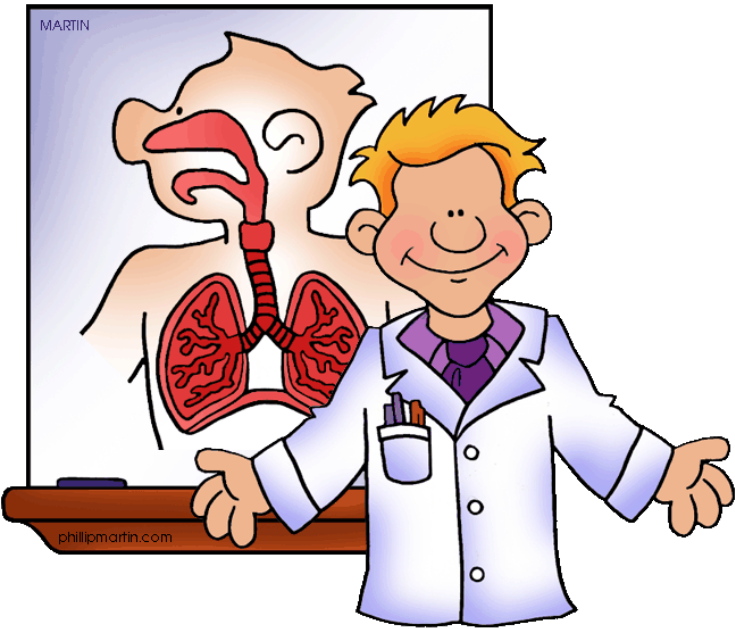
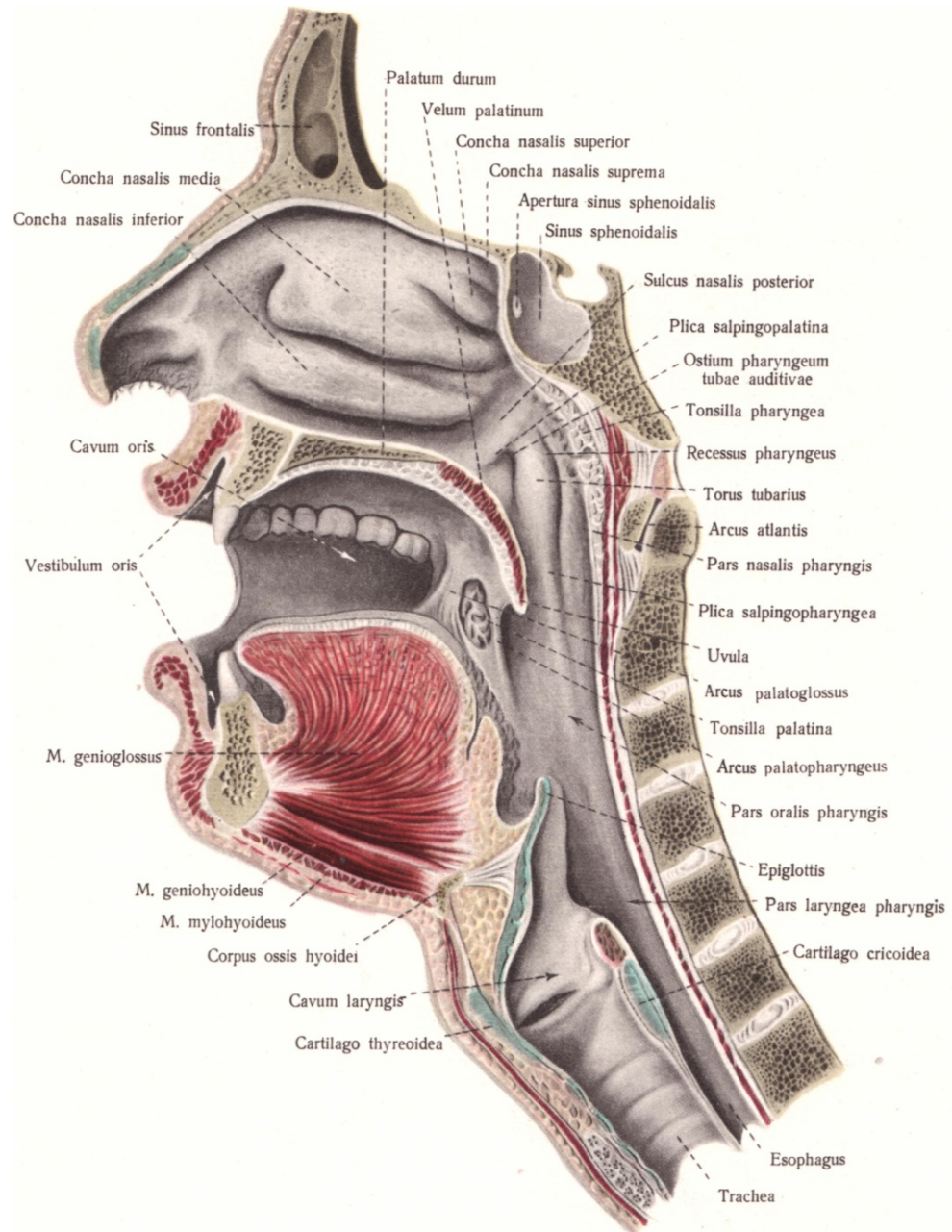


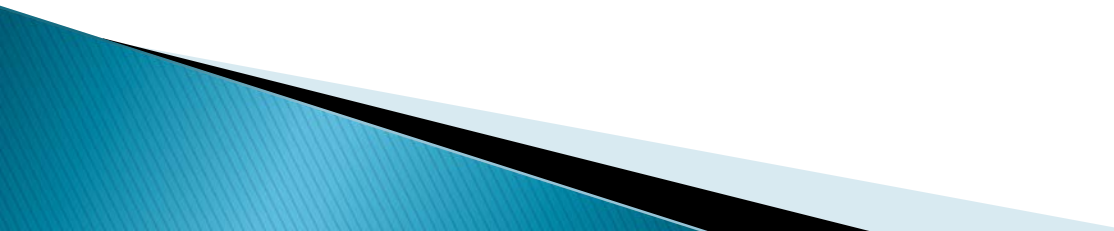
MARTIN




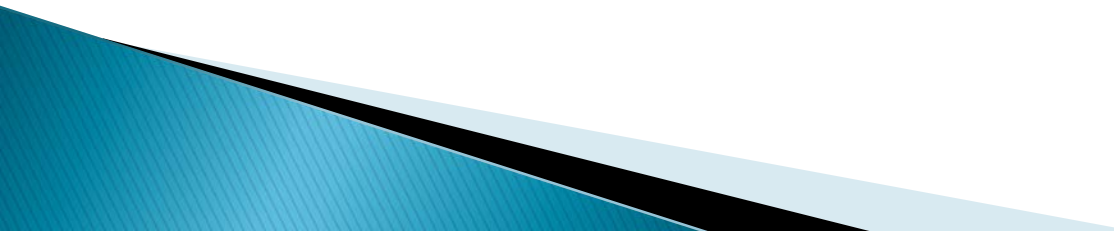
Pharynx, Larynx



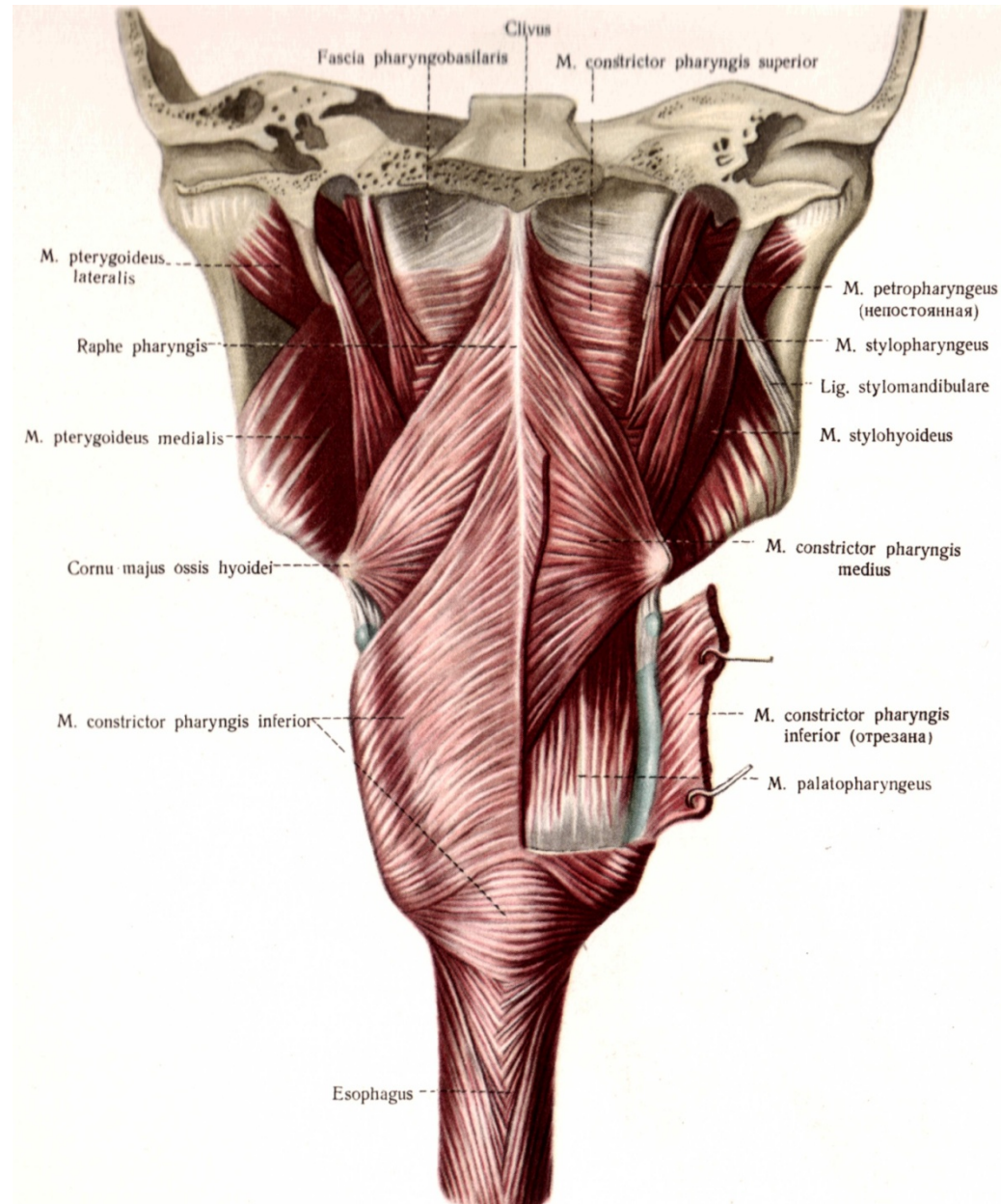


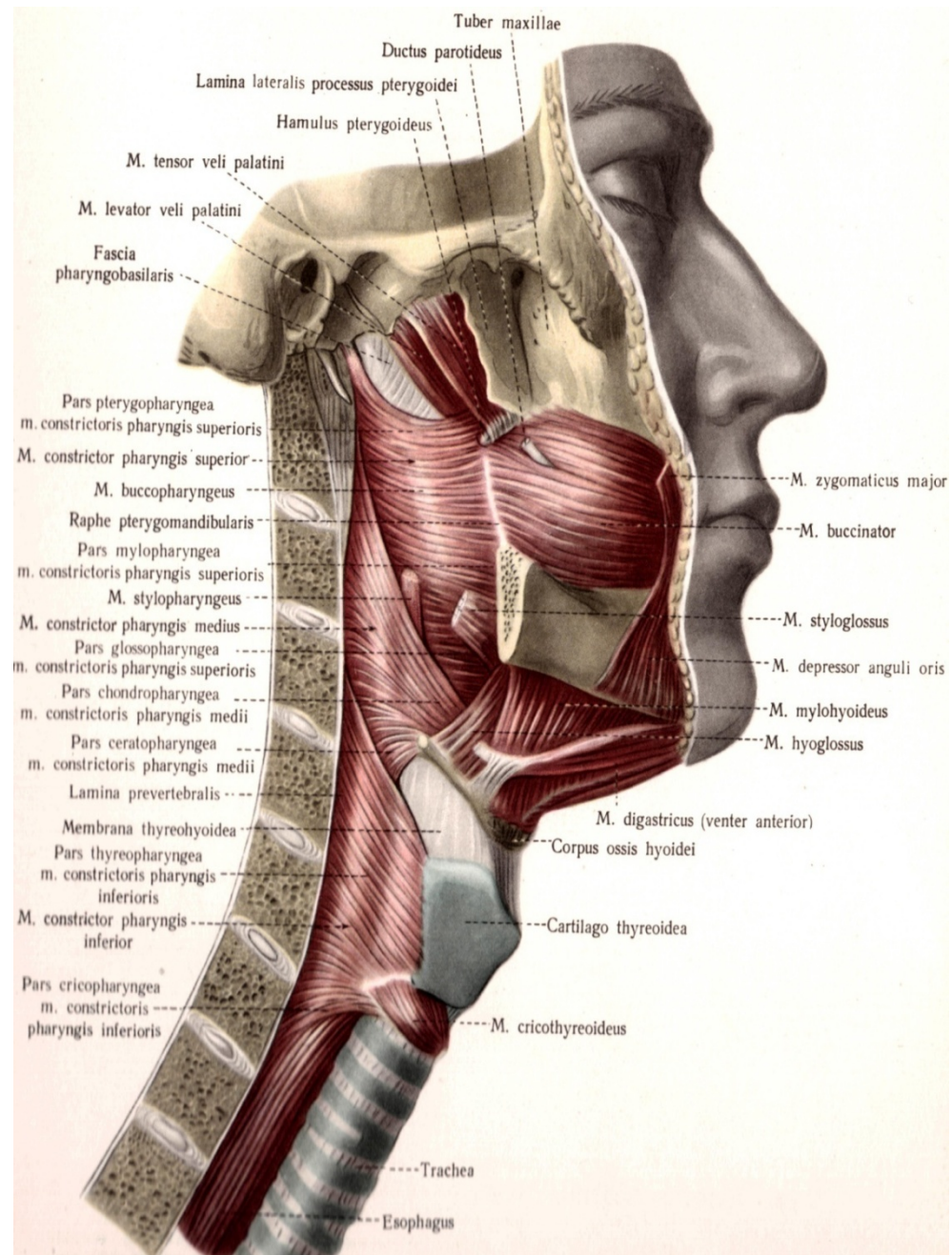
- ▶ **The pharynx** is a wide muscular tube, about 12 cm long, extends from the base of the skull to the level of the sixth cervical vertebra, where it is continuous with the esophagus.
 - ▶ It has:
 - ▶ **nasal part,**
 - ▶ **oral part,**
 - ▶ **laryngeal part.**
- 

- ▶ The wall of the pharynx consists of **three layers**:
 - ▶ 1. **The mucosa** is lined by stratified squamous nonkeratinized epithelium with **amount of elastic tissue** and a number of mucous **glands**,
 - ▶ **In the nasal part**, the epithelium is of the **ciliated columnar type** characteristic of the respiratory passages.
 - ▶ **In the oral and laryngeal parts**, there is stratified squamous epithelium of the non-keratinizing type, similar to that in the mouth.
 - ▶ There are many subepithelial collections of **lymph tissue**.
- 

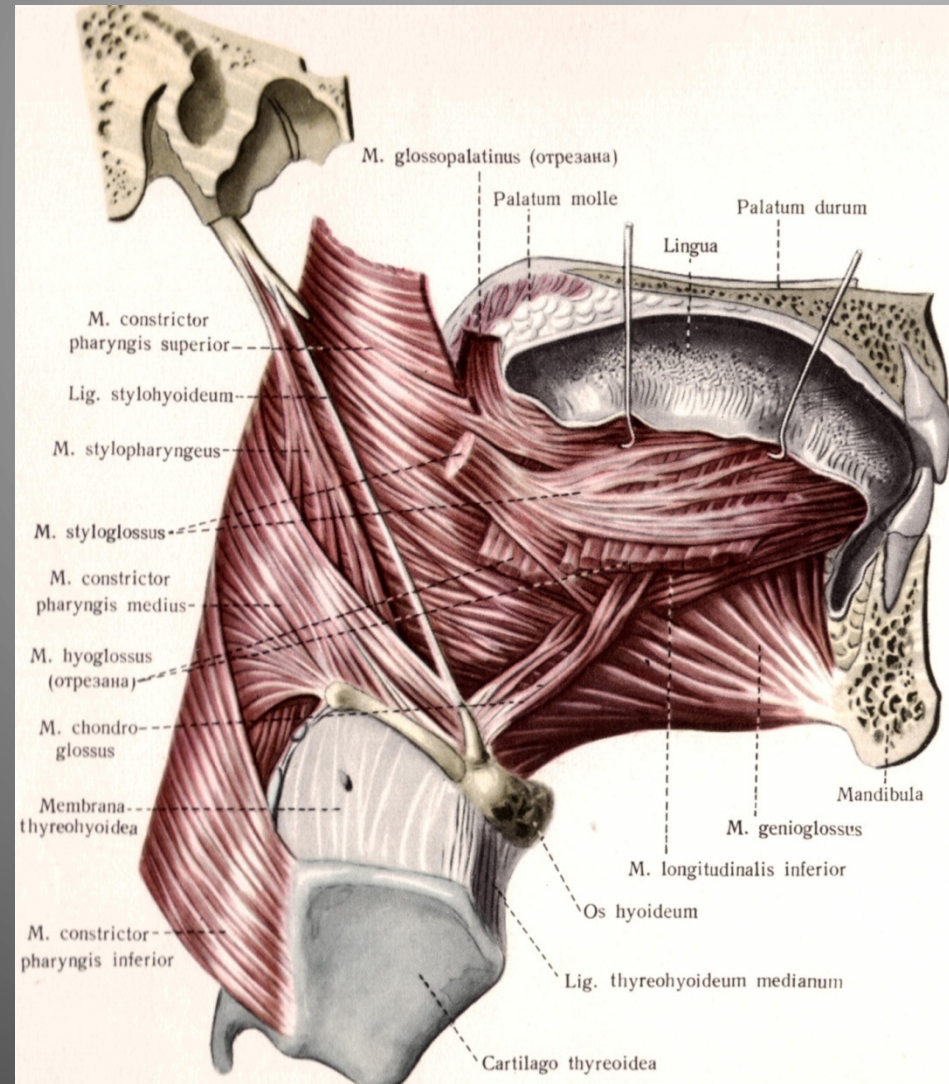
- ▶ **II. The muscles** of the pharynx consist of the **three constrictors**, and **three** longitudinally situated **skeletal muscles**.
 - ▶ **The pharyngobasilar fascia** lines the internal surfaces of the pharyngeal muscles and attaches the pharynx to the base of the skull, to the auditory tubes, and to the lateral margins of the posterior nasal apertures (choanae).
 - ▶ **The buccopharyngeal fascia** covers the external surfaces of buccinator and the pharyngeal muscles.
- 

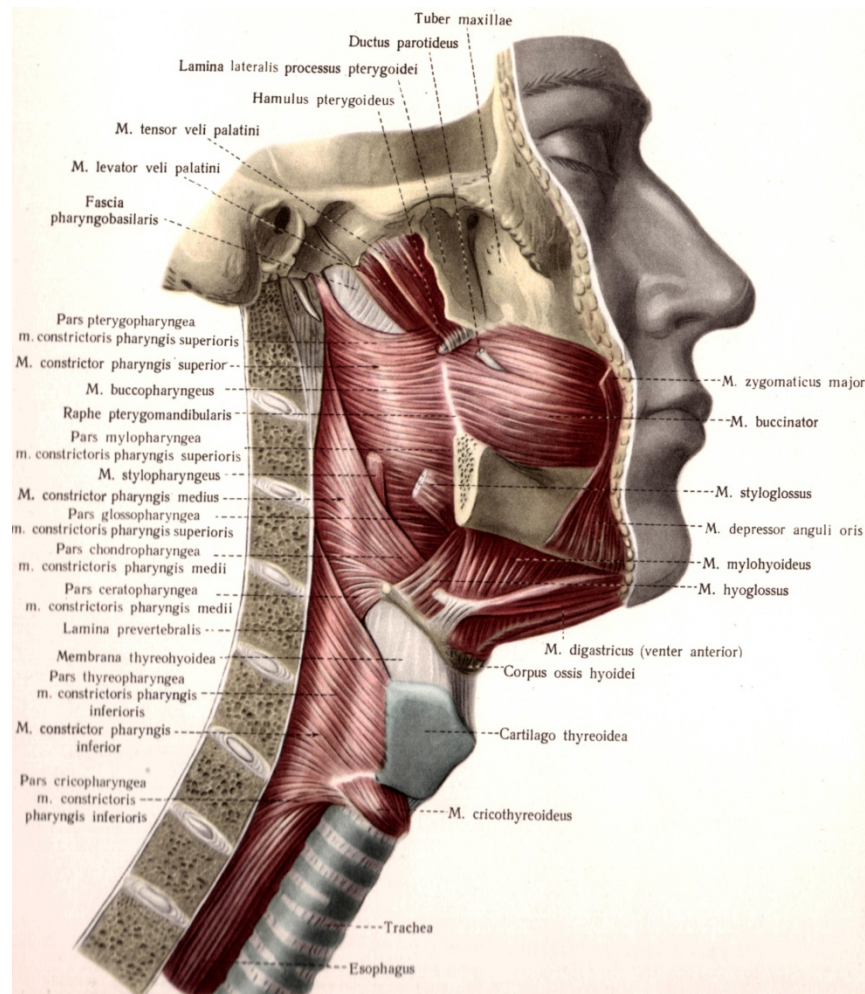
- ▶ **The constrictor muscles** are inserted posterior into a median fibrous **raphe** which descends from the **pharyngeal tubercle** on the base of the skull to **the esophagus**. They are: the superior, middle and inferior constrictor muscles.





- ▶ The skeletal muscle of the pharynx are: **stylopharyngeus**, **salpingopharyngeus** and **palatopharyngeus**.
- ▶ They are longitudinally oriented and can raise the pharynx.

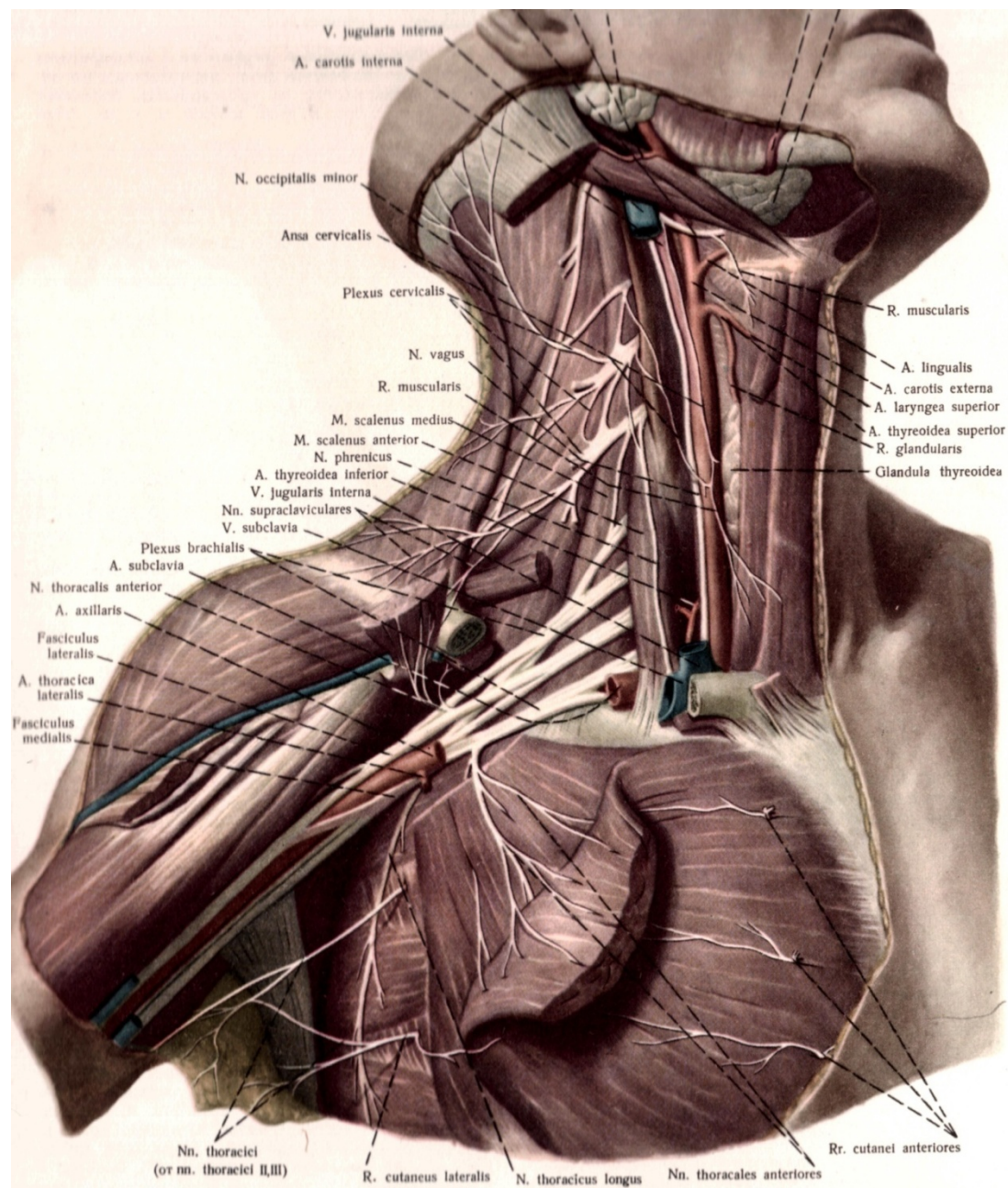


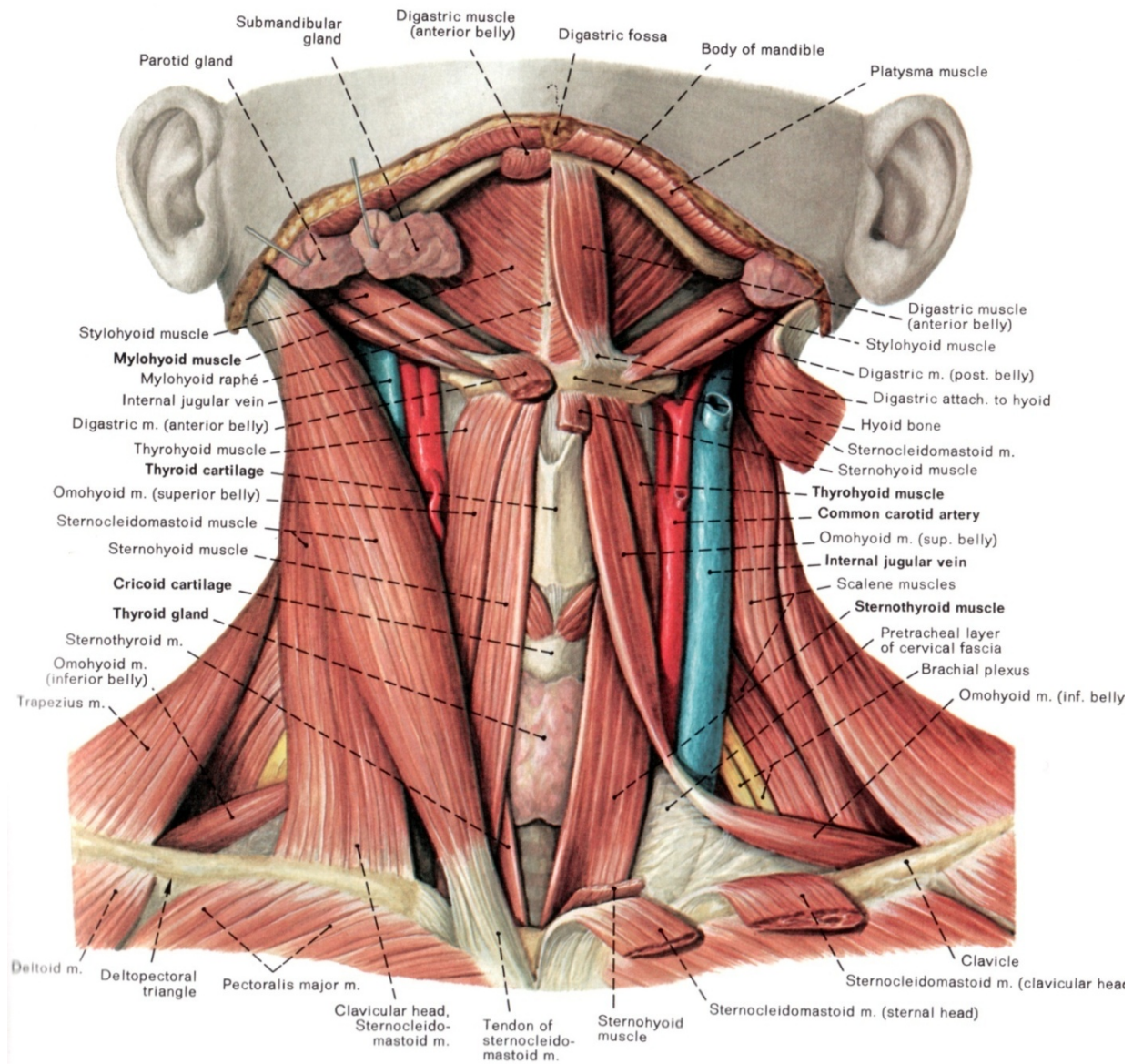


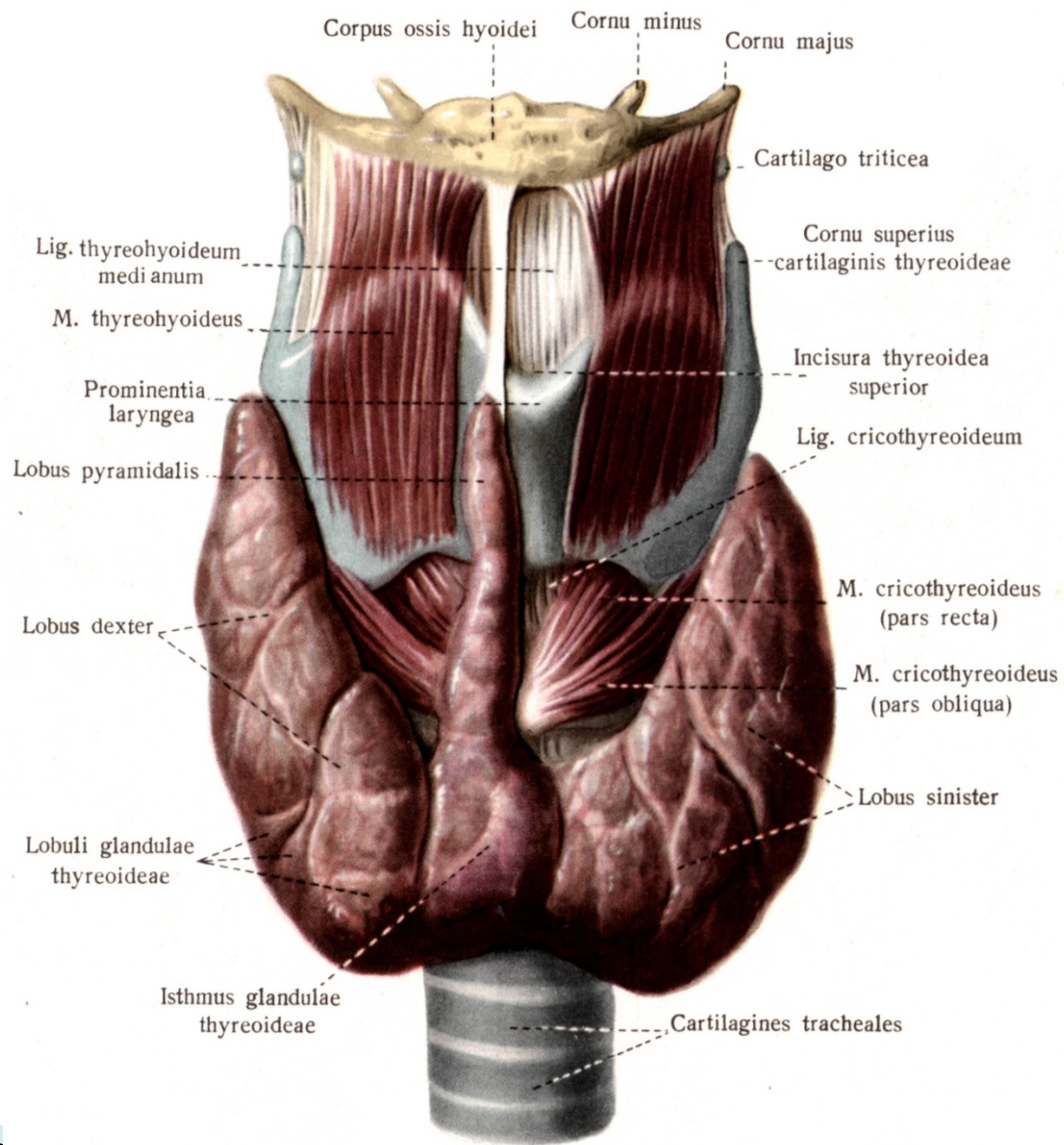
- ▶ **The buccopharyngeal fascia** covers the external surfaces of buccinator and the pharyngeal muscles.

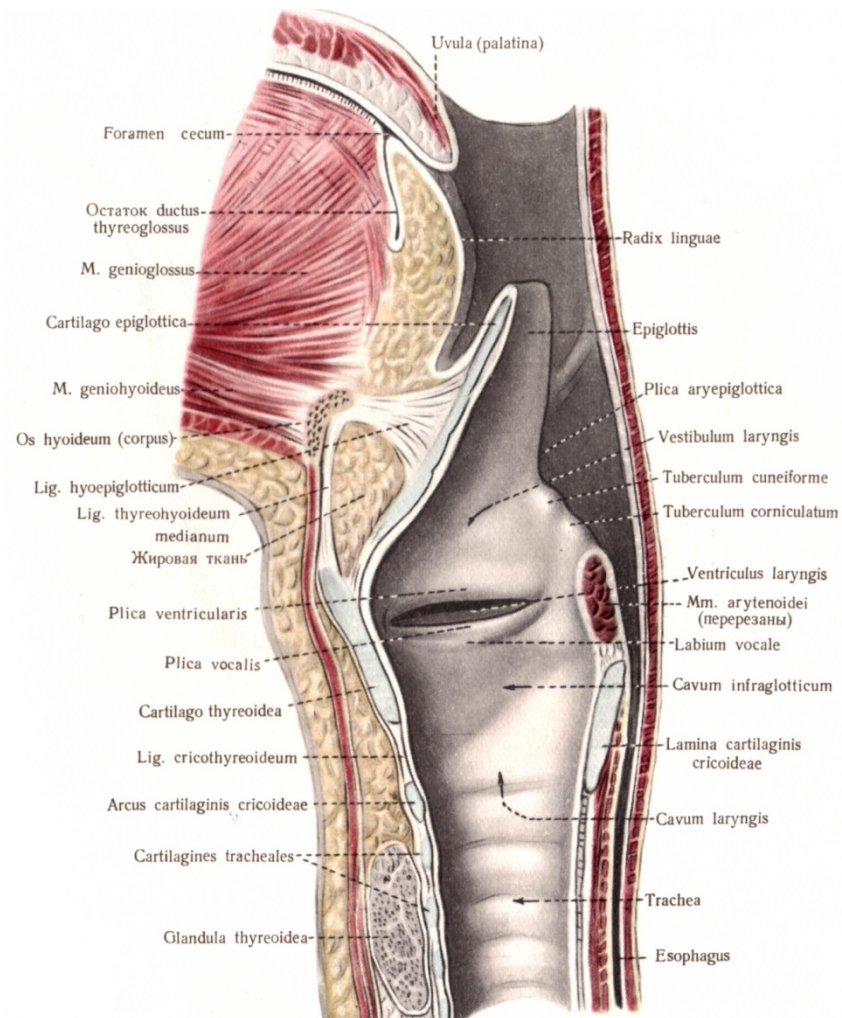
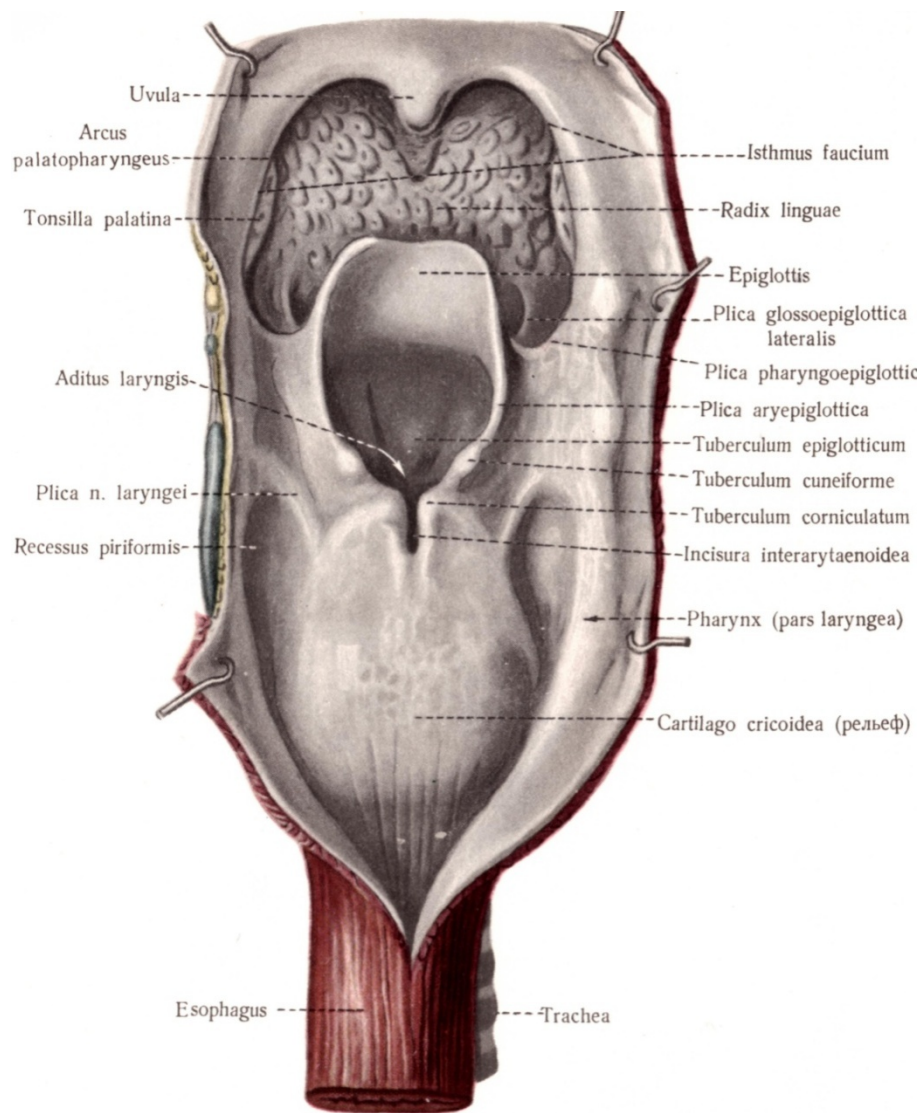
- ▶ **III. The outermost third layer** is adventitia, by which the pharynx is attached to the adjacent organs.
- ▶ It consists of dense connective tissue, venous plexus and nerves which separated it from **prevertebral fascia** and allows it to slide freely on this fascia during swallowing.

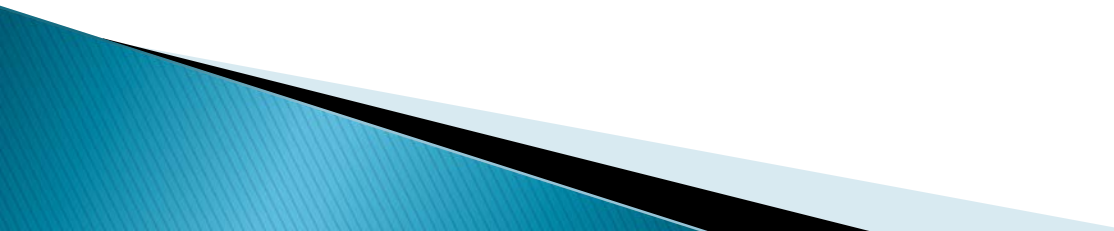
Larynx



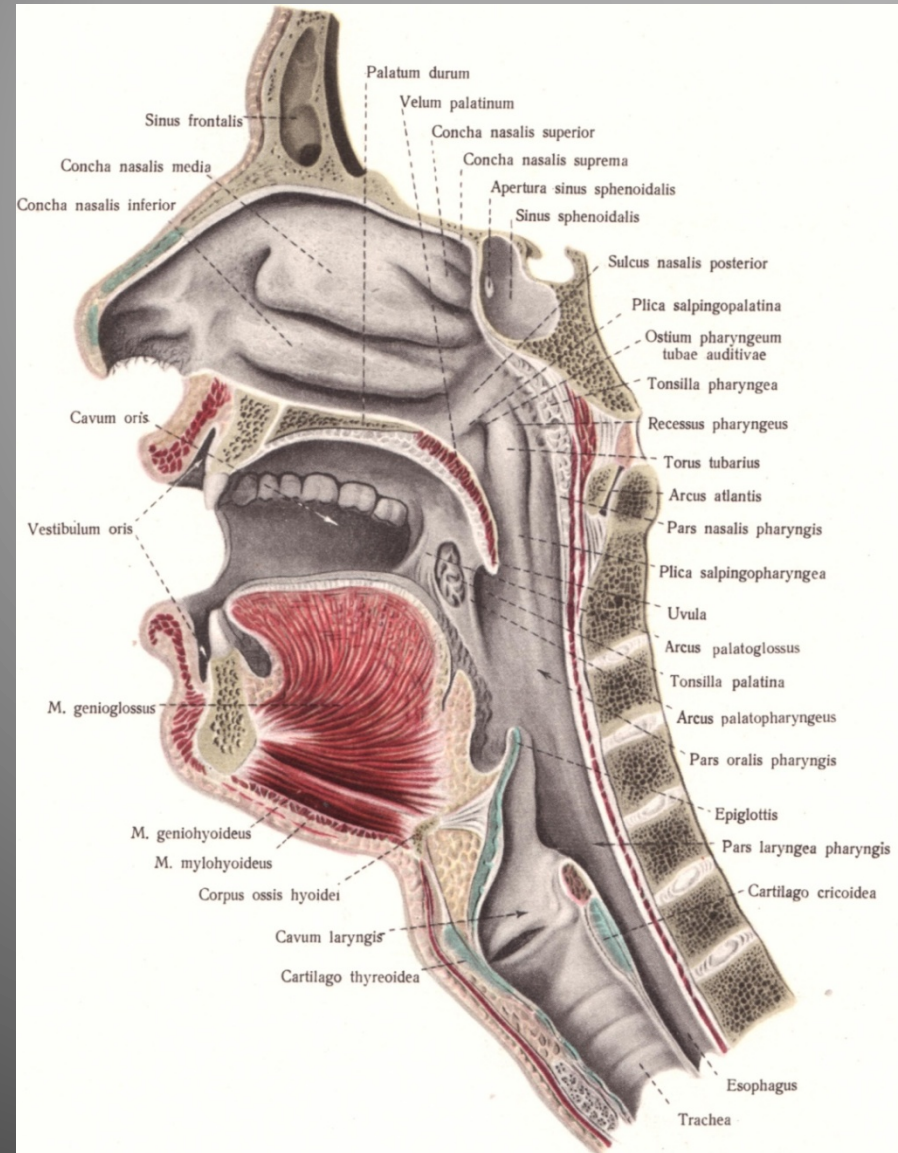




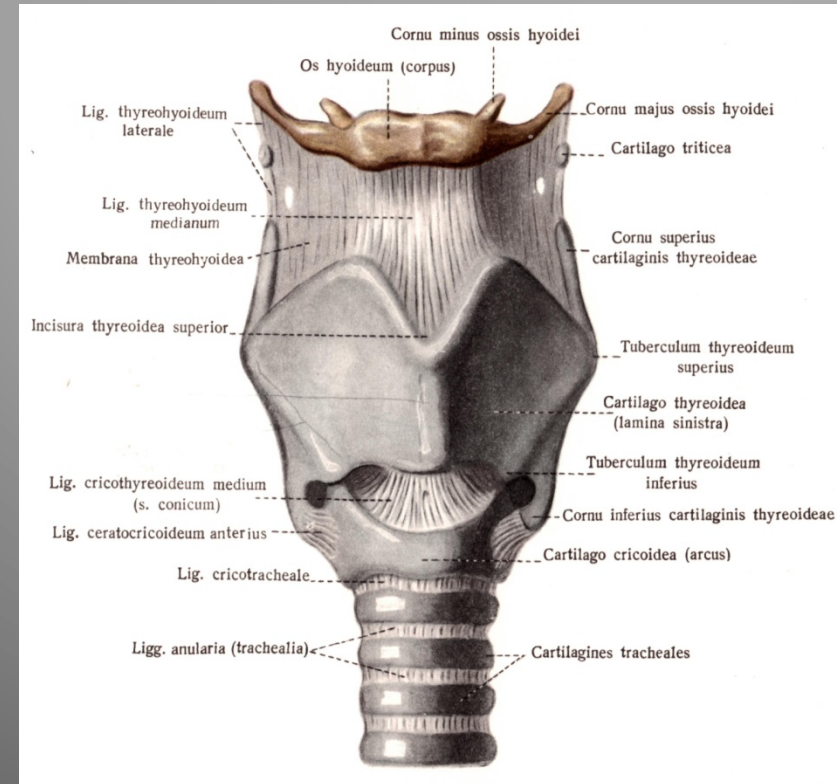


- ▶ **The cartilages** in the wall of the larynx can be divided in paired and unpaired.
 - ▶ **The unpaired cartilages** are:
 - ▶ **the thyroid** (V-shaped consisting of two plates (laminae) at an angle to each other),
 - ▶ the ring-like **cricoid**,
 - ▶ **epiglottic** cartilage (leaf-like)
- 

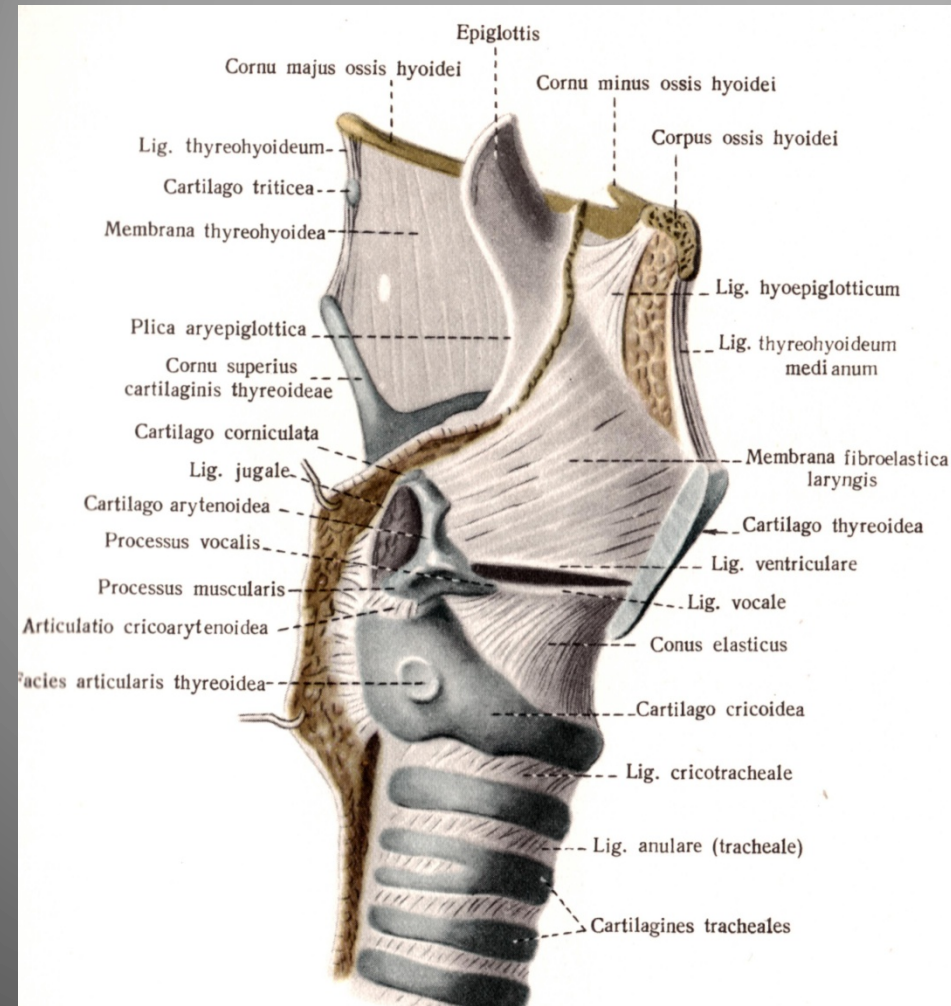
- ▶ The **epiglottis** has a lingual and a laryngeal surface.
- ▶ The **lingual surface** is covered by stratified squamous epithelium.
- ▶ On the **laryngeal side**, the epithelium undergoes a transition into pseudostratified columnar ciliate epithelium.

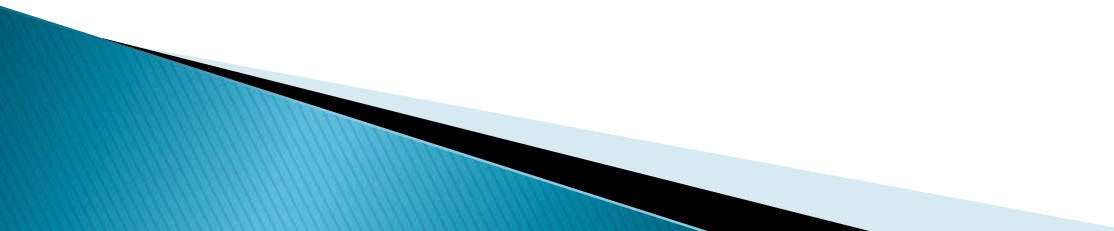


- ▶ The **thyroid cartilage** consists of two plates (laminae) fused in two-thirds to form the **laryngeal prominence**,
- ▶ From the laminae extends two horns (**cornua**).
- ▶ The **superior horns** are attached to greater horns of the hyoid bone
- ▶ The **inferior horns** articulate by **synovial joint** with the cricoid cartilage.

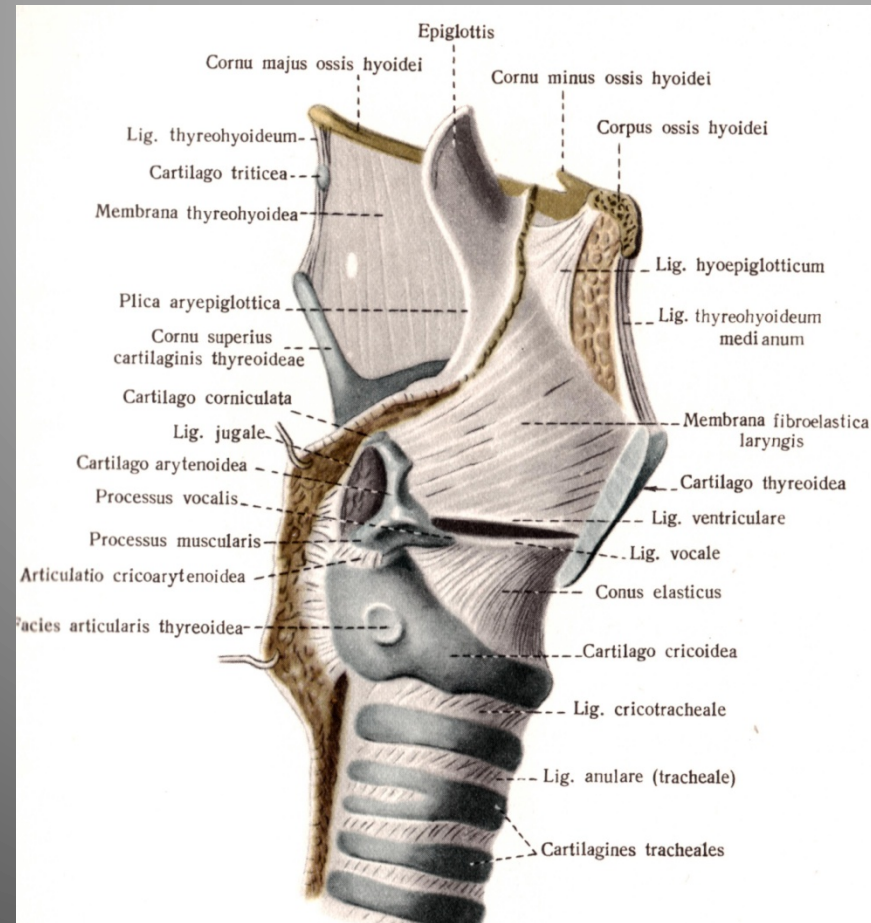


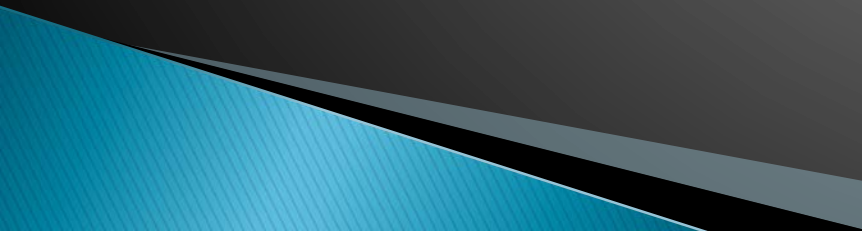
- ▶ The **cricoid** cartilage consists of **arch** anteriorly and the **lamina** posteriorly situated.
- ▶ Its inferior margin, attached to the trachea by the **cricotracheal ligament**.
- ▶ On the lamina lie the **arytenoid cartilages**.



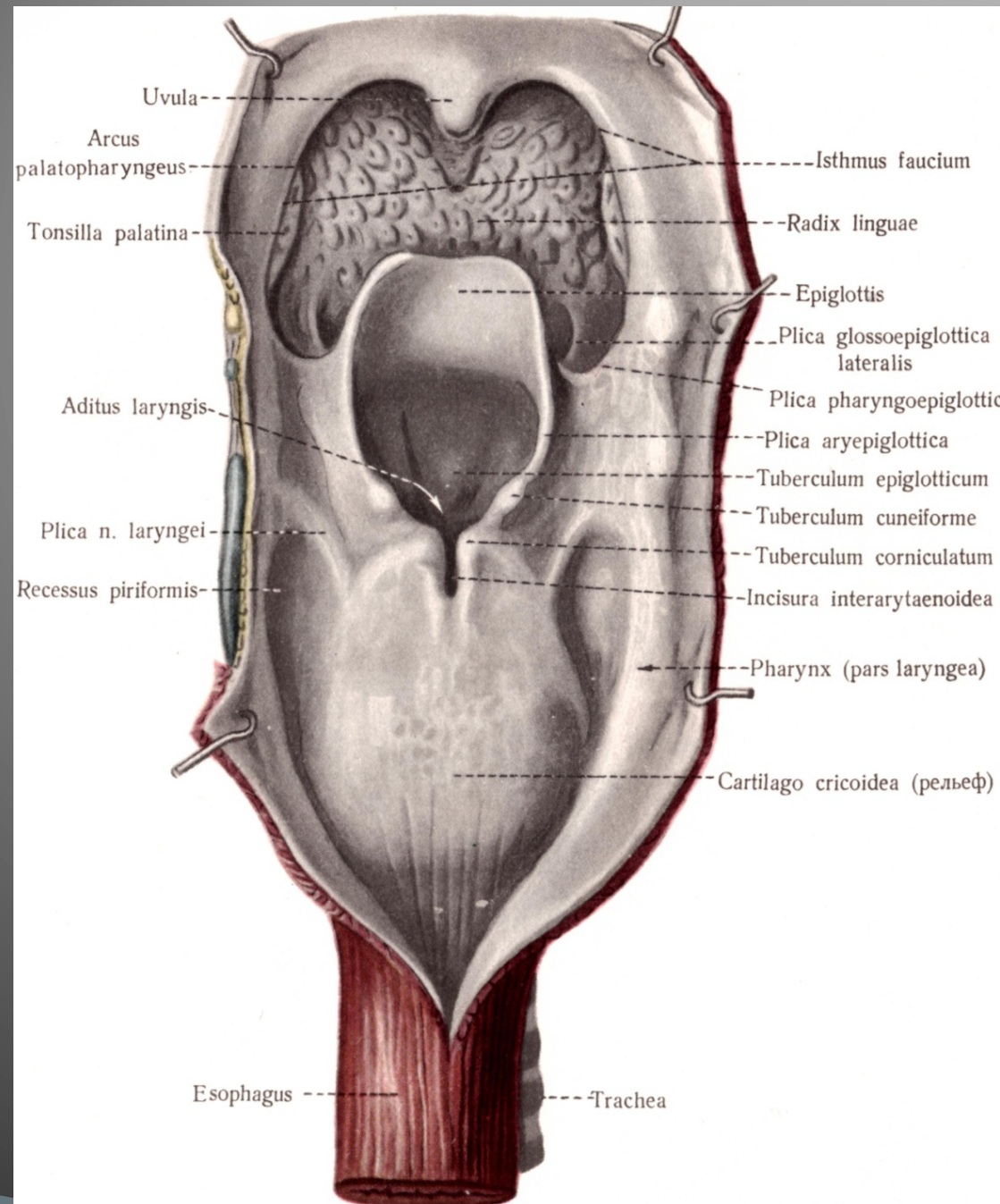
- ▶ **The paired cartilages are:**
 - ▶ **the arytenoids**
 - ▶ **the corniculates,**
 - ▶ **cuneiforms** and ect.
 - ▶ The cavity of the larynx is narrowed at the level of the arytenoid cartilages by **vestibular** and **vocal folds** projecting into it from each side.
- 

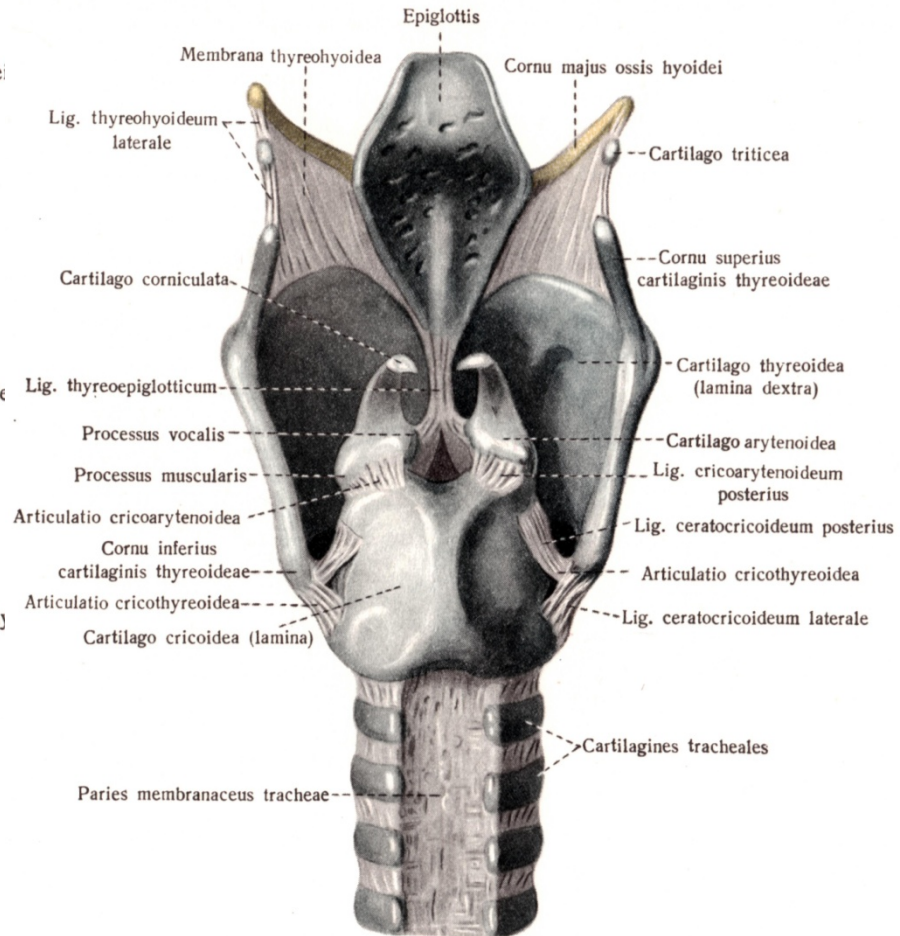
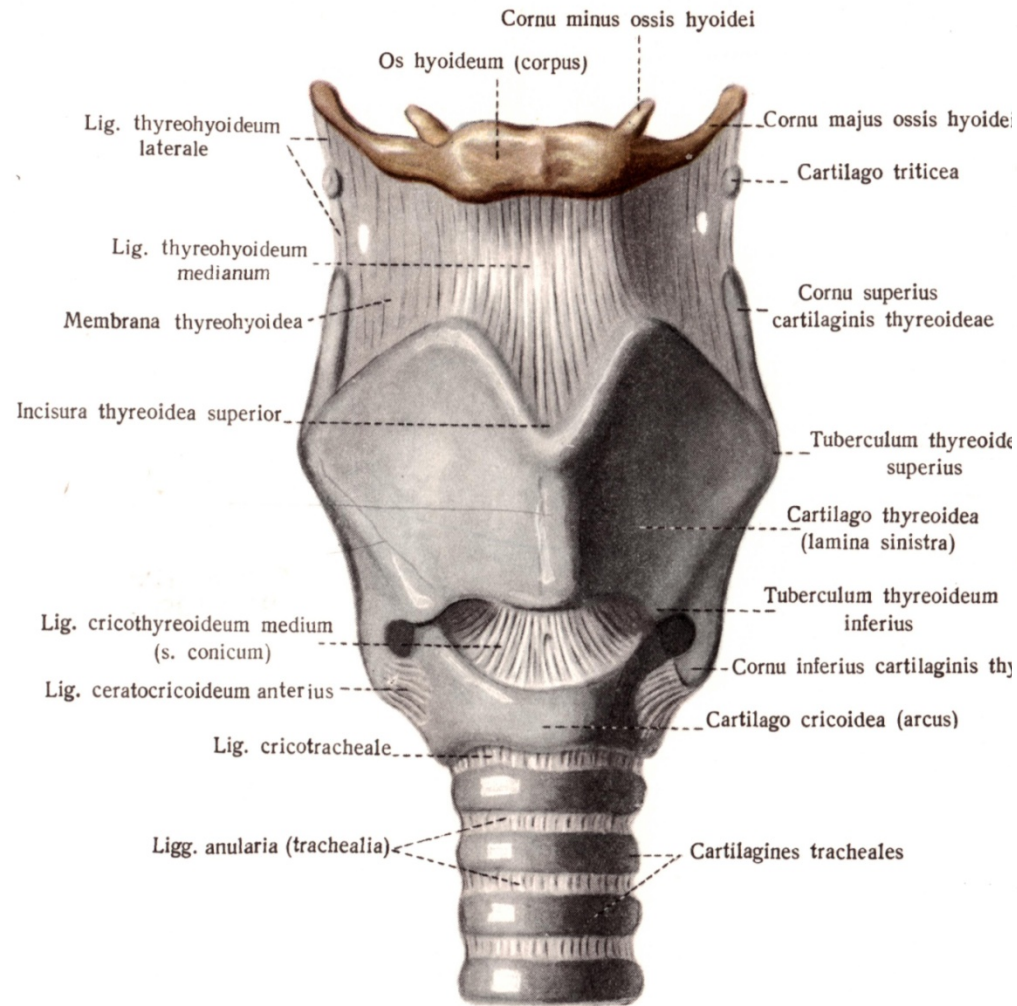
- ▶ Each **arytenoid cartilage** is **three-sided pyramid**, forms a synovial joint with the superior border of the lamina of the cricoid cartilage.
- ▶ The **basis** of arytenoid cartilage projects laterally to form **the muscular process** and anteriorly to form **the vocal process**.
- ▶ On the apex of the cartilage lies the **corniculate cartilage**.

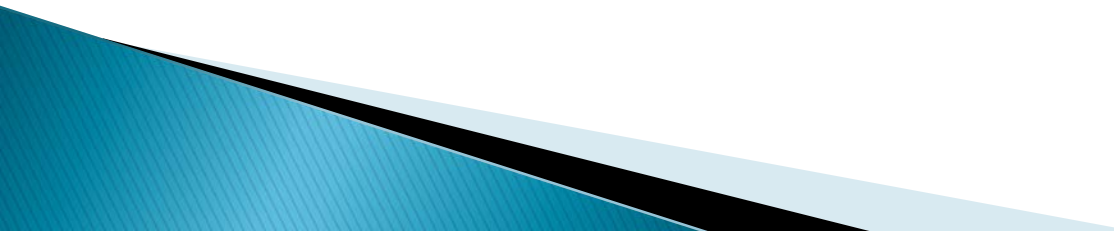


- 

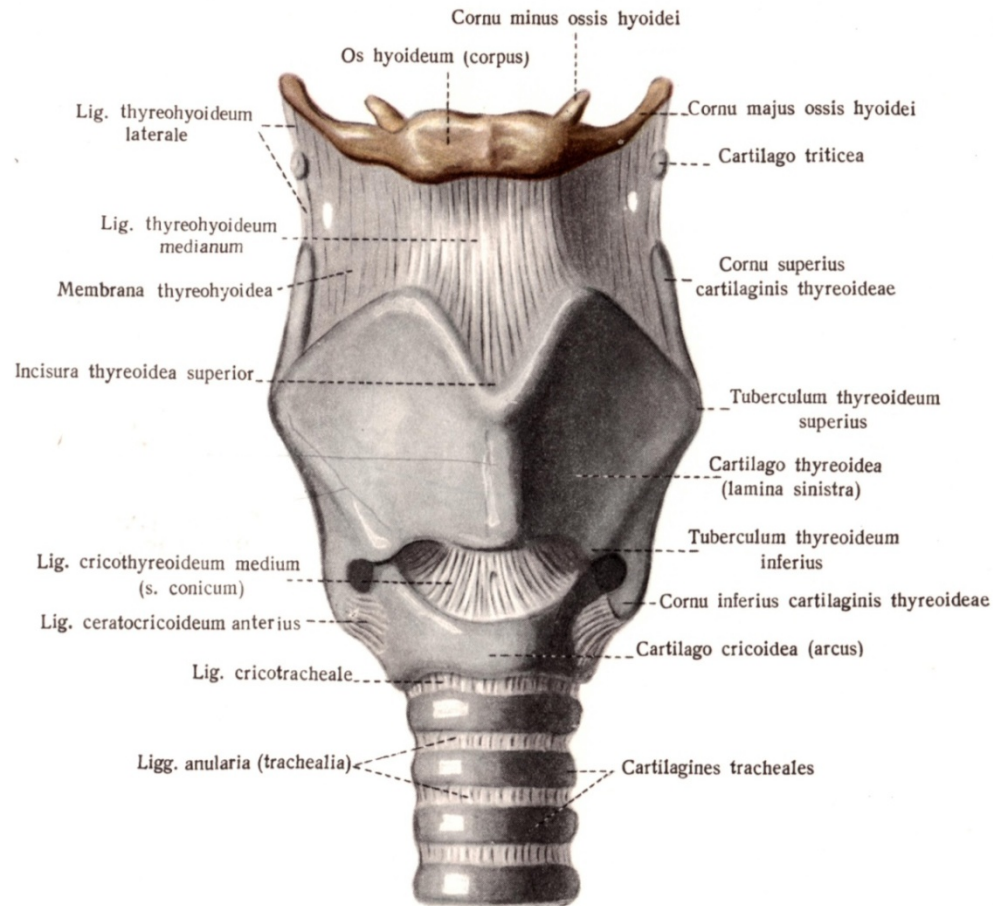
- ▶ The cuneiform cartilages and
- ▶ The corniculate cartilages





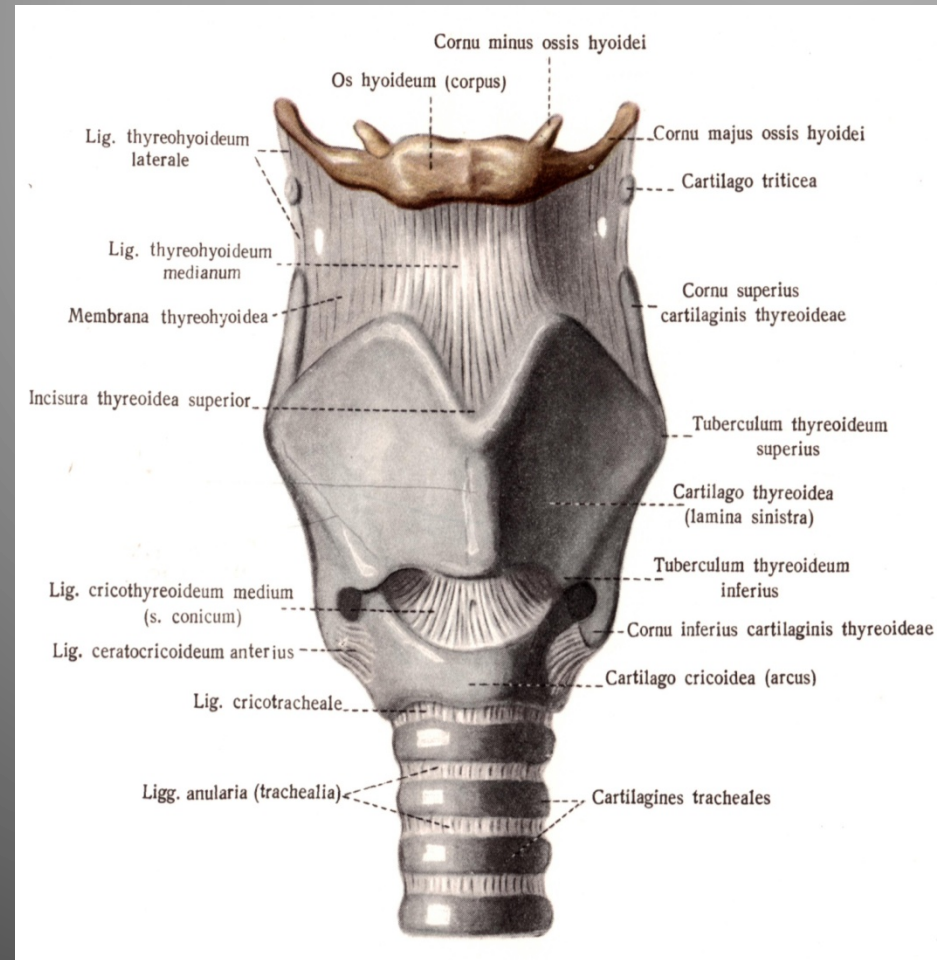
- ▶ **The larger cartilages** (thyroid, cricoid, and most of the arytenoids) are hyaline, and some are subject to calcification in the elderly.
 - ▶ **The smaller cartilages** (epiglottis, cuneiform, corniculate, and the tips of the arytenoids) are elastic cartilages.
 - ▶ **Ligaments** bind the cartilages together; most are **articulated** by the **intrinsic muscles** of the larynx, which are themselves unusual in that they are striated skeletal muscle.
- 

Membranes

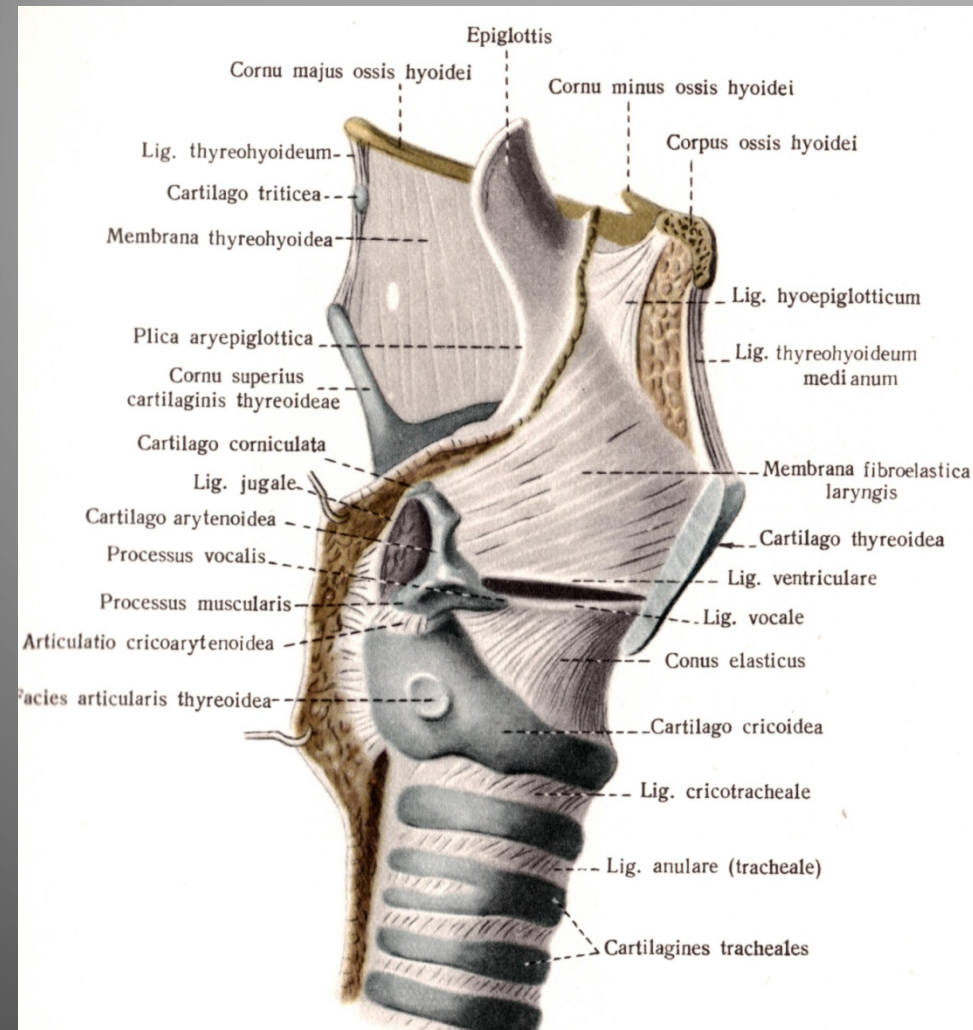


- ▶ **To repeat what you have learned**

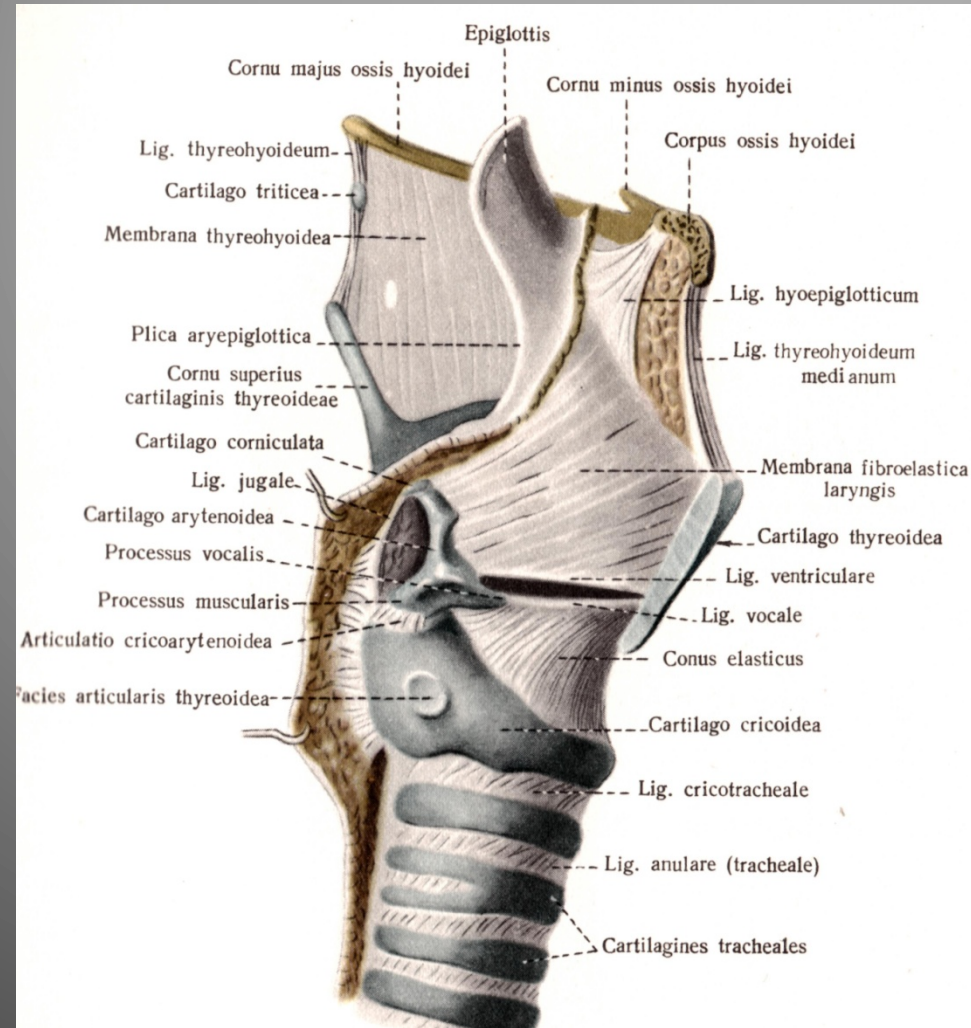
- ▶ The membrane between hyoid bone and superior margin of the thyroid cartilage is **thyrohyoid membrane**.
- ▶ The arch of the cricoid is attached to the lower margin of the thyroid cartilage by the **cricothyroid ligament**.



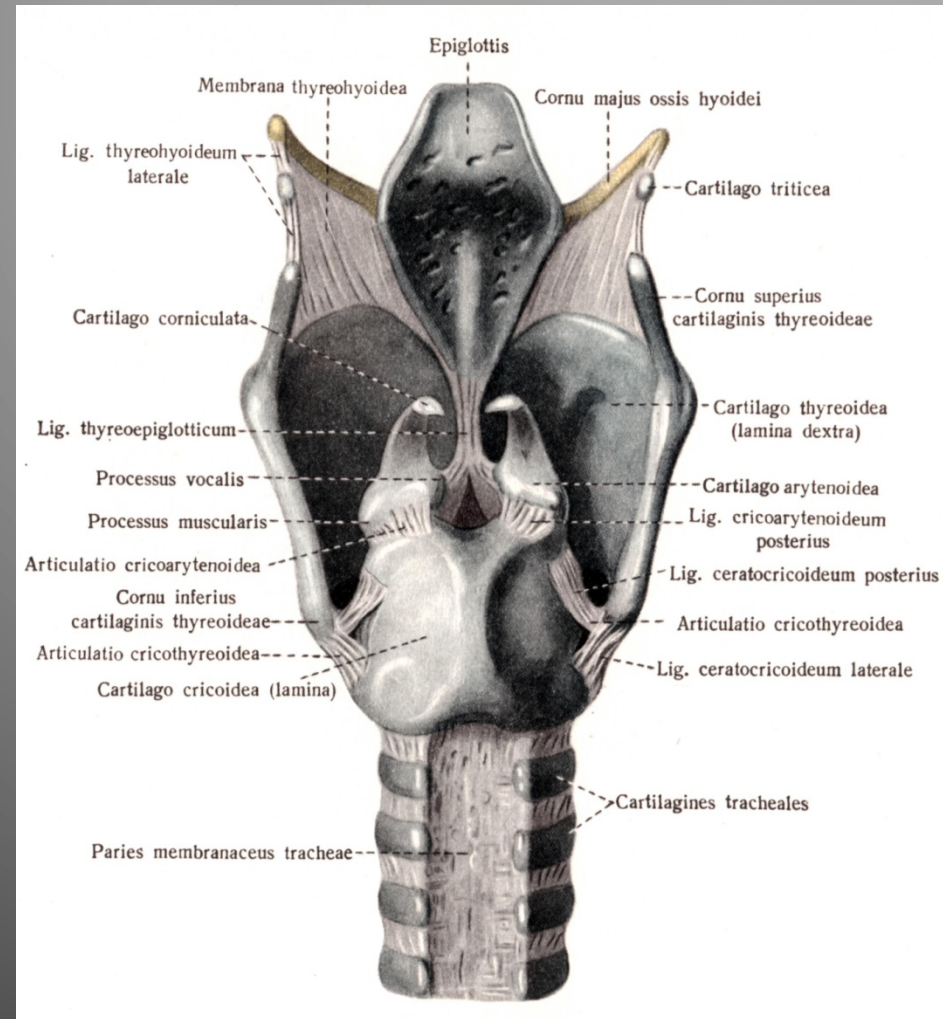
- ▶ **The quadric-lateral membrane** spreads among the lateral border of epiglottis anterior margin of arytenoid cartilage and the internal midline of the thyroid cartilage.
- ▶ Its inferior free margin is called ventricular ligament - **ligamentum ventriculare.**



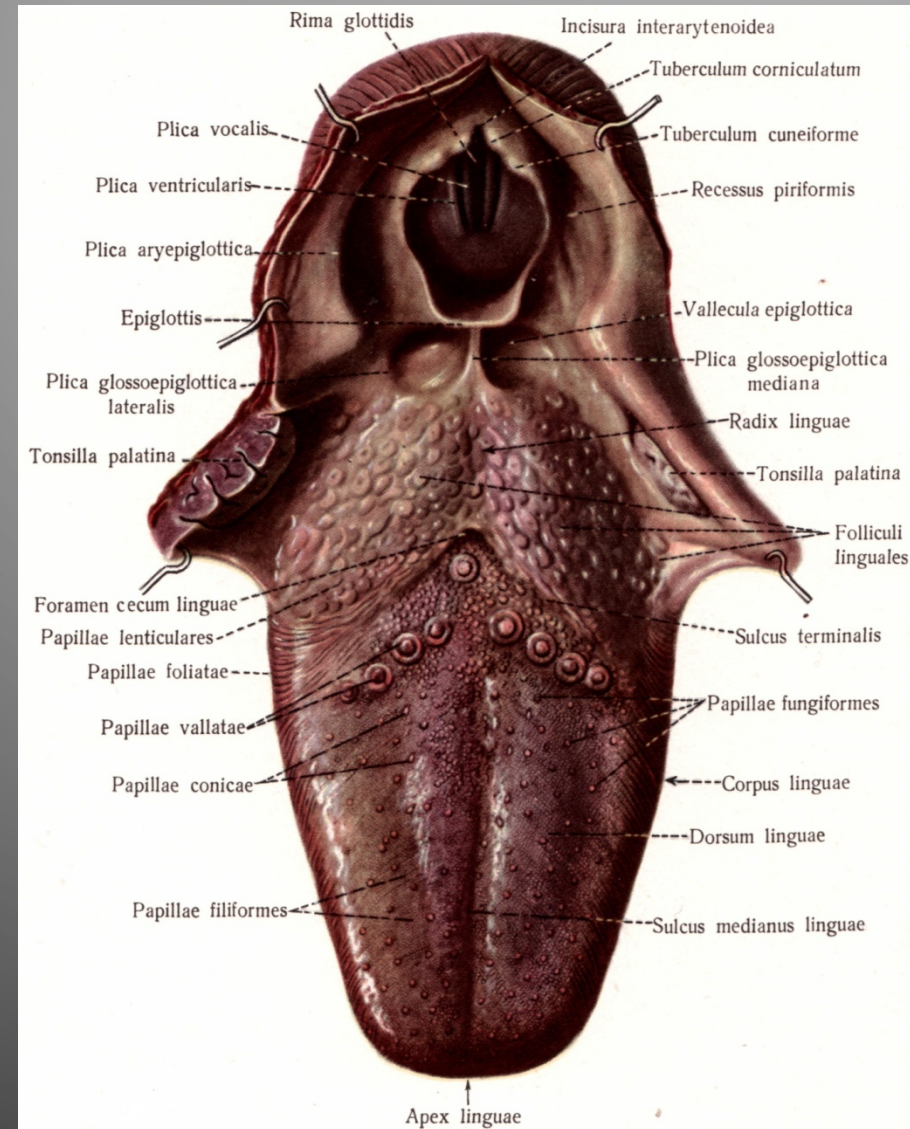
- ▶ The membrane passes from the upper border of the cricoid to the thyroid cartilage and to the vocal process of the arytenoid cartilage forms the **conus elasticus**.
- ▶ The free superior edge of each conus elasticus is the **vocal ligament**.



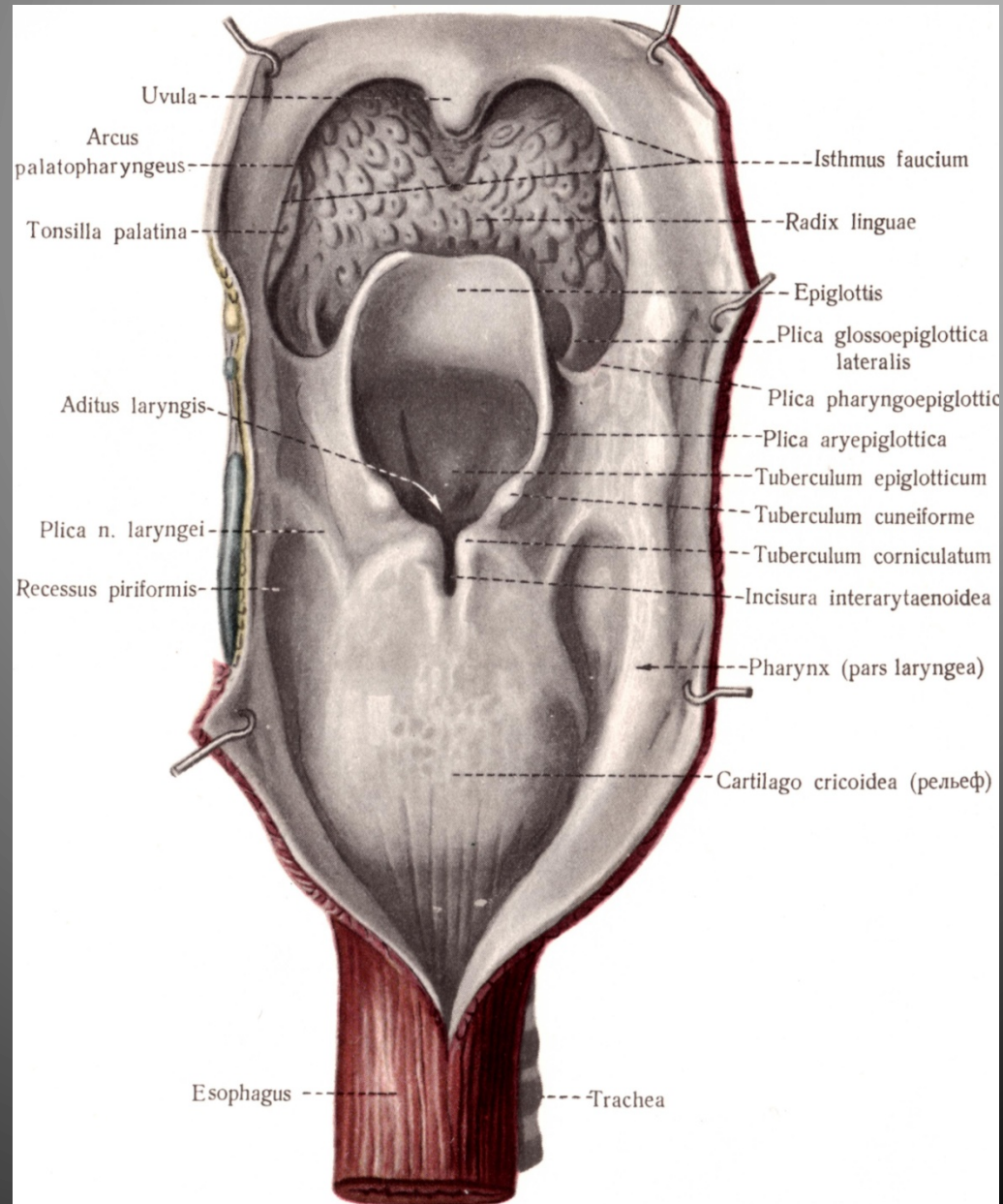
- ▶ **The thyroepiglottic ligament** connects the epiglottis with posterior surface of the thyroid cartilage.
- ▶ **The hyoidepiglotic ligament** connects epiglottis with hyoid bone.

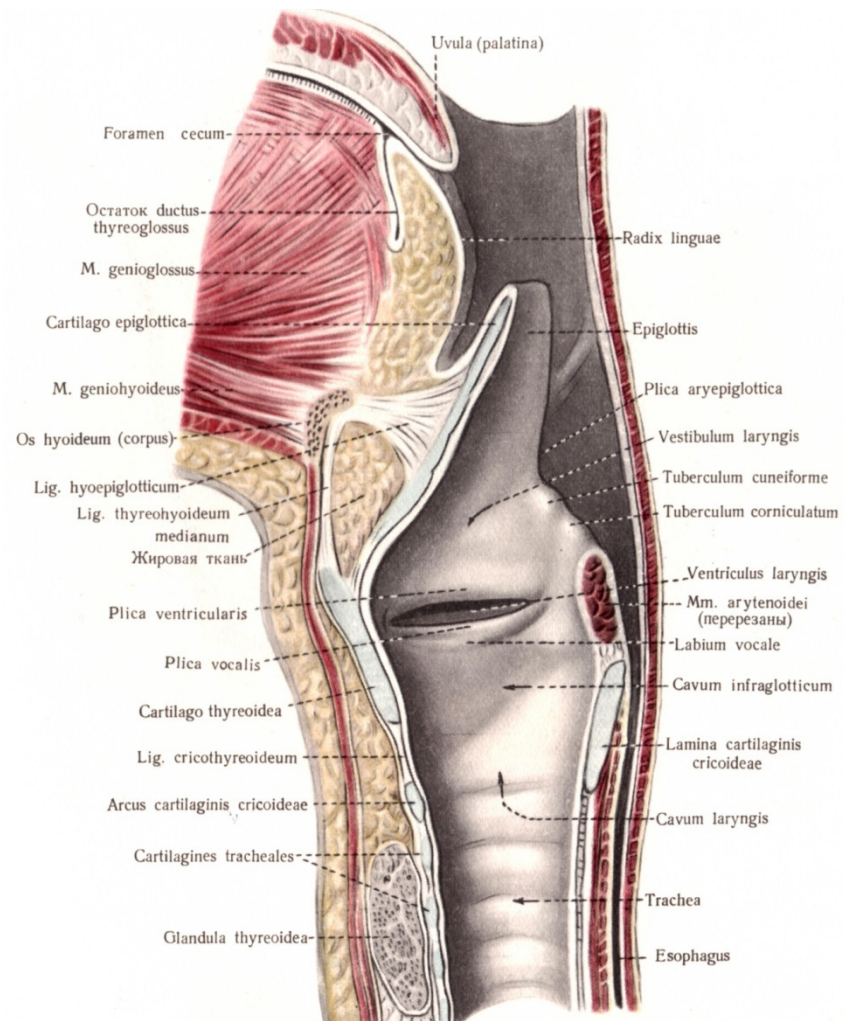
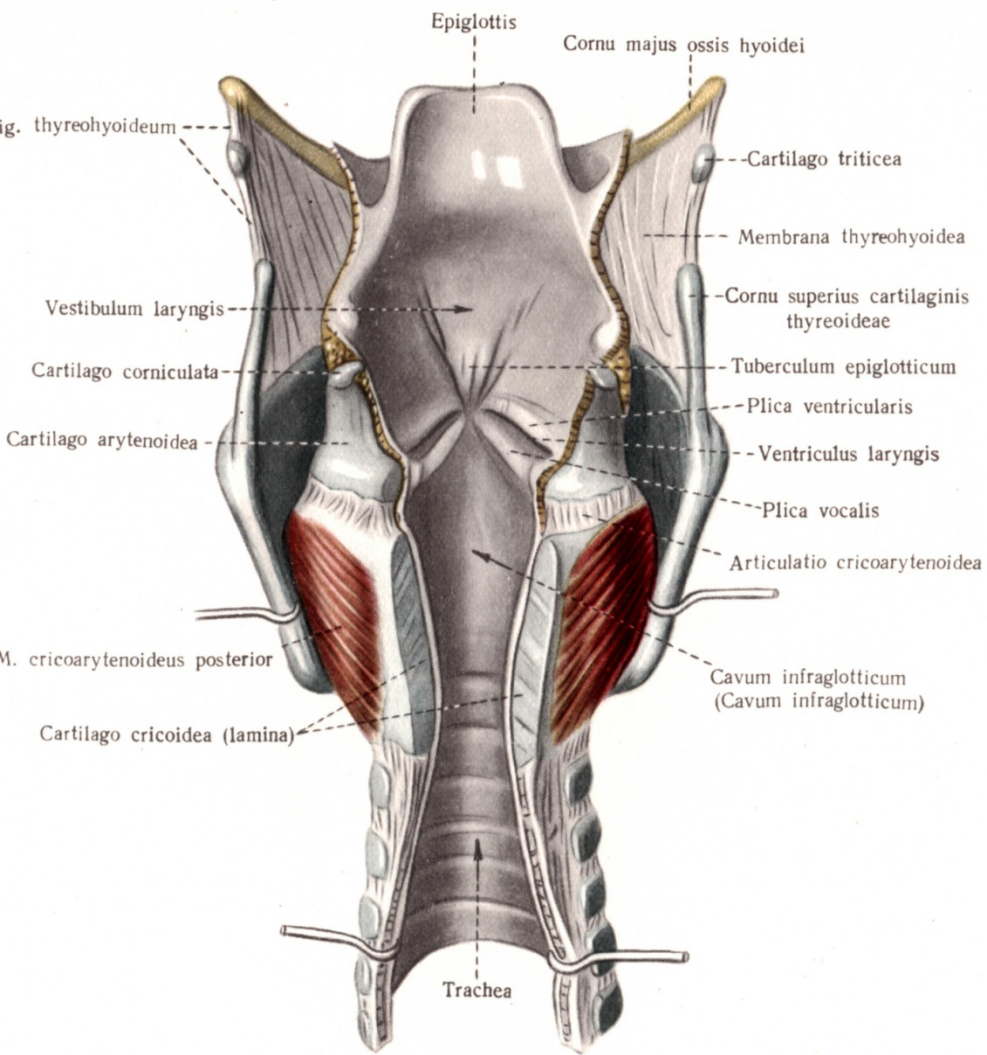


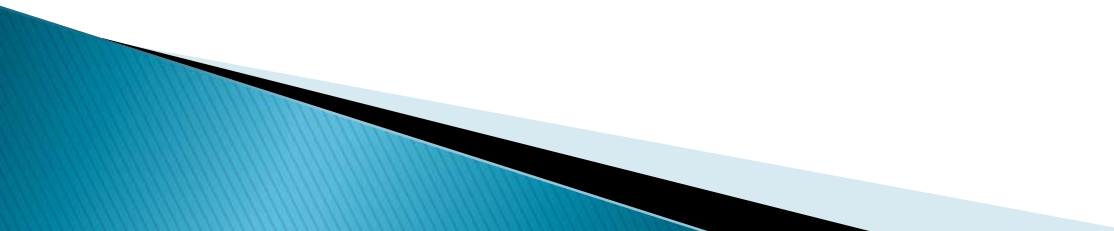
- ▶ The epiglottis is attached to the tongue by the **median and lateral glosso-epiglottic folds** of mucous membrane.

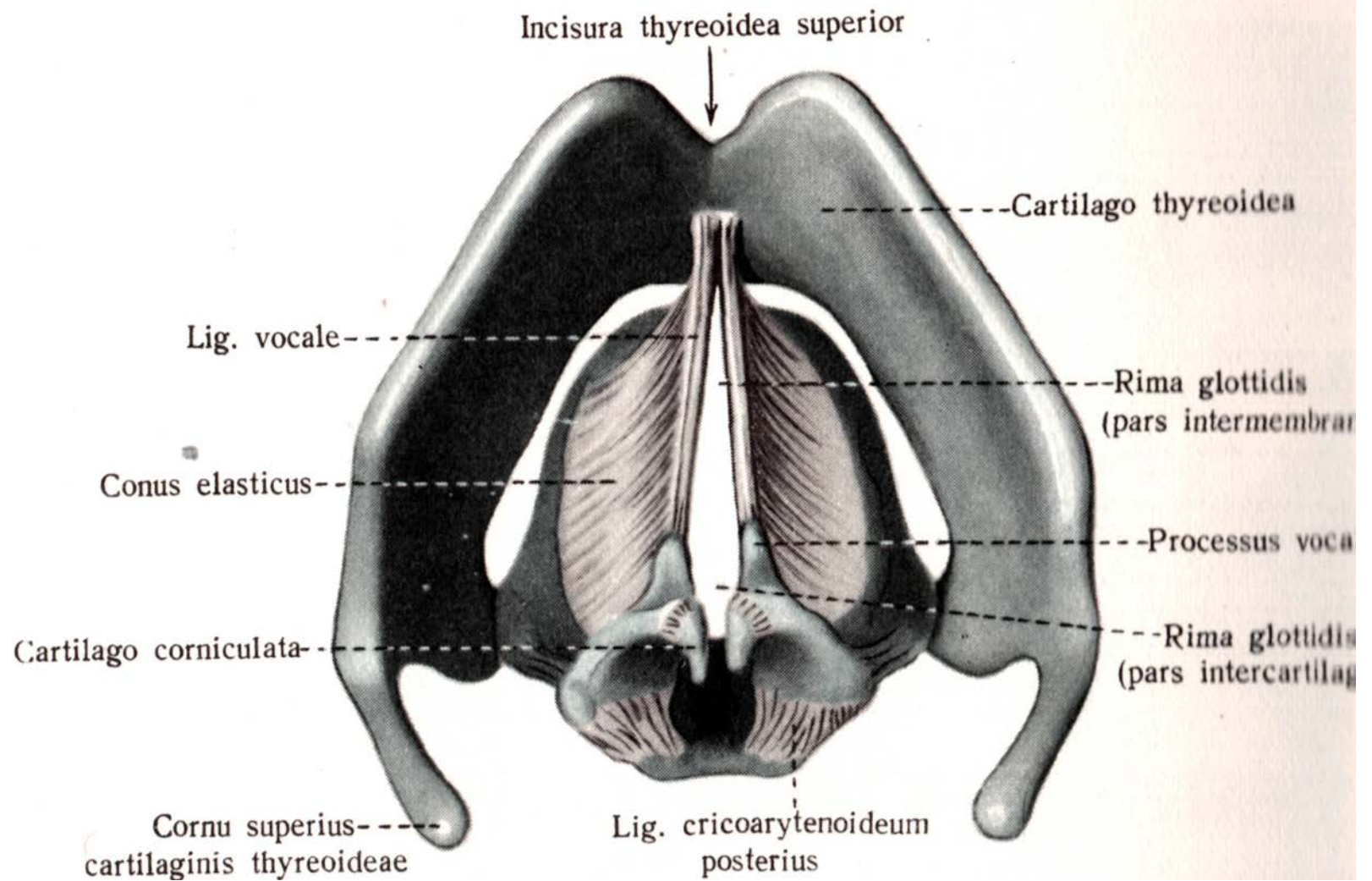



- ▶ The epiglottis is attached to the arytenoid cartilages by the **aryepiglottic folds**, in which embedded cuneiform and corniculate cartilages.
- ▶ **Interarytenoid incisura** is narrow space between two arytenoid cartilages, covering with mucosa.



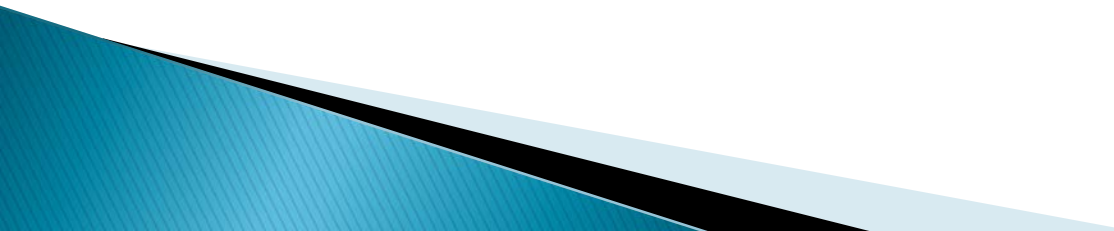


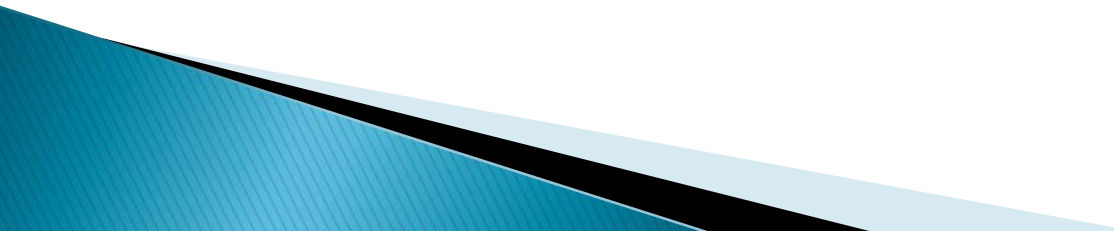
- ▶ Below the epiglottis, the mucosa forms two pairs of folds that extend into the lumen of the larynx. The upper pair constitutes the false vocal cords - **vestibular folds**, covered by typical respiratory epithelium beneath which lie numerous serous glands within the lamina propria.
 - ▶ The lower pair of folds constitutes the **true vocal cords**. Large bundles of parallel elastic fibers that compose the **vocal ligament** lie within the vocal folds, which are covered by a stratified squamous nonkeratinized epithelium.
- 



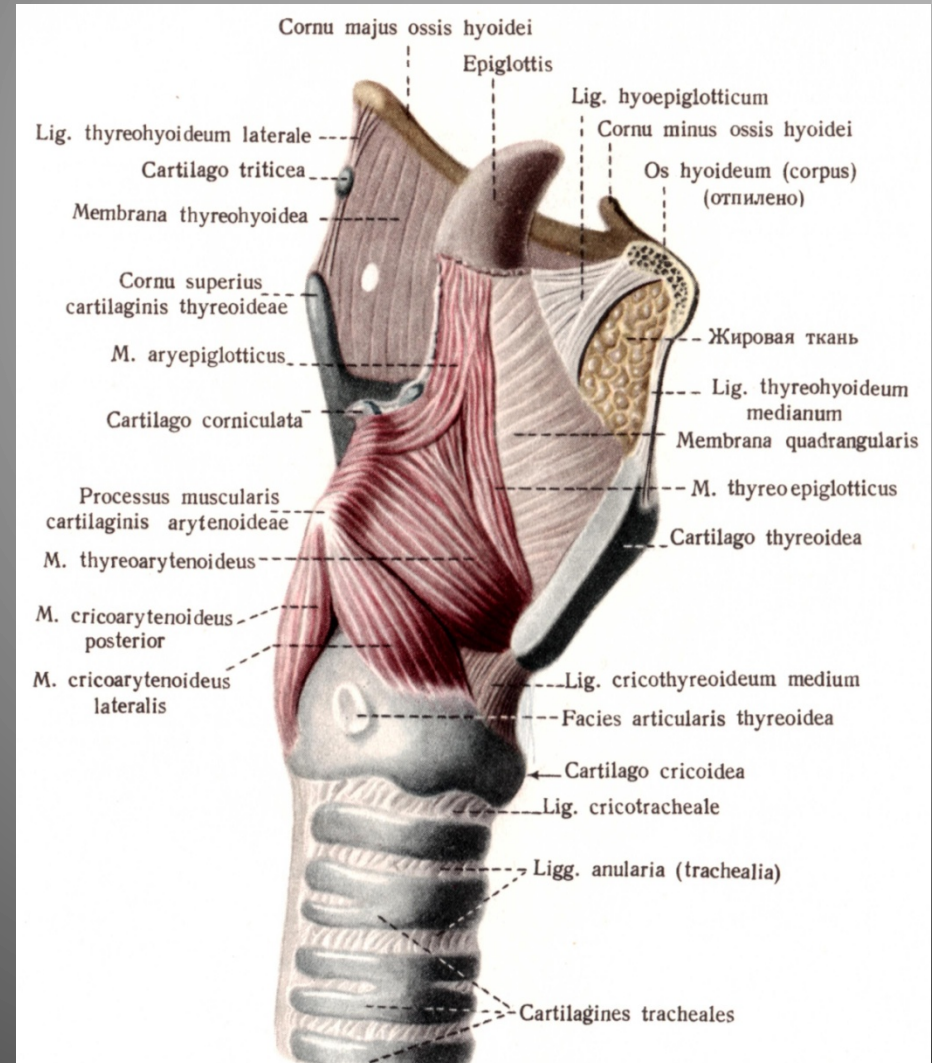
- ▶ **Rima glottidis** is fissure separating the free margins of the vocal folds.
 - ▶ **The posterior part** of the rima is widened, when the arytenoid cartilages are displaced laterally on the cricoid or rotated so that their vocal processes turn laterally.
 - ▶ The rima glottidis is **narrowed** or **closed** in the arytenoid cartilages are drawn together and rounded so that their vocal processes are in opposition.
 - ▶ **The vocal folds are tightened** by the cricothyroid muscles and **are relaxed** by the thyroarytenoid muscles.
- 

The laryngeal muscles

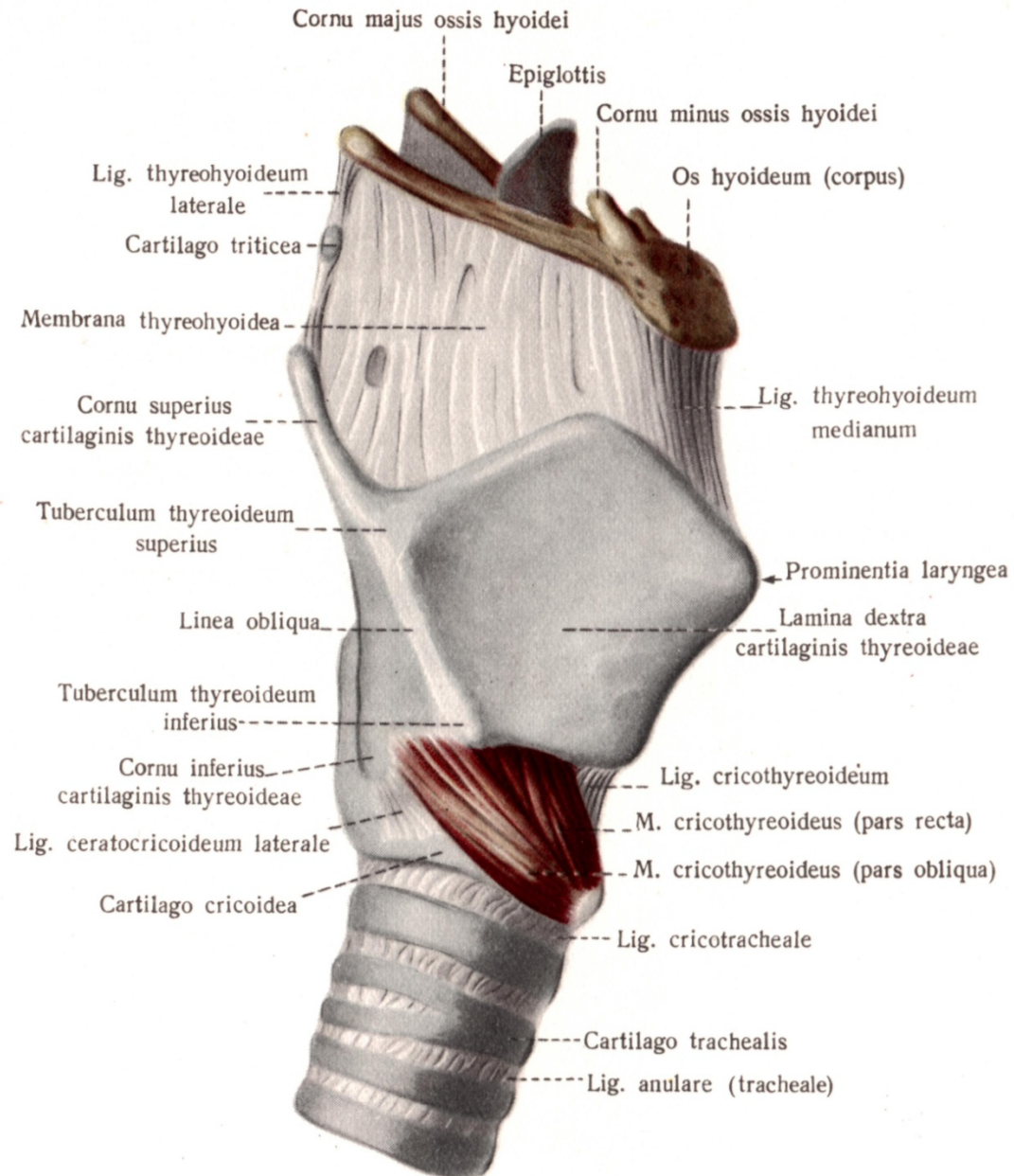
- ▶ The muscles that move the cartilages are **striated muscles**.
 - ▶ According to their function the muscles are:
 - ▶ open and close **the inlet of larynx**.
 - ▶ open and close **the rima glottidis**.
 - ▶ and that can be **tighten and relaxed** the vocal fold.
- 

- ▶ **The aryepiglottis** muscles close the inlet of larynx.
 - ▶ **The thyroepiglottis** muscles open the inlet of larynx.
 - ▶ **The posterior cricoarytenoid muscles** open the rima glottidis.
 - ▶ **The lateral cricoarytenoid** muscles close the rima glottidis.
 - ▶ **The transverse and oblique arytenoid** muscles are closing the rima glottidis.
 - ▶ **The cricothyroideus muscles** (anticus muscles) lengthen and thinning the vocal folds. **The thyroarytenoid muscles** shorten and relax the vocal folds.
- 

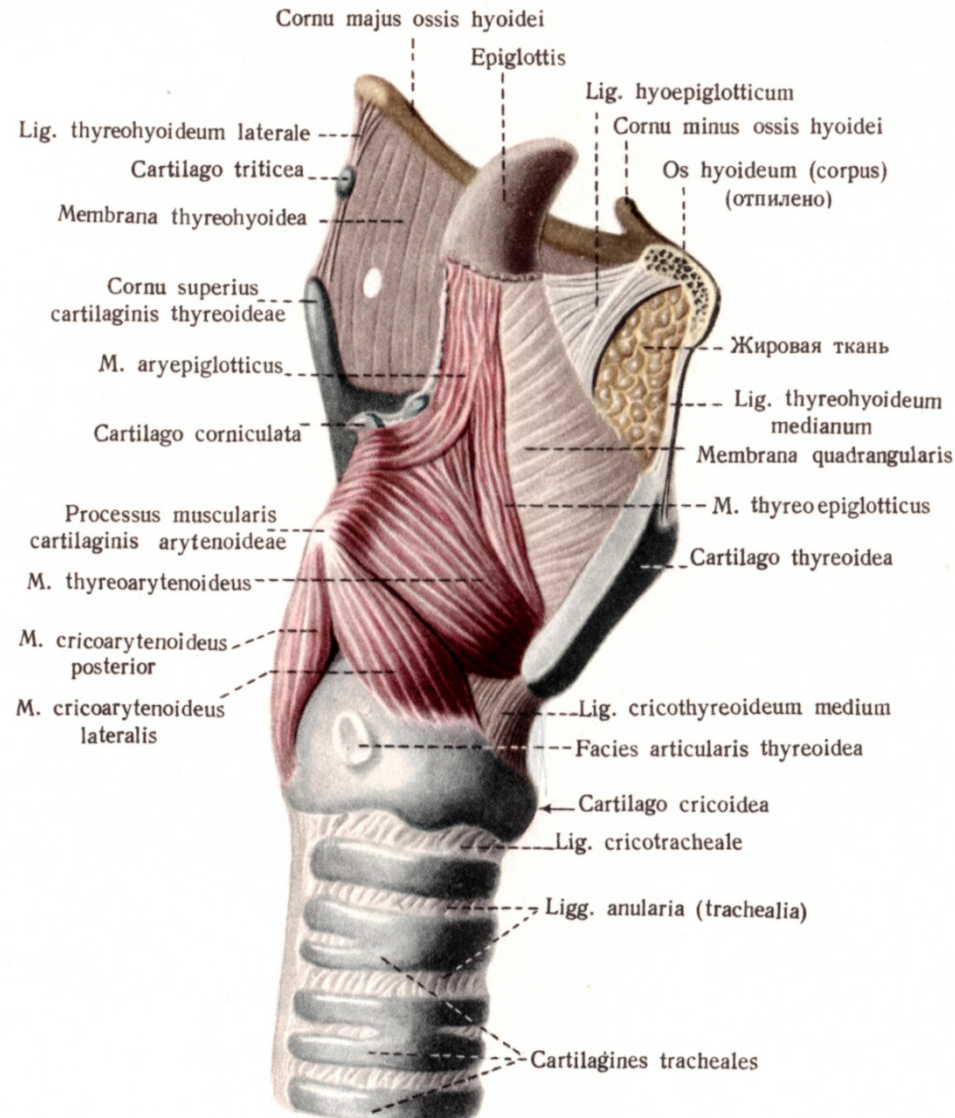
- ▶ The aryepiglottis muscles close the inlet of larynx.
- ▶ The thyroepiglottis muscles open the inlet of larynx.



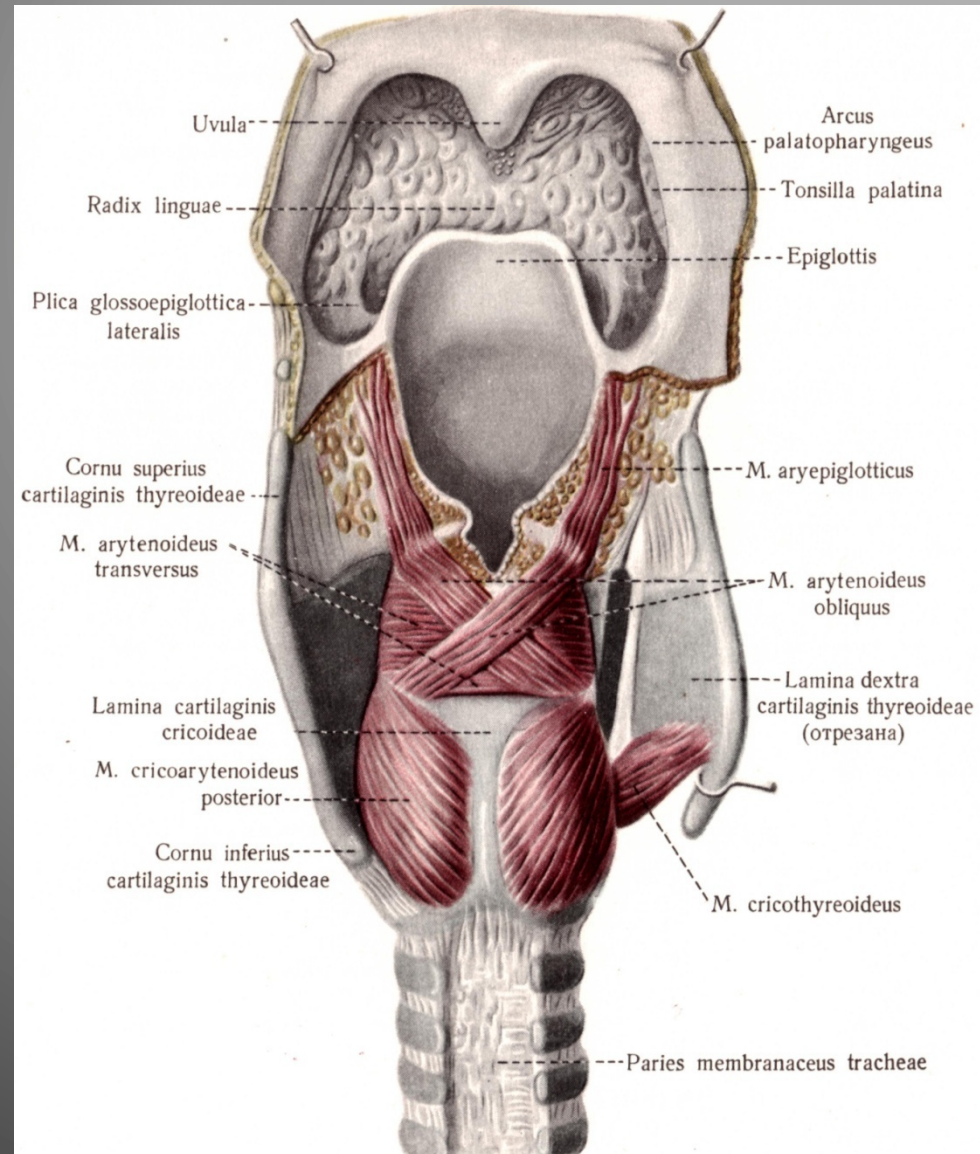
- ▶ The **cricothyroideus muscles** (anticus muscles) are tighten the vocal folds.

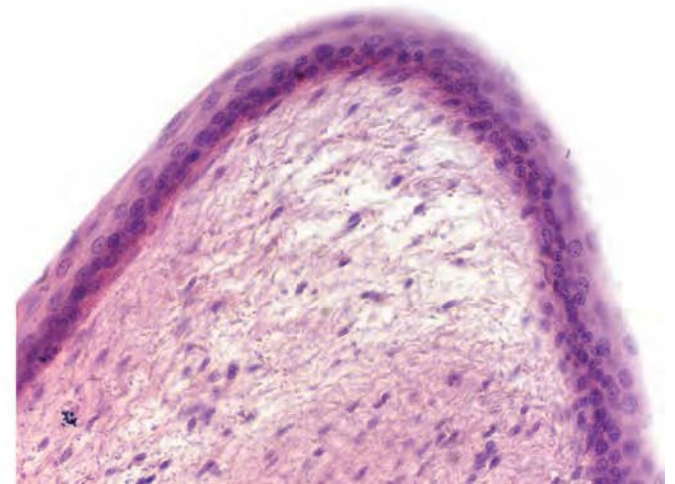
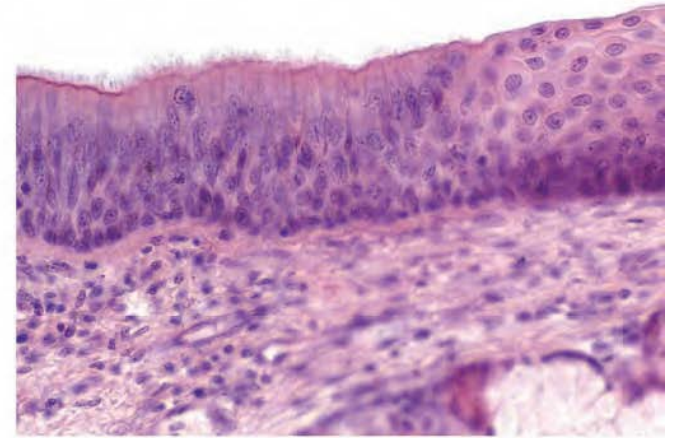
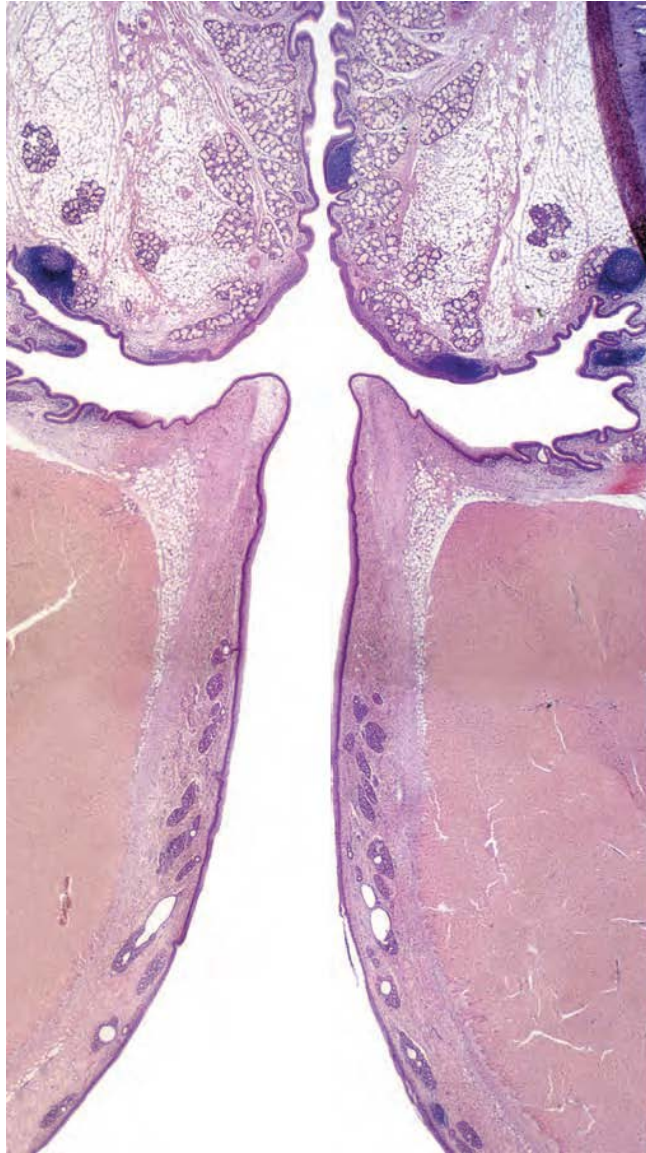


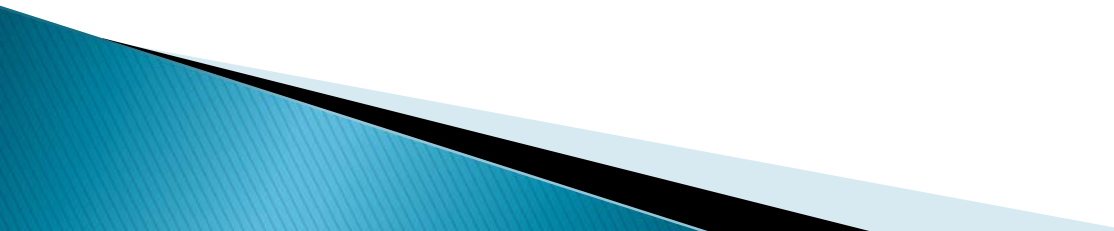
- ▶ **The thyroarytenoid muscles shorten and relax the vocal folds.**

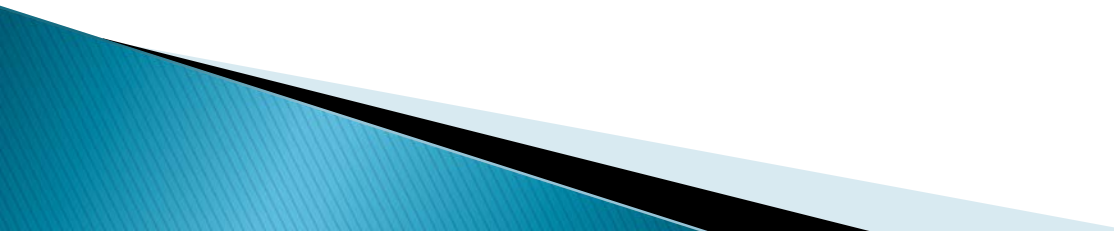


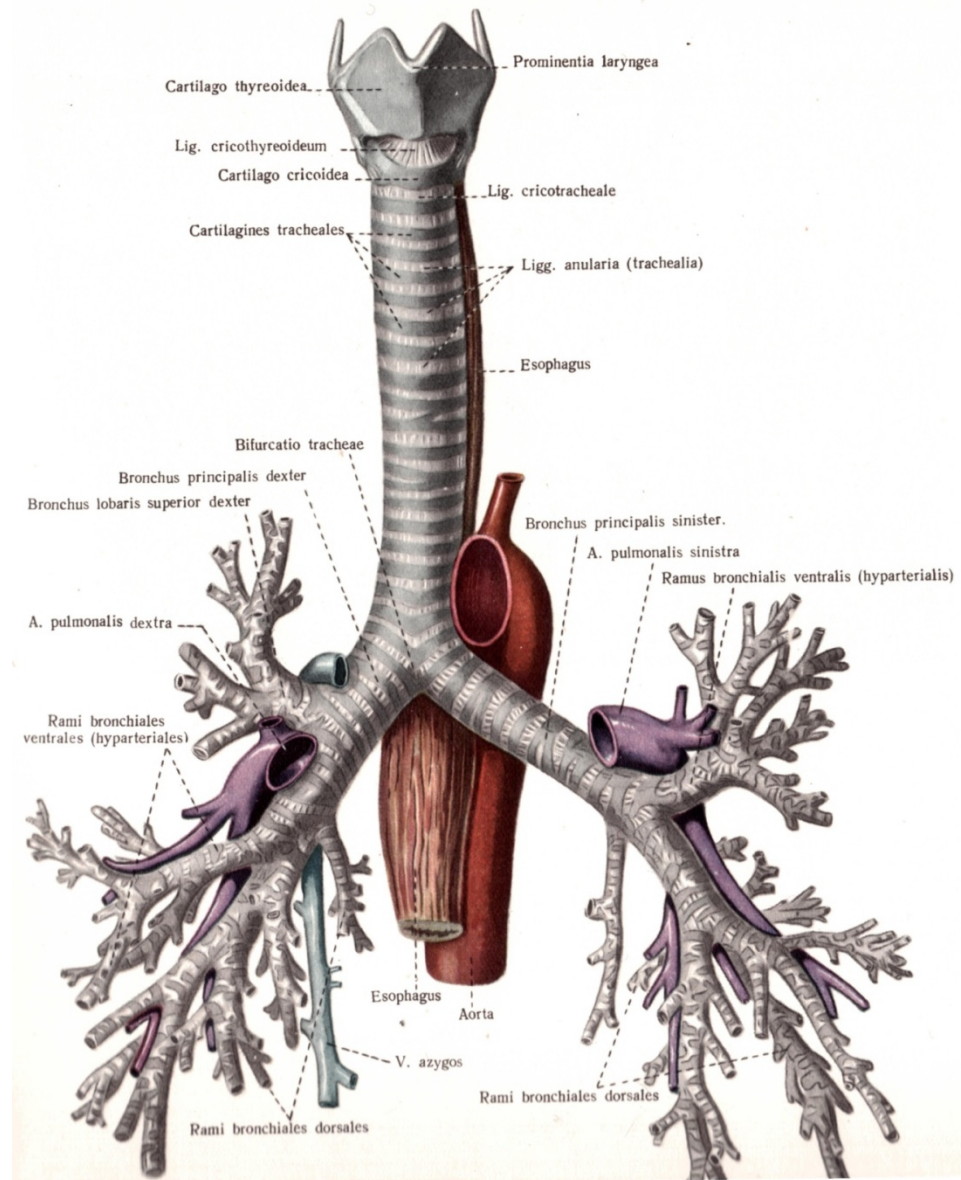
- ▶ **The posterior cricoaritenoid muscles** open the rima glottidis by rotation aside of the muscular process of the arytenoid cartilage.
- ▶ **The lateral cricoarytenoid muscles** close the rima glottidis.
- ▶ **The transverse and oblique arytenoid muscles** are closing the rima glottidis.





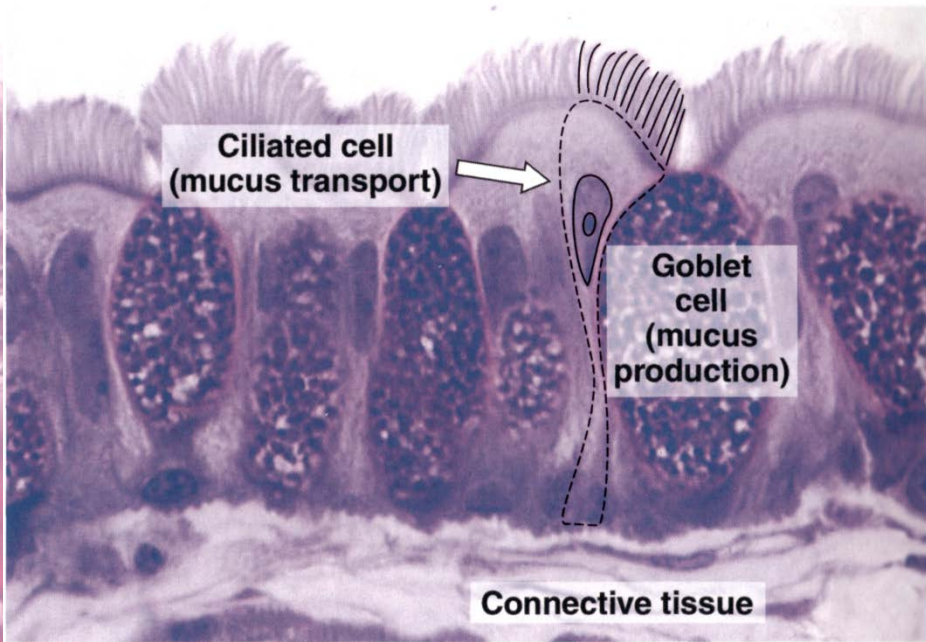
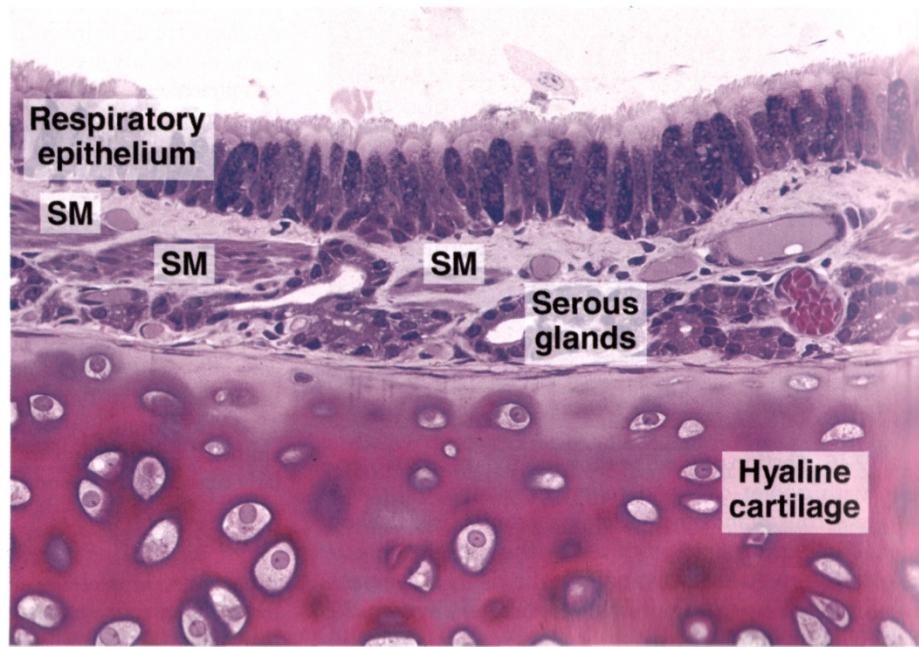
- ▶ **Superior laryngeal nerve** supplies the mucosa of the upper portion of larynx to the vocal folds and only one anticus muscle (crico-thyroid).
 - ▶ **Inferior laryngeal nerve** supplies all the intrinsic muscles of the larynx, except cricothyroid, and the mucosa below the rima glottidis. It communicates with the internal branch of the superior laryngeal nerve and is accompanied by the inferior laryngeal branch of the inferior thyroid artery.
- 

- ▶ **The trachea** is a mobile, fibro-cartilage tube, about **10 cm** long, that extends from the base of the larynx to its bifurcation into the two primary bronchi (occurs at the level of the fourth thoracic vertebra).
 - ▶ The wall of trachea has **three layers**: mucosa, fibrocartilage layer and adventitia.
- 



- ▶ **The mucosa** is lined with - **pseudostratified columnar ciliated epithelium** that contains a rich population of goblet, stem cells, small granule – endocrine cells.
- ▶ **The endocrine cells** produce catecholamine,
- ▶ Second cell type produces polypeptide hormones such as **serotonin, calcitonin, and gastrin-releasing peptide, bombesin.**
- ▶ The epithelial cells are rest on **a thick basal membrane.**
- ▶ **The lamina propria** is composed of loose connective tissue contains many scattered lymphoid follicles, follows **muscularis mucosa** and **submucosa** with tracheal glands in it.

- ▶ **The fibrocartilage layer** contains of **16-20 C-shaped rings** of hyaline cartilage that keeps the tracheal lumen opened. These cartilages are closed posteriorly by the bundles of smooth muscle fibers – **the tracheal muscle**.
The adjacent rings are connected by **anular ligament**.
- ▶ **The adventitia**, the outer layer, consists of dense connective tissue also blood and lymphatic vessels and nerves.





Thank you

