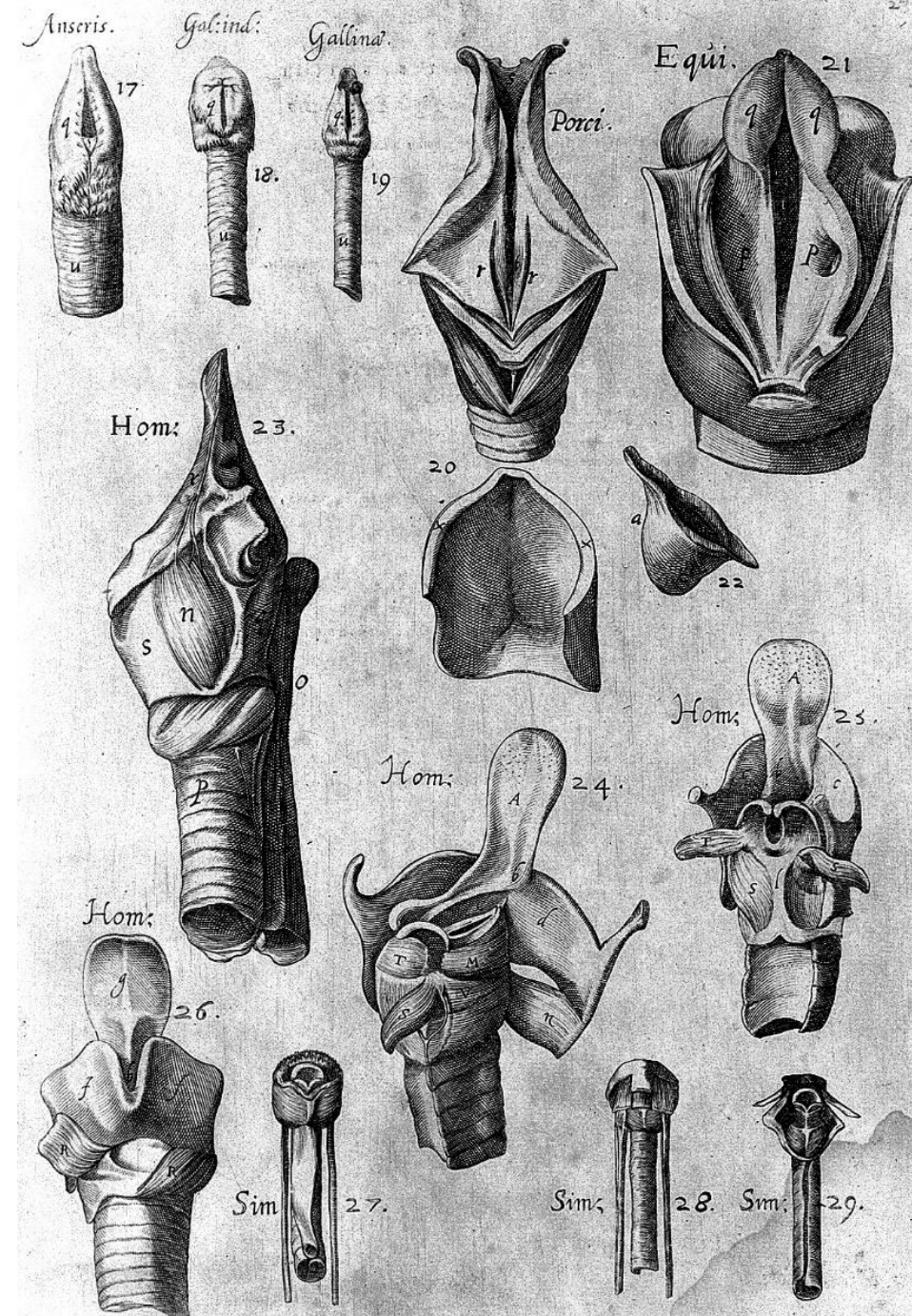
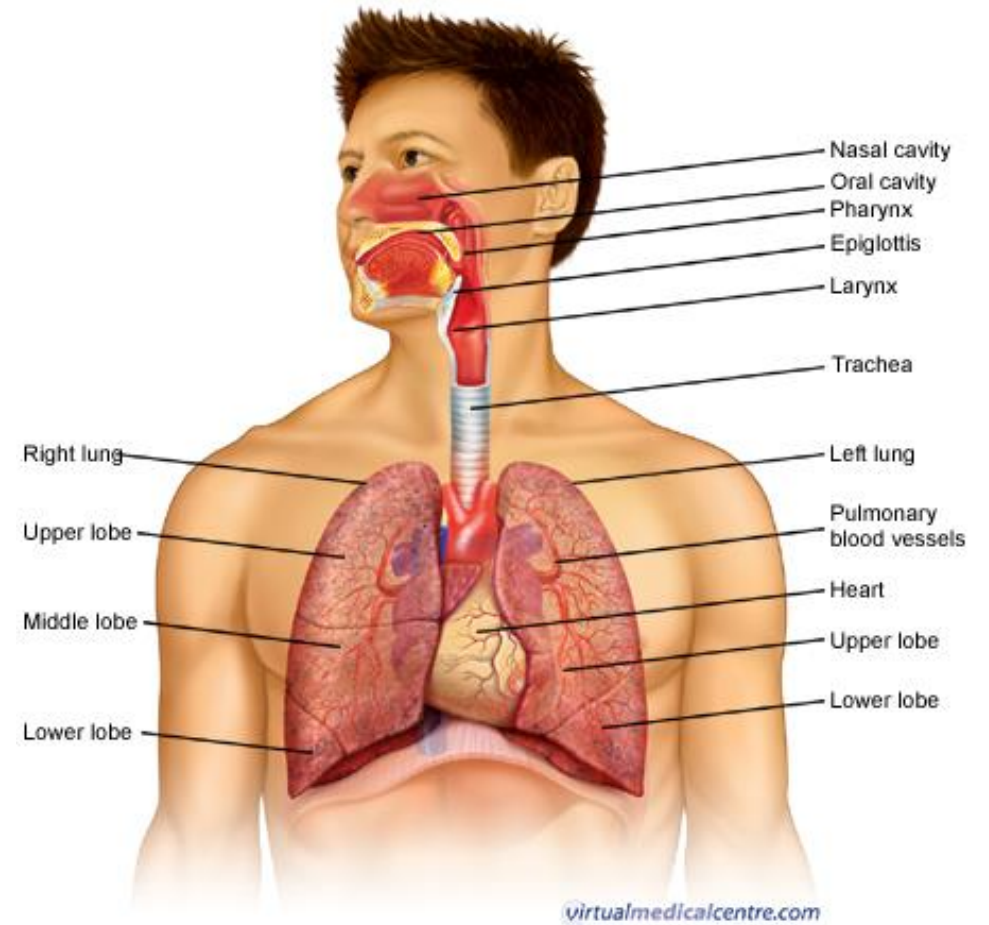


Larynx

Dr. Danial Safavi

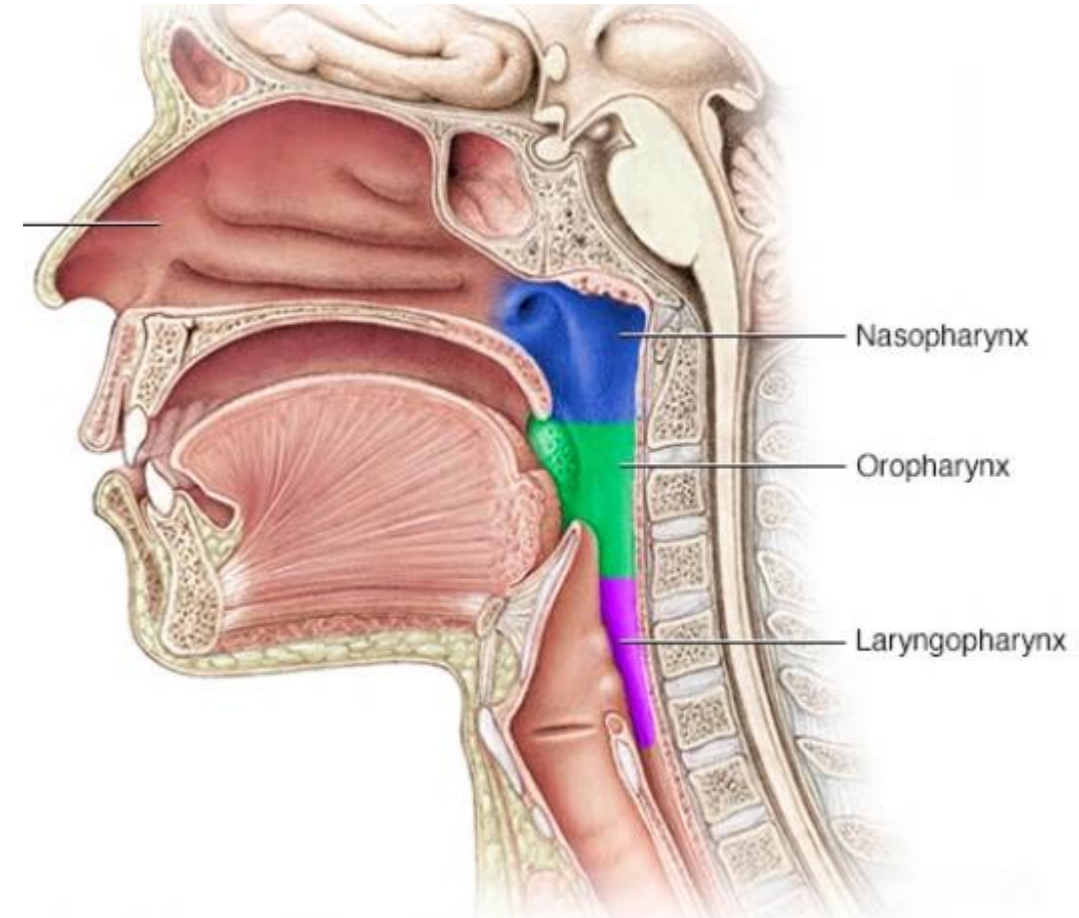


Respiratory system



Larynx

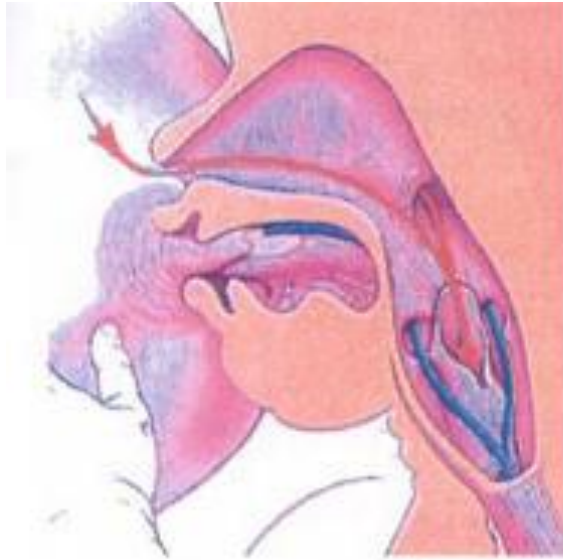
- Oral and Nasal cavities are both points of entry for air
- Pharynx is a common space for food and air
- In the last portion of pharynx, Laryngopharynx, the air will go to larynx while food continues down the laryngopharynx to enter the esophagus



Larynx

- Serves as the entrance point for air to the trachea
- Guards the airway
- Serves as the organ of phonation

Position of larynx



oral cavity of a
baby less than
9 months old



oral cavity and
larynx of an
adult man



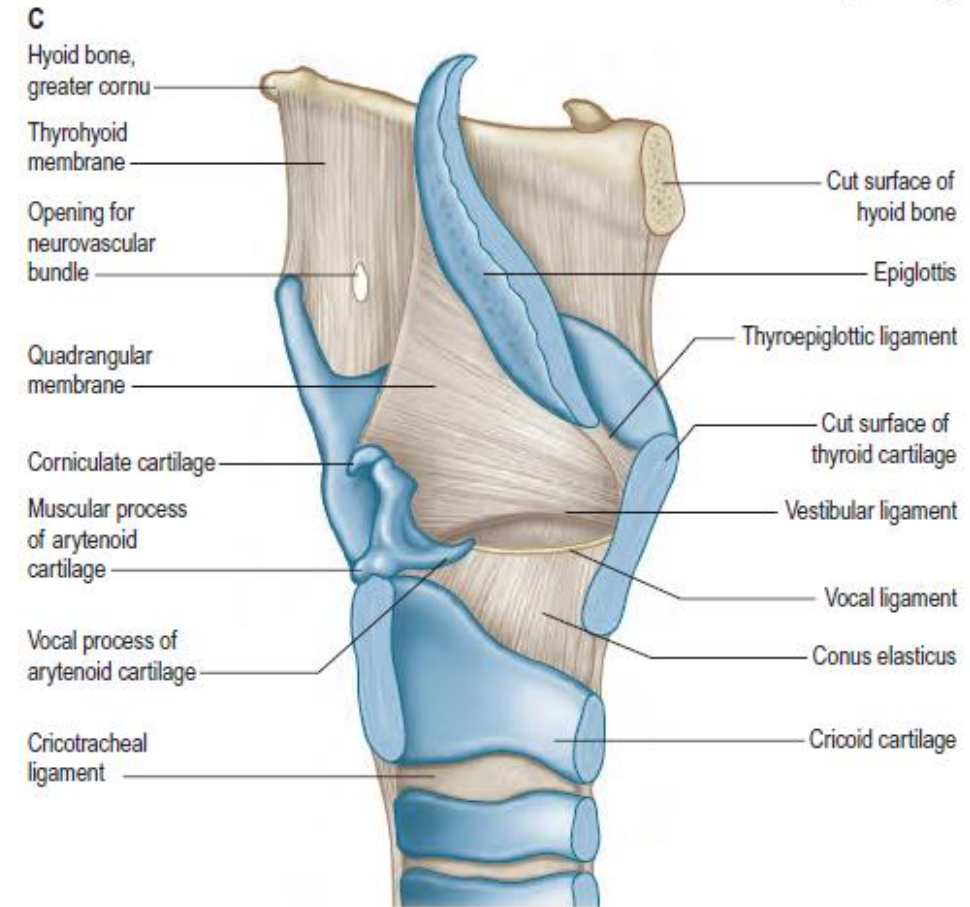
Cartilages of larynx

- Major cartilages

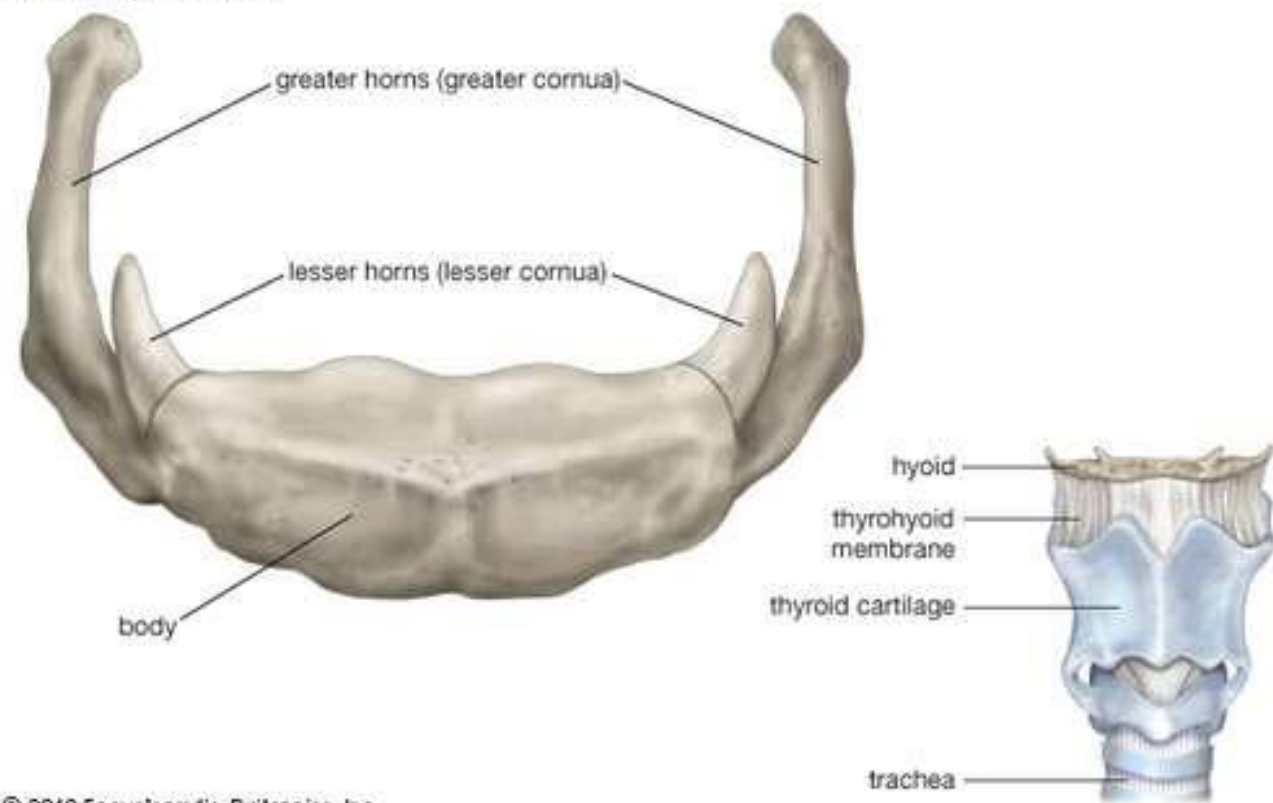
- Epiglottis
- Thyroid
- Cricoid
- Arythenoid

Minor cartilages:

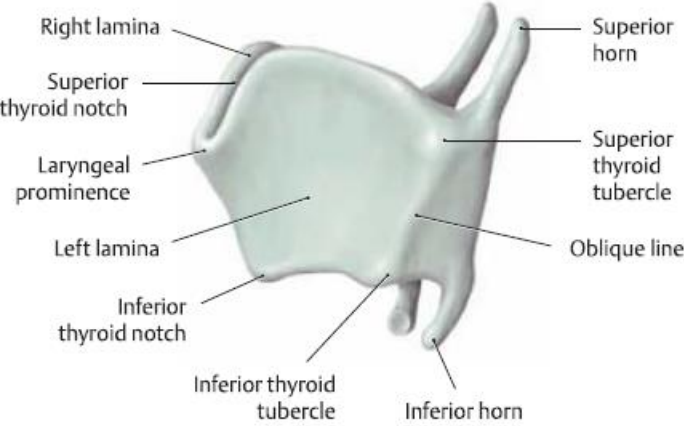
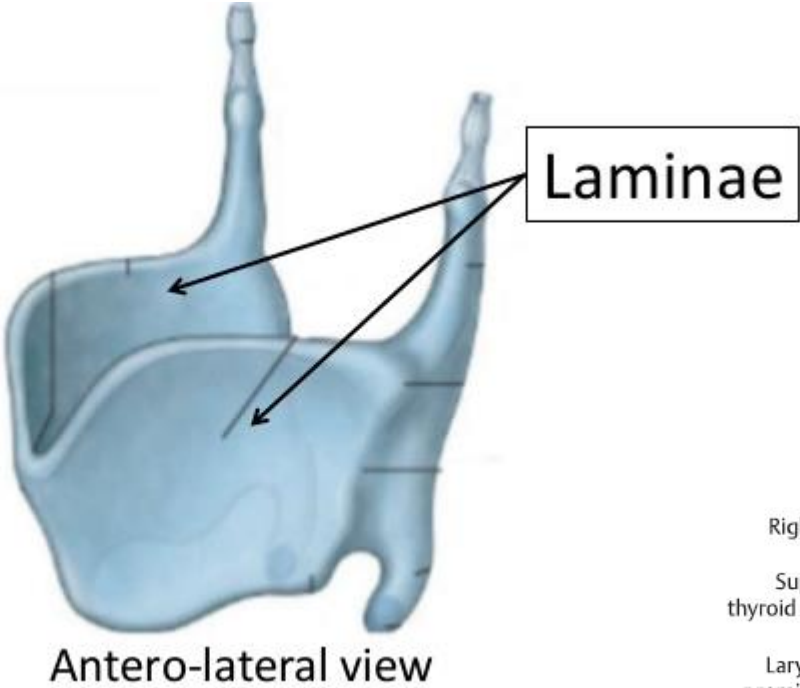
- Cuneiform
- Corniculate
- Triceal

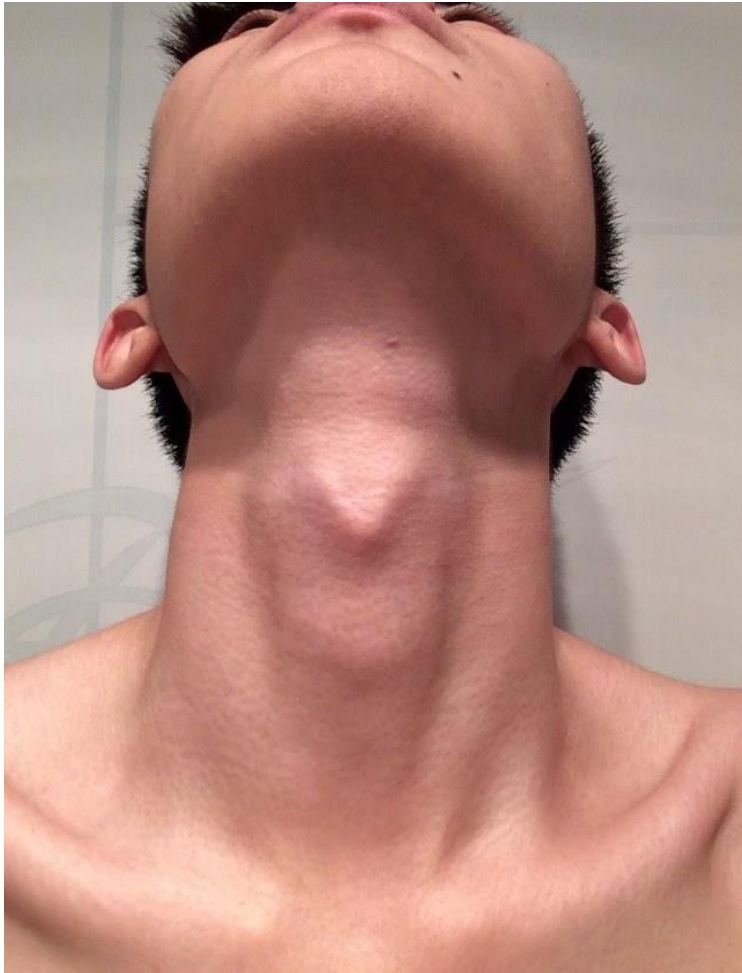


Human hyoid bone



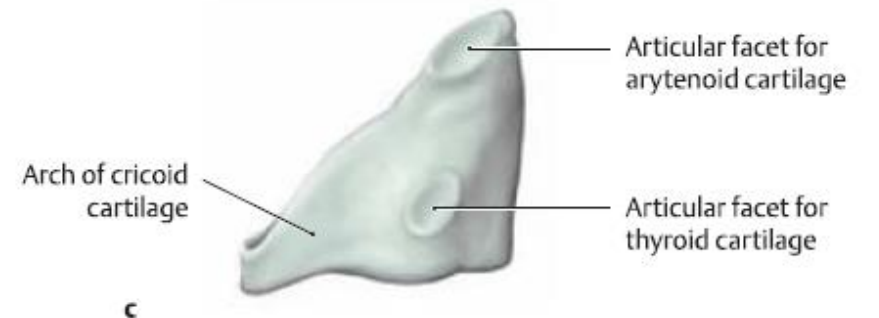
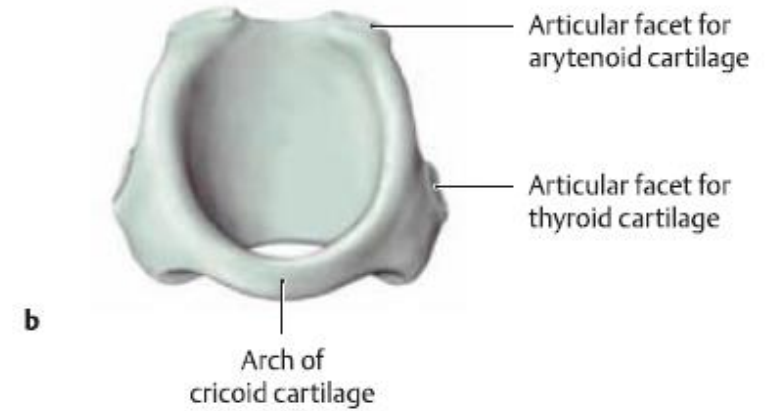
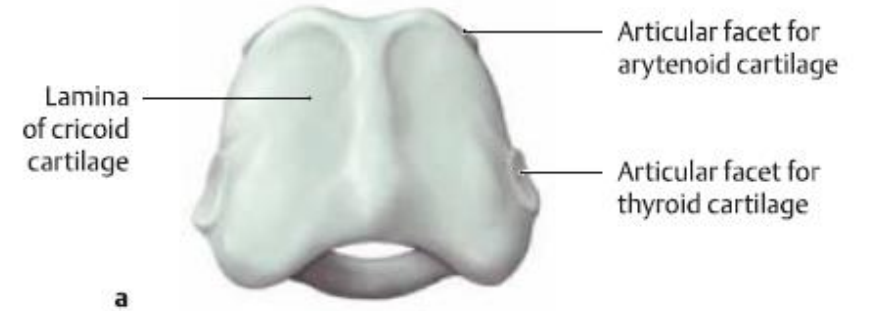
Thyroid





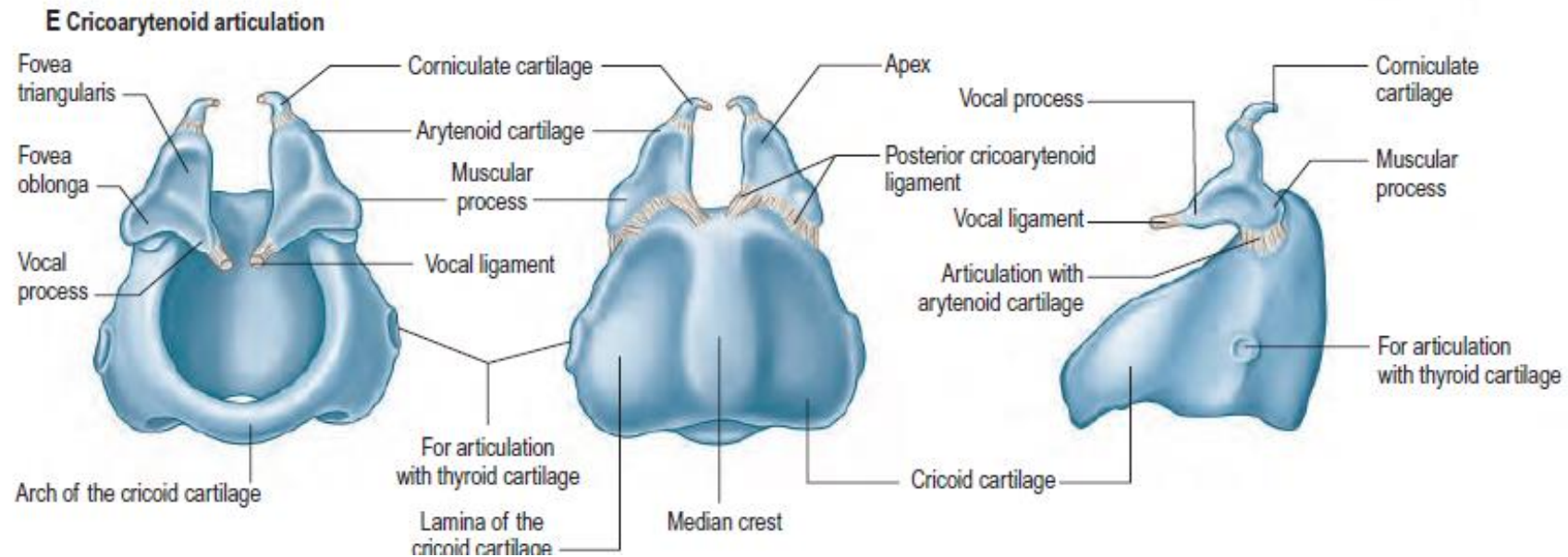
Cricoid

Has a narrow **Arch** Anteriorly, and a wider **Lamina** posteriorly
Articulates with the Inferior horns of the Thyroid
Articulates with the Arythenoid cartilages



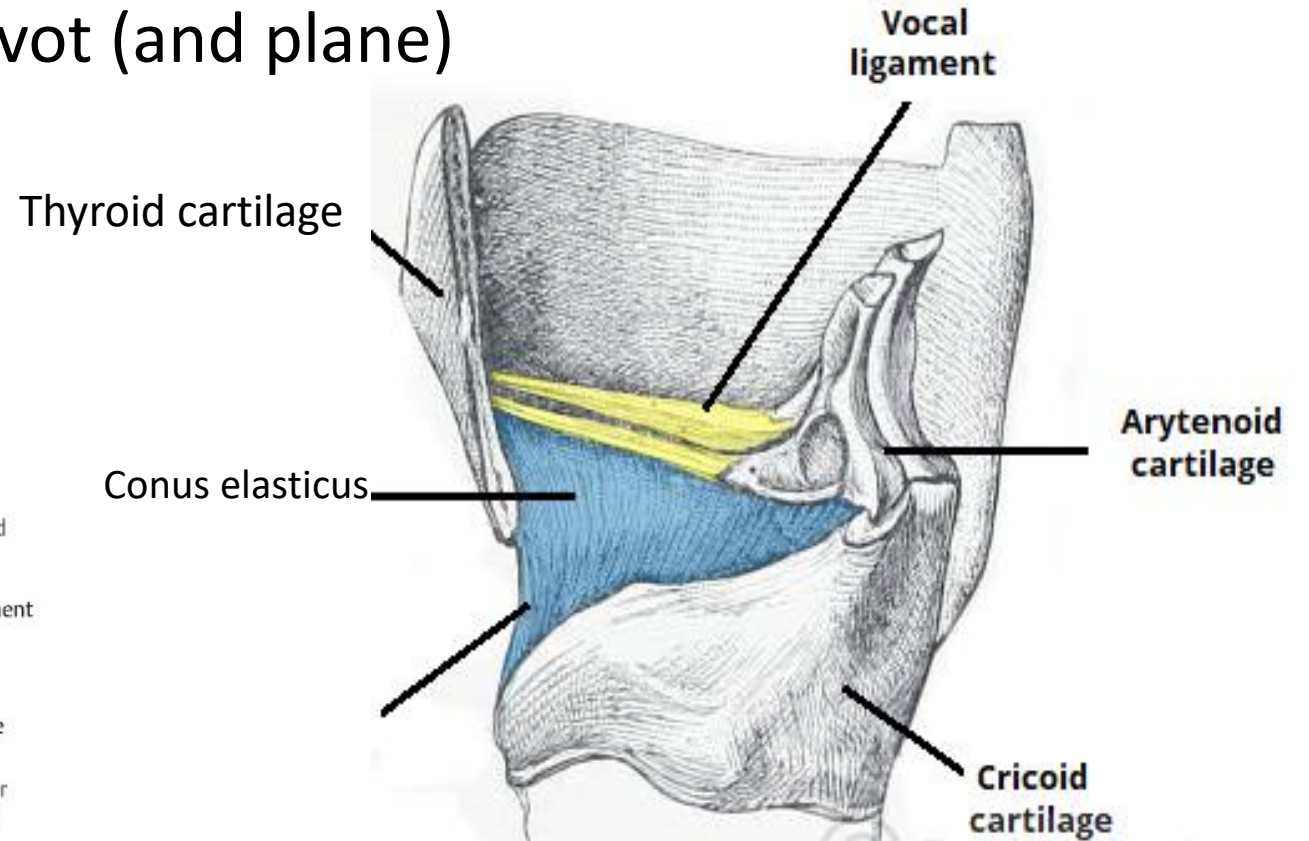
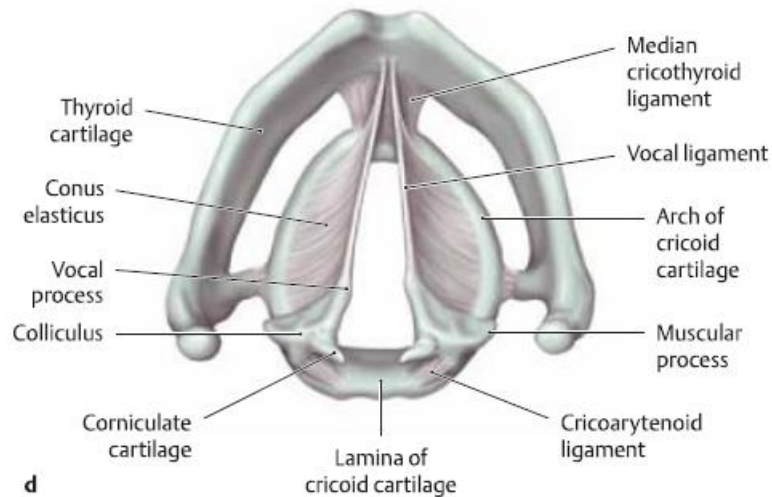
Arythenoid

- Pyramidal shaped cartilages
- Articulate with the lamina of cricoid
- Has a Vocal process anteriorly, Muscular process laterally, and an apex that is pointing to Corniculate cartilage



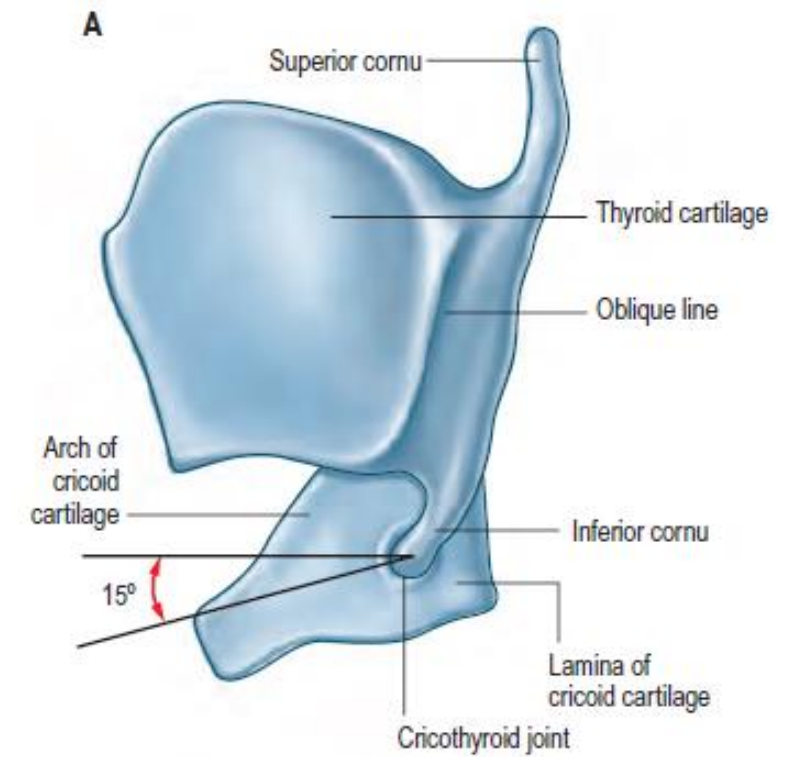
Crico-arythenoid joint

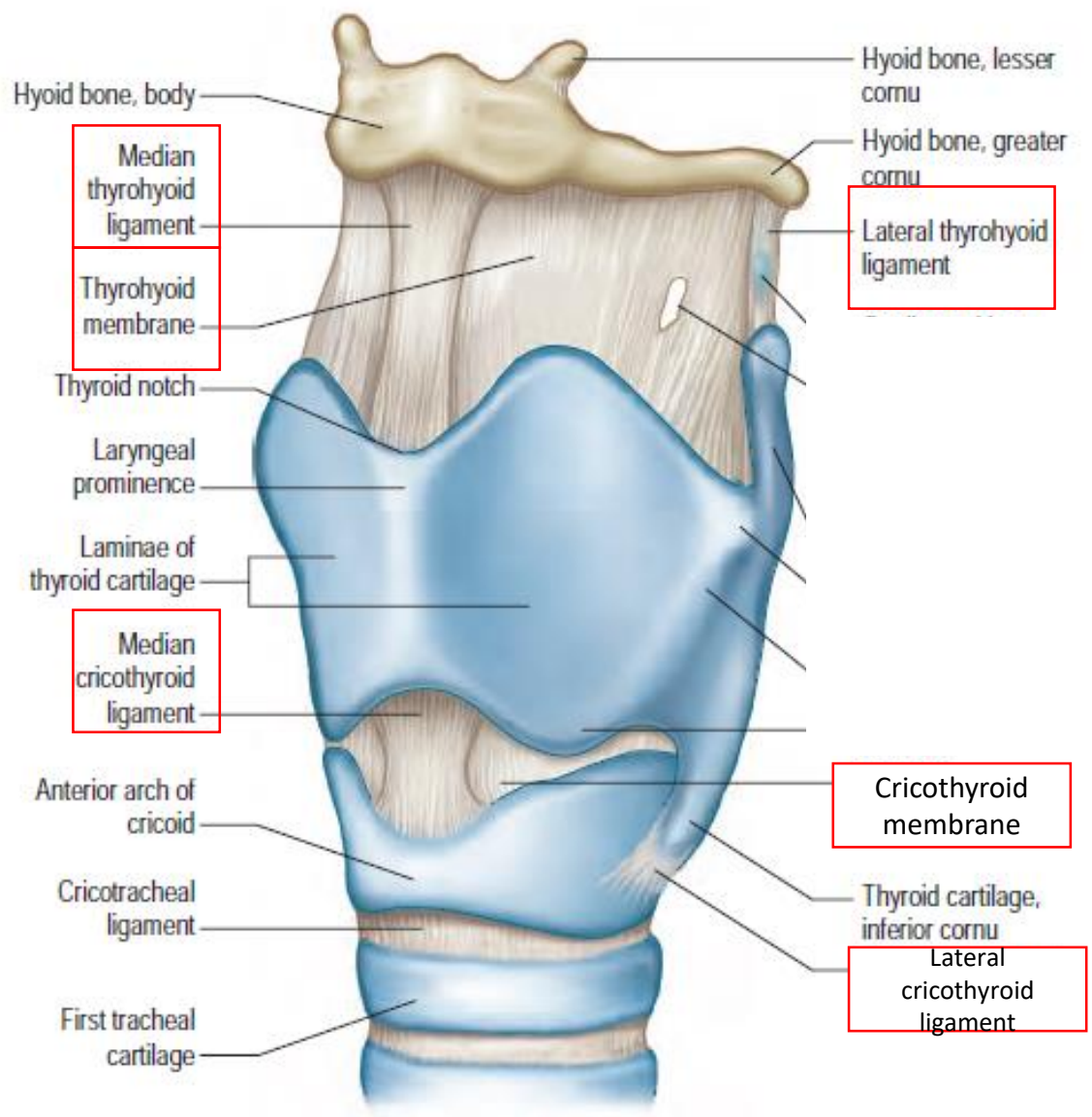
- The crico-arythenoid joint : pivot (and plane)
 - Rotational movements can:
 - Adduct
 - Abduct
- The vocal cords !

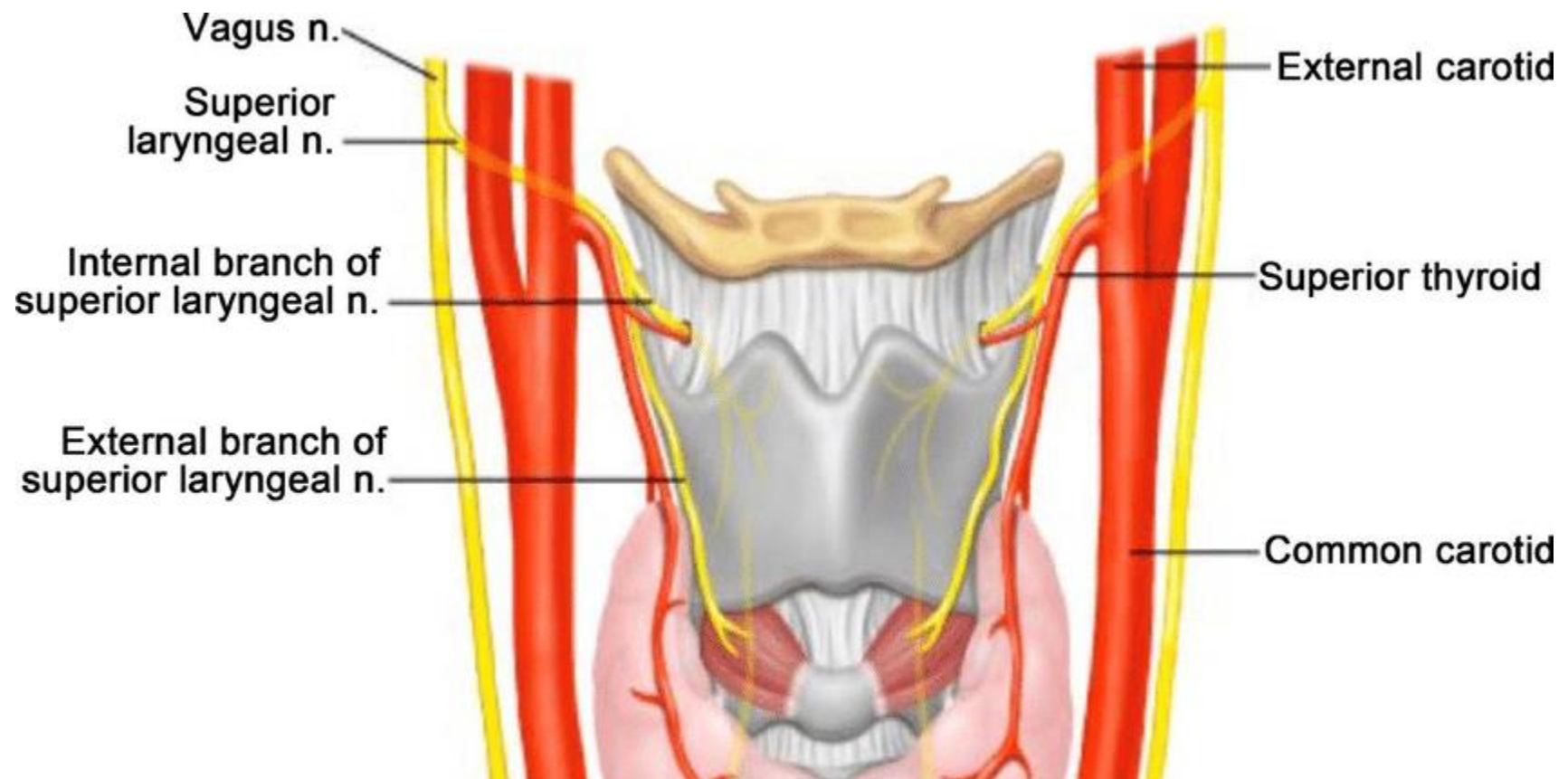


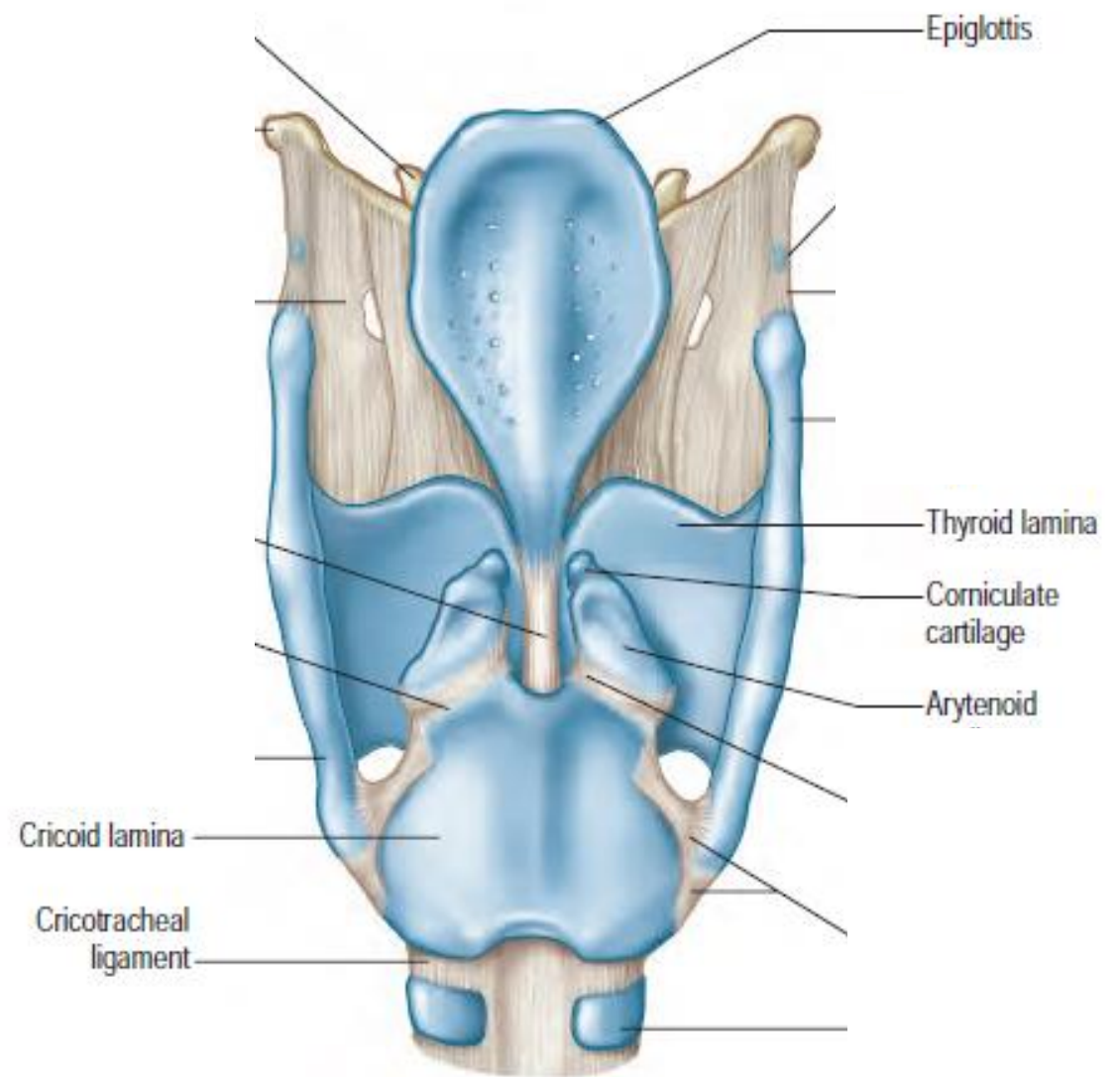
Cricothyroid joint

- The crico-Thyroid joint : Hinge

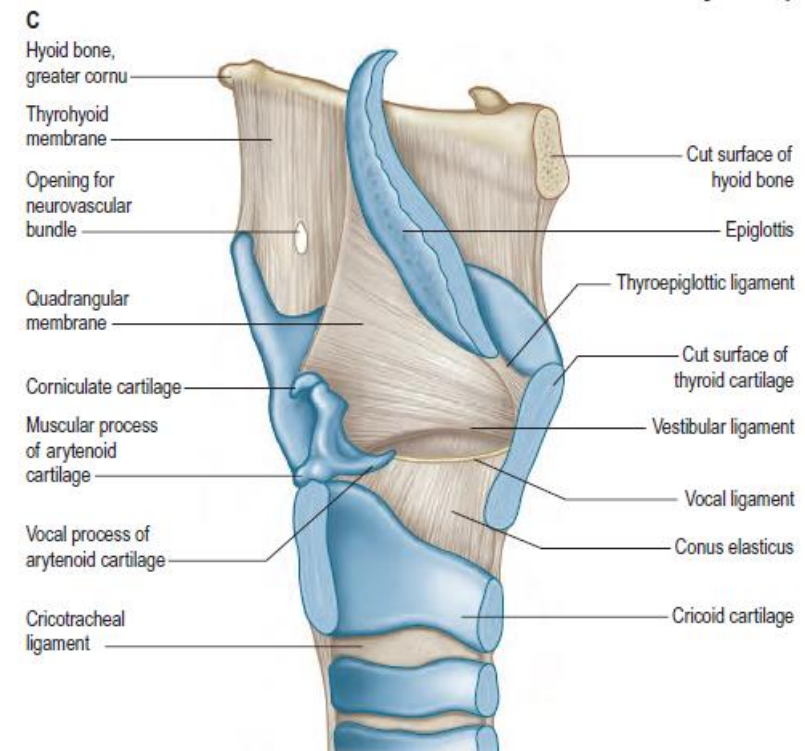


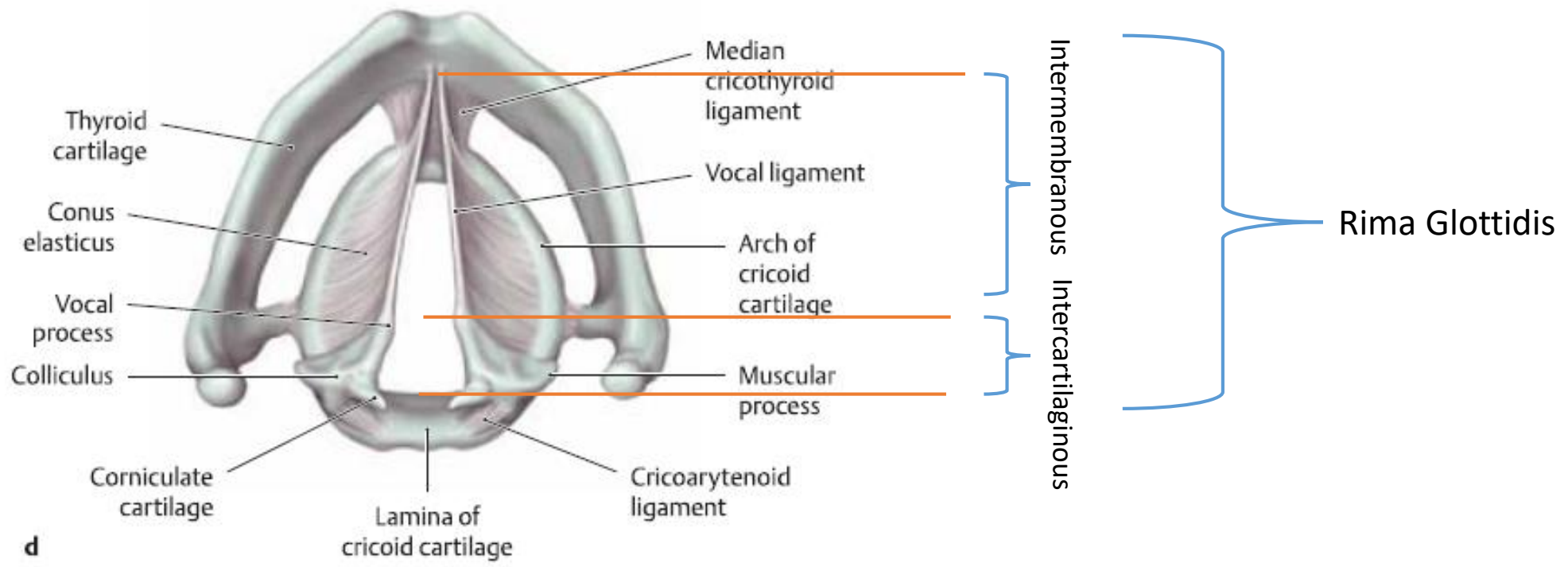






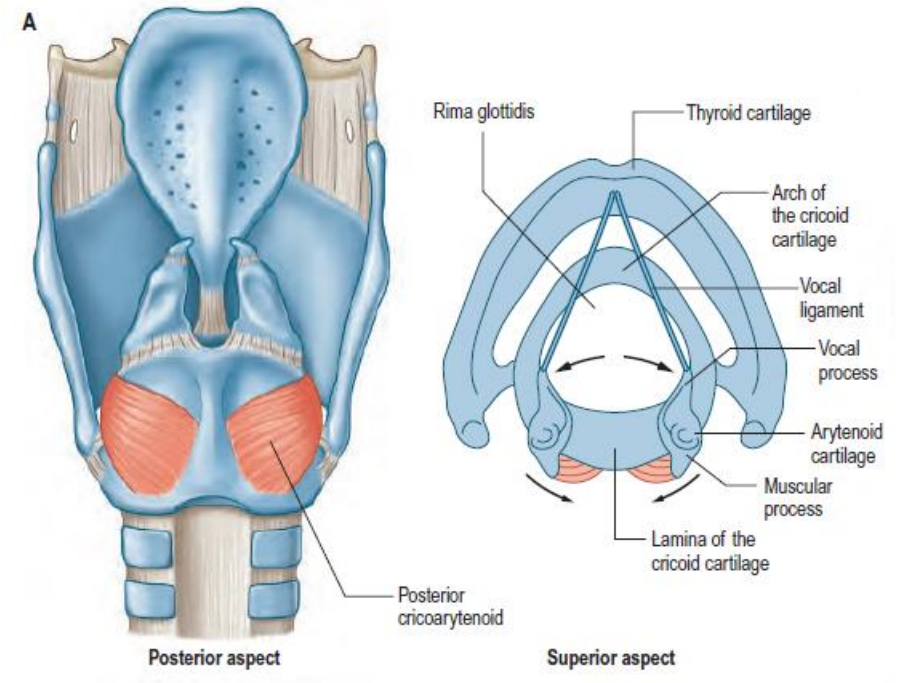
- Most laryngeal cartilages are Hyaline cartilage
 - Epiglottis, corniculate, cuneiform and vocal process of arythenoid cartilage are elastic cartilages.





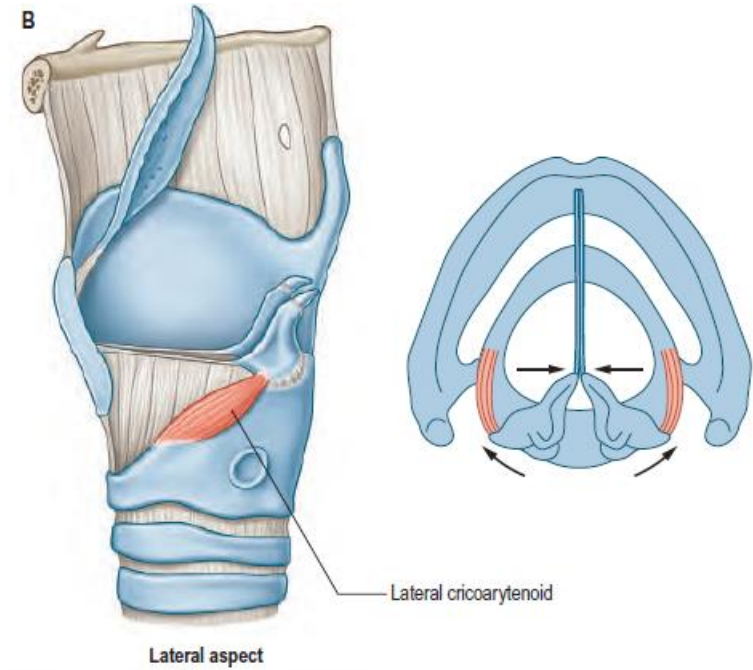
Muscles of the Larynx

- Posterior crico-arythenoid
 - Opens Rima Glottidis



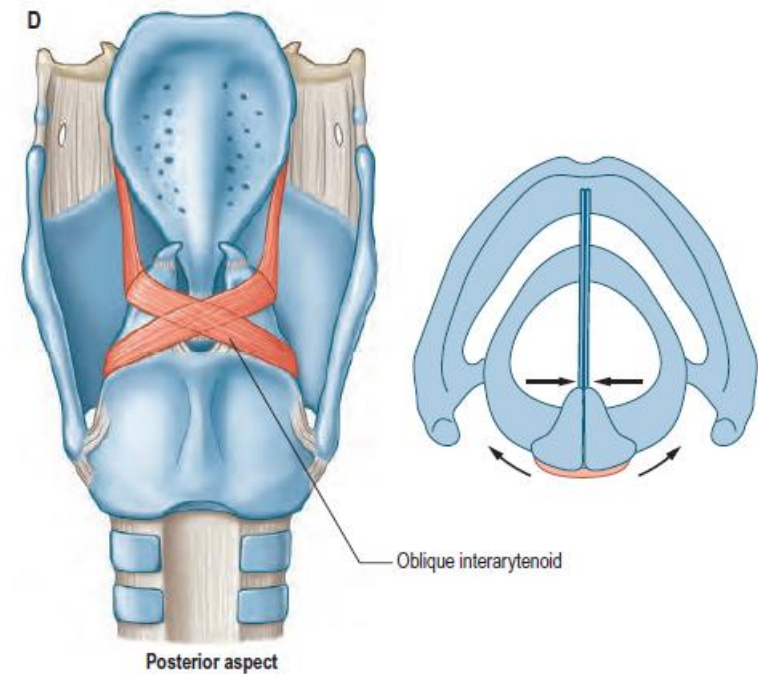
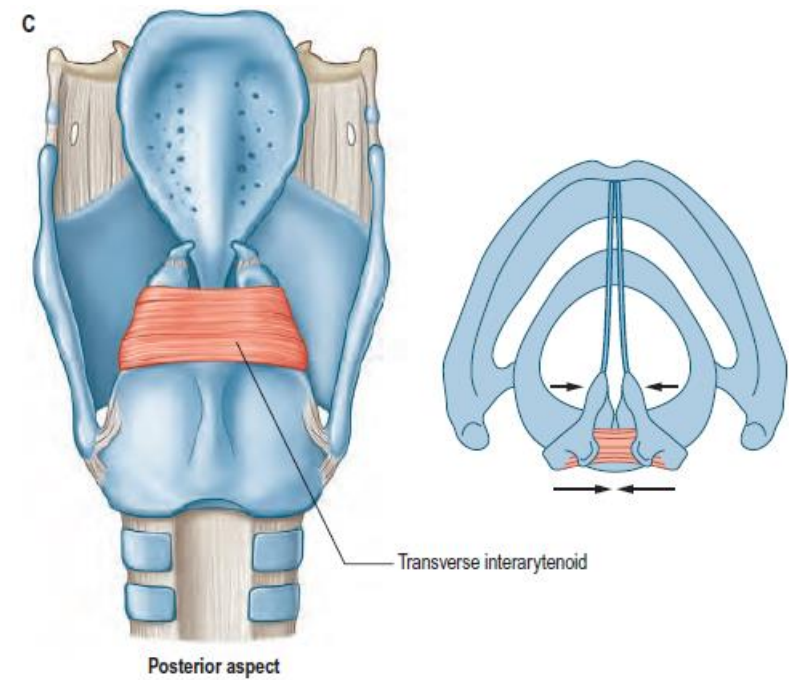
Muscles of the Larynx

- **Lateral Crico-arythenoid**
 - Closes the intermembranous portion of Rima Glottidis



Muscles of the Larynx

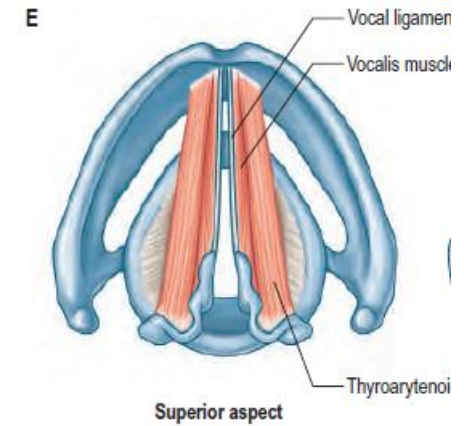
- **Interarythenoid** (Transverse & oblique)
 - Closes the intercartilaginous portion of Rima Glottidis



Muscles of the Larynx

- **Vocalis**

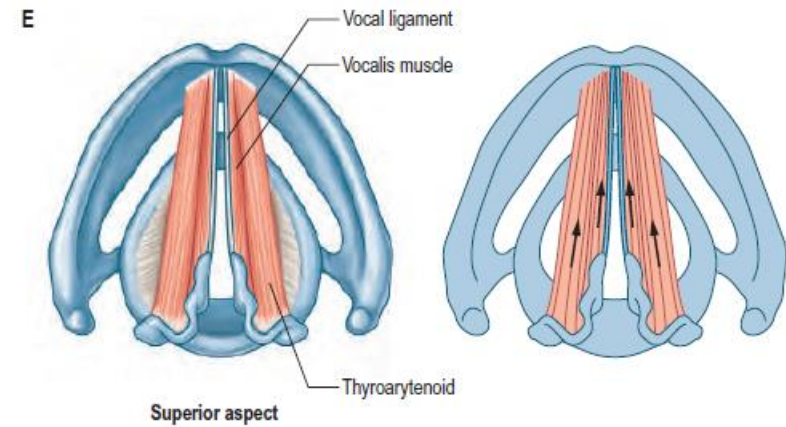
- Isometric contraction, increase thickness of the vocal cord



Muscles of the Larynx

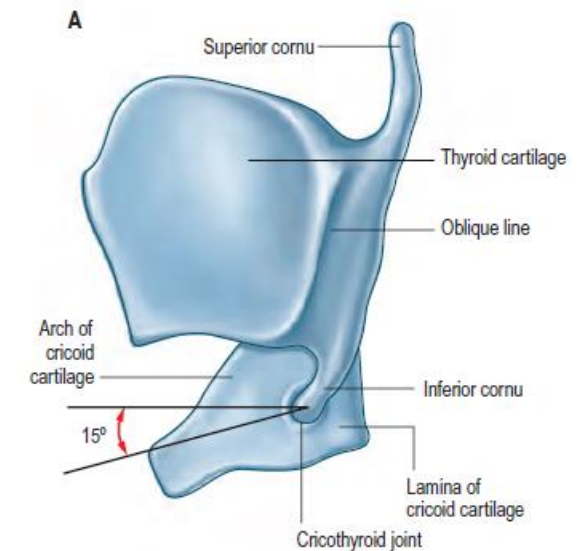
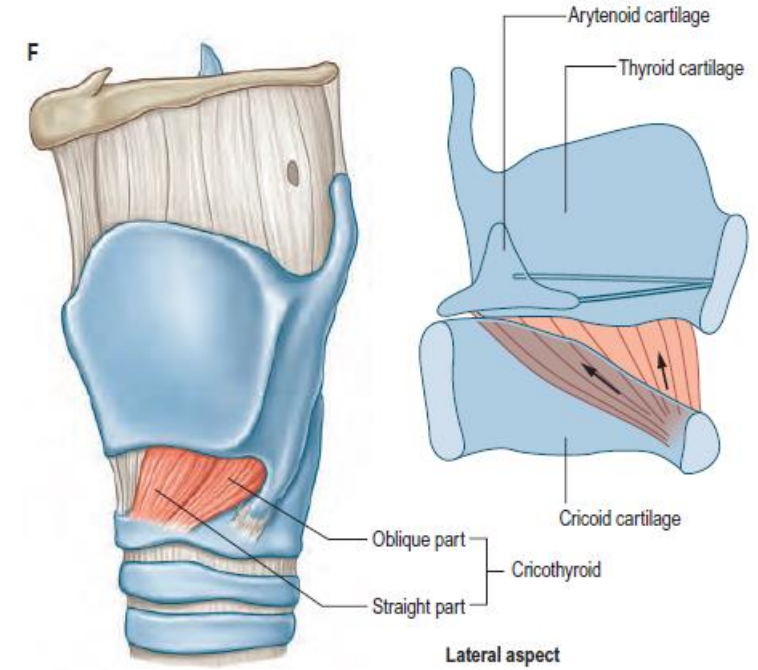
- **Thyro-Arythenoid**

- Decrease Tension and length of vocal cords
- Help with closing the intermembranous part of rima glottidis

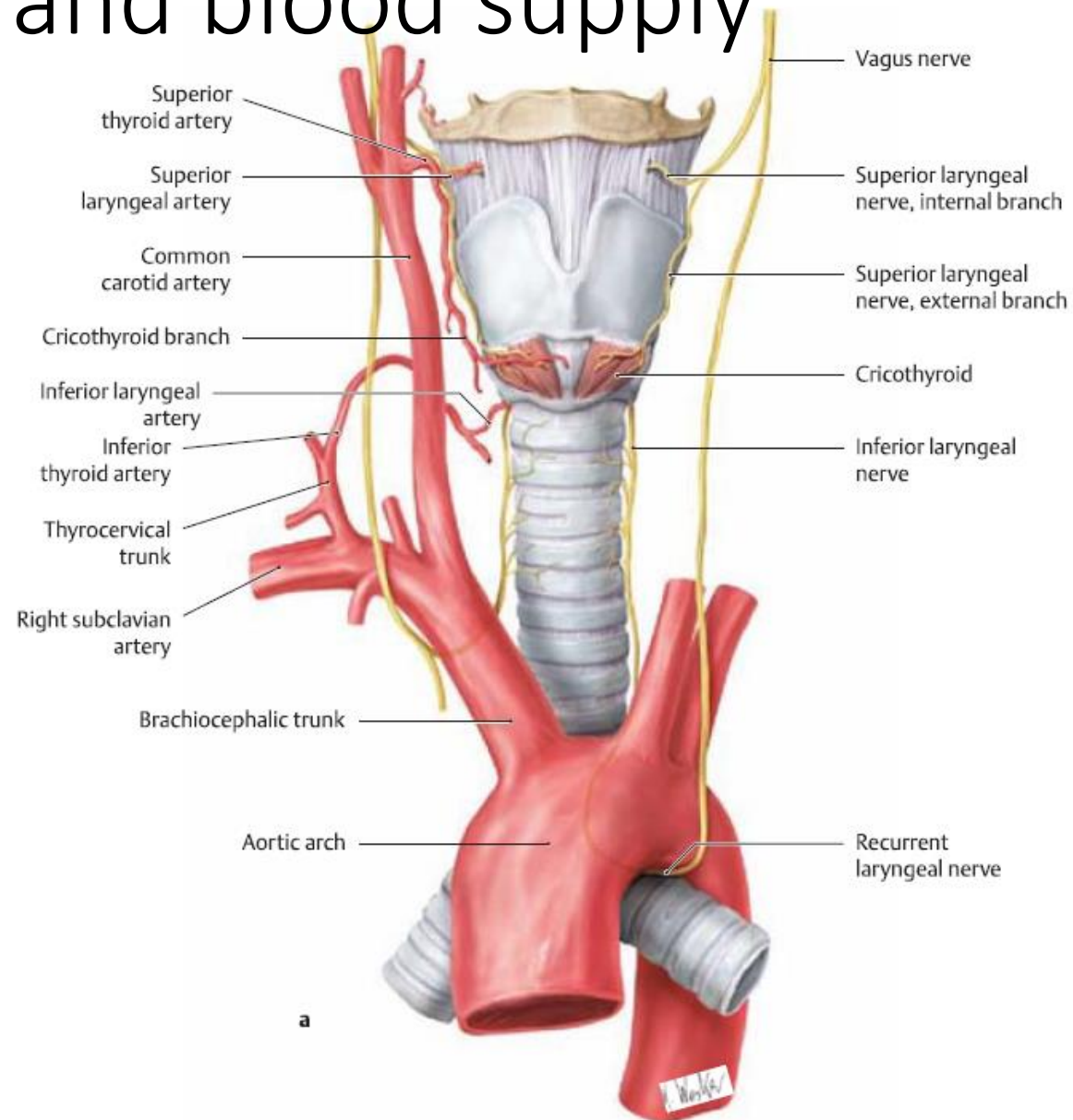


Muscles of the Larynx

- Cricothyroid muscle
 - Increase the tension of Vocal cords, higher pitch

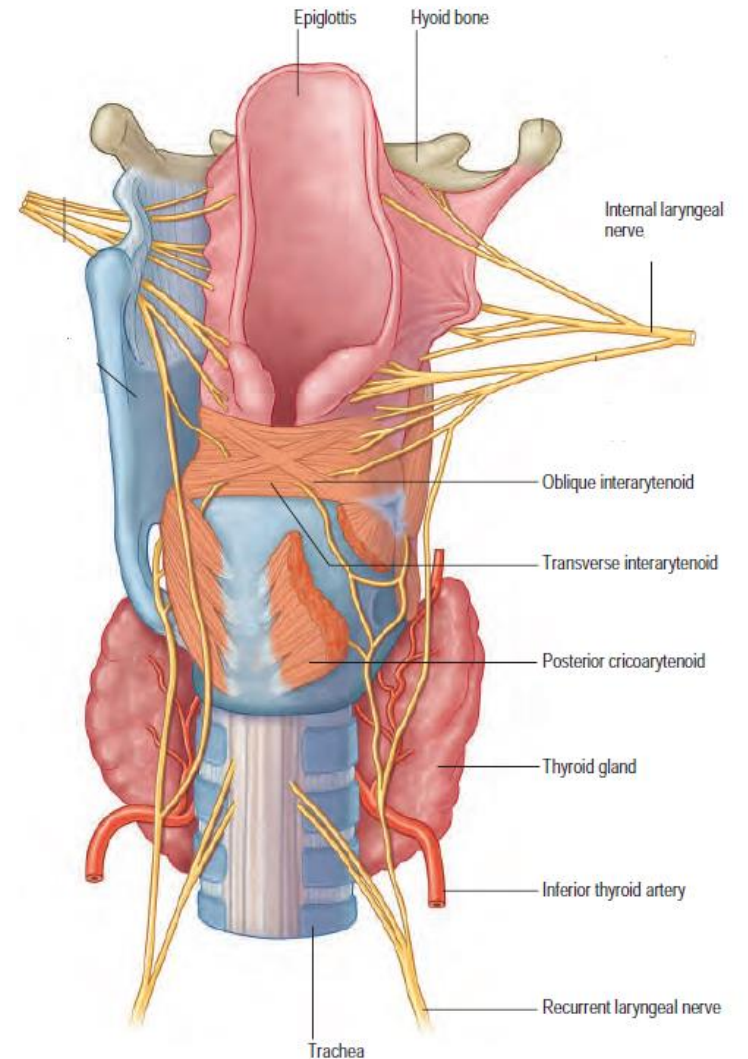


Innervation and blood supply

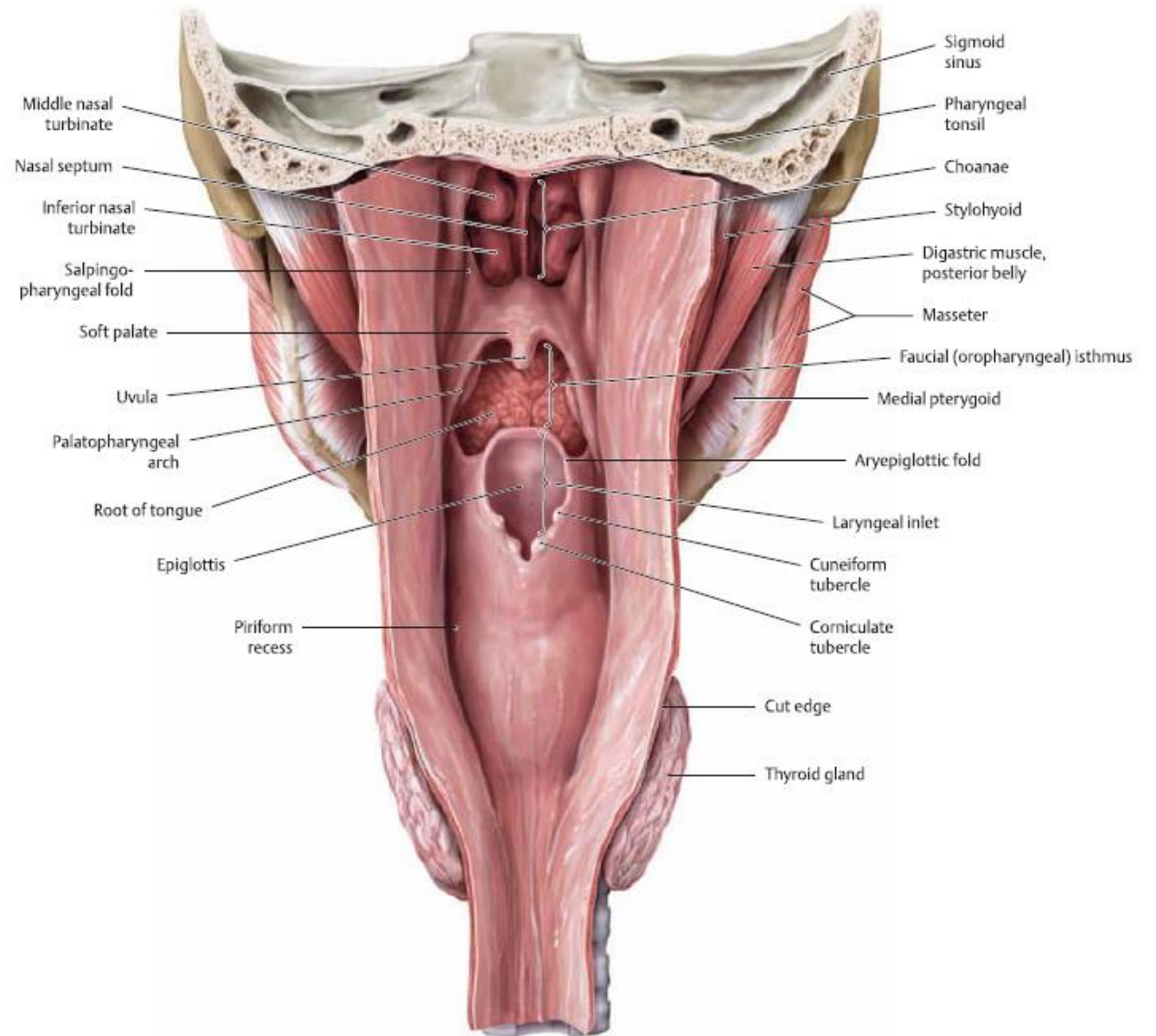


Innervation

- Superior Laryngeal nerve : innervates Cricothyroid muscle with its external branch
- Recurrent laryngeal nerve(inferior laryngeal branch): innervates all the other laryngeal muscles

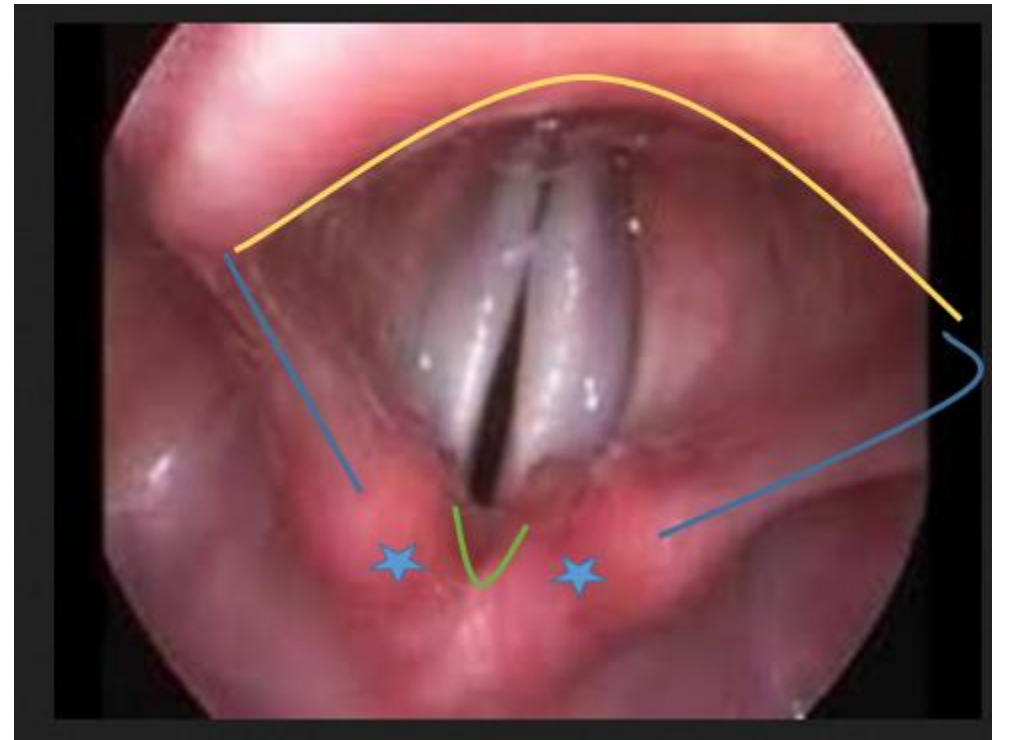


Mucosa

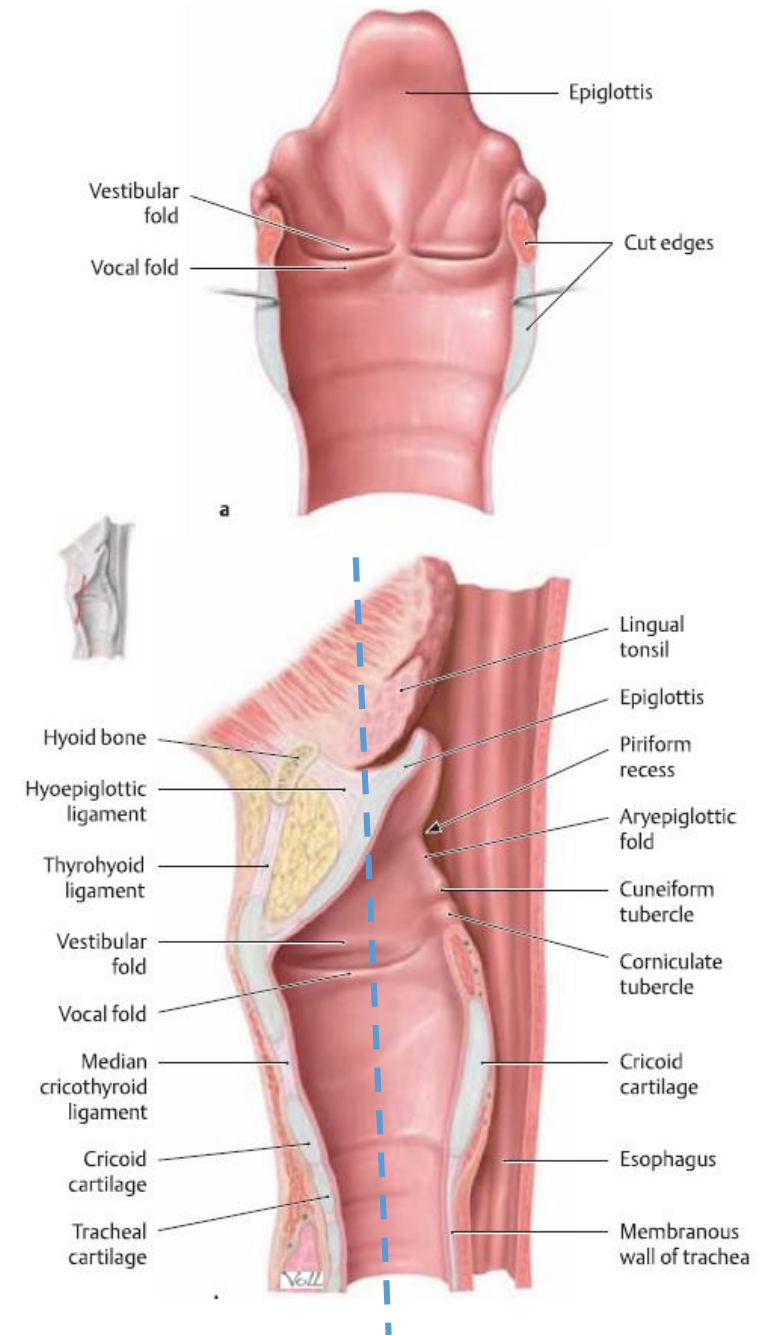


Laryngeal inlet

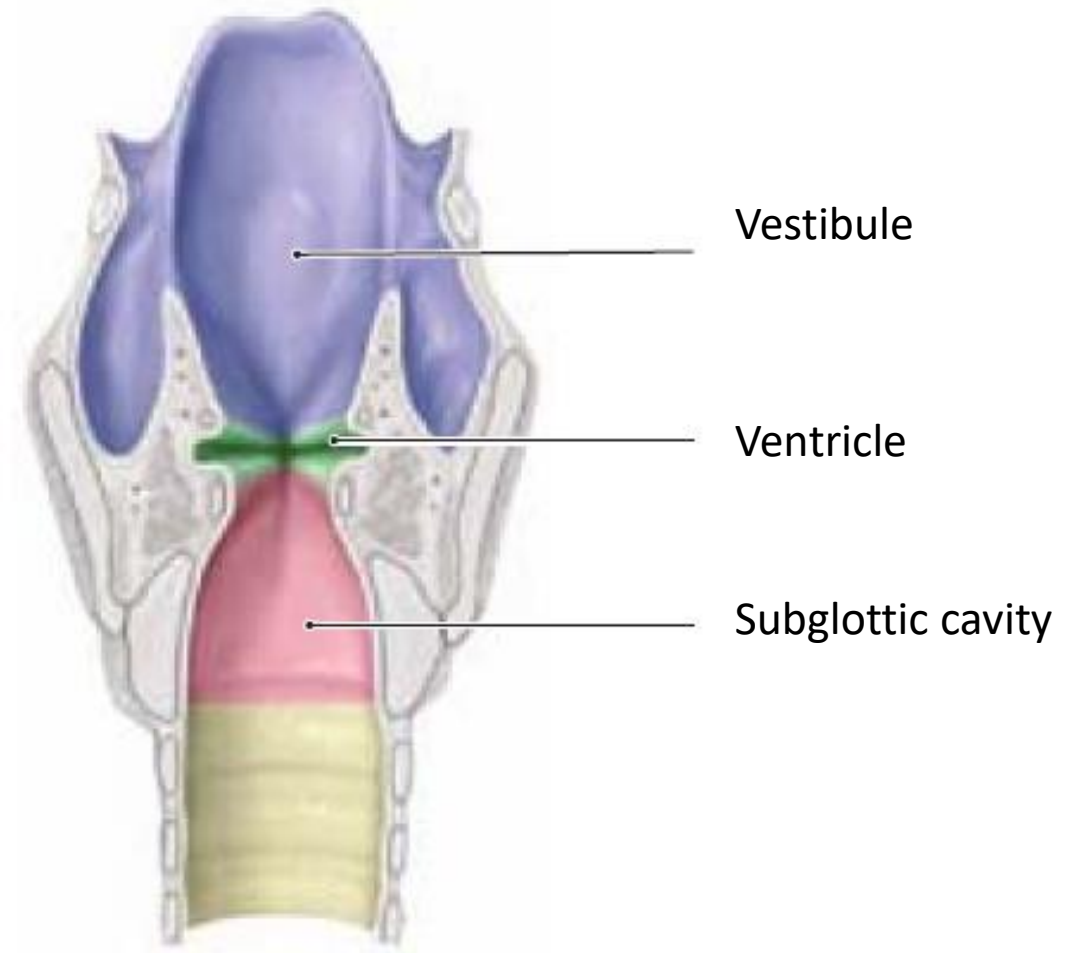
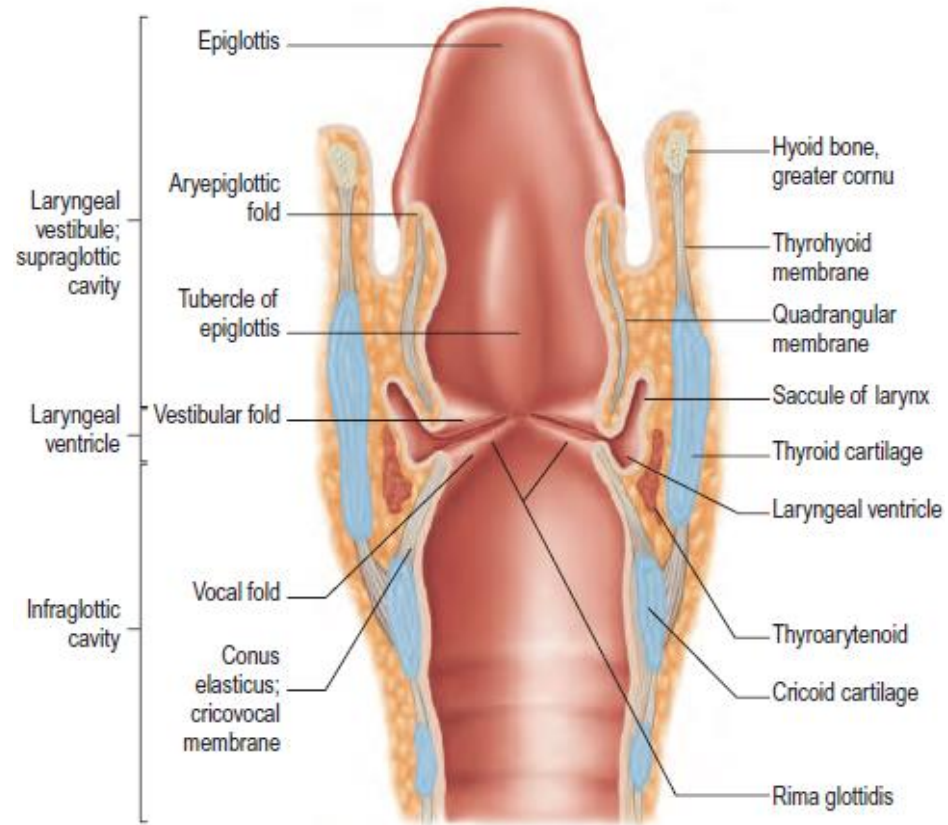
- Epiglottis
- Aryepiglottic fold
- Arythenoids
- Interarythenoid notch

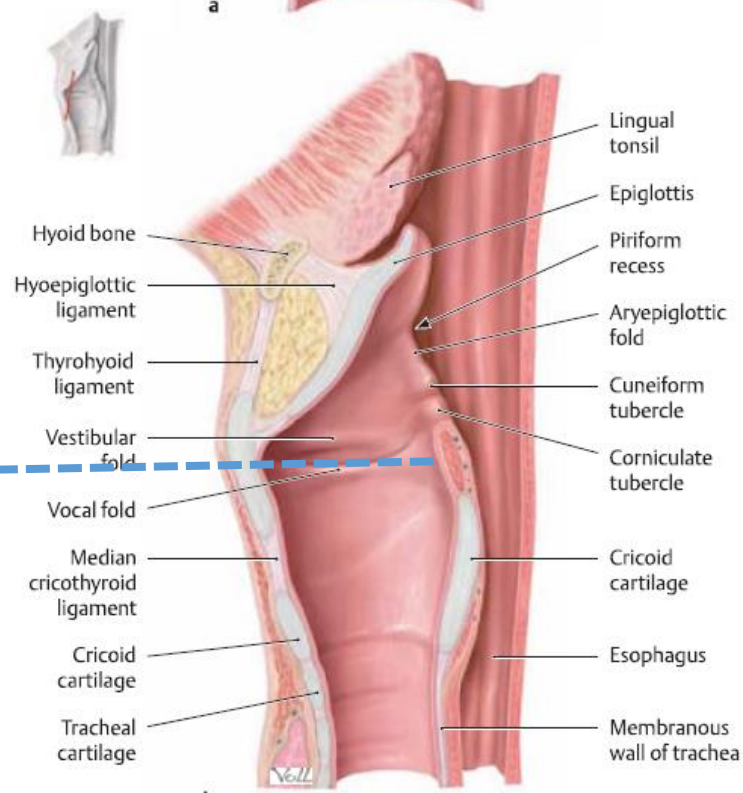
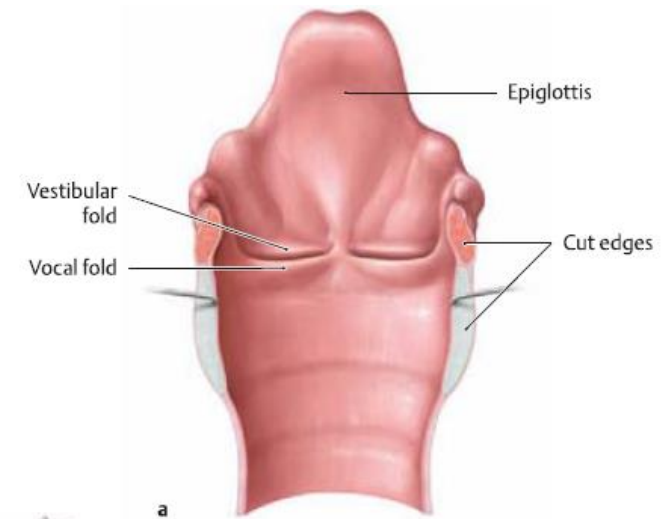


- Inside the aryepiglottic fold :
 - Corniculate cartilage
 - Cuneiform cartilage
 - Aryepiglottic muscle



Spaces in the larynx





Superior laryngeal nerve

Recurrent laryngeal nerve

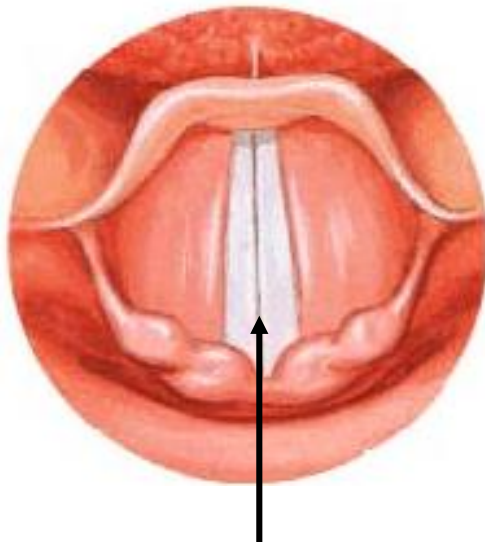
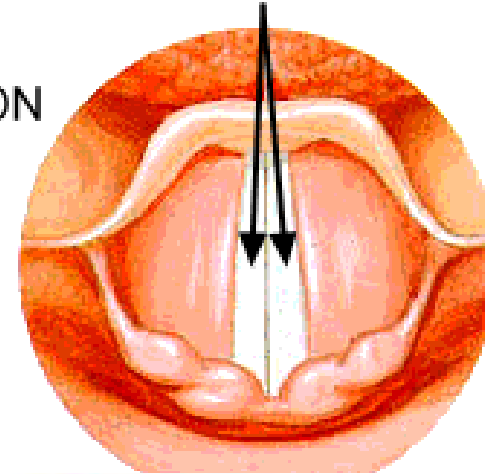


Movements of the vocal cords

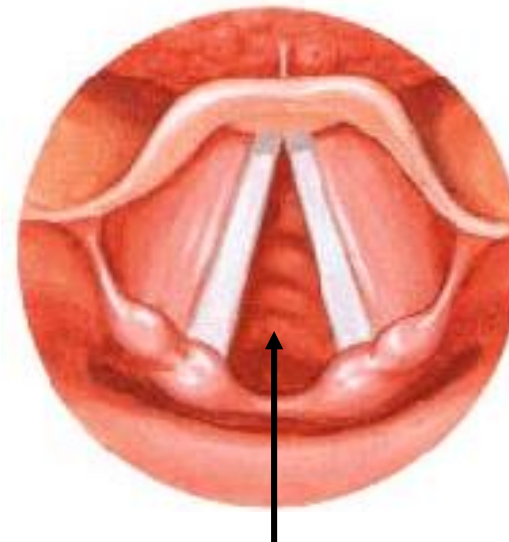
- Adduction
- Abduction

Vocal Cords

PHONATION

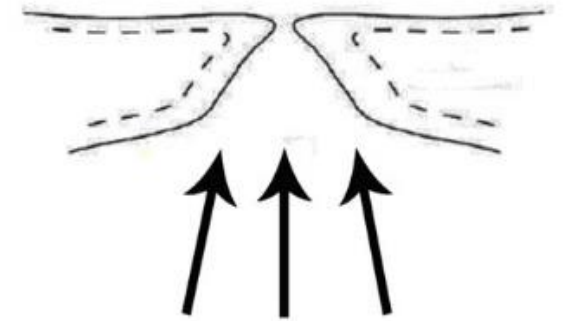
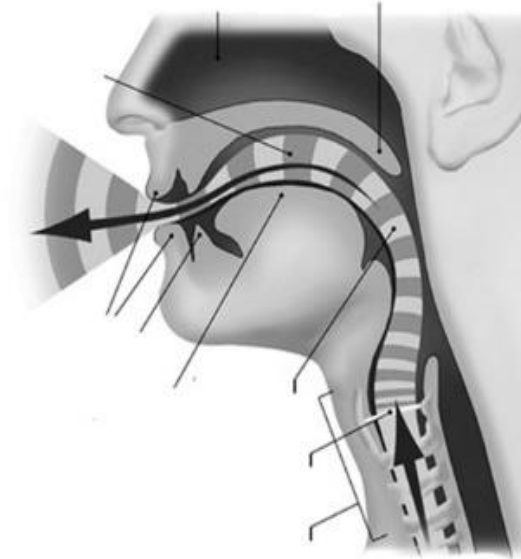


Glottis is closed (cords adducted)



glottis is opened (cords abducted)

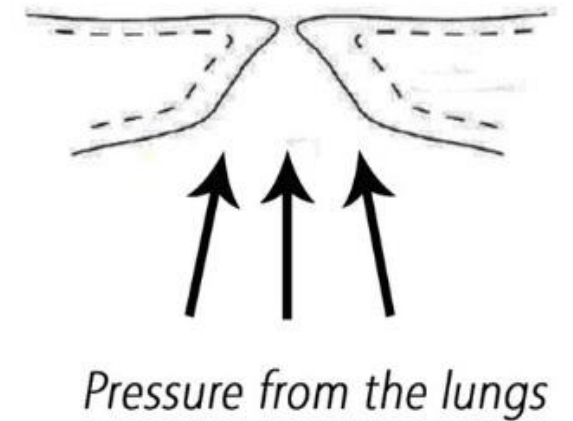
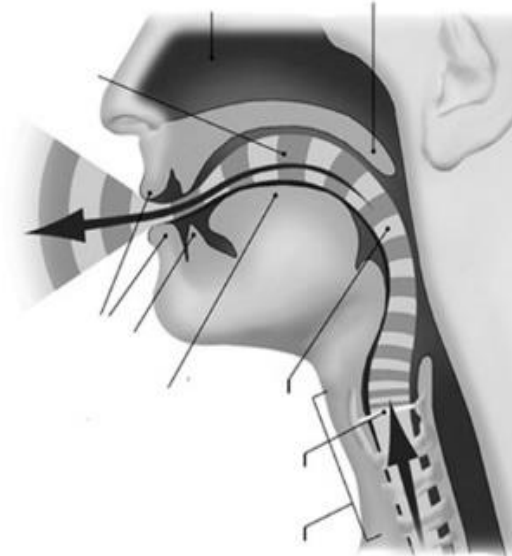
Phonation



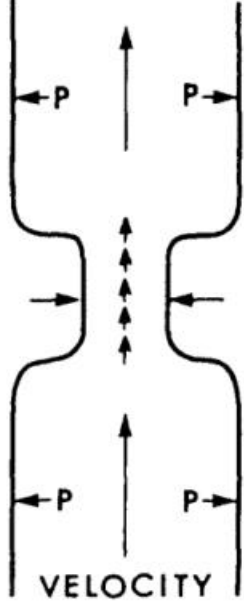
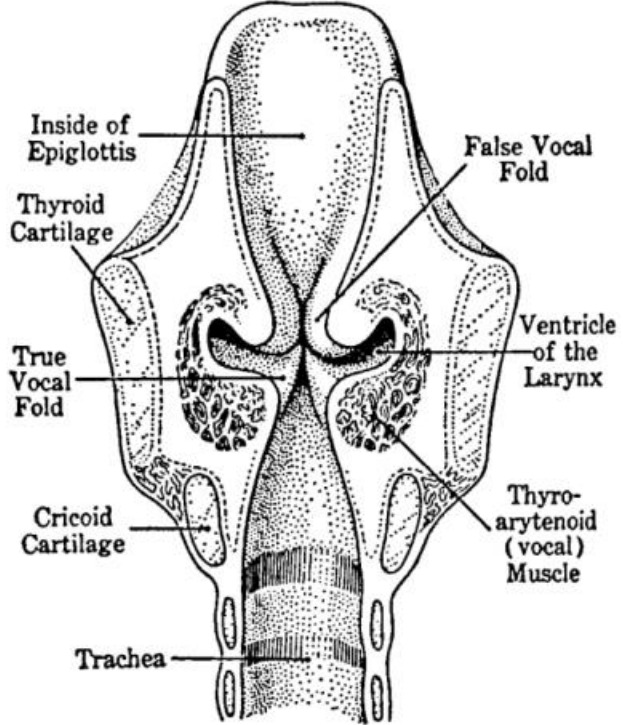
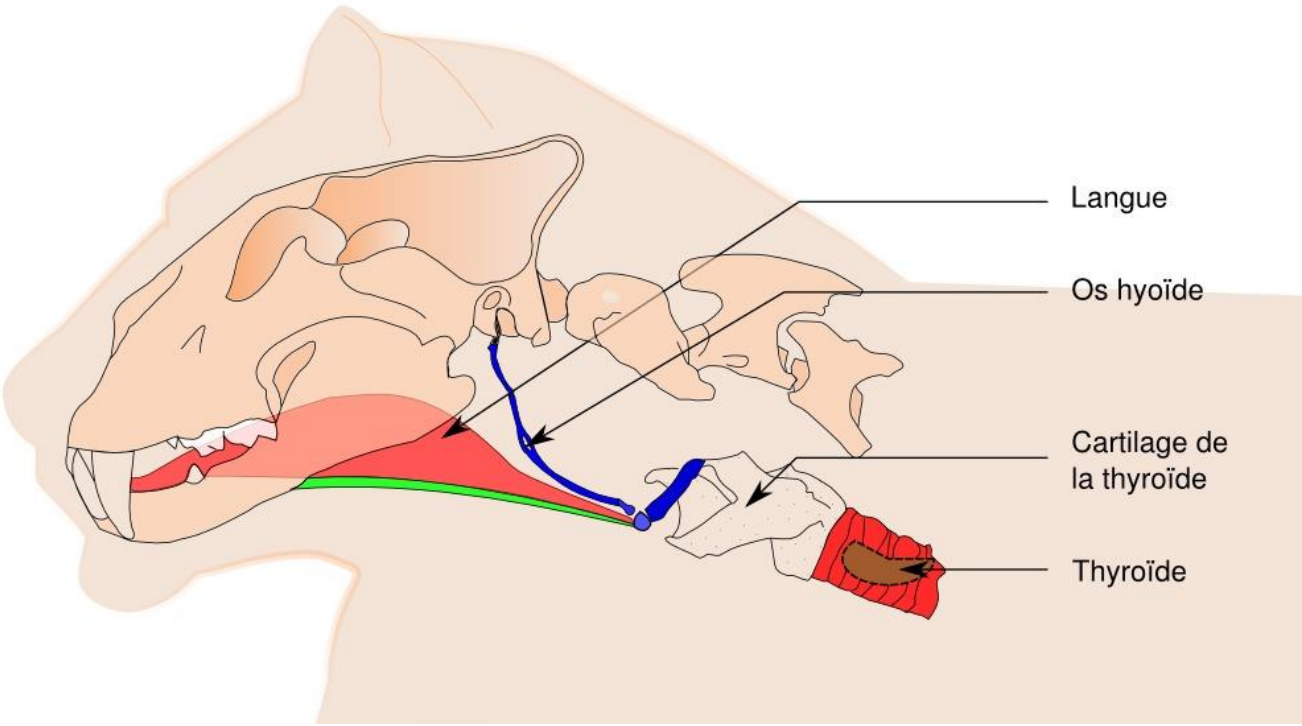
Pressure from the lungs

Phonation

- Frequency and intensity
- Frequency is decided by:
 - Tension of vocal cord
 - Thickness of vocal cord
 - Length of vocal cord
- Intensity by the:
 - Pressure of air
 - Length of the vocal tract
 - Shape of the vocal tract

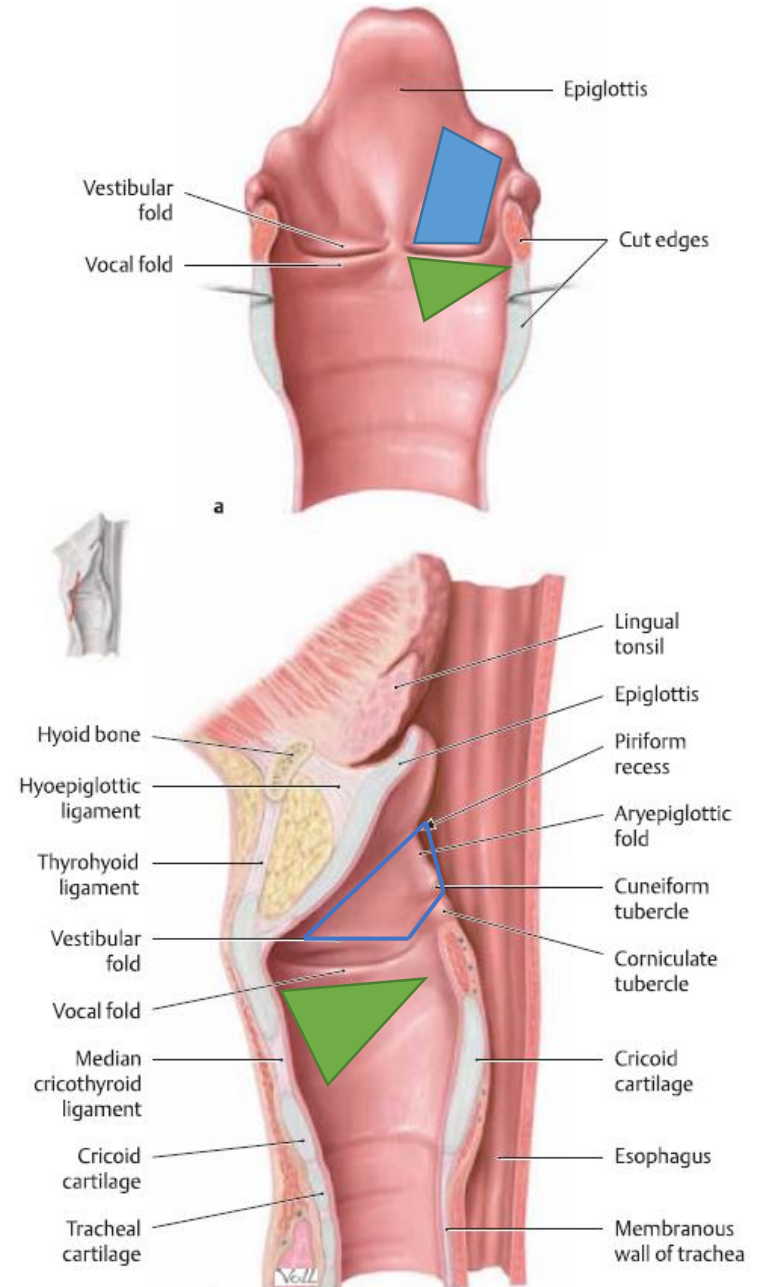


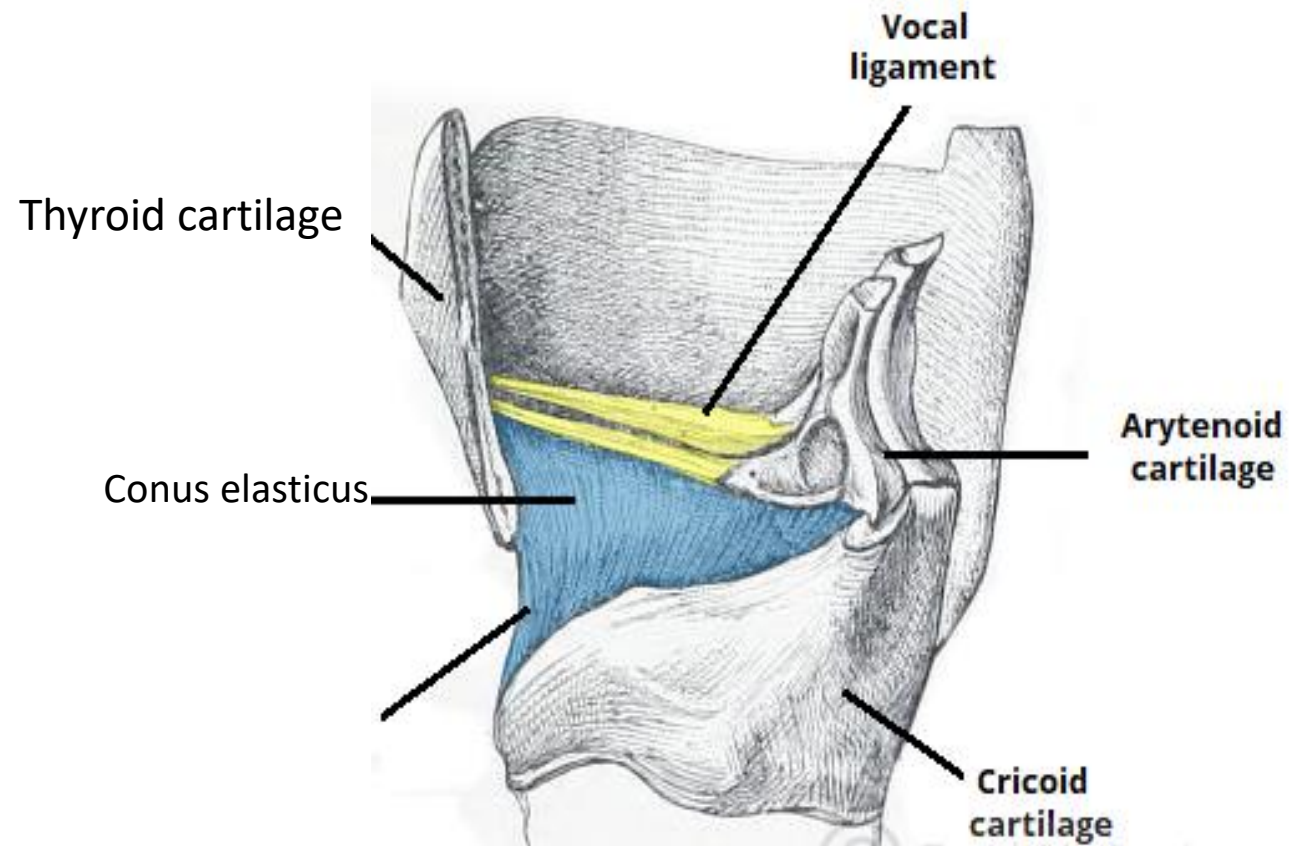
Amplification



Fibroelastic Membranes

- Quadrangular membrane
 - Aryepiglottic fold
 - Vestibular fold
 - Epiglottis
 - Arythenoid
- Triangular membrane (conus elasticus)
 - Vocal fold
 - Cricothyroid membrane
 - Margin of cricoid



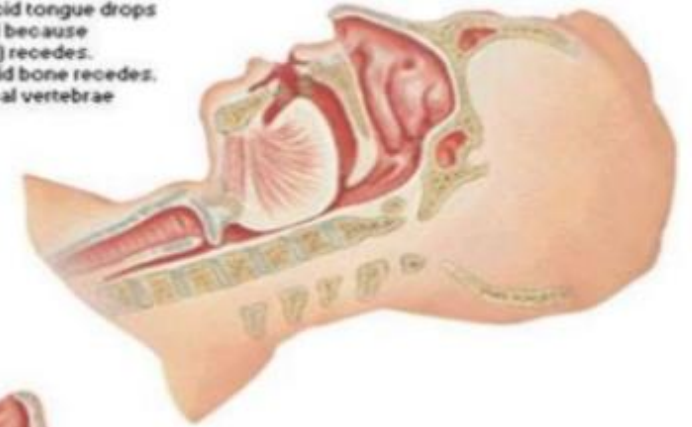


Emergency



Airway Obstruction and Patency Unconscious Person

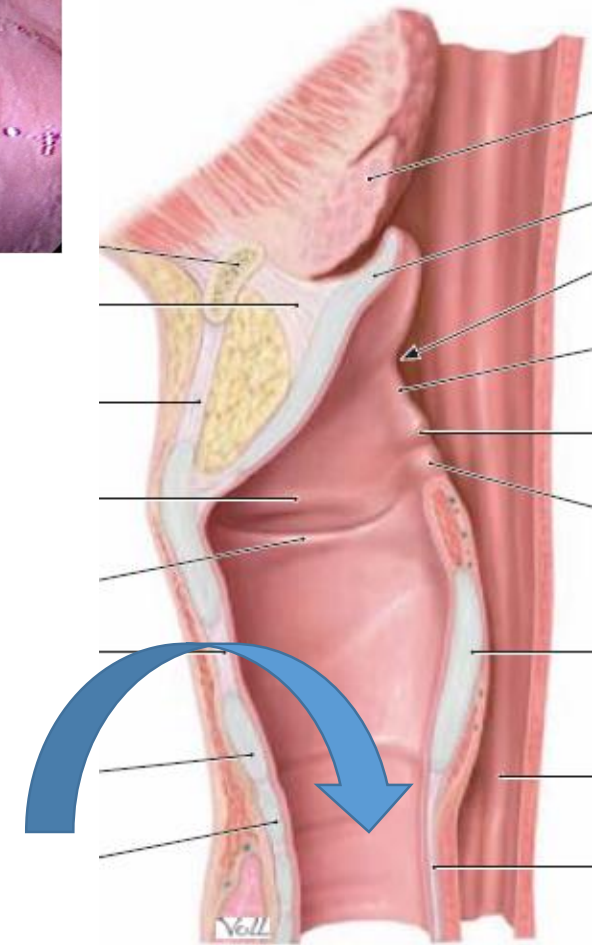
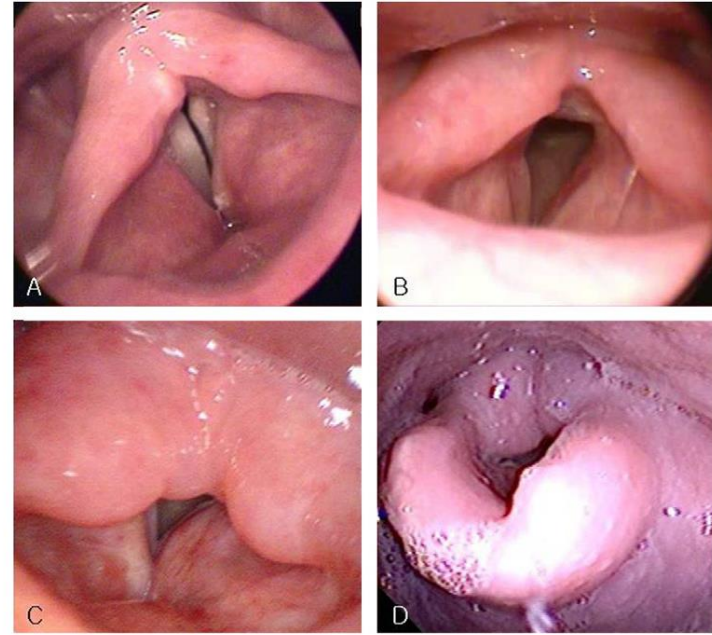
Obstruction. With head flexed, flaccid tongue drops back against posterior pharyngeal wall because mandible (to which tongue is attached) recedes. Epiglottis also falls back because hyoid bone recedes. Pharynx narrowed by flexion of cervical vertebrae

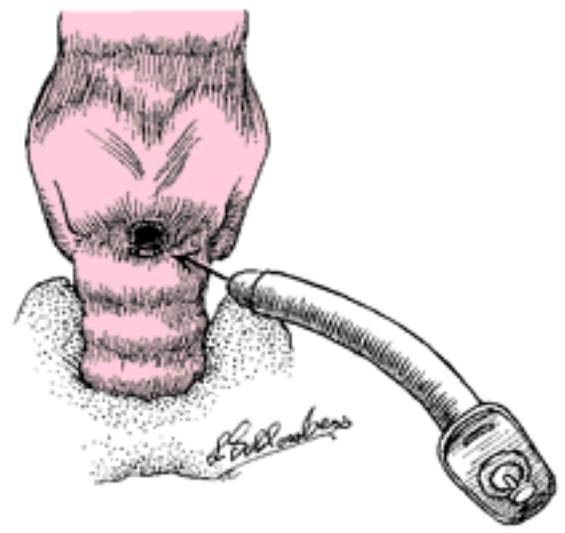
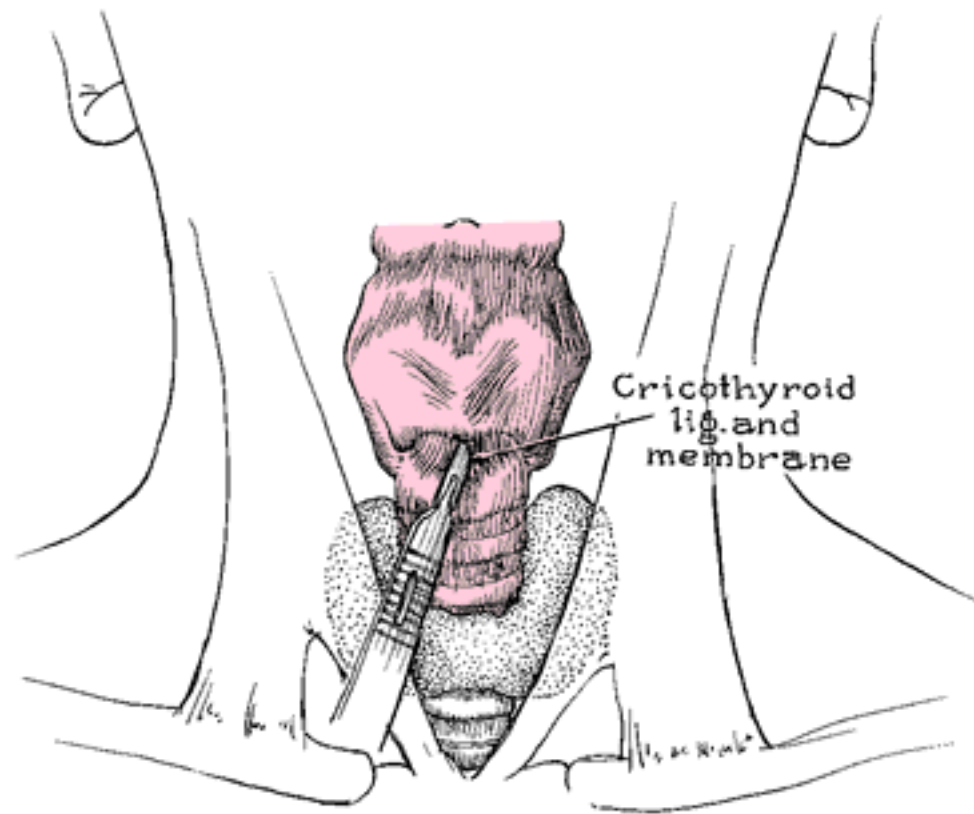


Patency. With head extended (head-tilt maneuver), mandible usually moves forward (or is actively pushed forward with jaw-thrust maneuver); tongue thus drawn forward. Epiglottis also pulled anteriorly by movement of hyoid bone. Pharynx widened by extension of cervical vertebrae

Conicotomy

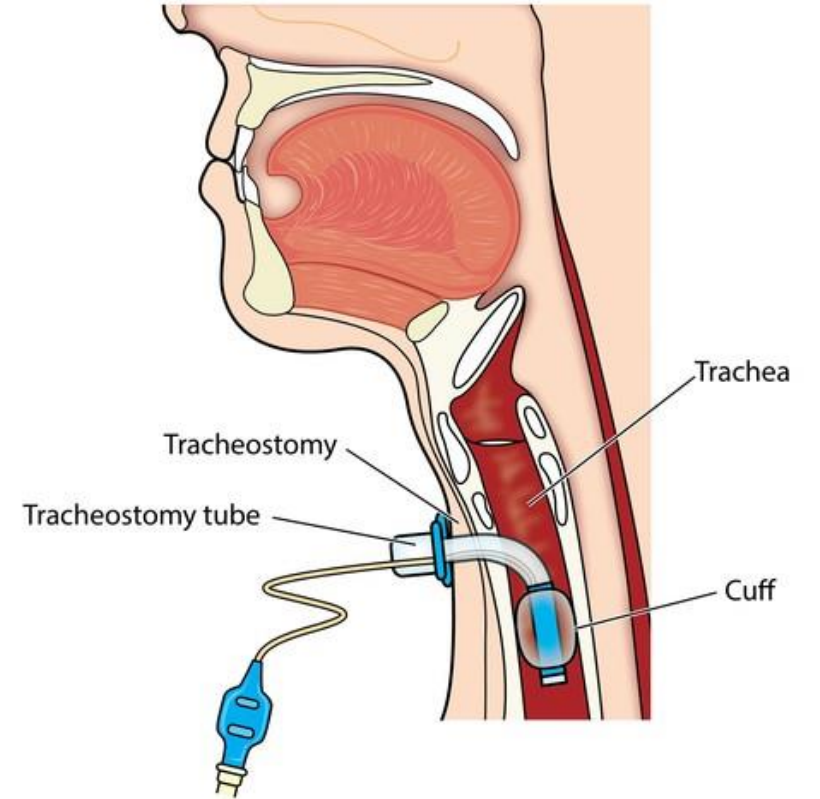
- Opening the airway with incision of the Conic ligament
- Done in emergencies to gain access to the airways when intubation is not possible



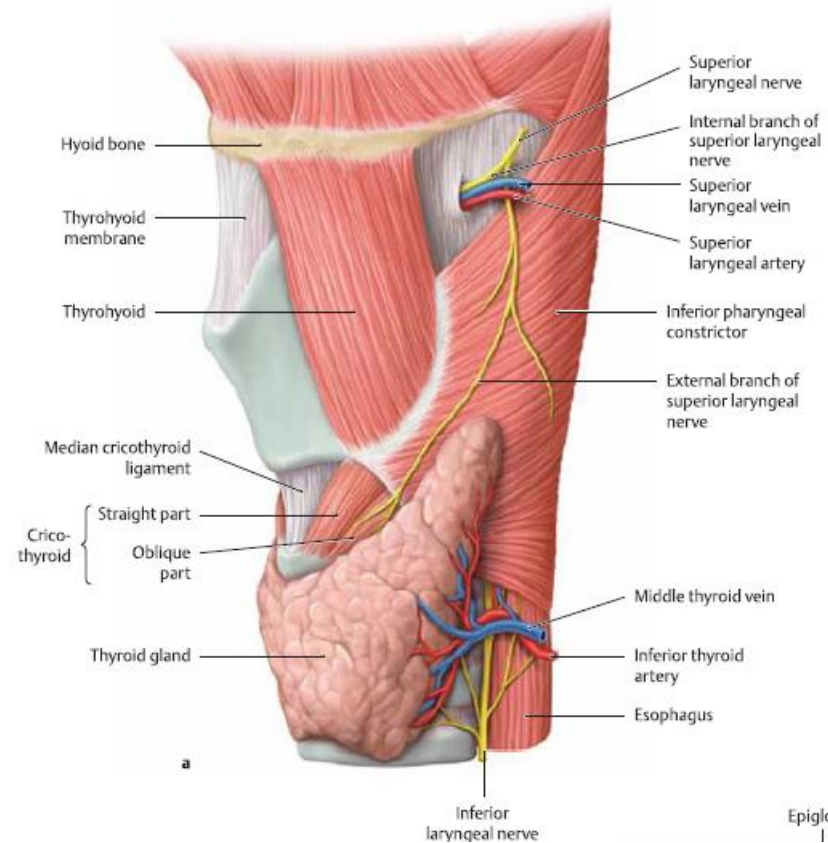


Tracheostomy

- Another way of gaining access to the airways, in this case the trachea is opened and a tube is inserted
- Usually for longer term



Patient's complaints: change in the quality of sound.



Thank you

