RS

ANATOMY

MODIFIED NO. 3

كتابة: صهيب زعيتر و عمر صمادي

تدقيق: Done

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The Larynx

Color code
Slides
Doctor
Additional info
Important

- Larynx in Arabic means الحنجرة

- The larynx is described as a box of cartilage. It contains:

1- Three single cartilages.
2- Three paired cartilages.

- These together form the larynx.

- The hyoid bone lies at the upper border of the larynx, but it is not included in the larynx.

- The end of the larynx marks the start of the trachea.

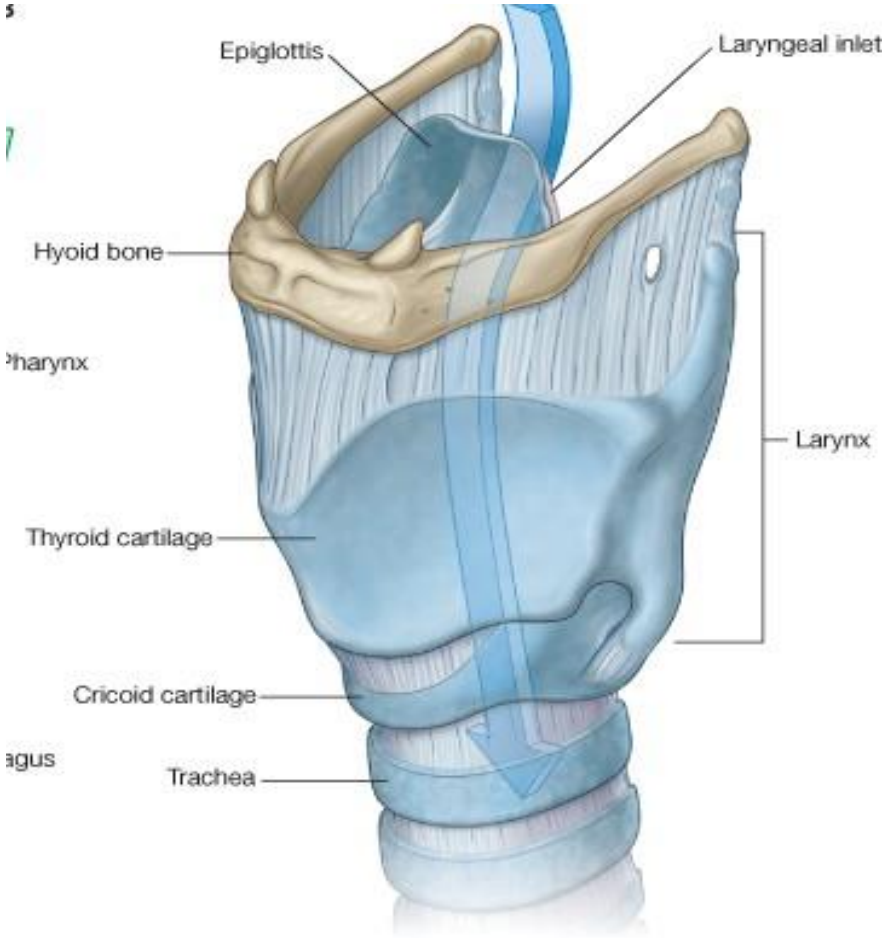
- Above, it opens into the laryngopharynx, and this opening is called the inlet of the larynx. It is bordered by the epiglottis and the aryepiglottic fold, which extends from the epiglottis to the arytenoid cartilage.

- Air is the only thing that enters the inlet of the larynx.

- How does closure occur? We discussed this in GI (as you remember xD). We said that the bolus pushes the epiglottis backward and downward, while the larynx moves upward. This can be observed during deglutition and swallowing.

The Larynx

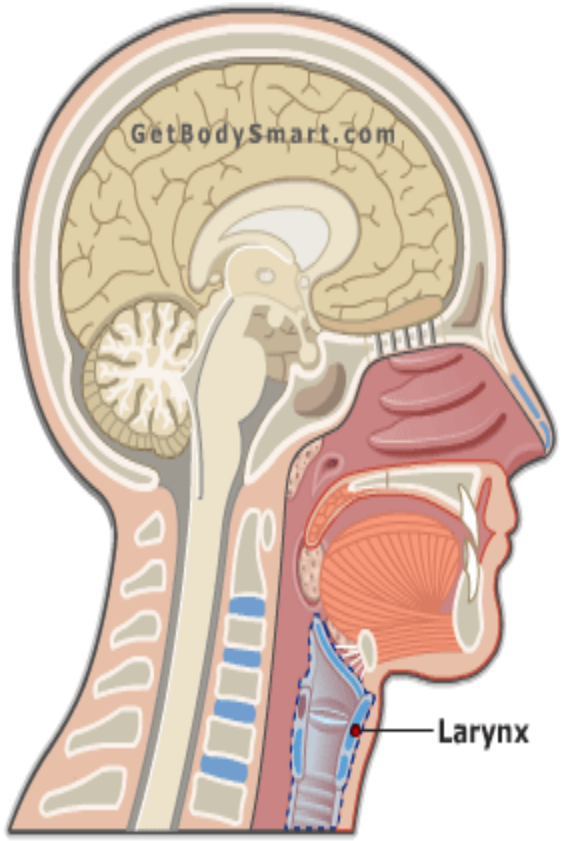
- Extends from the middle of C3 vertebra till the level of the lower border of C6 (lower border of cricoid)
- Continue as Trachea
- Above it opens into the **laryngo-pharynx**
- Suspended from the hyoid bone above and attached to the trachea below by membranes and ligaments



Functions

Explanation in the next slide

- 1. acts as an **open valve in respiration**
- 2. Acts as a **closed valve in deglutition**
- 3. Acts as a **partially closed valve in the production of voice**
- 4. During cough it is first closed and then open suddenly to release compressed air



Point 3:

- The larynx contains the true vocal cords, which are responsible for speech. How does this happen?

During expiration, adduction of the true vocal cords occurs, meaning the airway is temporarily closed. Below the true vocal cords, a compressed column of air builds up. Then, adduction and abduction occur (vibration), with these movements partitioning the column of air.

- The air that escapes passes through the larynx muscles, oral cavity muscles, and nasal muscles, producing the sound that forms the voice.

Point 4:

- This is important in cases where particles enter the larynx. If such a case occurs, the true vocal cords close, leading to the formation of a compressed column of air. Then, a sudden opening of the cords allows the air to exit forcefully, resulting in coughing.

So to summarize:

1- Open --> respiration.

2- Close --> deglutition or swallowing.

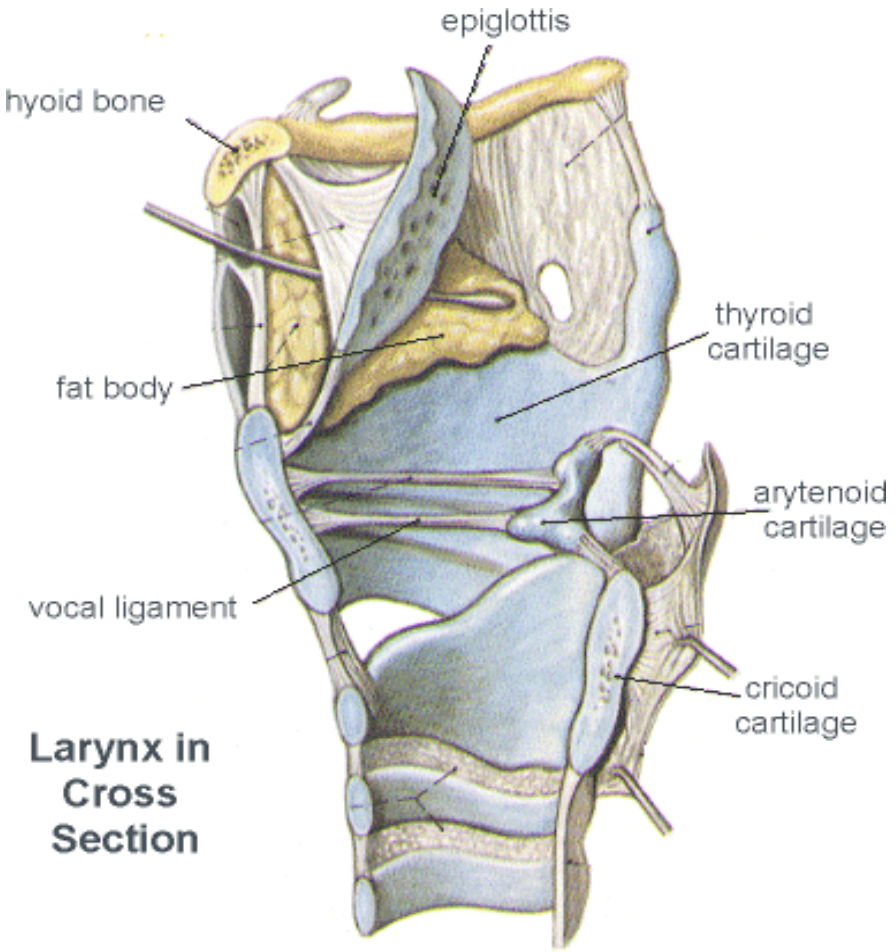
3- Partially closed --> production of voice.

4- Sudden opening of true vocal cords --> coughing

Parts

- **1. Cartilage**
- **2. Mucosa**
- **3. Ligaments**
- **4. Muscles**

Explanation in the next slide



Cartilage:

- As we talk before, larynx is box of cartilage and it contain 3 single cartilages and 3 pairs cartilages that we will talk about in the next slides.

Mucosa:

- The larynx is internally lined with mucosa, and the type of epithelium is respiratory epithelium, which means pseudostratified ciliated columnar epithelium with goblet cells—except for the true vocal cords.

- There are true and false vocal cords. We focus on the true vocal cords, as they are responsible for articulation.

- Why do the true vocal cords have a different type of epithelium? This is because they are subjected to significant mechanical stress. For example, if someone sings or screams all night, they may wake up the next day with their voice temporarily gone. This occurs due to injury to the true vocal cords. However, after 2-3 days, their voice typically returns because the epithelium covering the true vocal cords has the ability to undergo mitosis and regenerate. This epithelium is stratified squamous non-keratinized epithelium.

Ligaments:

- All the cartilages of the larynx are connected by ligaments and membranes. What is the difference between them?

- **Ligaments**: These are thicker structures and are located at the midline or lateral positions.
- **Membranes**: These are thinner and found between the cartilages.

Muscles:

- All laryngeal muscles work on the vocal cords, except for the inlet muscles, which work on the laryngeal inlet.

Muscles that work on the vocal cords:

- **Muscles causing vibration (adduction and abduction):**
  - **Posterior crico-arytenoid:** Causes abduction (opens the vocal cords).
  - **Lateral crico-arytenoid:** Causes adduction (closes the vocal cords).
- **Muscles affecting vocal cord tension (taut or relaxed):**
  - **Cricothyroid muscle:** Causes tension (taut) in the vocal cords, increasing pitch (high-pitched voice, صوت حاد ورفيع).
  - **Vocalis muscle:** Causes relaxation of the vocal cords, decreasing pitch (low-pitched voice, صوت ثخين).

Voice changes during puberty:

- **Males:**
  - Testosterone secretion leads to changes, including a deeper voice (low pitch).
  - The angle of the thyroid cartilage becomes acute.
  - Vocal cords become longer and thicker.
  - Bones become heavier, and muscles bulkier.
- **Females:**
  - Estrogen and progesterone secretion cause:
    - Light bones (heavier in males).
    - Smooth muscles (bulkier in males).
    - The angle of the thyroid cartilage is obtuse.
    - Short and tense vocal cords, resulting in a higher-pitched voice (صوتهم رفيع).

Let's start now with Cartilage ▫

Cartilage

- A. Single :

  Epiglottis

  Cricoid

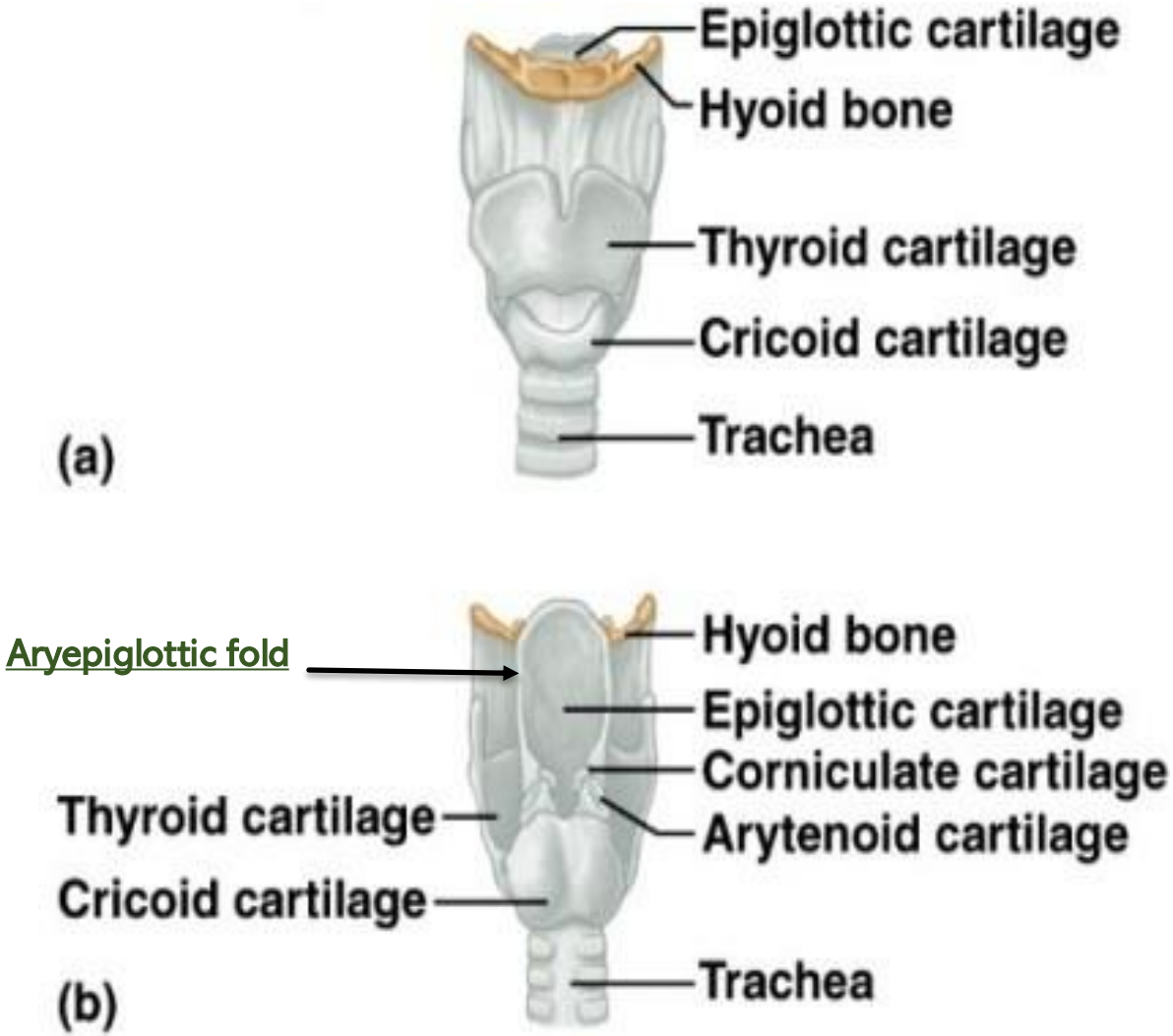
  Thyroid

B. Pairs:

Arytenoid

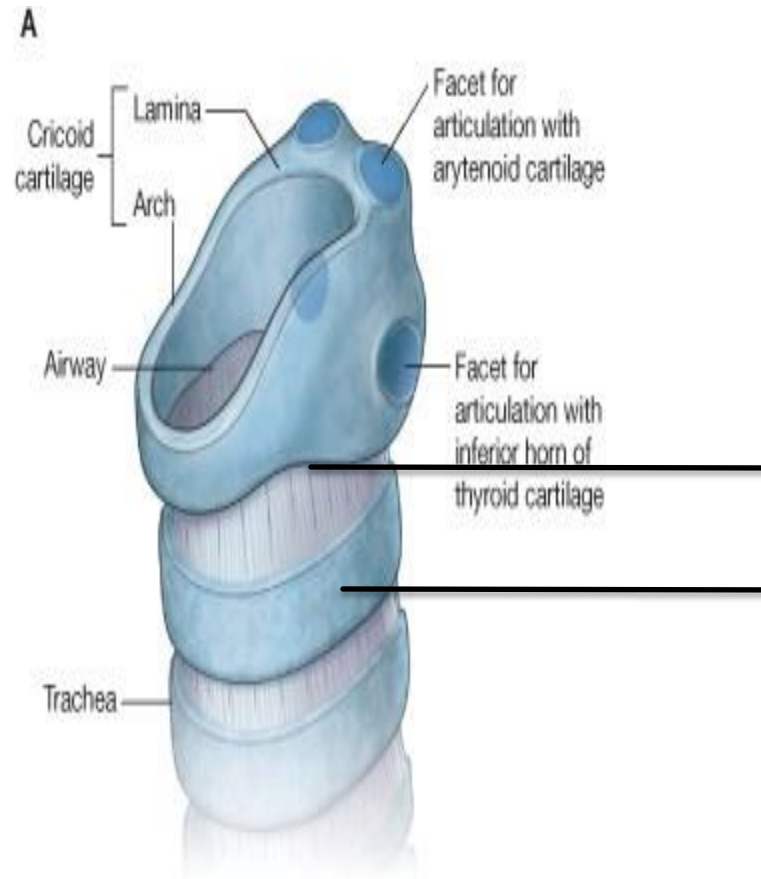
Cuneiform

Corniculate



Cricoid cartilage

- The most inferior of the laryngeal cartilages
- Completely encircles the airway
- Shaped like a 'signet ring'
- Broad **lamina of cricoid cartilage** posterior
- Much narrower **arch of cricoid cartilage** circling anteriorly.

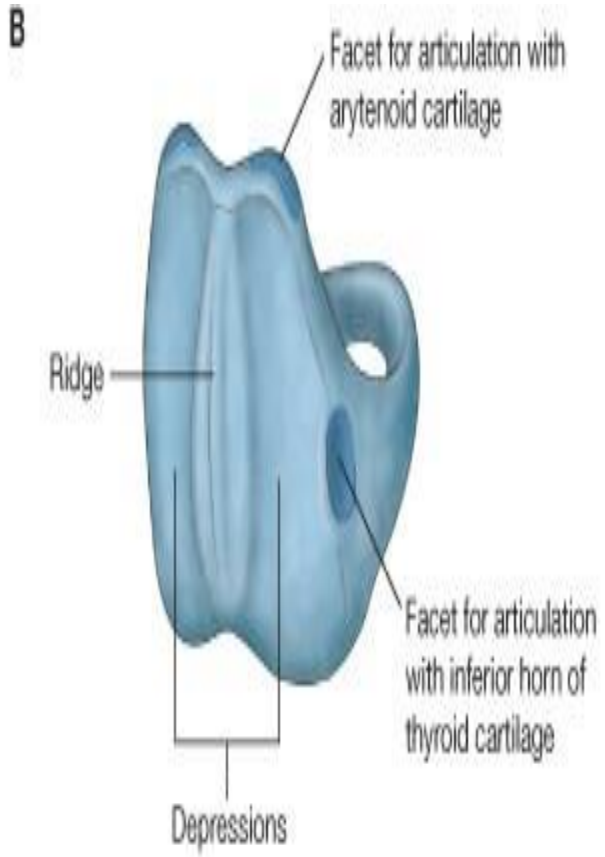


The lower edge of the cricoid cartilage marks the end of the larynx and the start of the trachea.

This represents the first ring of the trachea and is connected by the cricotracheal membrane. If an opening is made in this membrane, a tracheostomy can be performed.

Cricoid cartilage

- Posterior surface of the lamina has two oval depressions separated by a ridge
- The **esophagus** is attached to the ridge
- Depressions are for attachment of the **posterior crico-arytenoid muscles**.
- Has two **articular facets** on each side
- One facet is on the sloping superolateral surface and articulates with the **base of an arytenoid cartilage;**
- The other facet is on the lateral surface near its base and is for articulation with the **inferior horn of the thyroid cartilage**



Cricoid Cartilage:

- **Anteriorly:** It has an arch.
- **Posteriorly:** It has a lamina.

Articulations of the Cricoid Cartilage:

- **With arytenoid cartilage:**
  - Through two facets on the upper border of the lamina. These facets articulate with the arytenoid cartilage and are located superior to the lamina of the cricoid cartilage.

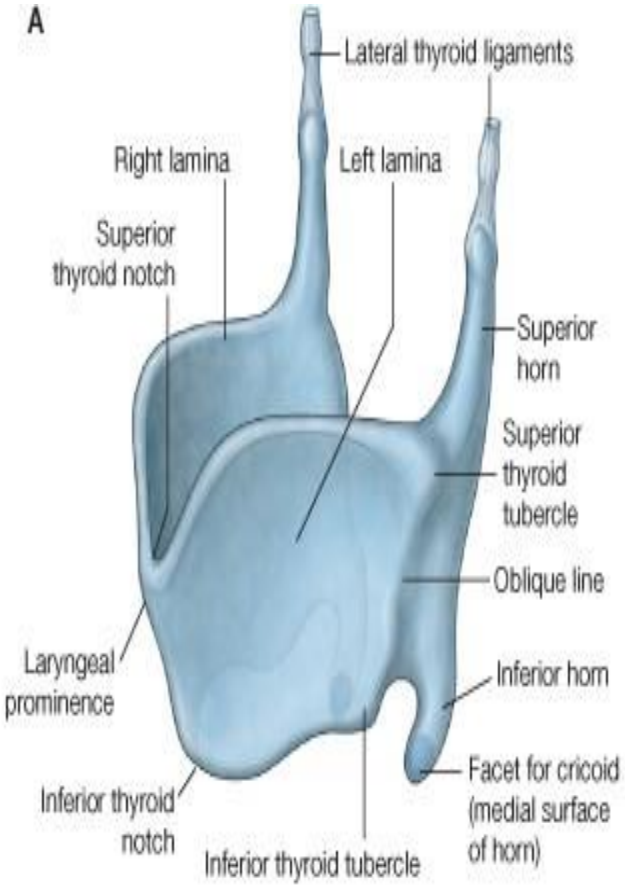
- **With the thyroid cartilage:**
  - Through the lateral inferior facet of the lamina, which articulates with the inferior horn of the thyroid cartilage.
  - Lamina Features:

- The lamina contains a ridge for the attachment of the oesophagus.

- The oesophagus is located posterior to the trachea, and a membrane extends from it and attaches to the ridge for fixation.

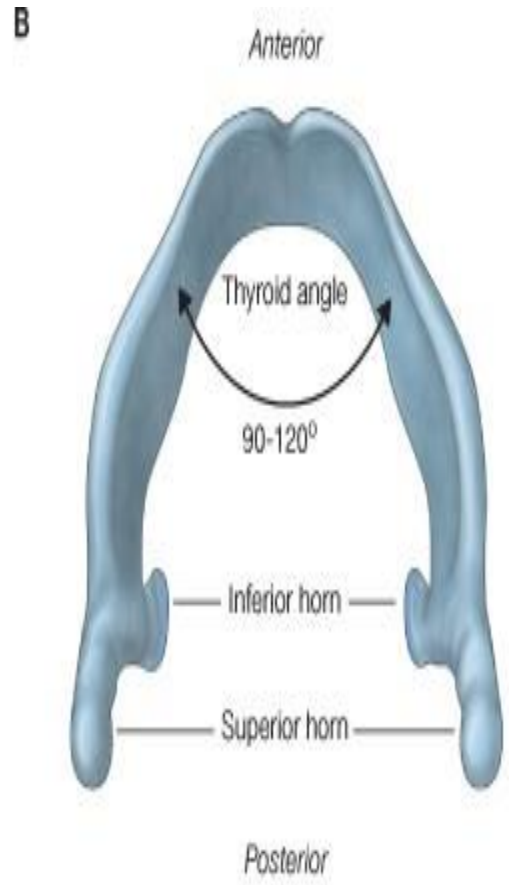
Thyroid cartilage

- The largest of the laryngeal cartilages
- It is formed by a right and a left lamina
- Widely separated **posteriorly**, but converge and join **anteriorly**
- Posterior margin of each lamina is elongated to form a **superior horn** and an **inferior horn**



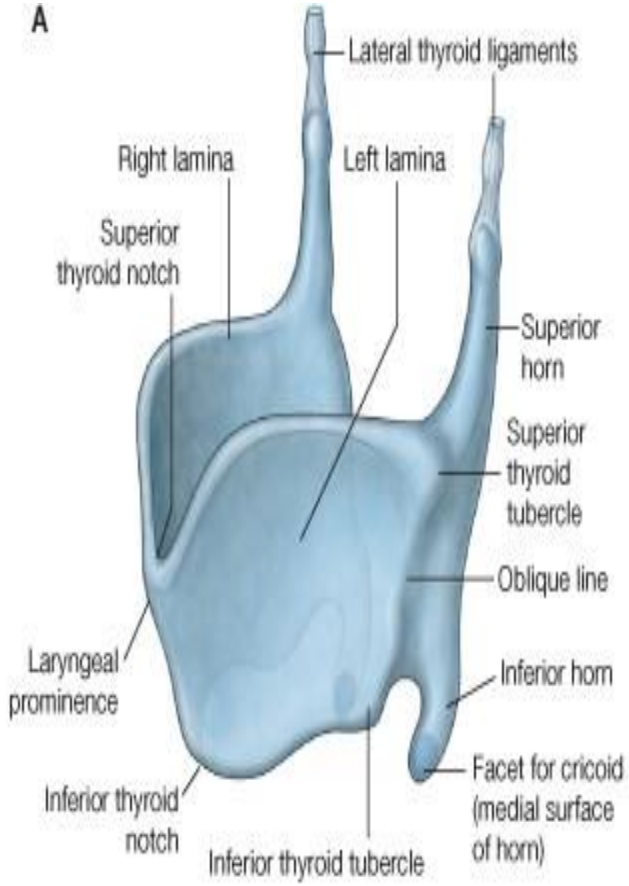
Thyroid cartilage

- Most superior point of the site of fusion between the two laminae is the **laryngeal prominence** (**'Adam's apple**')
- Angle between the two laminae is more acute in men (90°) than in women (120°)
- Superior to the laryngeal prominence, the **superior thyroid notch** separates the two laminae
- Superior thyroid notch and the laryngeal prominence are **palpable** landmarks in the neck
- Less distinct **inferior thyroid notch** in the midline along the base of the thyroid cartilage.



Thyroid cartilage

- The medial surface of the inferior horn has a **facet** for articulation with the **cricoid cartilage;**
- The superior horn is connected by a **ligament** to the posterior end of the greater horn of the **hyoid bone**.
- Lateral surface of lamina is marked by a ridge (the **oblique line**), which curves anteriorly from the base of the superior horn to the inferior margin of the lamina.
- Ends of the oblique line are expanded to form **superior** and **inferior thyroid tubercles**
- The oblique line is a site of attachment for the **extrinsic muscles** of the larynx (sternothyroid, thyrohyoid, and inferior constrictor).



Everything mentioned here is almost the same as in the previous three slides, so give it a quick read! 😁

- The thyroid cartilage is formed by two laminae, one on the right and one on the left, which come together anteriorly to form an angle and are open posteriorly.

- This angle, when viewed superiorly, creates a prominence known as the laryngeal prominence. Above it lies the superior thyroid notch. Together, they are referred to as the Adam's apple. In males, the Adam's apple is more prominent due to the acute angle of the laminae, while in females, it is less pronounced because of the obtuse angle.

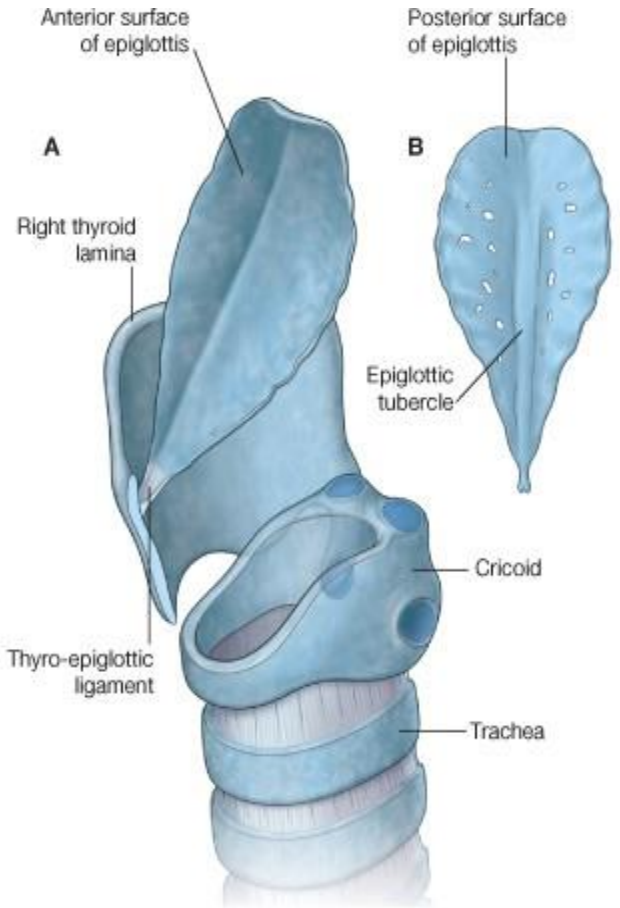
- The thyroid cartilage has a close relationship with the thyroid gland, which has two lateral lobes lies on the lateral side of the larynx, connected by the isthmus. The isthmus lies in front of the second, third, and fourth tracheal rings.

- The thyroid cartilage has a superior horn, which articulates with the greater horn of the hyoid bone, while the inferior horn has a facet for articulation with the lamina of the cricoid cartilage.

- Additionally, there is an oblique line extending from the superior thyroid tubercle to the inferior thyroid tubercle. This oblique line serves as an attachment point for various muscles, such as the sternothyroid and thyrohyoid muscles.

Epiglottis

- Is a 'leaf - shaped' cartilage attached by its stem to the angle of the thyroid cartilage.
- Projects posterosuperiorly from its attachment to the thyroid cartilage.
- The attachment is via the **thyro-epiglottic ligament** in the midline between the laryngeal prominence and the inferior thyroid notch
- The upper margin of the epiglottis is behind the pharyngeal part of the tongue.
- The inferior half of the posterior surface of the epiglottis is raised slightly to form an **epiglottic tubercle.**

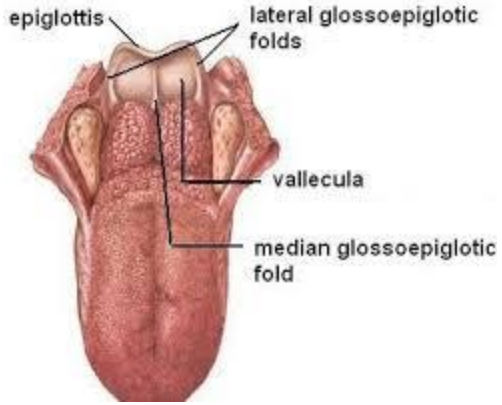


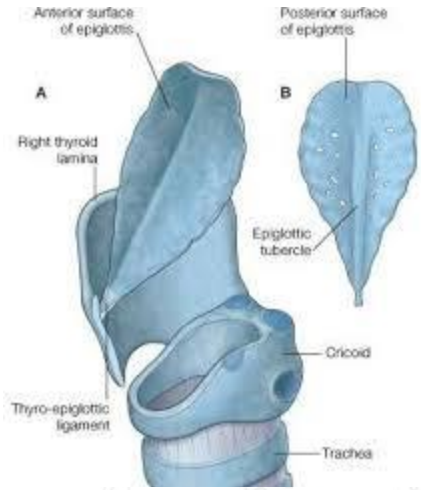
- The epiglottis has a base, which is the upper free edge. It is a leaf-like structure with an apex that is attached to the angle of the thyroid cartilage internally through a ligament called the thyroepiglottic ligament.

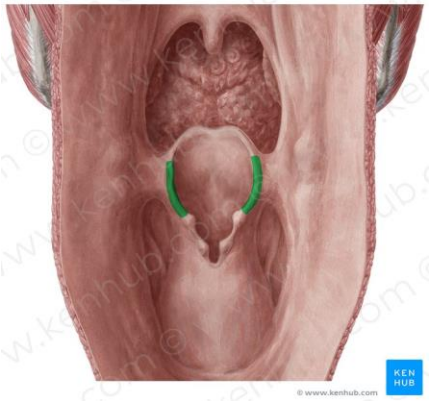
- The superior anterior surface is smooth and connected to the tongue. (If you remember from the GI system, the doctor mentioned this xD.) The tongue is connected to the epiglottis through the midline glossoepiglottic fold, the lateral glossoepiglottic fold, and the valleculae located between them.

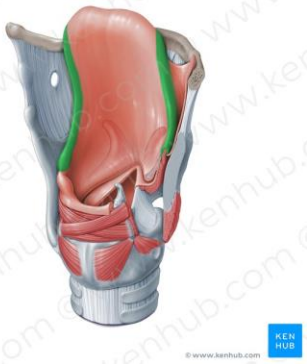
- The type of epithelium on the anterior surface is oral, meaning it is stratified squamous non-keratinized epithelium. On the **posterior surface,** which contains a tubercle in the middle, we call it the respiratory surface, meaning it is lined with pseudostratified ciliated columnar epithelium.

- As mentioned before, from the edge of the epiglottis, a membrane extends, forming the aryepiglottic fold. There is also a muscle called the aryepiglottic muscle, which assists with muscle action at the inlet.



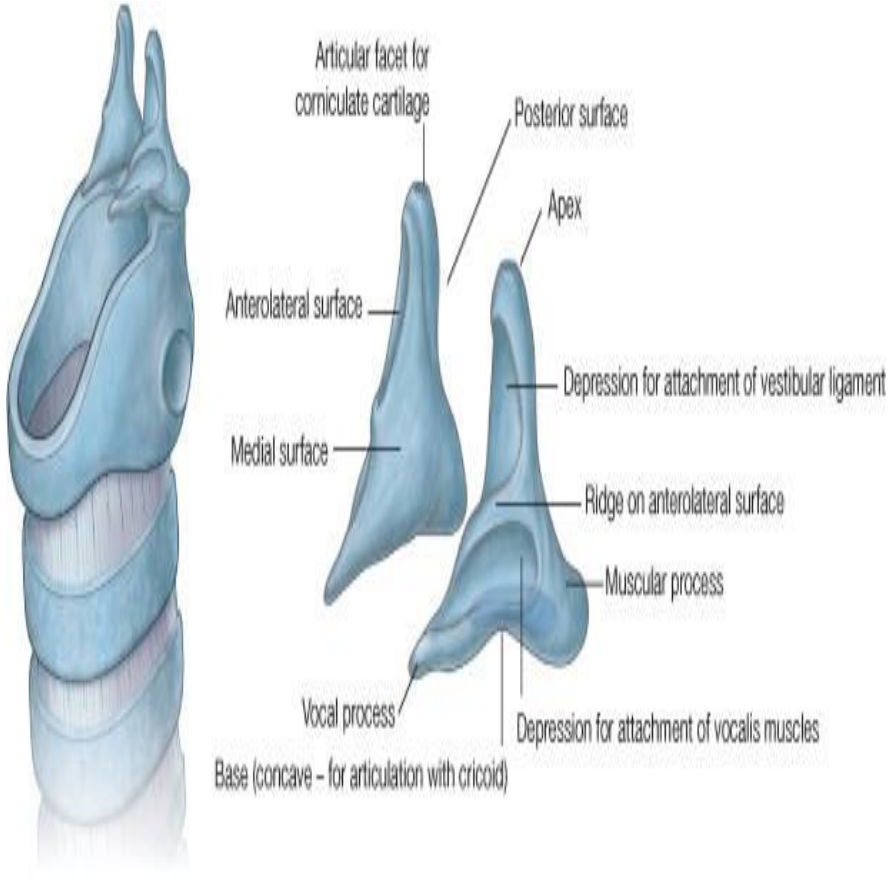






Arytenoid cartilages

- Two arytenoid cartilages are pyramid- shaped cartilages with three surfaces
- **Base of arytenoid cartilage** and an **Apex of arytenoid cartilage**
- The **base** of arytenoid cartilage is concave and articulates with the facet on the superolateral surface of the **cricoid cartilage**;
- The **apex** of arytenoid cartilage articulates with a **corniculate cartilage**;
- The **medial surface** of each cartilage faces the other;

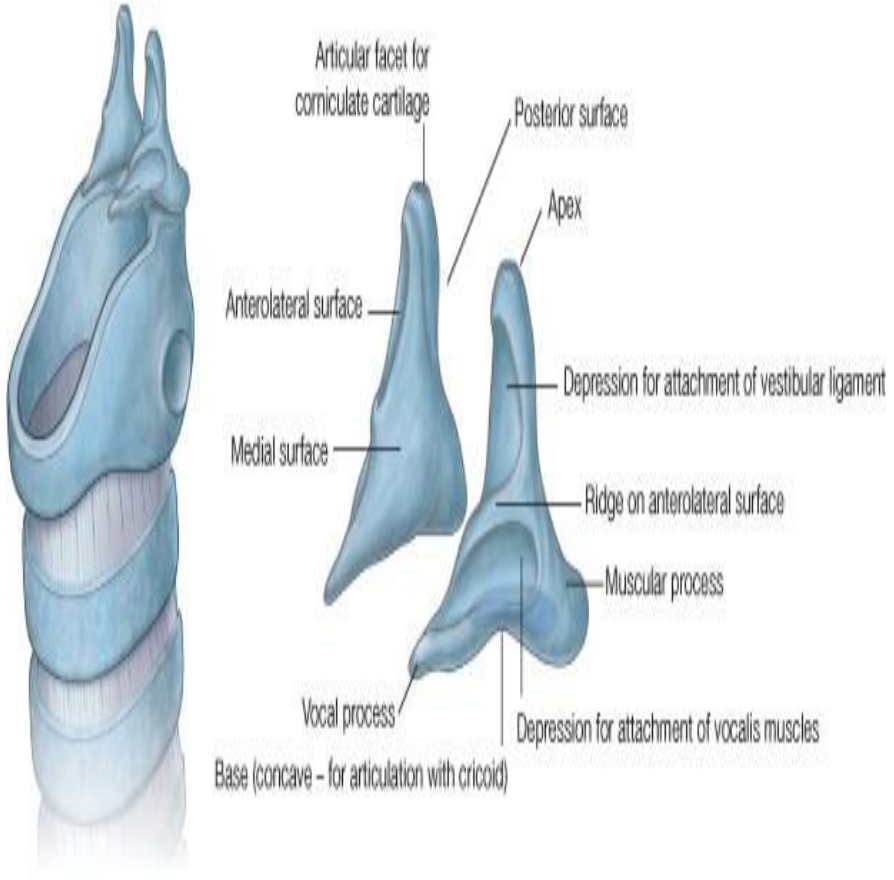


Arytenoid cartilages

- The **anterolateral surface** has two depressions, separated by a ridge, for **muscle (vocalis)** and **ligament (vestibular ligament)** attachment.

- The anterior angle of the base of arytenoid cartilage is elongated into a **vocal process** to which the **vocal ligament** is attached

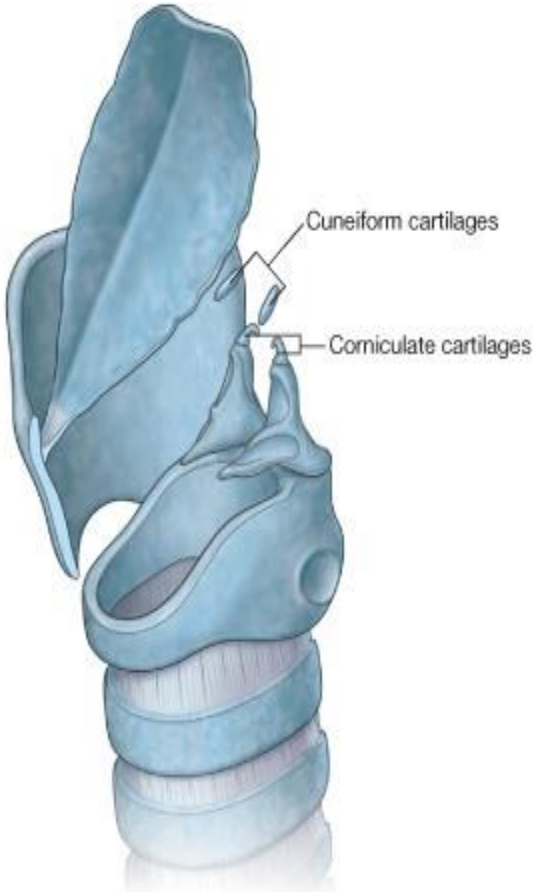
- The lateral angle is similarly elongated into a **muscular process** for attachment of the posterior and lateral crico-arytenoid muscles.



- The arytenoid cartilage has an apex and a base.
- **Base:**
  - Articulates with the lamina of the cricoid cartilage (note its concave shape, which facilitates articulation).
- **Apex:**
  - Articulates with the corniculate cartilage, forming a synovial joint between the apex of the arytenoid and the corniculate cartilage.
  - The arytenoid cartilage also has two surfaces:
- **Medial surface:** Smooth.
- **Lateral surface:**
  - Contains a ridge and two cavities.
  - Above the ridge, there is a cavity or depression for the attachment of the false vocal fold.
  - Below the ridge, there is a cavity for the attachment of the vocalis muscle, which is part of the true vocal cords.
  - The base has two processes:
- **Anterior vocal process:**
  - Attached to the true vocal cords.
- **Posterior muscular process:**
  - Attached to two muscles responsible for adduction(**Lateral crico-arytenoid)** and abduction (**Posterior crico-arytenoid)**.

Corniculate and Cuneiform

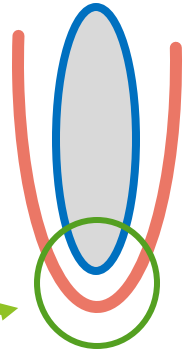
- The **corniculate** cartilages are two small conical cartilages
- Bases articulate with the apices of the arytenoid cartilages
- Their apices project postero-medially towards each other.
- The **Cuneiform** are two small club- shaped cartilages
- Lie anterior to the corniculate cartilages
- Suspended in the part of the fibroelastic membrane that attaches the arytenoid the epiglottis.



- Cornicualte cartilage is conical in shape,  attached to the apex of arytenoid by a synovial joint.
- Cuniform cartilage is club shaped,  embedded inside the ary-epiglottic fold.
- Ary-epiglottic fold attaches to the sides of epiglottis and the arytenoids (will be explained soon), it has a muscle called ary-epiglotticus, the cuniform cartilage helps strengthen this muscle.

A note that will help you understand in the future : When a ligament is covered with mucosa, it is called a fold.

A cross-section of the ligament:
Ligament
mucosa



This part is called a fold

Ligaments

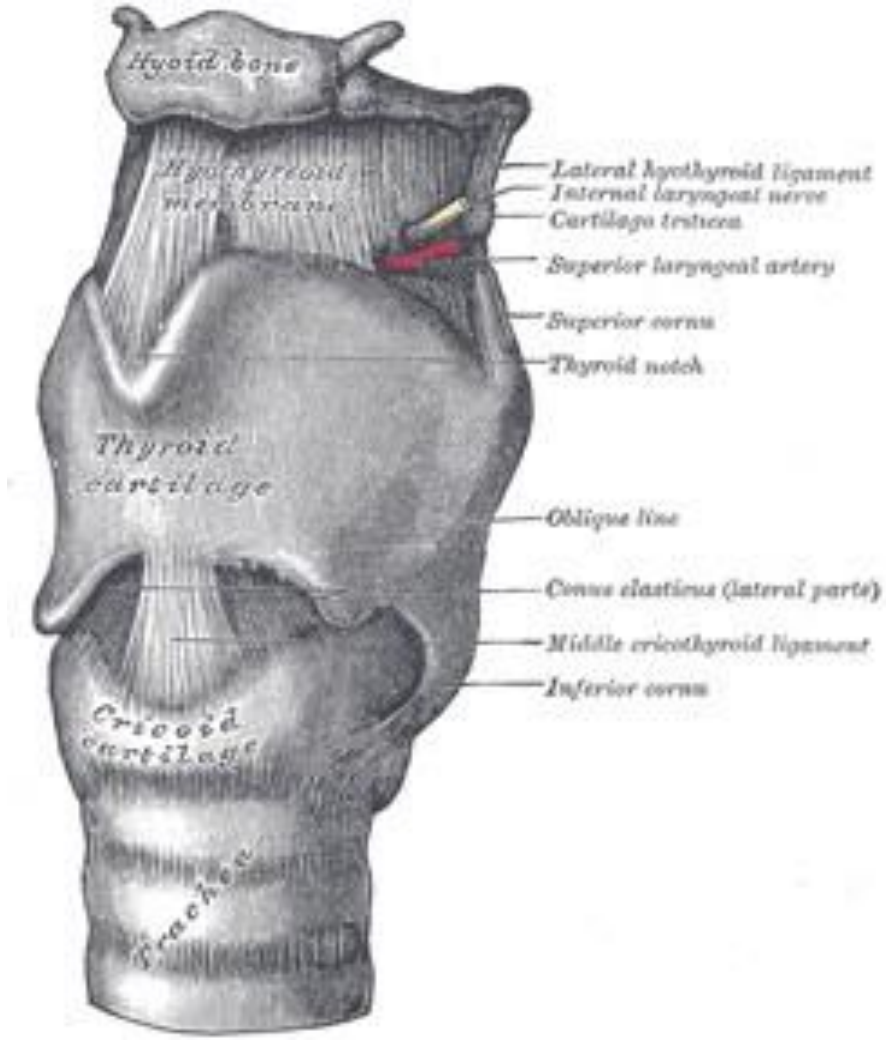
- Ligaments of larynx connect cartilages together.
- The name of the ligament will indicate its attachments.
- Intrinsic ligaments connect laryngeal cartilage with other laryngeal cartilage, and they are inside the larynx.
- Extrinsic ligaments connect laryngeal cartilage with other parts, and they are on the outside of the larynx.

Extrinsic ligaments

- **Thyrohyoid membrane**
- **Hyo-epiglottic ligament**
- **Cricotracheal ligament**

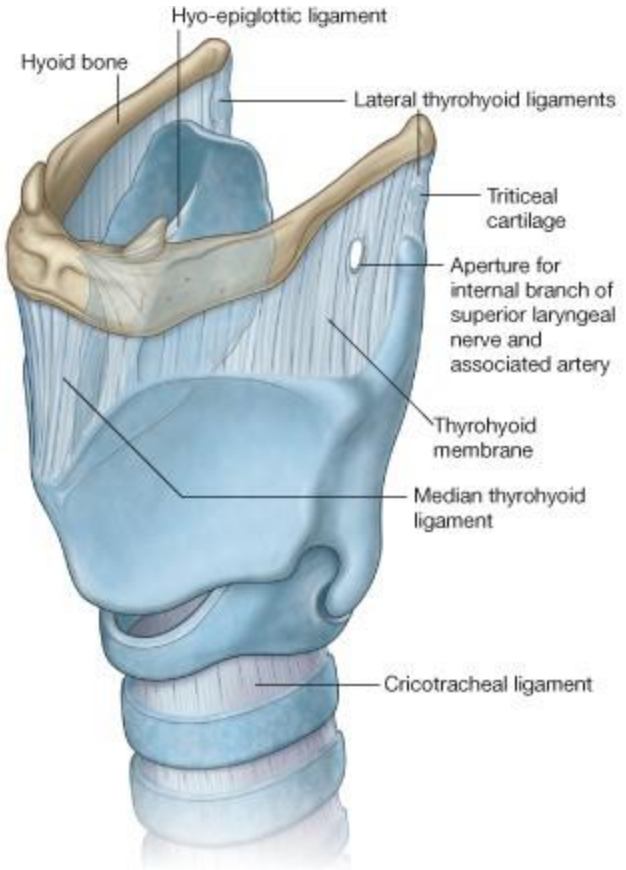
Thyrohyoid membrane

- Tough fibroelastic ligament that spans between the superior margin of the thyroid cartilage below and the hyoid bone
- Attached to the thyroid laminae and adjacent anterior margins of the superior horns
- Ascends medial to the greater horns and posterior to the body of the hyoid bone to attach to the superior margins of these structures.
- An **aperture** in the lateral part of the thyrohyoid membrane on each side is for the **superior laryngeal arteries, nerves, and lymphatics**



Thyrohyoid membrane

- The posterior borders of the thyrohyoid membrane are thickened to form the **lateral thyrohyoid ligaments**.
- Also thickened anteriorly in the midline to form the **median thyrohyoid ligament**.
- Occasionally, there is a small cartilage (**triticeal cartilage**) in each lateral thyrohyoid ligament.

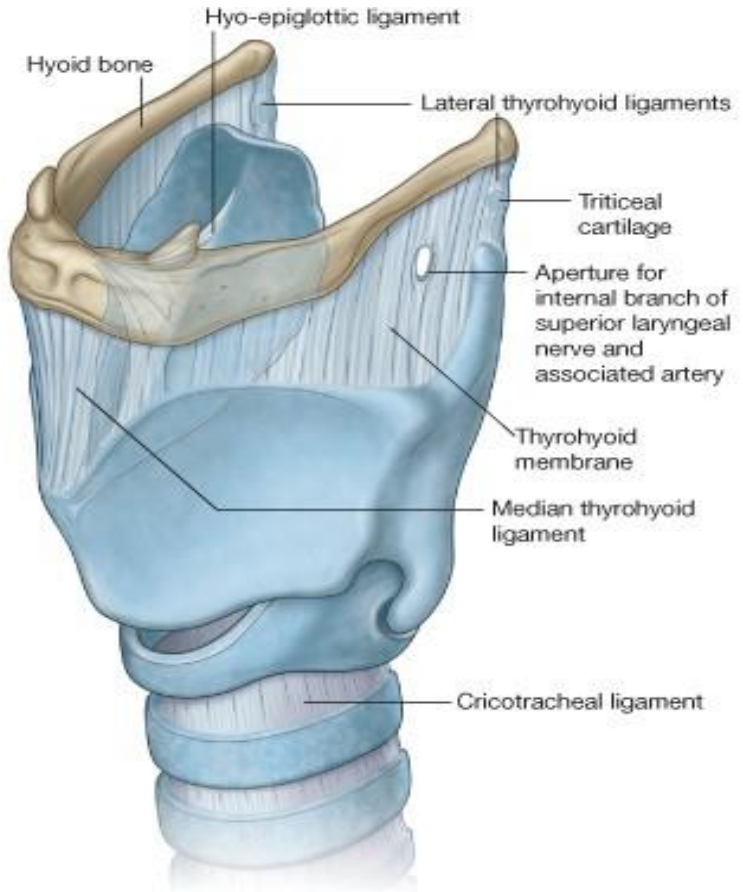


- The hyoid bone has a lesser cornua and a greater cornua, the greater cornua articulates with the superior horn of thyroid cartilage.
- Thyrohyoid ligament is attached to the superior edge of thyroid cartilage inferiorly and inferior edge of hyoid bone superiorly.
- In the midline, the membrane is thickened making median thyrohyoid ligament, and also is thickened laterally making the lateral thyrohyoid ligaments.
- The thyrohyoid membrane has an aperture (hole) which lets in internal laryngeal nerve and superior laryngeal artery.
- Internal laryngeal nerve is a branch of the superior laryngeal nerve (vagus nerve), it is a sensory nerve carrying sensations from parts superior to the true vocal cords.
- Superior laryngeal artery is a branch of the superior thyroid artery.
- Additionally, there could be a cartilage called triticeal cartilage embedded inside the lateral thyrohyoid ligaments.

Extrinsic ligaments

- **Cricotracheal ligament** runs from the lower border of the cricoid cartilage to the adjacent upper border of the first tracheal cartilage.

- **The hyo-epiglottic ligament** extends from the midline of the epiglottis, antero-superiorly to the body of the hyoid bone.



- The cricotracheal ligament is important because it allows us to perform tracheostomies.
- A tracheostomy (tray-key-OS-tuh-me) is a hole that surgeons make through the front of the neck and into the windpipe, also known as the trachea. Surgeons place a tracheostomy tube into the hole to keep it open for breathing.

- The hyo-epiglottic ligament is a membrane that connects the hyoid bone with the epiglottis.

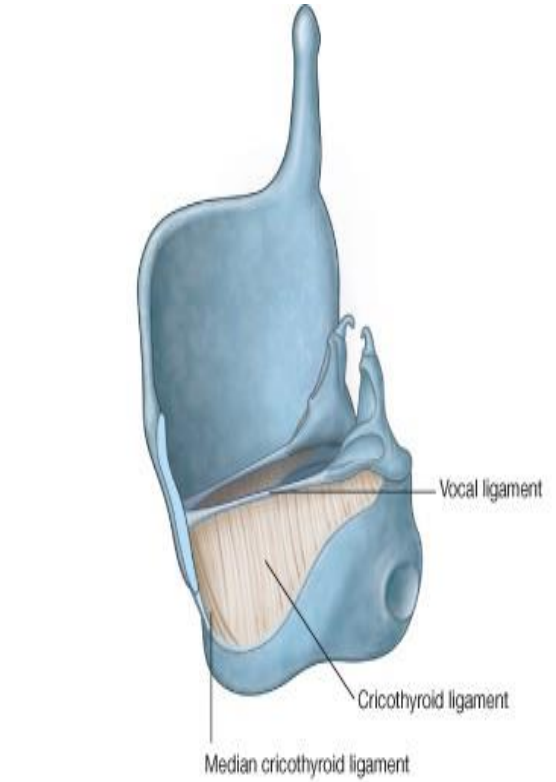
Intrinsic ligaments

- The fibro-elastic membrane of larynx links together the cartilages and completes the architectural framework of the laryngeal cavity

- It is composed of two parts-a lower **cricothyroid ligament** and an upper **quadrangular membrane.**

Cricothyroid ligament

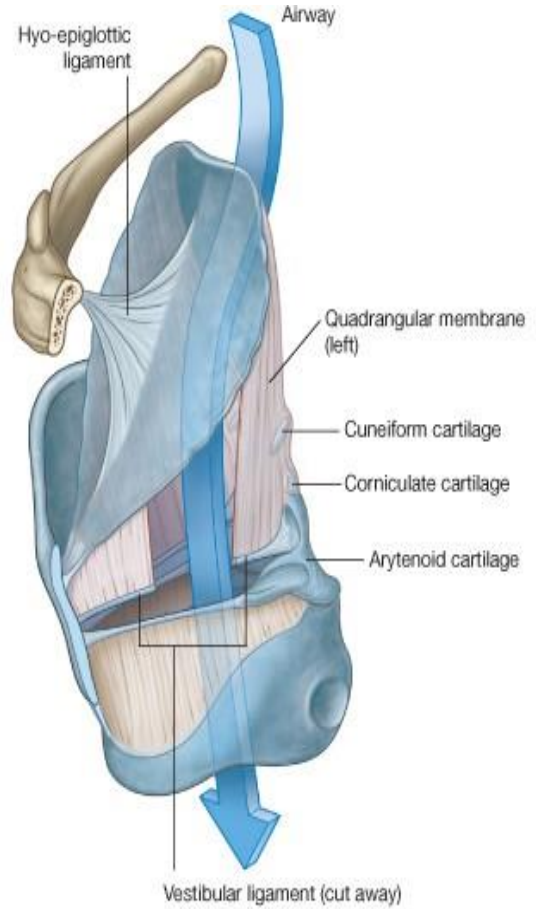
- **Cricovocal membrane or cricothyroid membrane**
- Attached to the arch of cricoid cartilage and extends superiorly
- End in a **free upper margin** within the space enclosed by the thyroid cartilage
- Upper free margin attaches:
- **Anteriorly** to the **thyroid cartilage;**
- **Posteriorly** to the **vocal processes** of the arytenoid cartilages.
- The free margin is thickened to form the **vocal ligament**, which is under the **vocal fold** (**true** '**vocal cord**') of the larynx.
- The cricothyroid ligament is also thickened anteriorly to form a **median cricothyroid ligament**
- *In emergency situations, the median cricothyroid ligament can be perforated to establish an airway*



- The cricothyroid ligament arises from the inside of the larynx on the cricoid cartilage and attaches to the angle of thyroid cartilage anteriorly and the vocal process of arytenoid posteriorly.
- Surgeons call it (conus elasticus) because it's a fibro-elastic tissue.
- Its attachment to the thyroid cartilage is thickened making the median cricothyroid ligament.
- It has an upper free edge, which makes the true vocal cords.

Quadrangular membrane

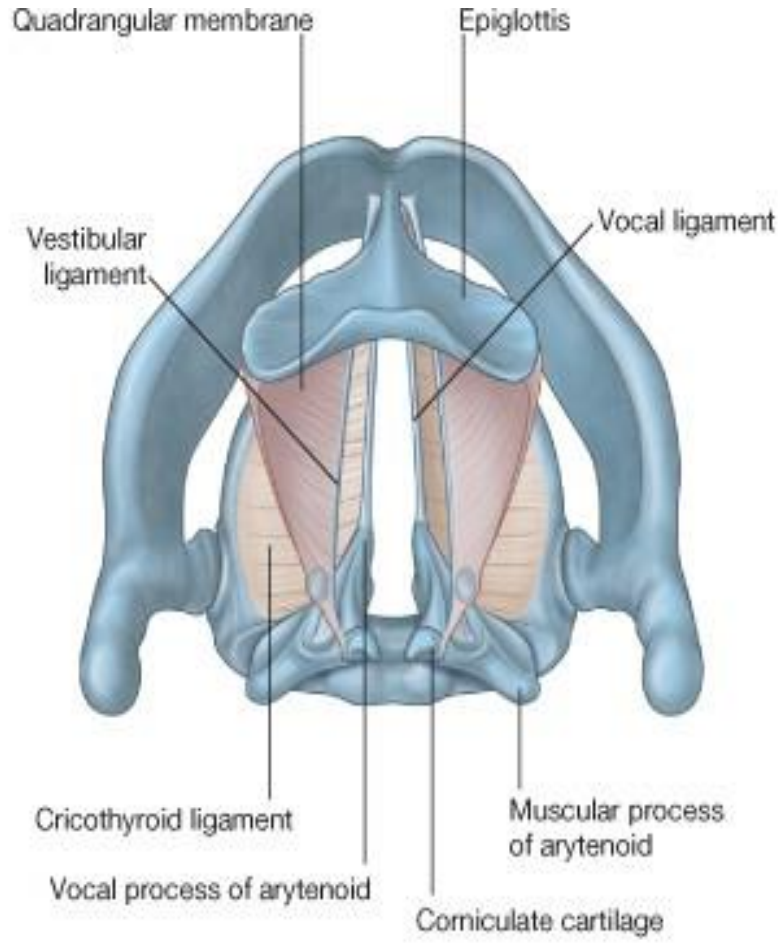
- Runs between the lateral margin of the epiglottis and the anterolateral surface of the arytenoid cartilage
- Attached to the corniculate cartilage
- Free upper margin and a free lower margin
- **Free lower margin** is thickened to form the **vestibular ligament** under the **vestibular fold** (**false 'vocal cord'**)



Quadrangular membrane

- Vestibular ligament is separated from the vocal ligament below by a gap

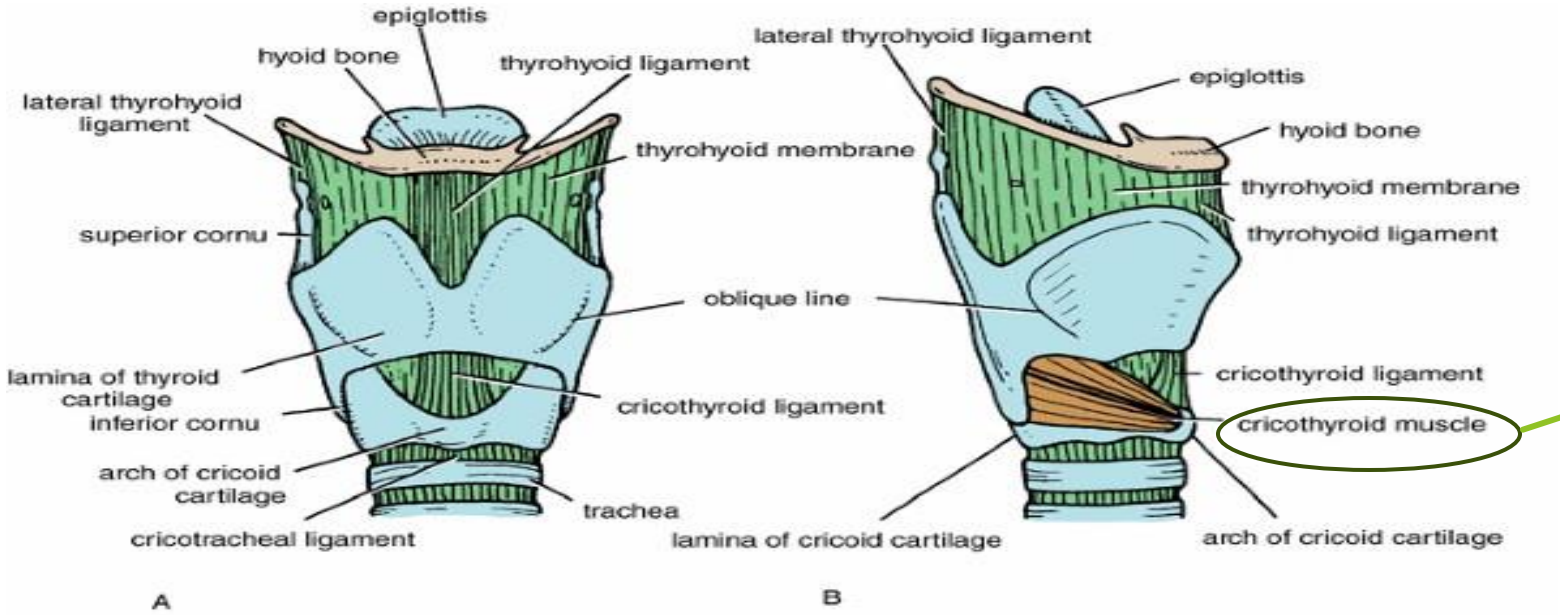
- When viewed from above the vestibular ligament is **lateral** to the vocal ligament



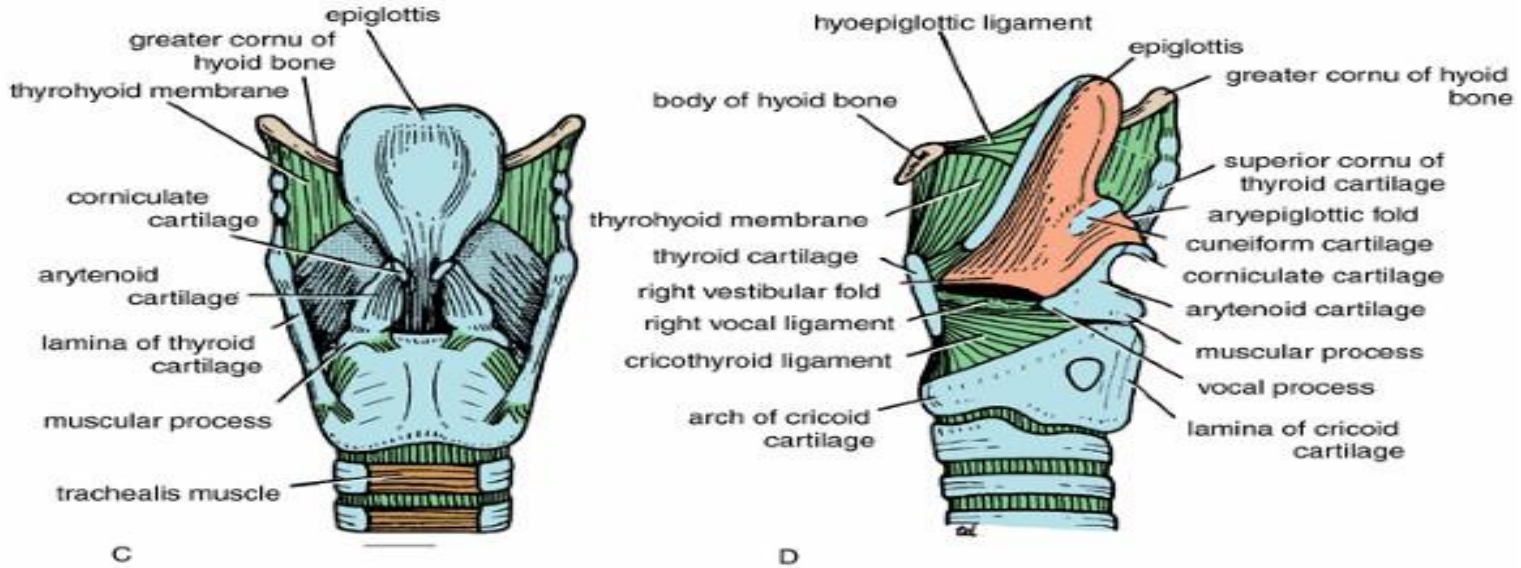
- The quadrangular membrane resembles a square.
- It starts from the lateral edges of the epiglottis then attaches to the inside of the thyroid cartilage.
- Its free lower border makes the false vocal ligaments (vestibular ligament).
- The upper edge (attachment to the epiglottis) has a muscle called ary-epiglotticus.

https://youtu.be/Xqq6G_PgxQM

Cartilage and Ligaments



The only muscle on the external surface of the larynx

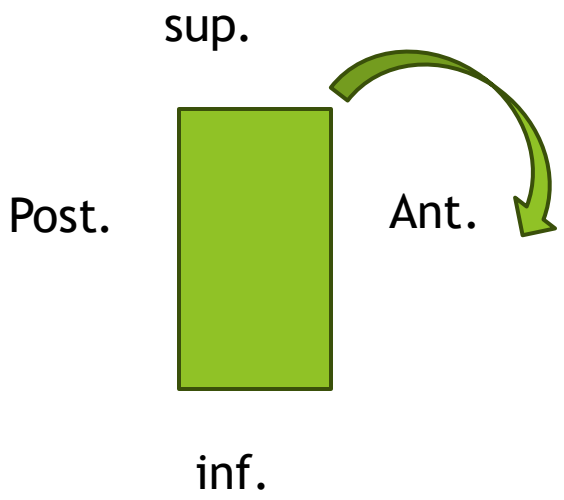


Laryngeal joints

Cricothyroid joints

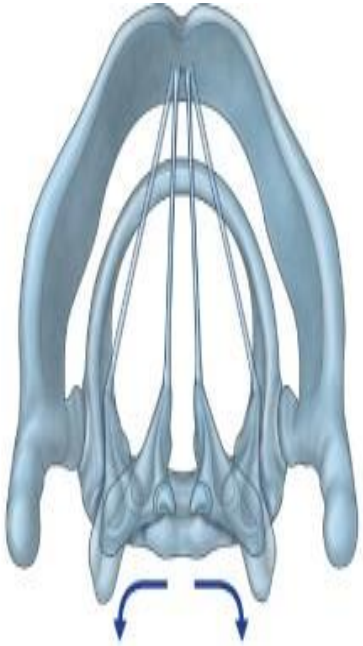
- Between the inferior horns of the thyroid cartilage and the cricoid cartilage, are **synovial**
- Surrounded by a capsule and is reinforced by associated ligaments
- Enable the thyroid cartilage to move **forward and tilt downwards** on the cricoid cartilage
- Forward movement and downward rotation of the thyroid cartilage effectively **lengthens and puts tension on the vocal ligaments**

- Cricothyroid joint is a joint between the inferior horn of thyroid cartilage and lateral lamina of cricoid, it is a synovial joint.
- It allows the forward and downward movement of thyroid cartilage (tilting) by the cricothyroid muscle, this movement tenses the true vocal cords to allow phonation.

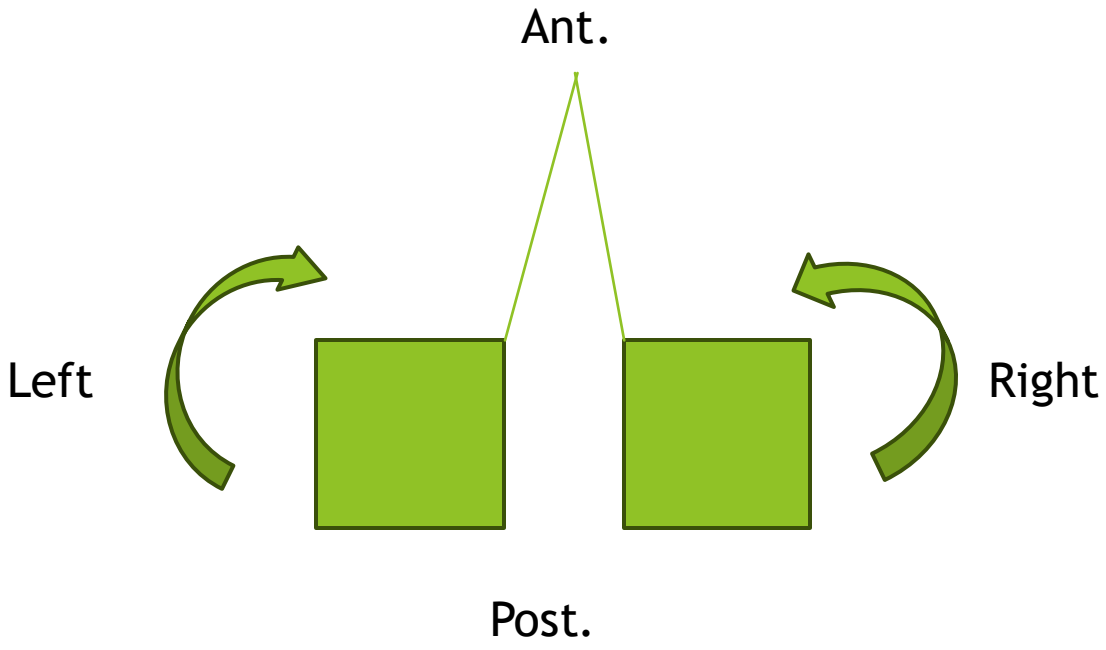


Crico-arytenoid joints

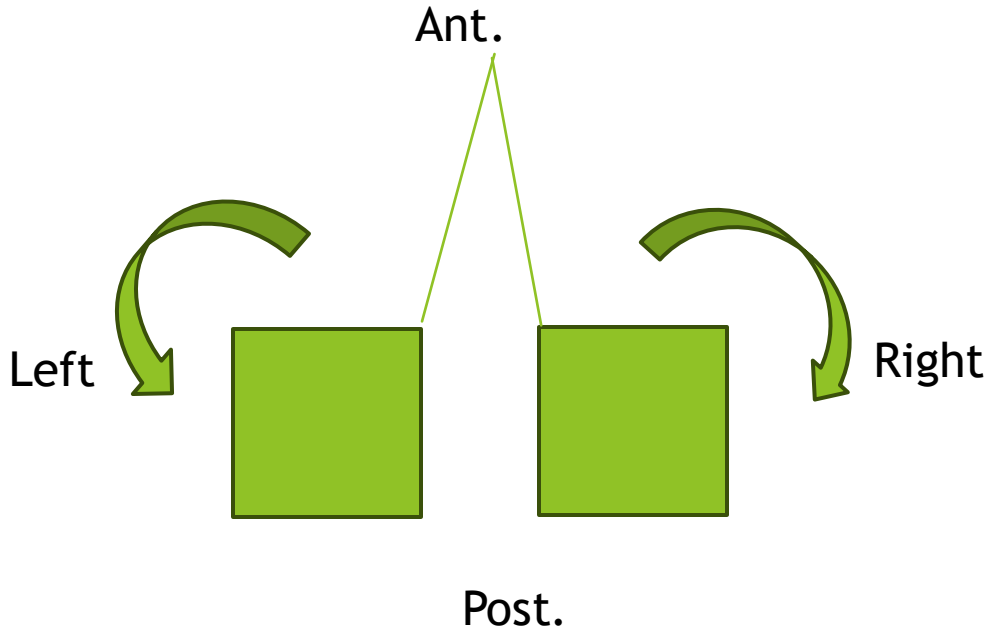
- Between articular facets on the superolateral surfaces of the cricoid cartilage and the bases of the arytenoid cartilages
- Enable the arytenoid cartilages to **slide away or towards each other and to rotate**
- The vocal processes **pivot either towards or away from the midline.**
- These movements **abduct and adduct the vocal ligaments**



- The arytenoid cartilage has its vocal process (attachment of vocal cords) facing the inside of the larynx.
- The articulation of the arytenoid cartilage with cricoid makes the cricoarytenoid joint, which has a rotatory movement.
- The posterior cricoarytenoid muscle makes the arytenoids rotate outward, causing the abduction of the vocal cords.
- The lateral cricoarytenoid muscle makes the arytenoids rotate inward, causing the adduction of the vocal cords.
- These muscles attach to the muscular process of the arytenoids.



Lateral cricoarytenoid movement

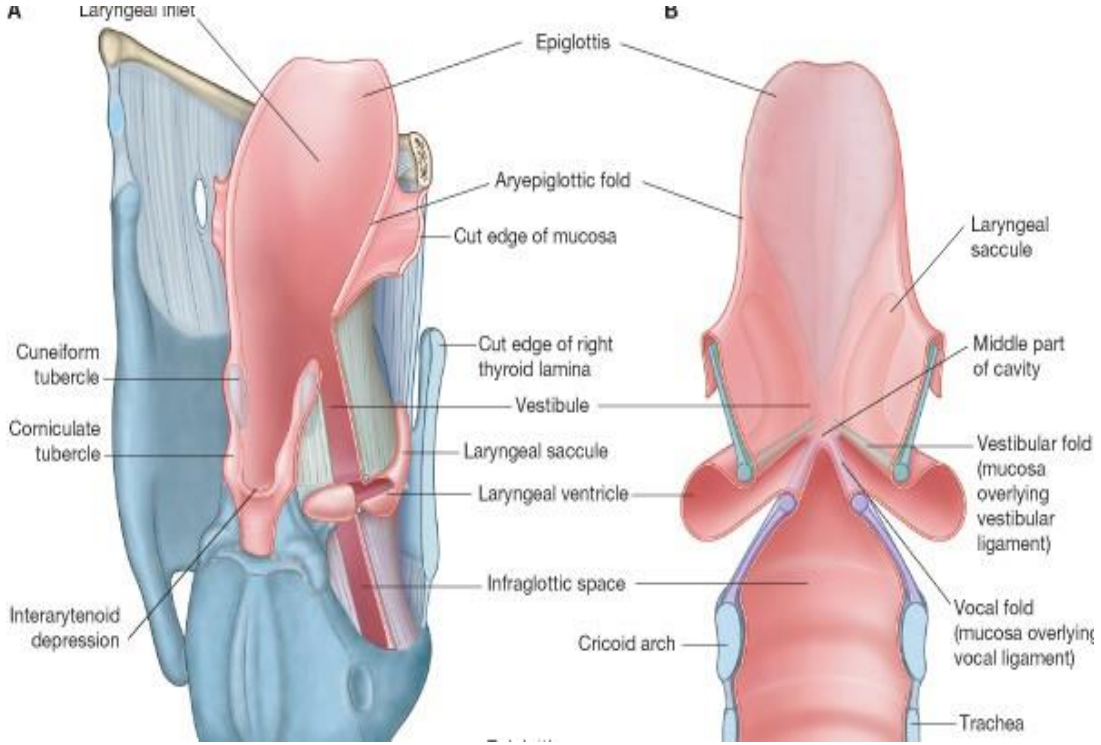


Posterior cricoarytenoid movement

Cavity of the larynx

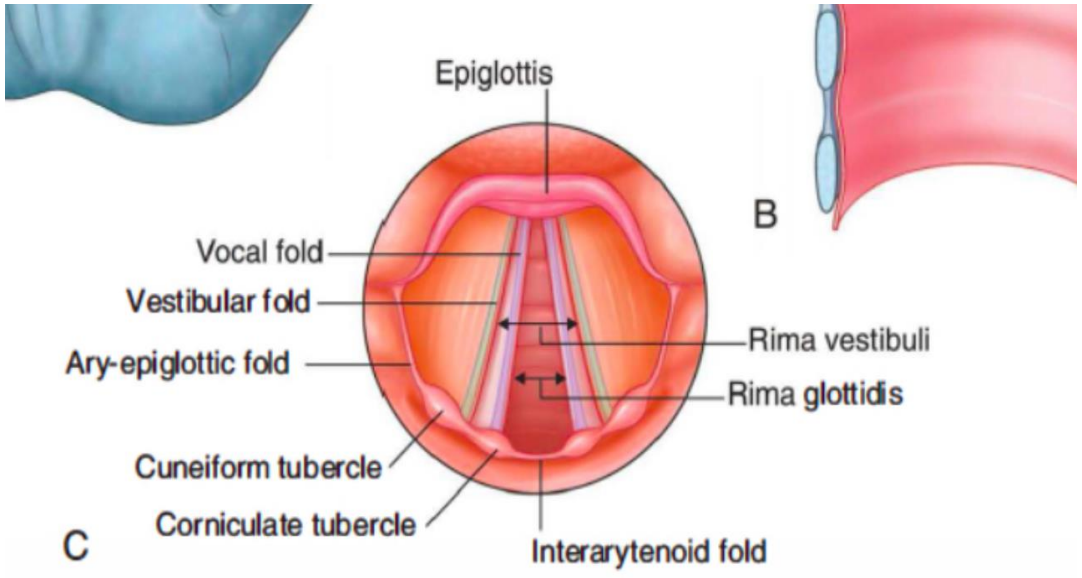
Laryngeal cavity

- The central cavity of the larynx is tubular in shape and is lined by mucosa
- Support is provided by the fibro- elastic membrane of larynx and by the cartilages to which it is attached.
- The superior aperture of the cavity **(laryngeal inlet)** opens into the anterior aspect of the pharynx just below and posterior to the tongue
- laryngeal inlet is **oblique** and points postero-superiorly



- The inlit of the larynx has 3 edges :
  1.free edge of epiglottis.
  2.Ary-epiglottic folds.
  3.inter-arytenoid fold (between the two arytenoids cartilage)
- Anesthesiologists know the surface anatomy of the larynx very well, so when they intubate a patient, they place the tube inside the larynx between the two vocal cords until they reach the trachea, this procedure is done to help the patient breath in case of suffocation if the two vocal cords closed.

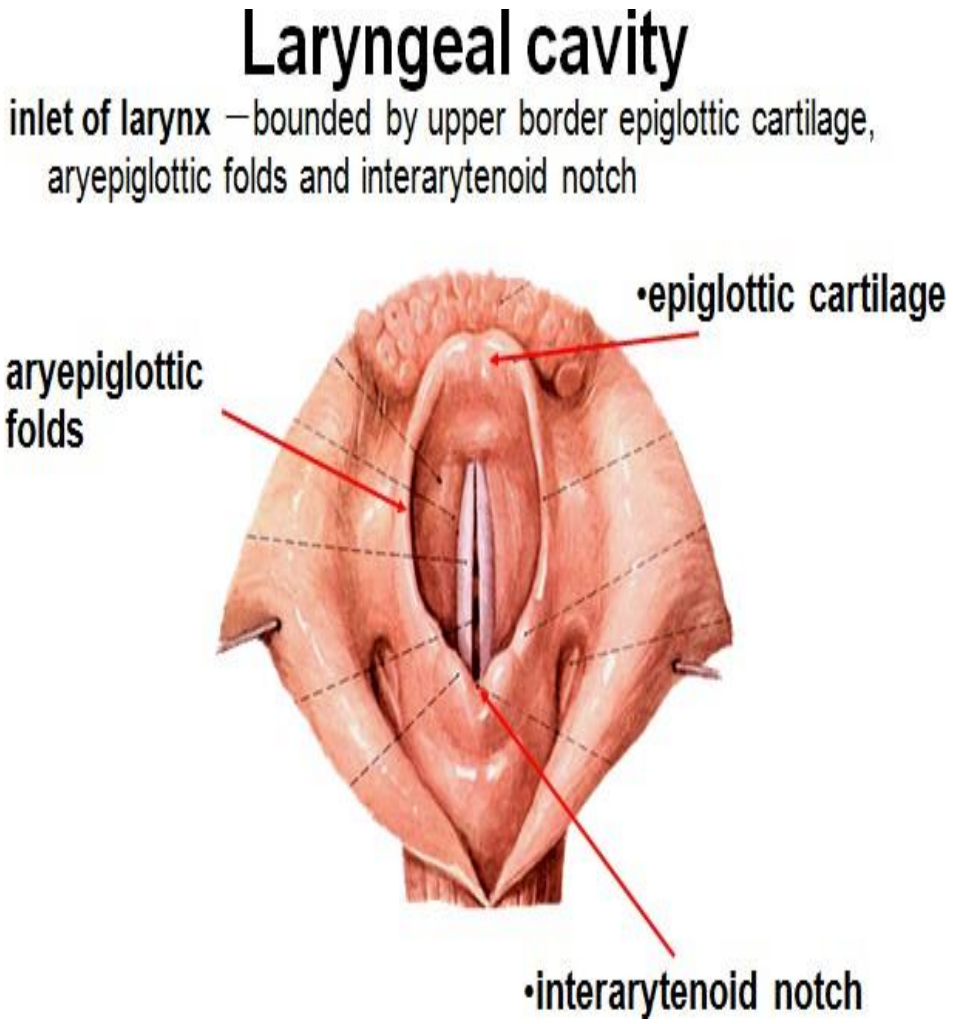
Anterior view



Posterior view

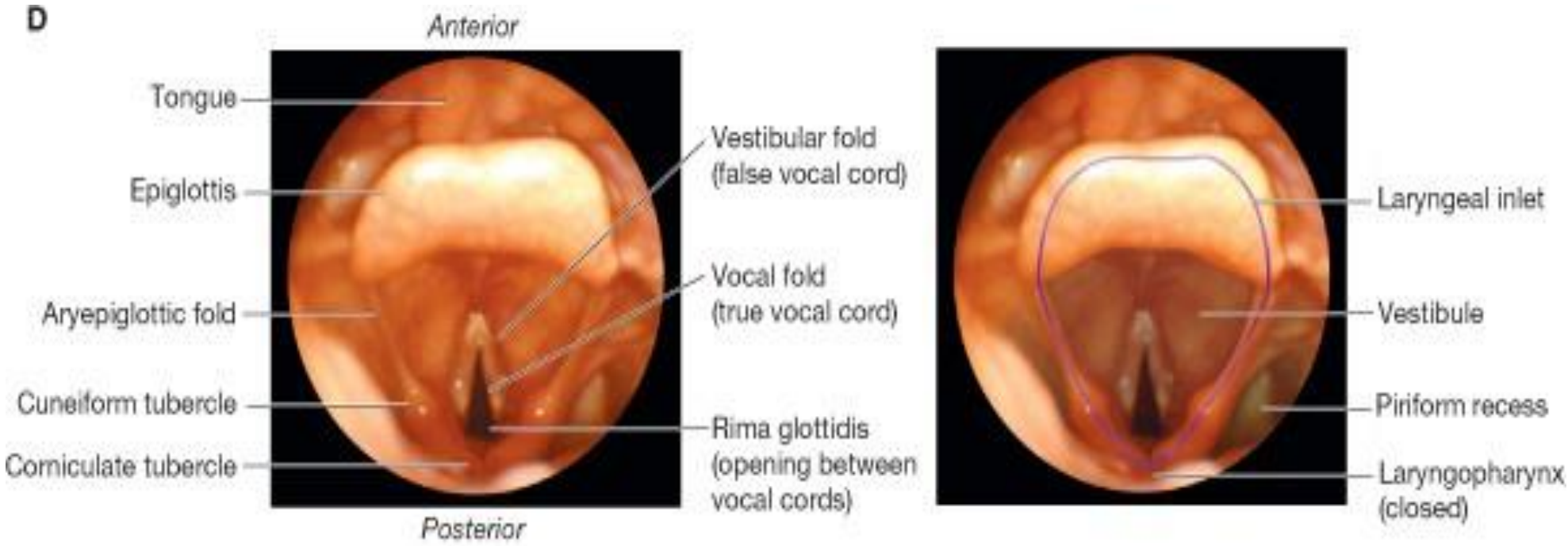
laryngeal inlet

- Anterior border is formed by mucosa covering the superior margin of the **epiglottis**
- Lateral borders are formed by mucosal folds (**aryepiglottic folds**)
- Posterior border in the midline is formed by a mucosal fold that forms a depression (**interarytenoid notch**) between the two corniculate tubercles



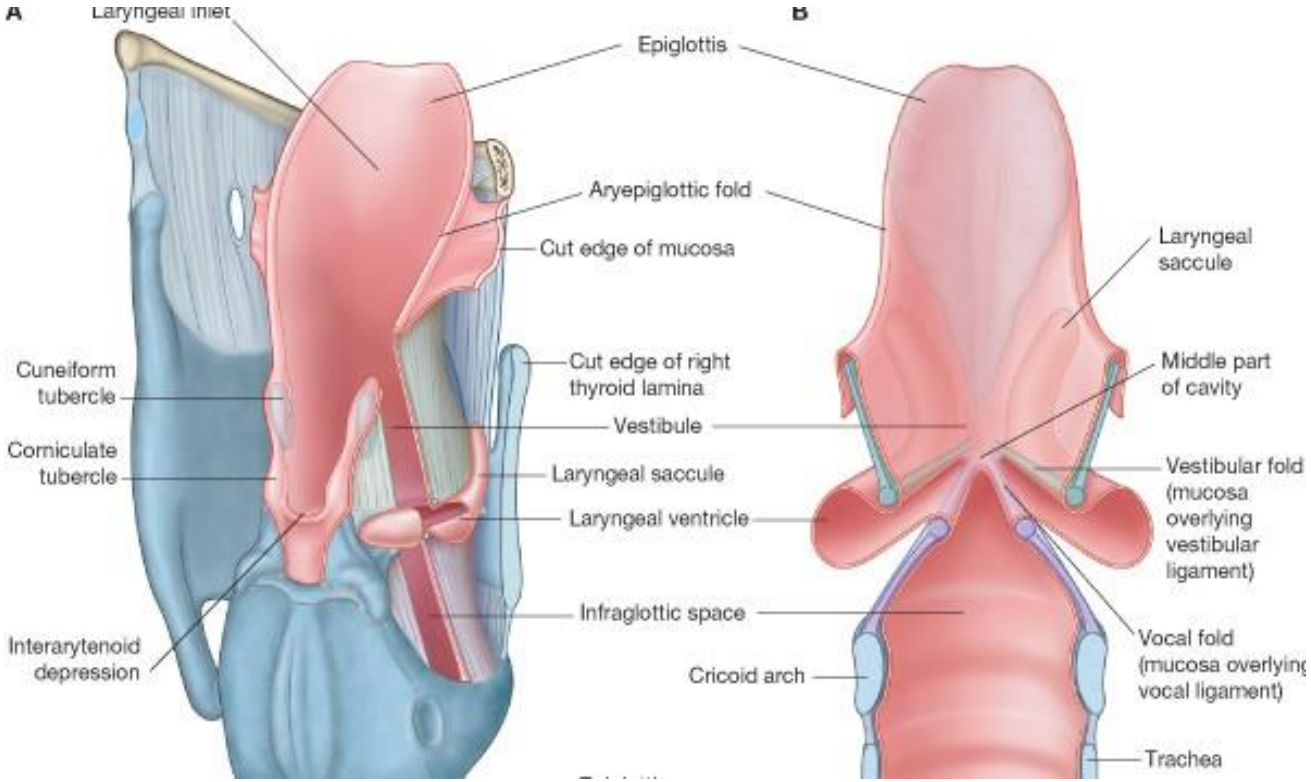
- **Aryepiglottic folds**

- Enclose the superior margins of the quadrangular membranes and adjacent soft tissues
- Two tubercles on the more posterolateral margin side mark the positions of the underlying **cuneiform and corniculate** cartilages;

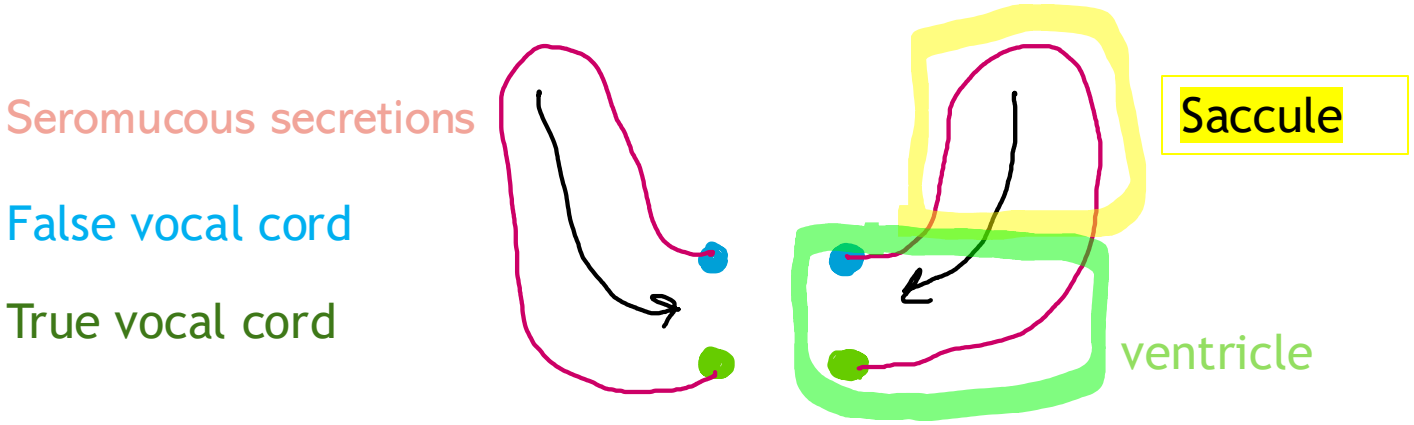


Inferior opening

- Inferior opening of the laryngeal cavity is continuous with the lumen of the trachea
- Completely encircled by the cricoid cartilage
- Horizontal in position unlike the laryngeal inlet
- The inferior opening is continuously open whereas the laryngeal inlet can be closed by downward movement of the epiglottis

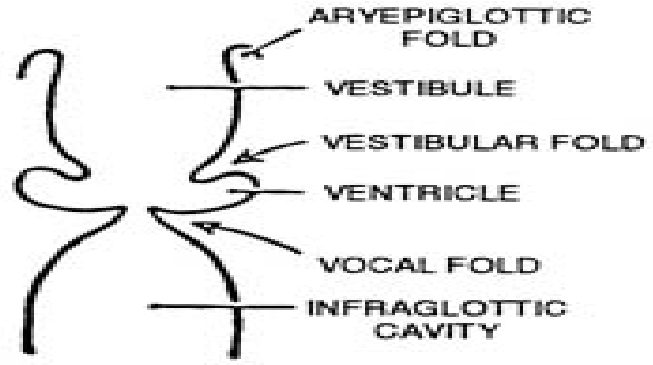


- Between the false and true vocal cords, we have a sac called the ventricle, with an ascending part called the saccule, its mucosa has seromucous glands that lubricate the true vocal cords.



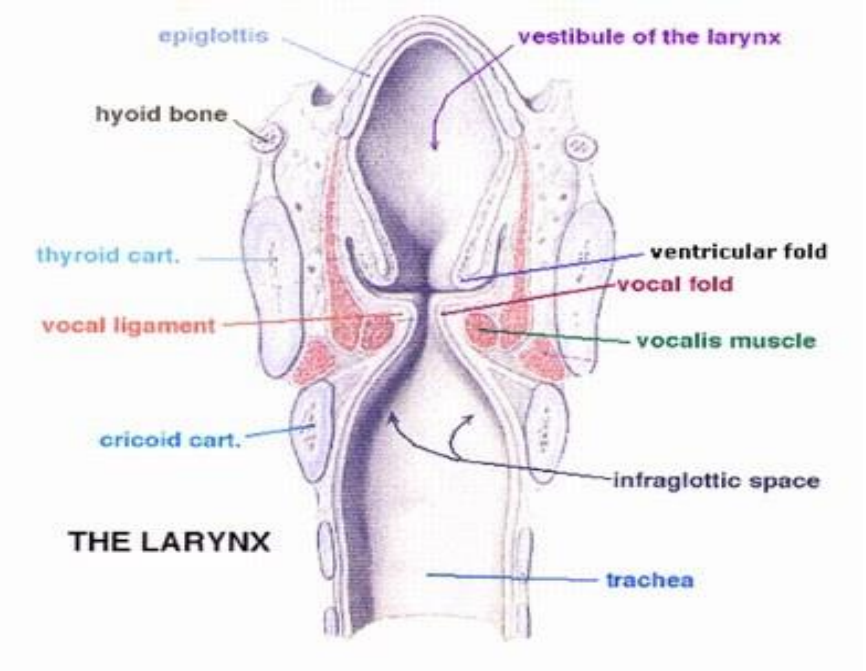
Division into three major regions

- The **vestibular and vocal folds**, divide it into three major regions**- the vestibule,** a **middle chamber,** and the **infraglottic cavity**



- The **vestibule** is the upper chamber of the laryngeal cavity between the laryngeal inlet and the vestibular folds

- *Vestibular folds enclose the vestibular ligaments and associated soft tissues;*

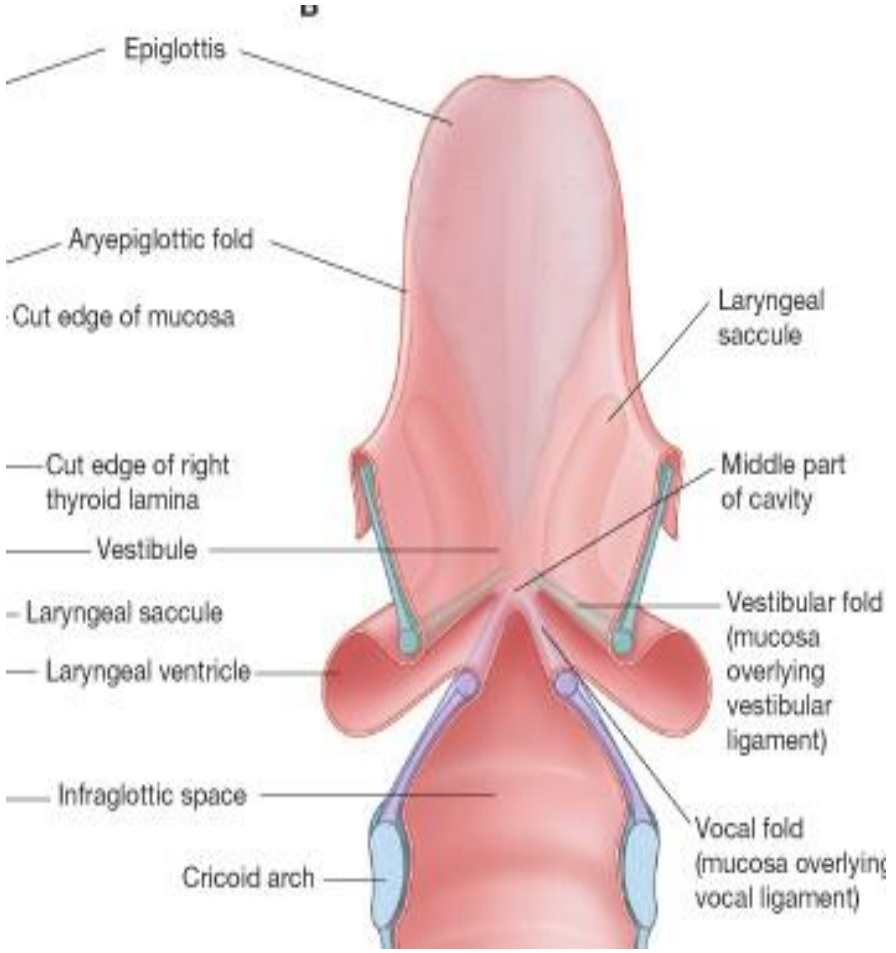


Division into three major regions

- The **middle part** of the laryngeal cavity is very thin and is between the vestibular folds above and the vocal folds below

- *Vocal folds enclose the vocal ligaments and related soft tissues below.*

- The **infraglottic space** is the most inferior chamber and is between the vocal folds and the inferior opening of the larynx;



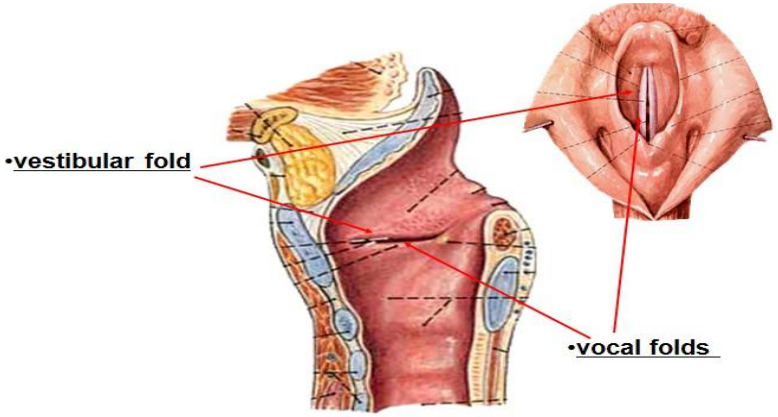
- The cavity of the larynx is divided into 3 spaces/regions:

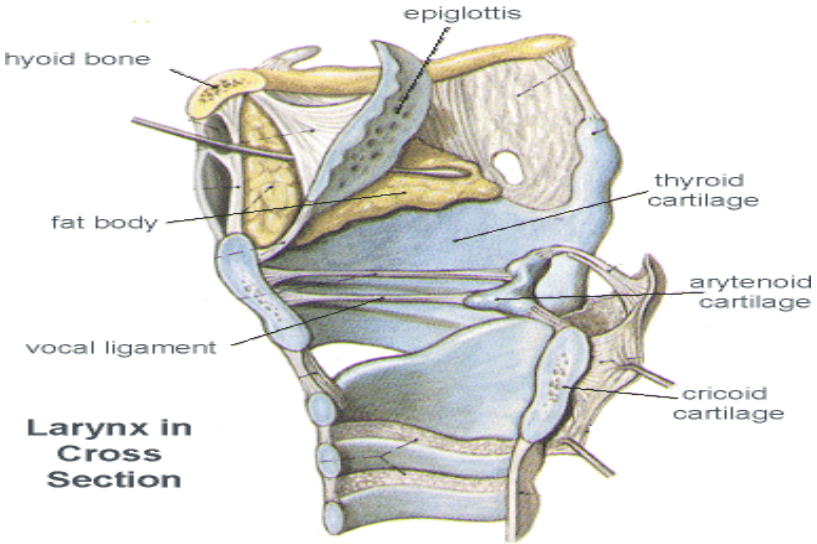
1. Vestibule, from the inlet to the false vocal cords
2. Glottic part, between the false vocal cord and true vocal cord, includes the ventricle and the saccule.
3. Infraglottic, from true vocal cords to the beginning of the trachea

Vocal Folds

- Consist of :
- Vocal ligament
- Mucous membrane (stratified squamous)
- Vocalis muscle
- No submucosa
- No blood vessels (white in color)
- On each side extend between the vocal process of the arytenoid and the back of the anterior lamina of thyroid.

- Longer in male which cause the difference of the pitch of the voice between genders



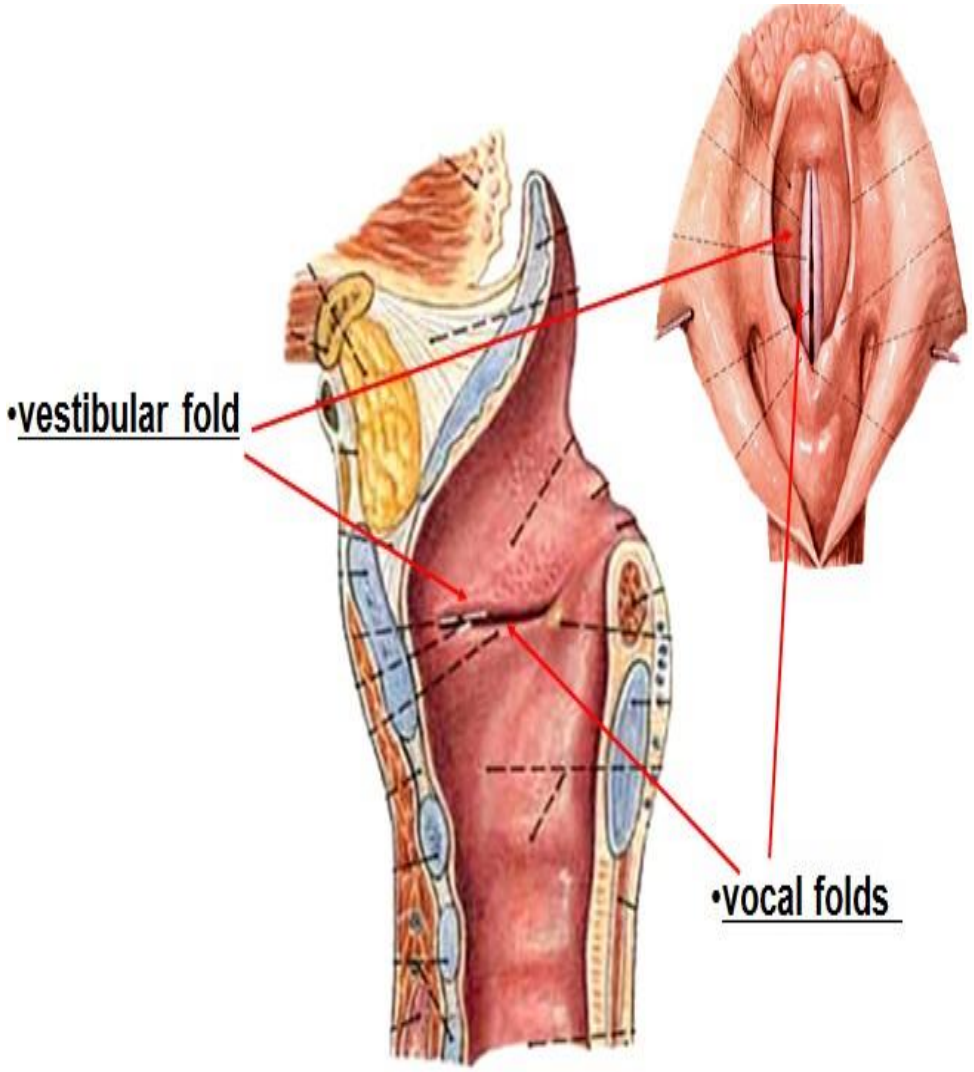


- The characteristics of the vocal folds:

1. It has the vocal ligament, formed by the upper free edge of (conus elasticus) or cricothyroid membrane.
2. Its epithelium is stratified squamous non-kertinized.
3. It has a muscle called vocalis, its function is to relax the true vocal cords.
4. It has no submucosa
5. It has no blood supply (that's why it looks white), supplied by diffusion.

Vestibular folds

- False vocal cords
- *Vestibular folds enclose the vestibular ligaments and associated soft tissues*
- *Vascularised (red in color)*
- *Fixed and not movable unlike the vocal cord*
- *Superior to the vocal cord*

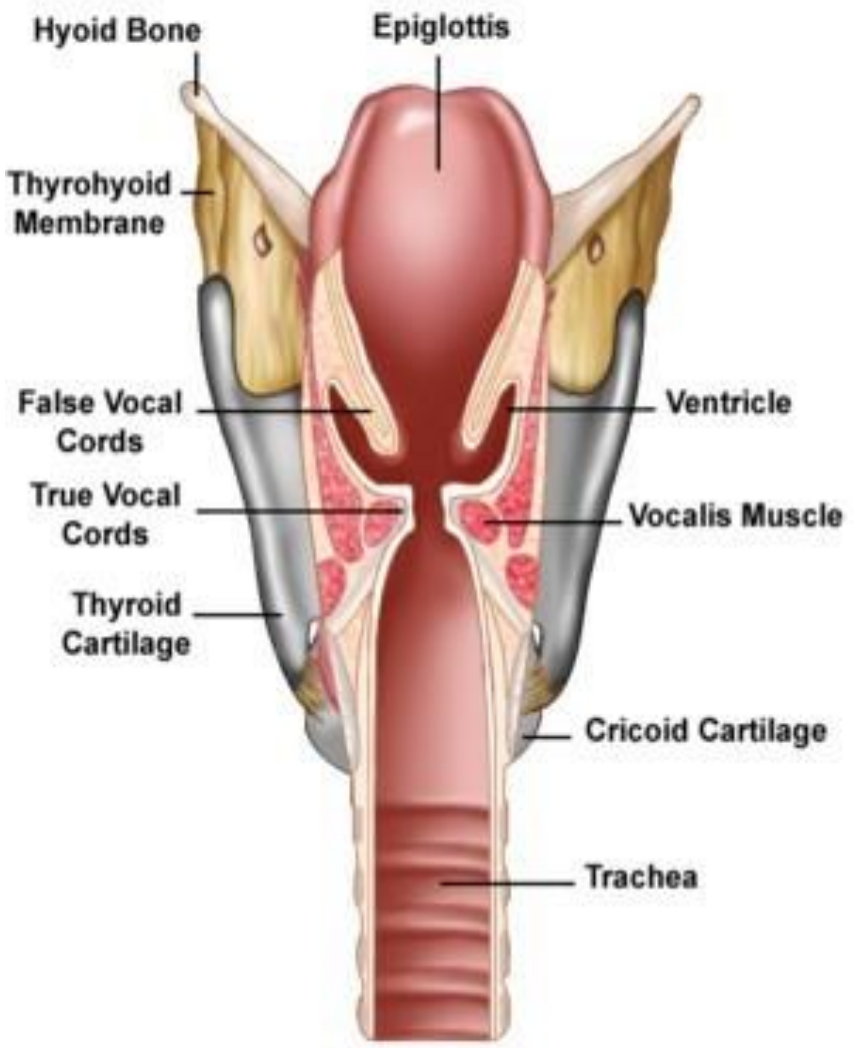


- The vestibular folds / false vocal cords:

1. It has the vestibular ligament formed by the lower free edge of quadrangular membrane.
2. It is rich in blood vessels (red in color)
3. It is lined by respiratory epithelium (pseudostratified ciliated columnar epithelium with goblet cells).
4. Doesn’t participate in the production of voice.

Laryngeal ventricles and saccules

- On each side, the mucosa of the middle cavity bulges laterally through the gap between the vestibular and vocal ligaments to produce a **laryngeal ventricle**
- Tubular extension of each ventricle (laryngeal saccule) projects antero-superiorly between the vestibular fold and thyroid cartilage
- Within the walls of these laryngeal saccules are numerous mucous glands.
- **Mucus** secreted into the saccules **lubricates the vocal folds**.

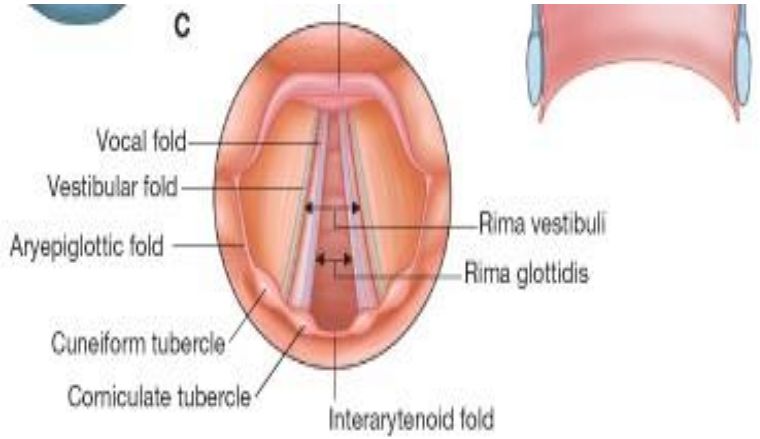


Rima vestibuli and rima glottidis

- **Rima vestibuli** is a triangular-shaped opening between the two adjacent **vestibular folds** at the entrance to the middle chamber

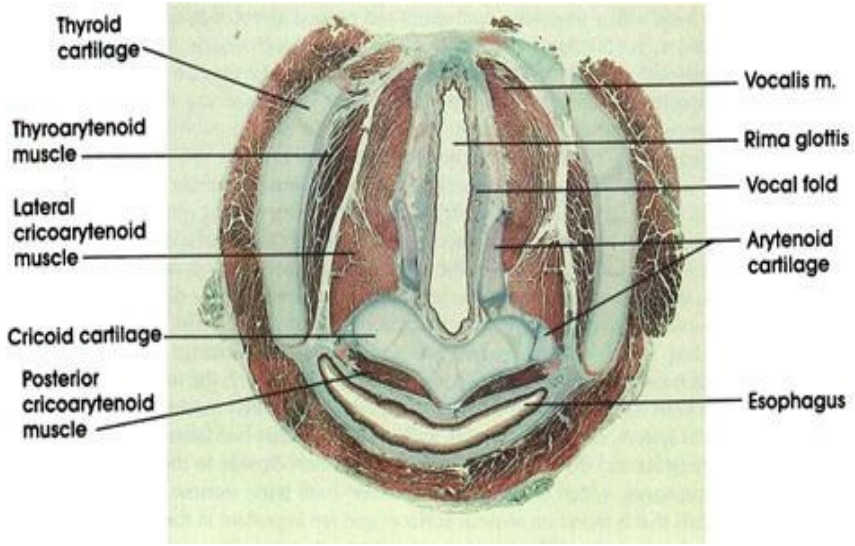
- Apex of the opening is anterior and its base is posterior

- The **Rima glottidis** is formed by the **vocal folds (true vocal cords)** and adjacent mucosa-covered parts of the arytenoid cartilages



Rima vestibuli and rima glottidis

- **Rima glottidis** opening separates the middle chamber above from the infraglottic cavity
- The base of it is formed by the fold of mucosa (interarytenoid fold) at the bottom of the interarytenoid notch
- Rima glottis is the narrowest part of the laryngeal cavity
- Both the rima glottidis and the rima vestibuli can be opened and closed by movement of the arytenoid cartilages and associated membranes.



- Rima vestibuli is the space/gap between the two false vocal cords (from superior view).
- Rima glottidis is the space/gap between the two true vocal cords (from superior view).
- Rima glottidis is narrower.

VERSIONS	SLIDE #	BEFORE CORRECTION	AFTER CORRECTION
V1→ V2	55	False vocal cords	True vocal cords
V2→V3	33	cricothyroid	cricotracheal

امسح الرمز و شاركنا بأفكارك لتحسين أدائنا !!