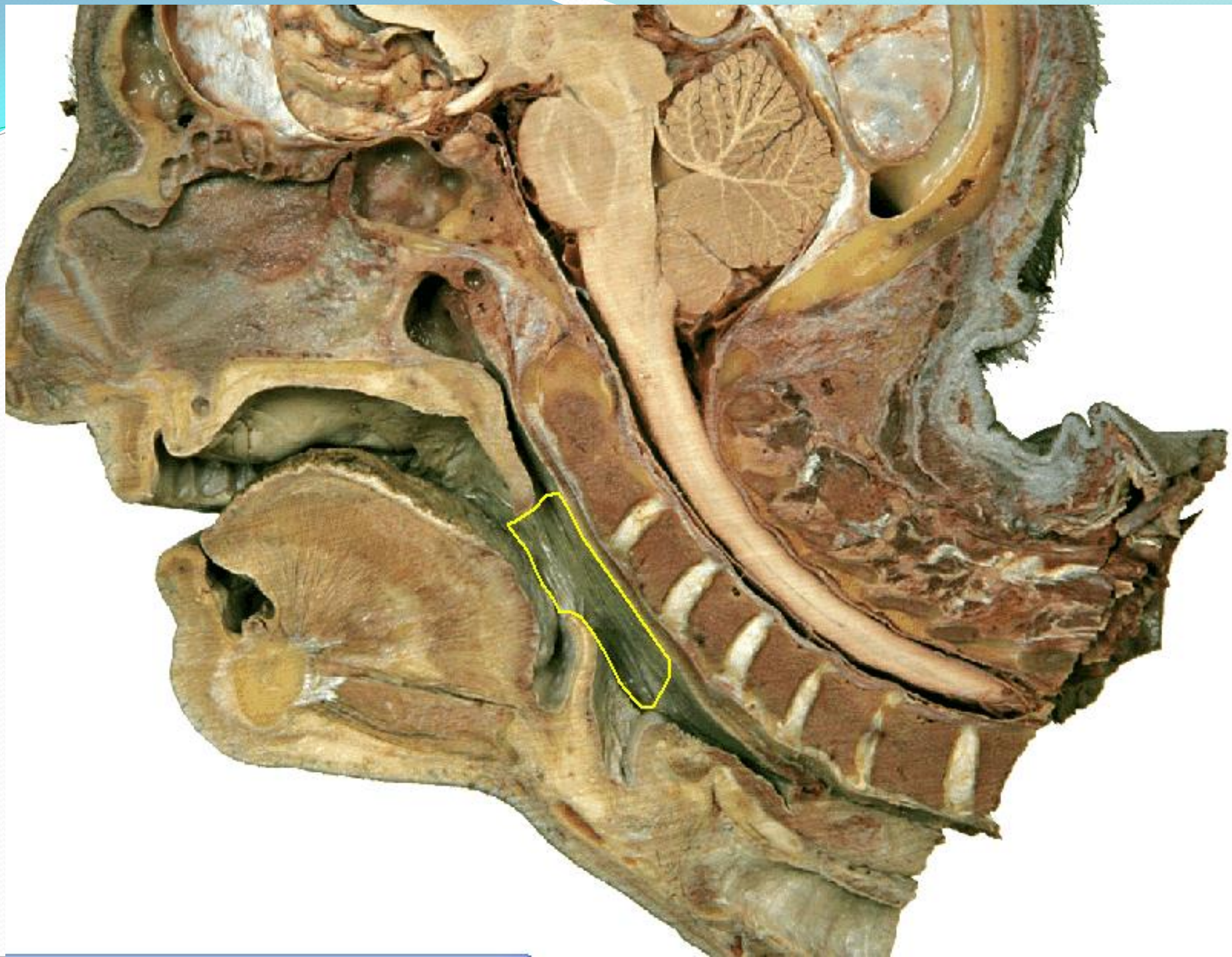
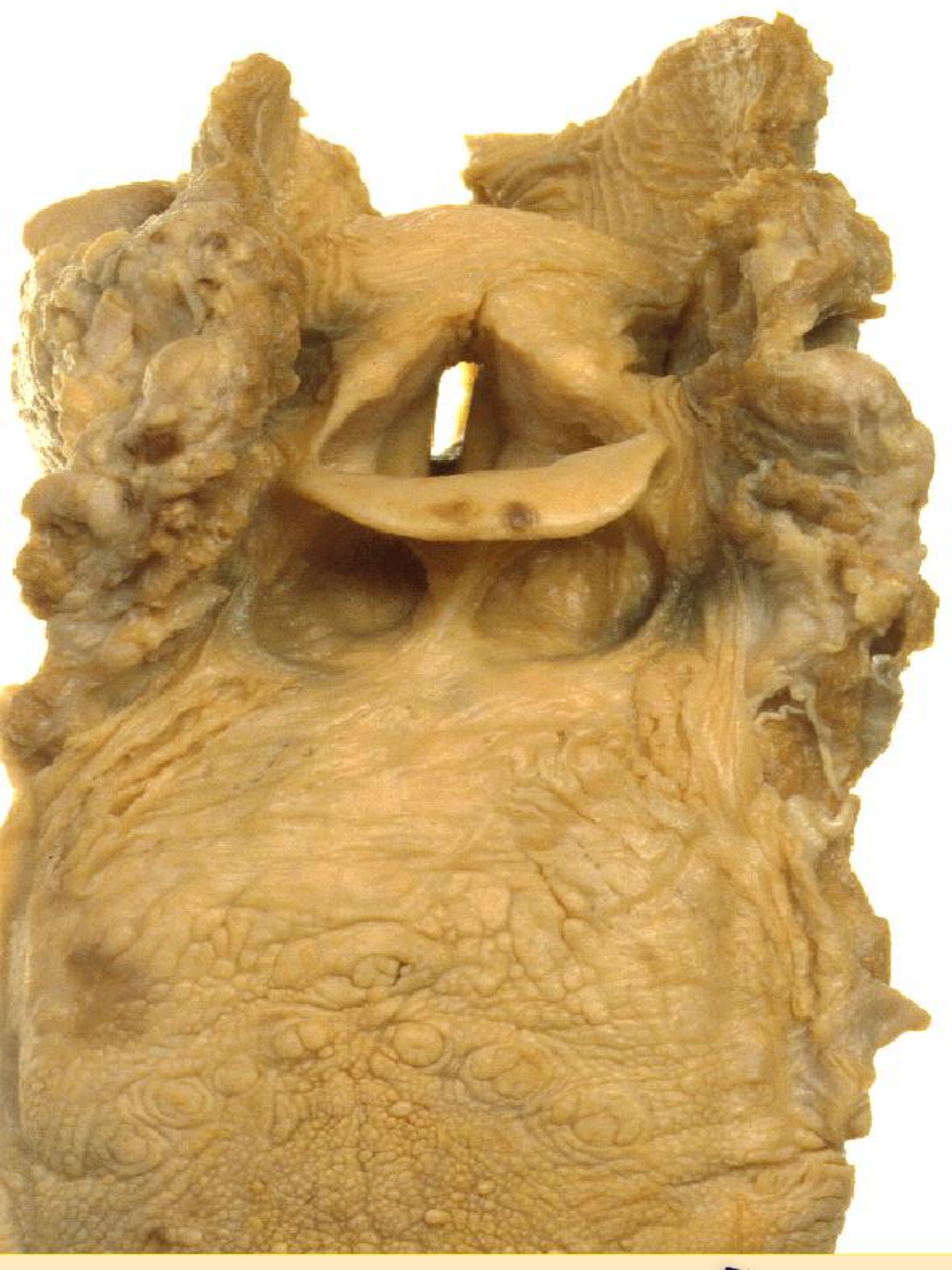
Pharynx

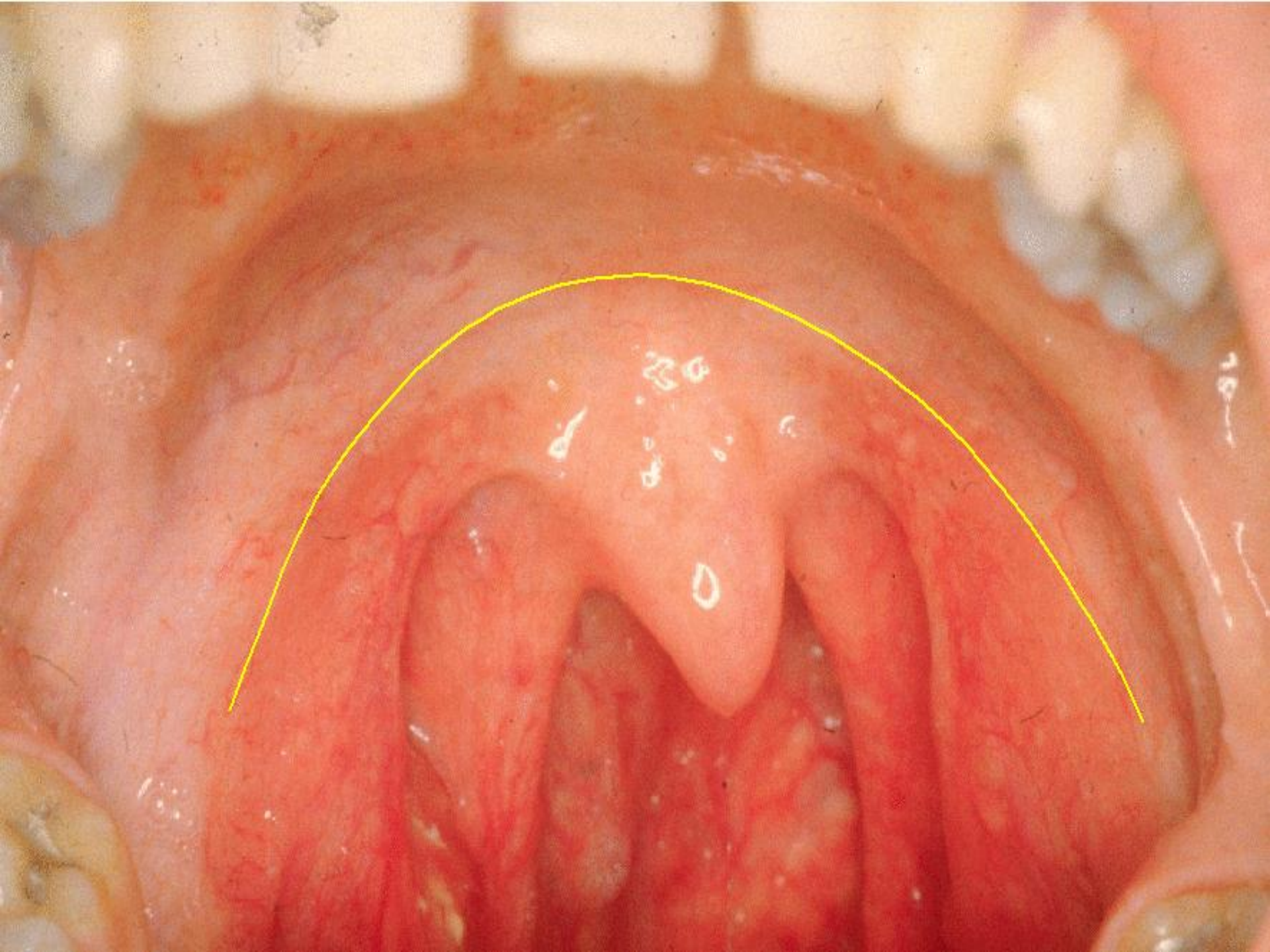
- It is a muscular tube
- Lies behind and communicates with the nasal, oral, and laryngeal cavities
- Lies in front of the prevetebral fascia
- About (12 cm) in adult

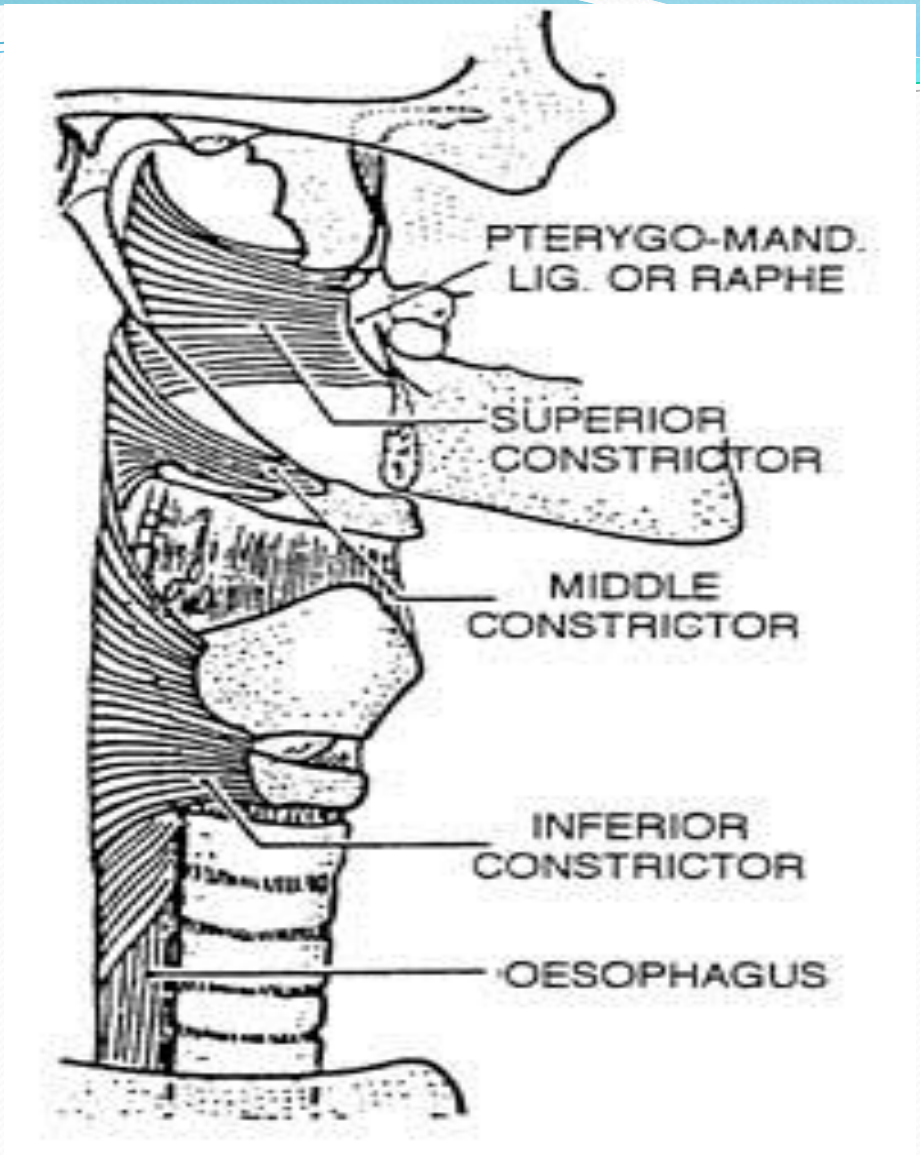
Pharyngeal subdivisions

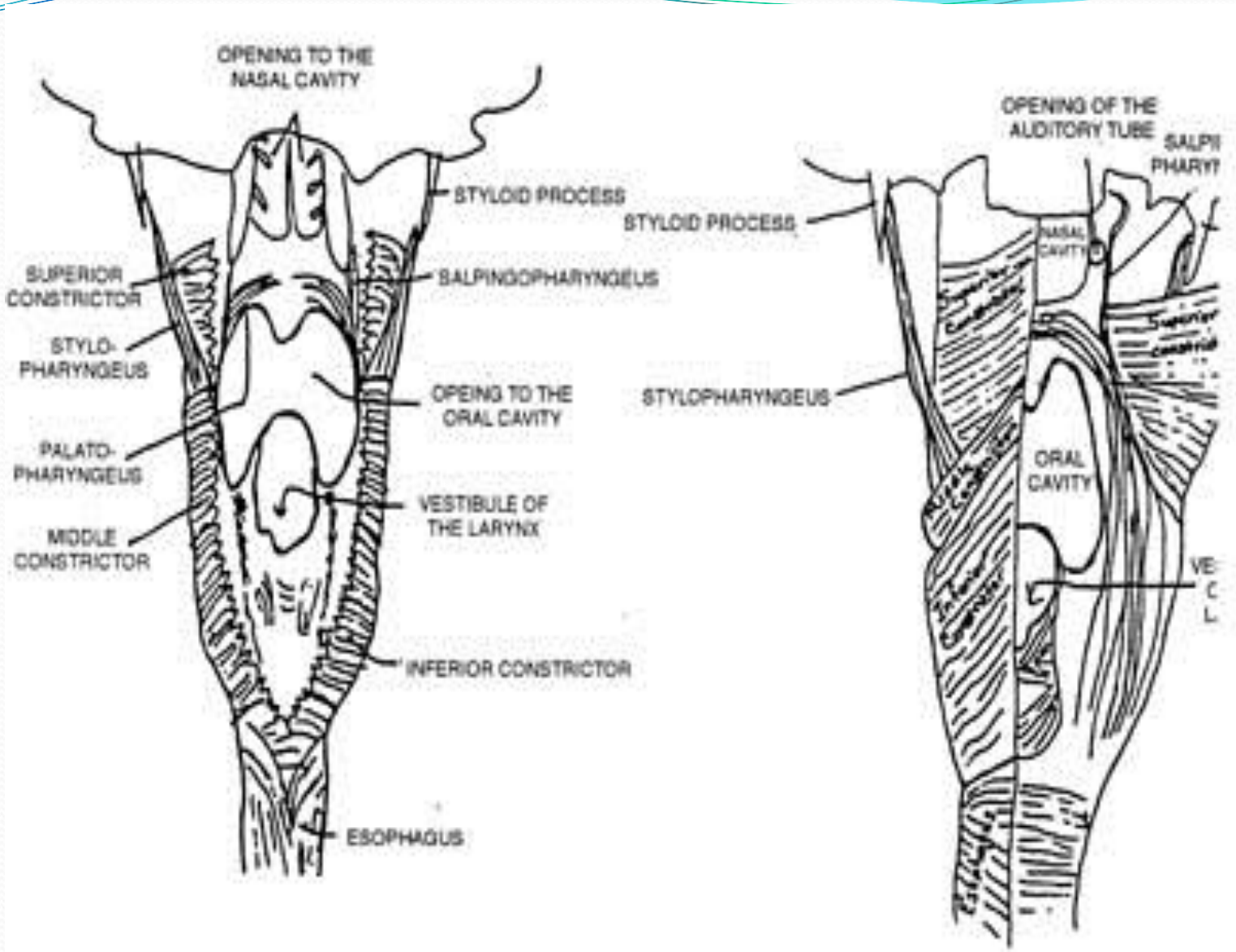
- Nasopharynx
- Oropharynx
- Hypopharynx








PTERYGO-MAND.
LIG. OR RAPHE
SUPERIOR
CONSTRICTOR
MIDDLE
CONSTRICTOR
INFERIOR
CONSTRICTOR
OESOPHAGUS


OPENING TO THE NASAL CAVITY
STYLOID PROCESS
SUPERIOR CONSTRICTOR
SALPINGOPHARYNGEUS
STYLO-PHARYNGEUS
OPEING TO THE ORAL CAVITY
PALATO-PHARYNGEUS
VESTIBULE OF THE LARYNX
MIDDLE CONSTRICTOR
INFERIOR CONSTRICTOR
ESOPHAGUS
OPENING OF THE AUDITORY TUBE
STYLOID PROCESS
STYLOPHARYNGEUS
ORAL CAVITY

layers

- Mucosa: non-keratinized stratified squamus epithelium & ciliated columnar epithelium
- Pharyngobasilar fascia: fibrous layer
- Muscles : longitudinal and circular
- Buccopharyngeal fascia: loose areolar tissue that separate pharynx from prevertebral fascia

Inner layer

- Salpingopharyngeus
- Stylopharyngeus
- Stylohyoid
- Palatopharyngeus (posterior pillar)

Outer layer (constrictors)

- Superior constrictor
- Middle constrictor
- Inferior constrictor

Nasopharynx

- Extend from the base of the skull to the level of soft palate
- Continuous with the nasal cavity througth the choanae
- Eustachian tube in the lateral wall
- Above and behind ET. There is a depression which called fossa of rosenmullar
- Adenoid :collection of lymphoid tissue lies in the posterior superior wall

Oropharynx

- Extend from the junction of soft and hard palate to the floor of the valleculae (level of hyoid bone)
- Subuints: 1-soft palate 2- base of tongue
  3-median and lateral glossogoepglottic folds
  4-valleculae 5-posterior pharyngeal wall
- Palatine Tonsil lies in tonsillar fossa between palatoglossal and palatopharyngel folds and coresponding muscles, it compose of lymphoid tissue with germinal center containing 6—20 epithelium-lined crypts. Tonsillar capsule (thin areolar tissue) separate it from the under lying superior constrictor

Lingual tonsil collection of lymphoid tissue in the base of tongue

- B-lymphocytes proliferates in germinal center
- Immunoglobulines(IgG, A, M ,D) complements, and cytokines accumulate in the tonsil
- The role of tonsil remain cotraversal and to date there is no proven immunologic effect from tonsillectomy

Hypopharynx

- Extend from the level of hyoid to the lower edge of the cricoid
- Subunits :1-pyriform fossi, 2-posterior and lateral walls, and 3-postcricoid region

Physiology of the pharynx

- **Airway**
- **Swallowing**
- **Sound resonate**

Swallowing

- **Oral phase** (voluntary): 1-mastication 2-adation and mixing of saliva 3-control of bolus 4-selection of bolus (volume, taste, fish bone, etc.)
- **Pharyngeal phase** (involuntary), quick, and including:-

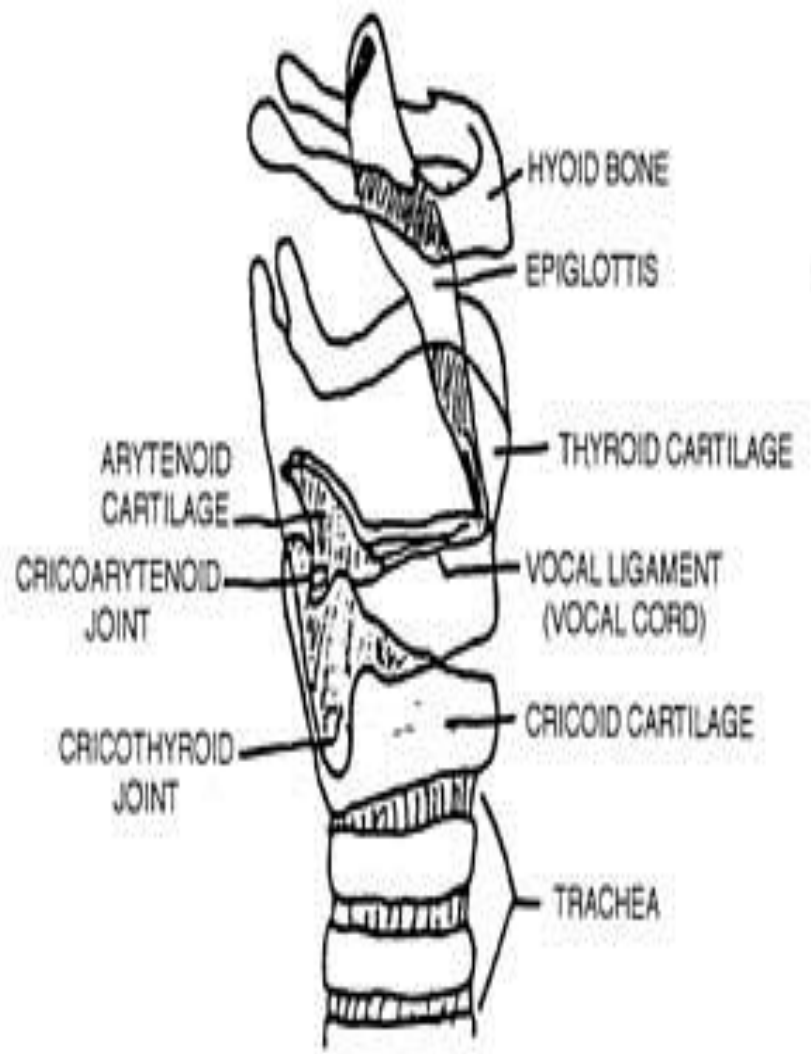
1. Nasopharyngeal closure
2. Cessation of respiration
3. Glottic closure
4. Bolus propulsion
5. Laryngeal elevation & pharyngeal shortening

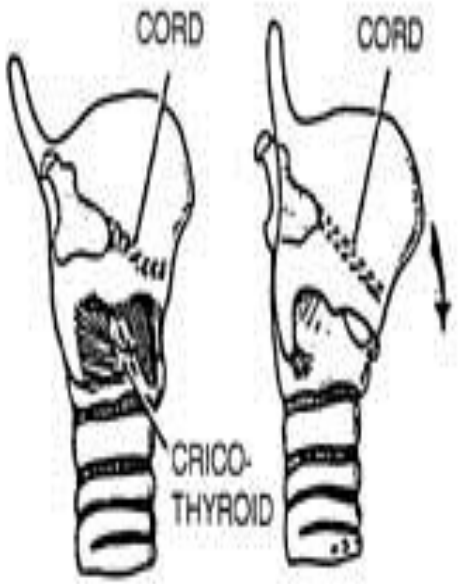
- **Esophageal phase** (involuntary): peristaltic movement from superior part downward associated with relaxation of lower esophageal sphincter

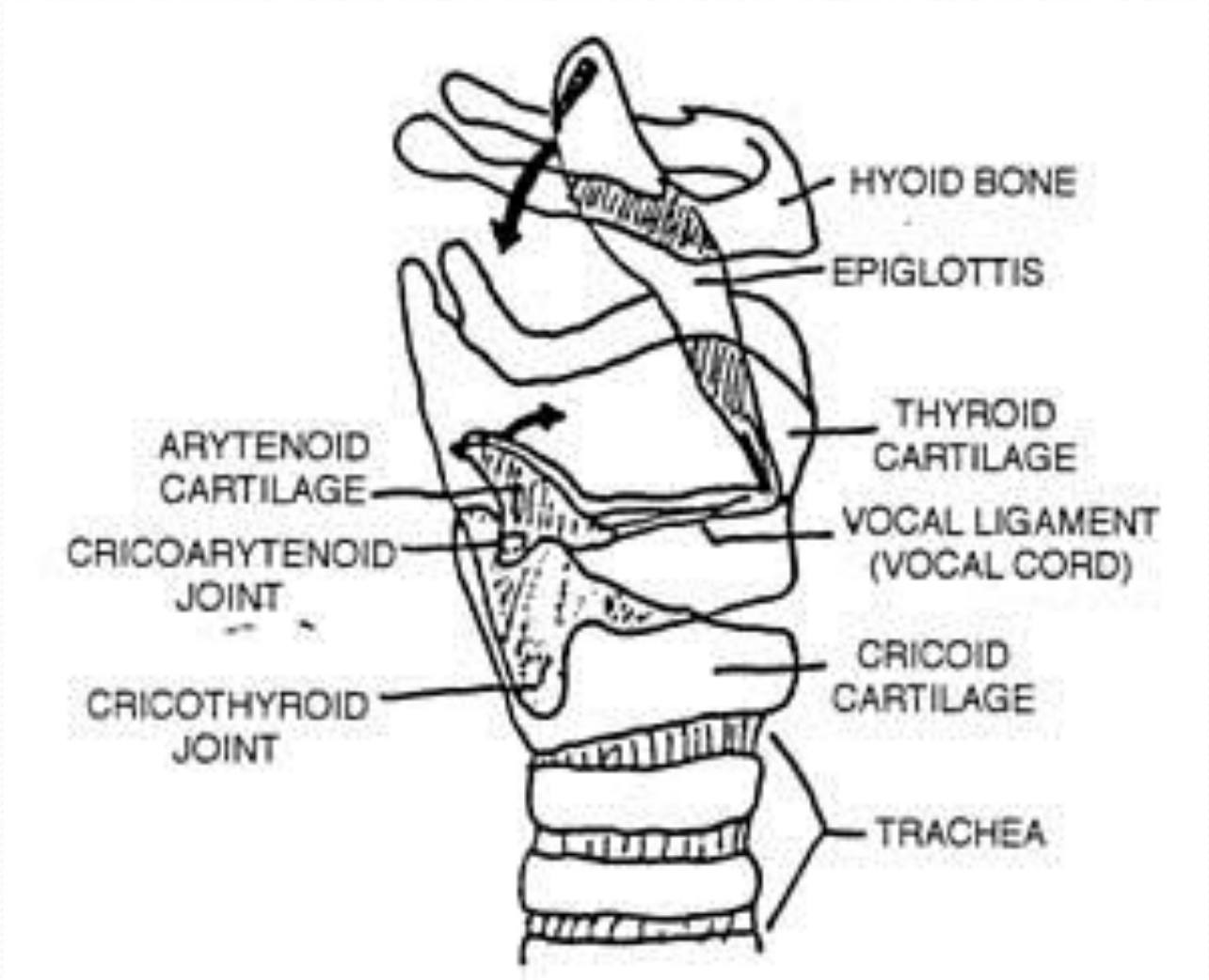
Larynx

Cartilages of the larynx

1. Thyroid cartilage (single)
2. Cricoid cartilage (single)
3. Epiglottis (single)
4. Arytenoid cartilages (paired)
5. Corniculate cartilages (paired)
6. Cuneiform cartilage (paired)


HYOID BONE
EPIGLOTTIS
THYROID CARTILAGE
ARYTENOID CARTILAGE
CRICOARYTENOID JOINT
VOCAL LIGAMENT (VOCAL CORD)
CRICOTHYROID JOINT
CRICOID CARTILAGE
TRACHEA


CORD
CORD
CRICO-THYROID


HYOID BONE
EPIGLOTTIS
THYROID CARTILAGE
ARYTENOID CARTILAGE
VOCAL LIGAMENT (VOCAL CORD)
CRICOARYTENOID JOINT
CRICOID CARTILAGE
CRICOTHYROID JOINT
TRACHEA

Hyoid bone

It is commonly described as part of the laryngeal framework, because it is an important point of attachment for extrinsic muscle of the larynx

Laryngeal ligaments and membranes

1. Thyrohyoid membrane
2. Cricothyroid membrane
3. Cricotracheal ligament
4. Vocal ligament

Clinical subdivisions

- **Supraglottis**

1. Epiglottis
2. Aryepiglottic folds
3. Arytenoid
4. Ventricle

Glottis

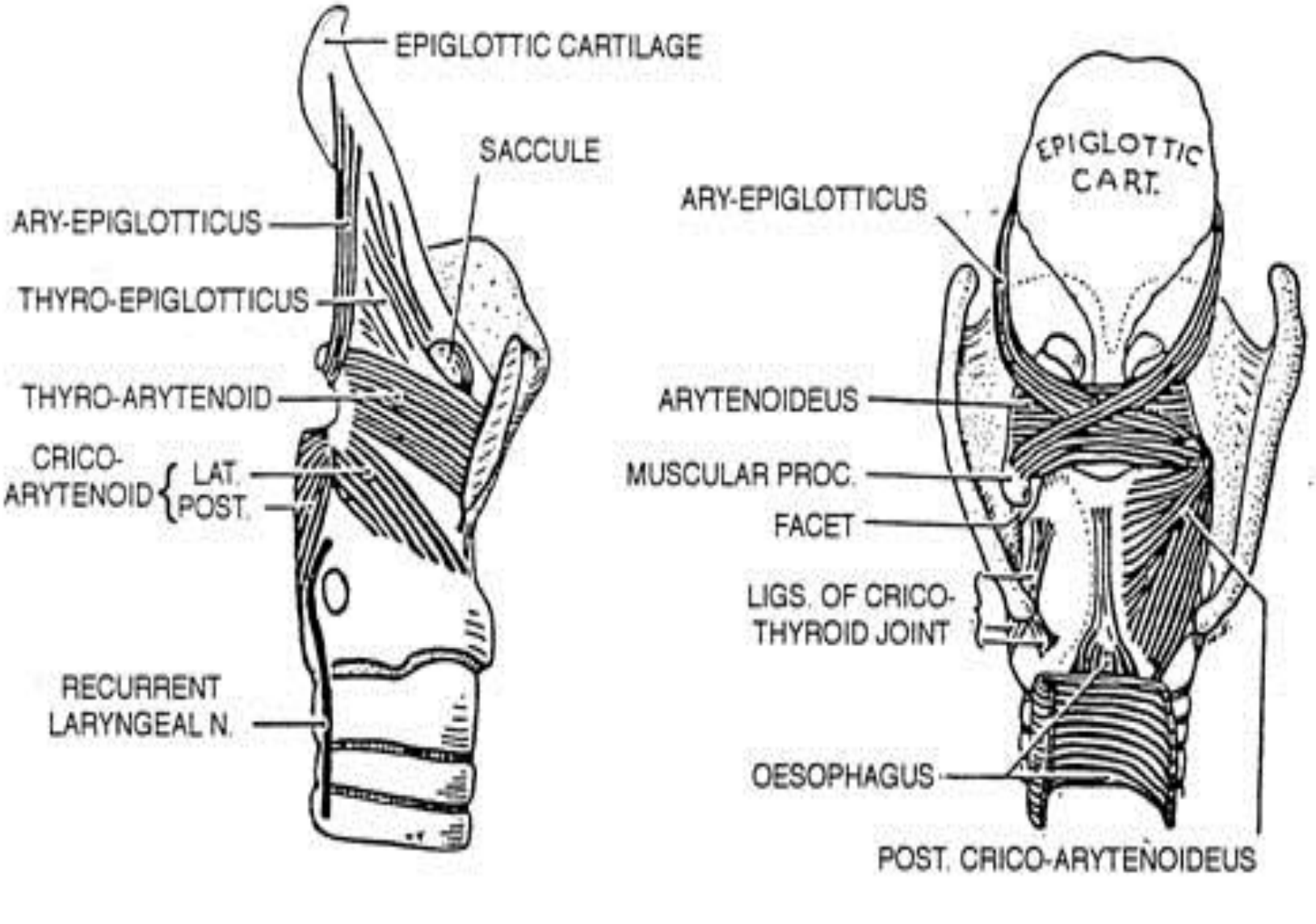
1. Anterior and posterior commissures
2. True vocal cords

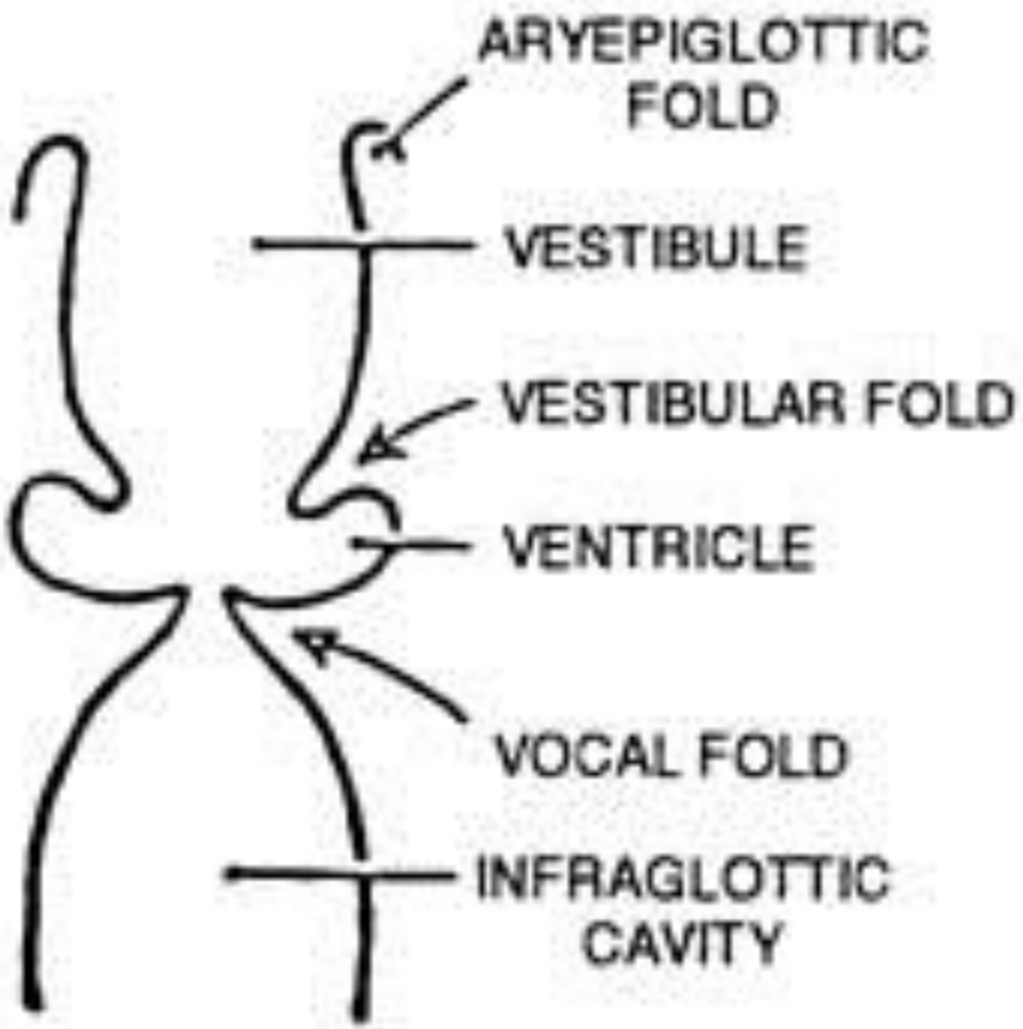
Subglottis

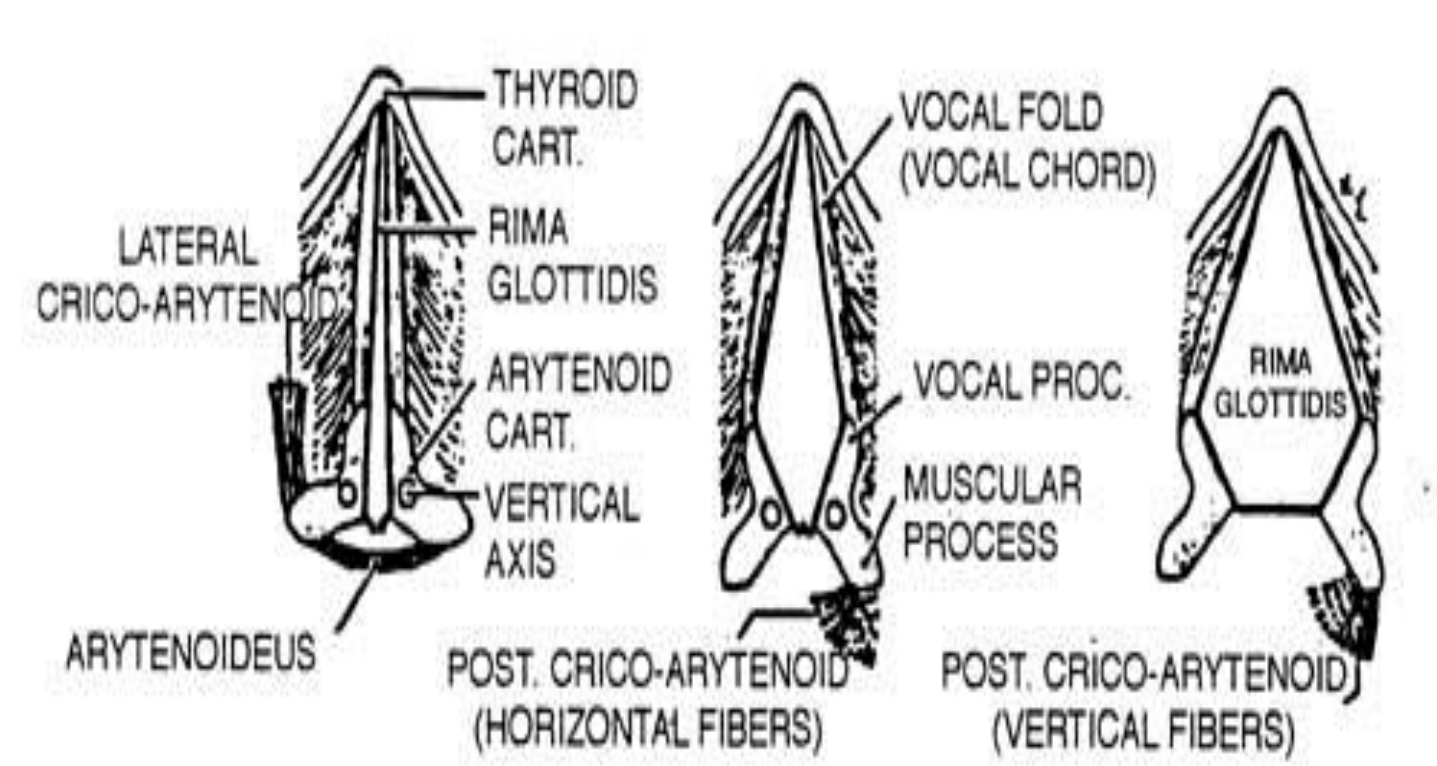
Extend from the under surface of the vocal cords to the inferior edge of cricoid cartilage

Laryngeal muscles

- **Extrinsic m.**
  - Sternohyoid muscle
  - Thyrohyoid m.
  - Geniohyoid m.
  - Stylohyoid m.
- **Intrinsic muscle**
  - Thyroarytenoid m.
  - Interarytenoid m.
  - Posterior cricoarytenoid m.
  - Lateral cricoarytenoid m.
  - Cricothyroid m.


EPIGLOTTIC CARTILAGE
SACCULE
ARY-EPIGLOTTICUS
THYRO-EPIGLOTTICUS
THYRO-ARYTENOID
CRICO-ARYTENOID
LAT.
POST.
RECURRENT LARYNGEAL N.
EPIGLOTTIC CART.
ARY-EPIGLOTTICUS
ARYTENOIDEUS
MUSCULAR PROC.
FACET
LIGS. OF CRICO-THYROID JOINT
OESOPHAGUS
POST. CRICO-ARYTENOIDEUS


ARYEPIGLOTTIC FOLD
VESTIBULE
VESTIBULAR FOLD
VENTRICLE
VOCAL FOLD
INFRAGLOTTIC CAVITY


THYROID CART.
RIMA GLOTTIDIS
LATERAL CRICO-ARYTENOID
ARYTENOID CART.
VERTICAL AXIS
ARYTENOIDEUS
VOCAL FOLD (VOCAL CHORD)
VOCAL PROC.
MUSCULAR PROCESS
POST. CRICO-ARYTENOID (HORIZONTAL FIBERS)
RIMA GLOTTIDIS
POST. CRICO-ARYTENOID (VERTICAL FIBERS)

Mucous membrane

- St . Sq. epithelium is found over true vocal cords
- Ciliated columnar epithelium in other regions

Functions of the larynx

- Airway protection
- Respiration
- Phonation
- Others
  - (Fixation of the chest)

Phonation

Speech result from the production of fundamental tone at the level of the true vocal cords, this then modified by the resonating chambers of the upper aerodigestive tract.

Vocal tract components

1. Activator : (lung and respiratory muscles)
2. Sound source generator (vocal cords)
3. Resonator (supraglottis, hypopharynx, oropharynx and nasopharynx
4. Articulator (palate, tongue, teeth, and lips are used to modulate the sound signal)