

# **THE LARYNX**

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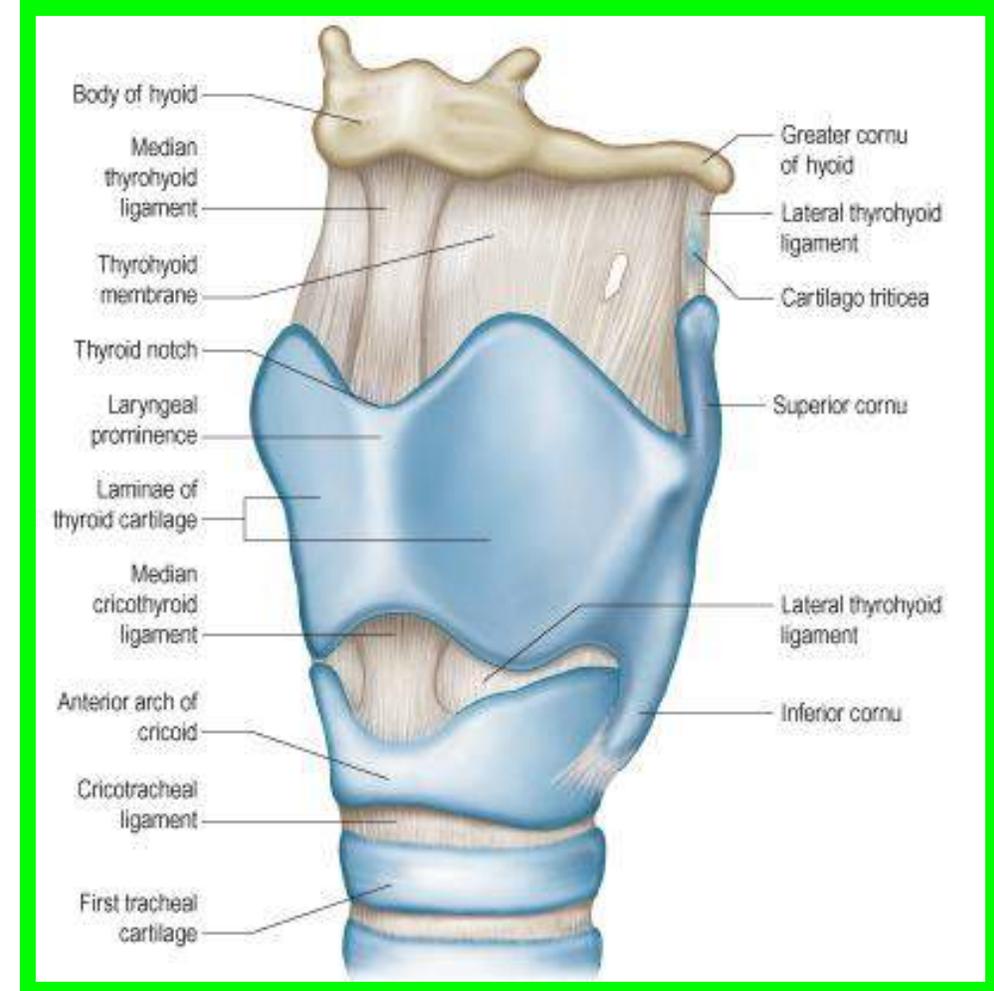
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# The Larynx

Is an organ that provides a protective sphincter at the inlet of the air passages and is responsible for voice production.

It is situated below the tongue and hyoid bone and between the great blood vessels of the neck and lies at the level of the fourth, fifth, and sixth cervical vertebrae

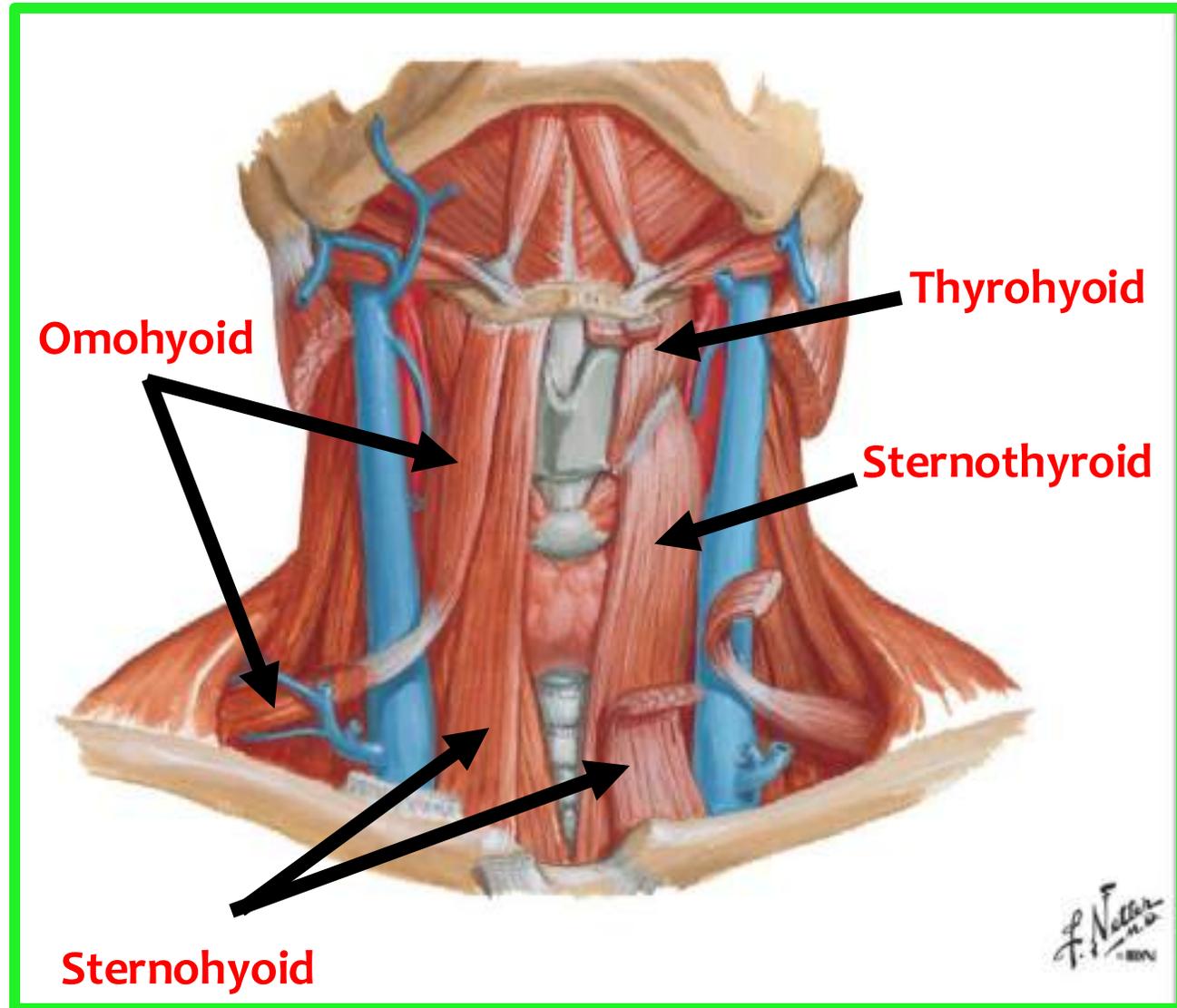
It opens above into the laryngeal part of the pharynx, and below is continuous with the trachea.



# The Larynx

The larynx is covered in front by **the infrahyoid strap muscles** and at the sides by the thyroid gland.

The framework of the larynx is formed of cartilages that are held together by ligaments and membranes, moved by muscles, and lined by mucous membrane



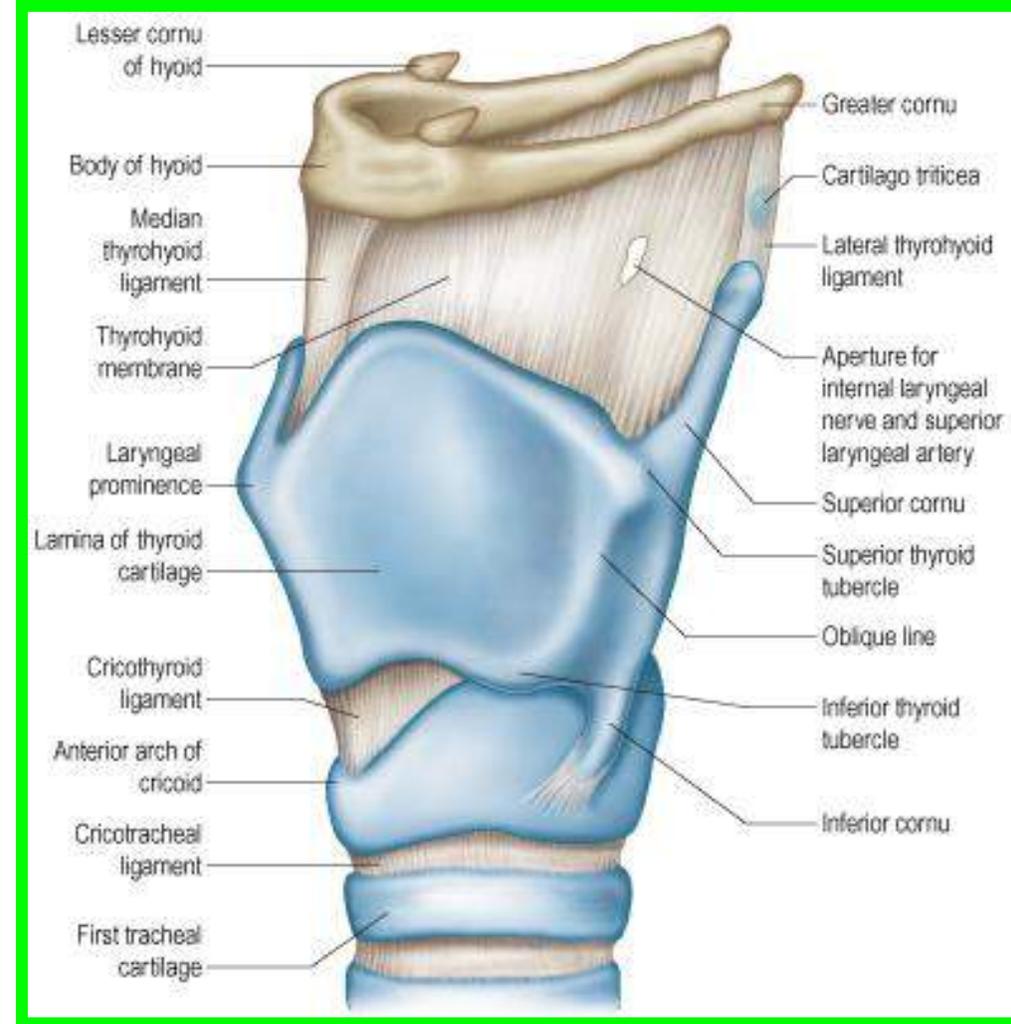
# The Larynx

## Cartilages of the Larynx

**1. Thyroid cartilage:** This is the largest cartilage of the larynx and consists of two laminae of hyaline cartilage that meet in the midline in the prominent V angle (the so-called Adam's apple).

❖ The posterior border extends upward into a **superior cornu** and downward into an **inferior cornu**

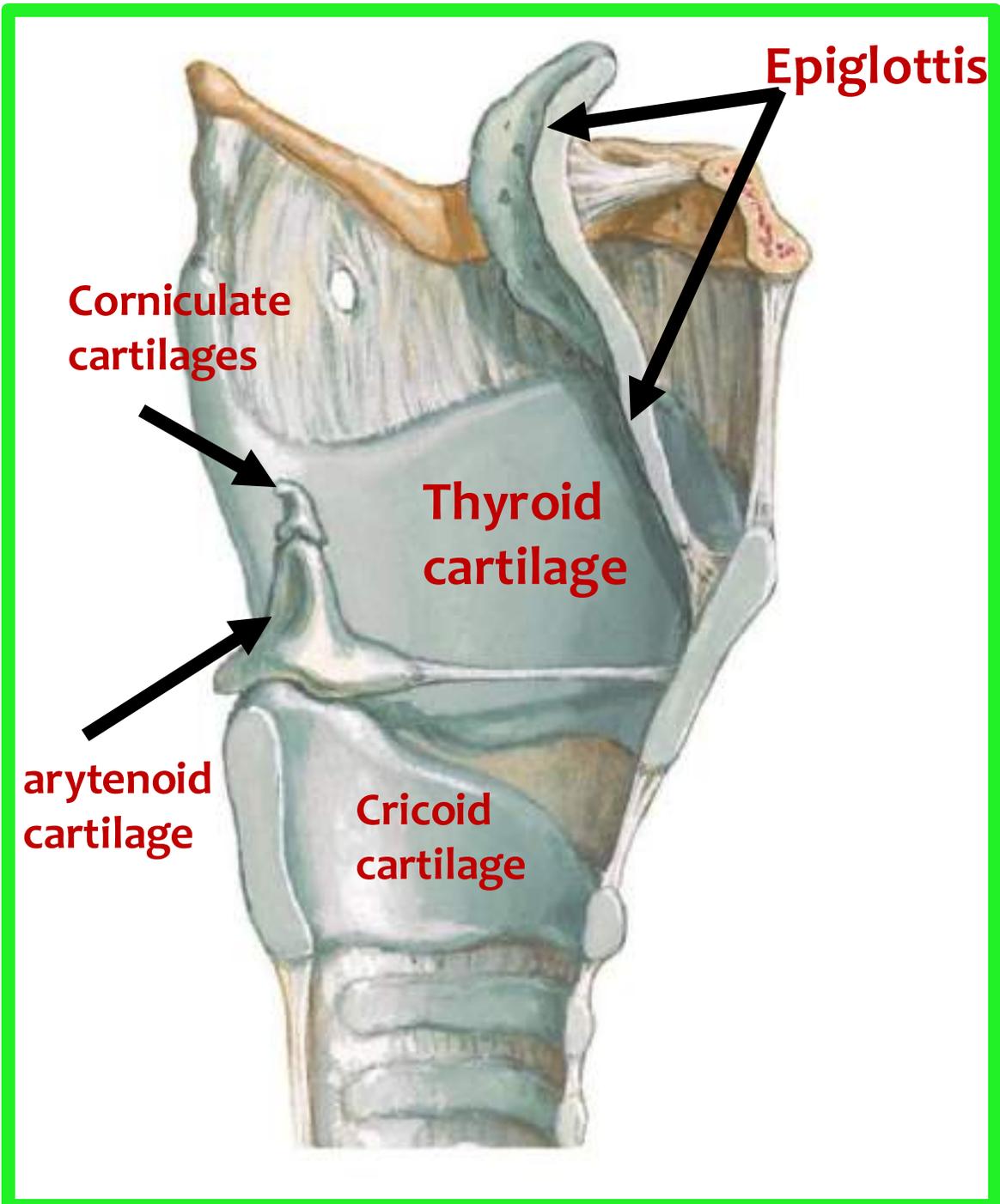
❖ On the outer surface of each lamina is an **oblique line** for the attachment of muscles.



# The Larynx

## 2. Cricoid cartilage:

- ✓ This cartilage is formed of hyaline cartilage and shaped like **a signet ring**, having a broad plate behind and a shallow arch in front
- ✓ The Cricoid cartilage lies **below the thyroid cartilage**,
- ✓ Posteriorly, the lamina has on its upper border on each side a **facet for articulation with the arytenoid cartilage**.



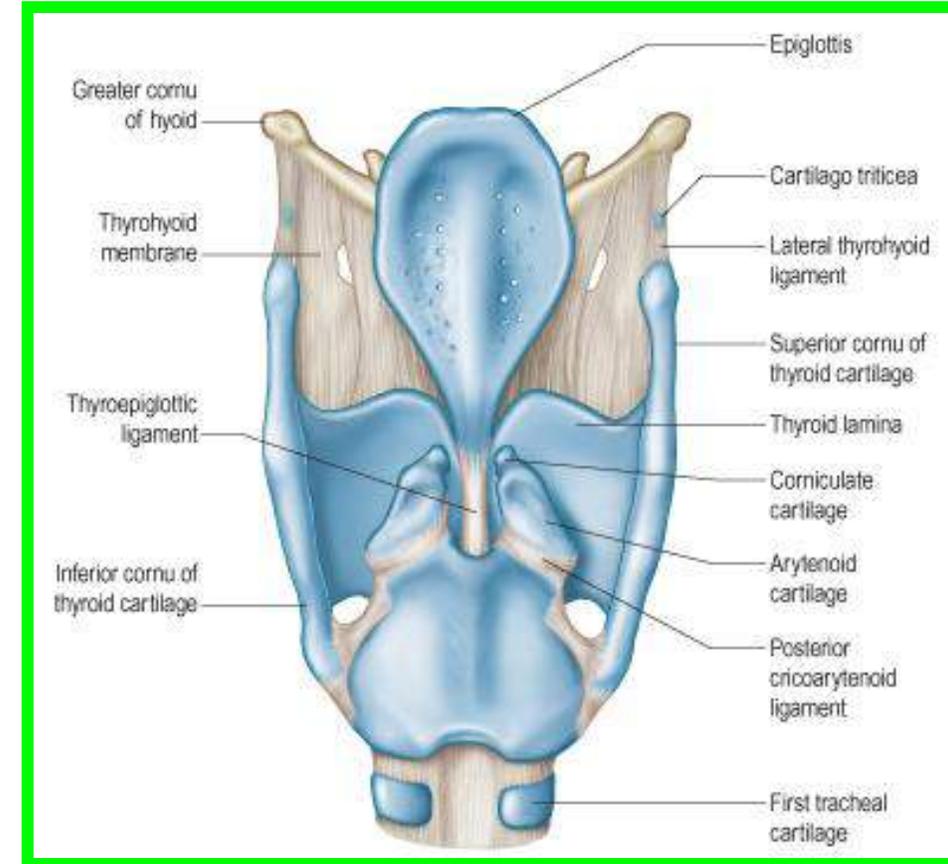
# The Larynx

## 3. Arytenoid cartilages:

❖ There are two arytenoid cartilages, which are small and pyramid shaped and located at the back of the larynx .

❖ They articulate with the upper border of the lamina of the cricoid cartilage.

❖ Each cartilage has an apex above that articulates with the small corniculate cartilage, a base below that articulates with the lamina of the Cricoid cartilage,

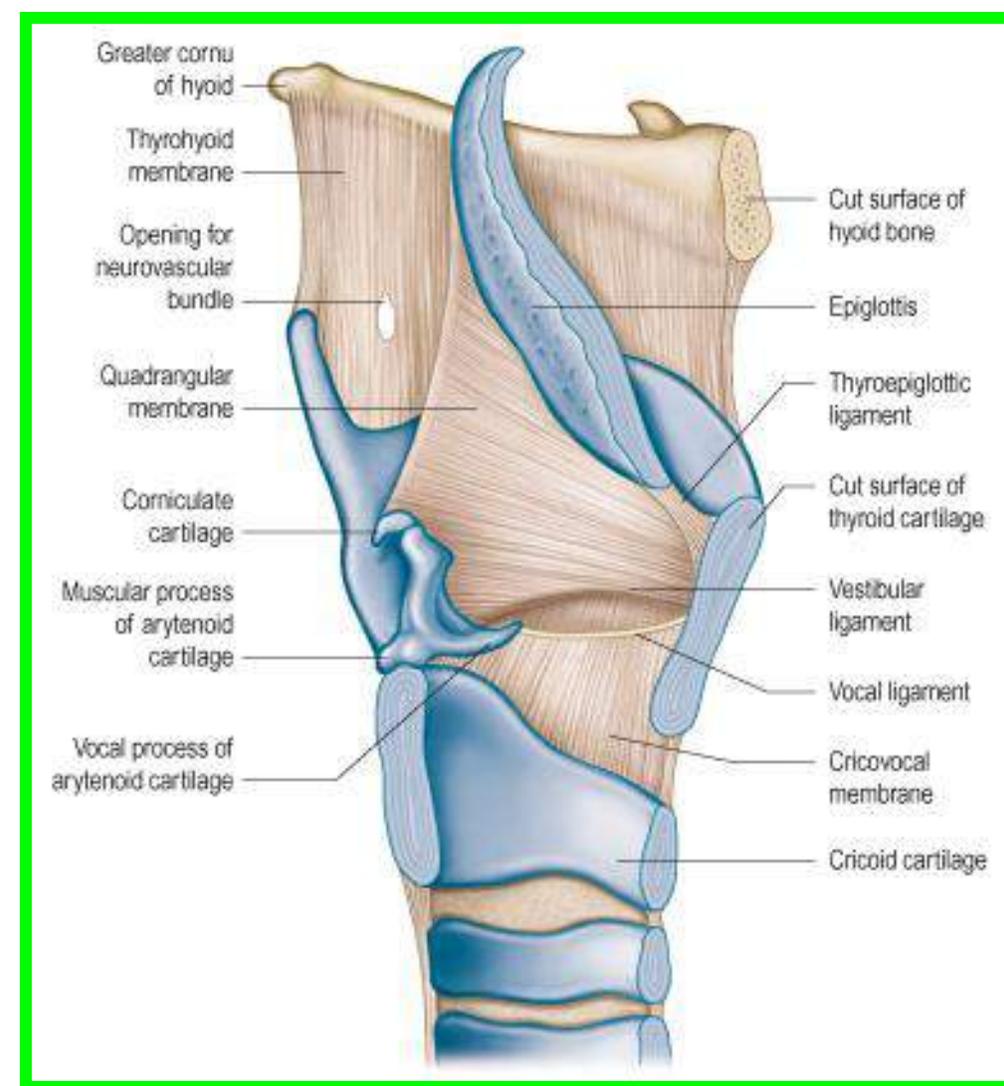
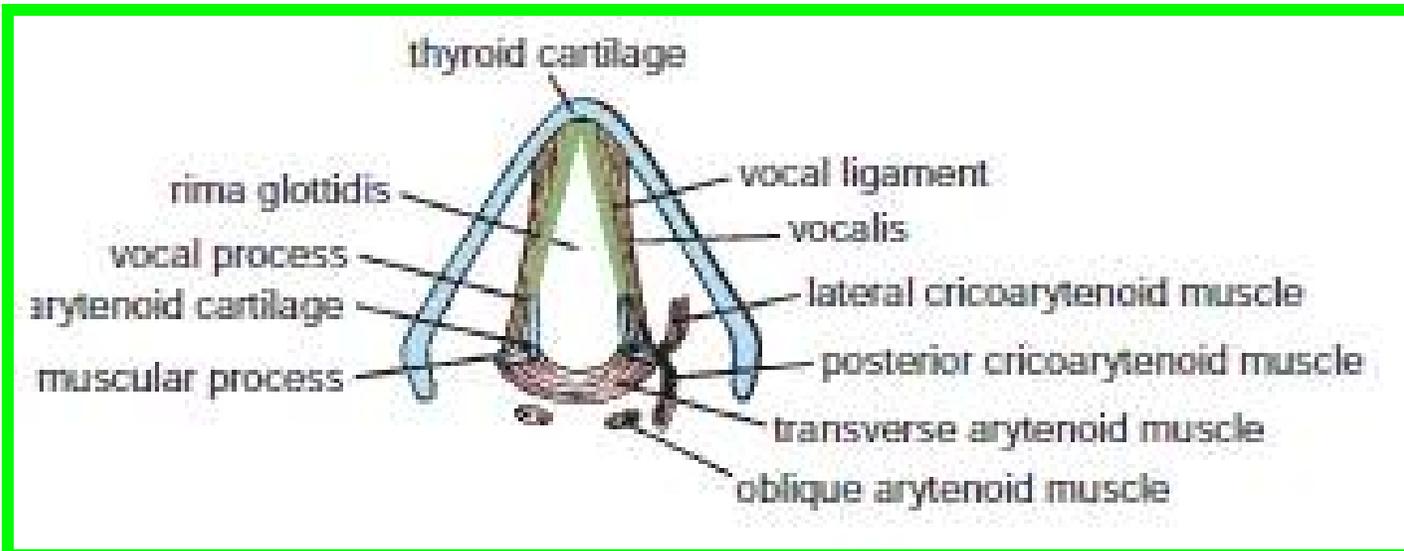


# The Larynx

## 3. Arytenoid cartilages:

❖ **A vocal process** that projects forward and gives attachment to the vocal ligament.

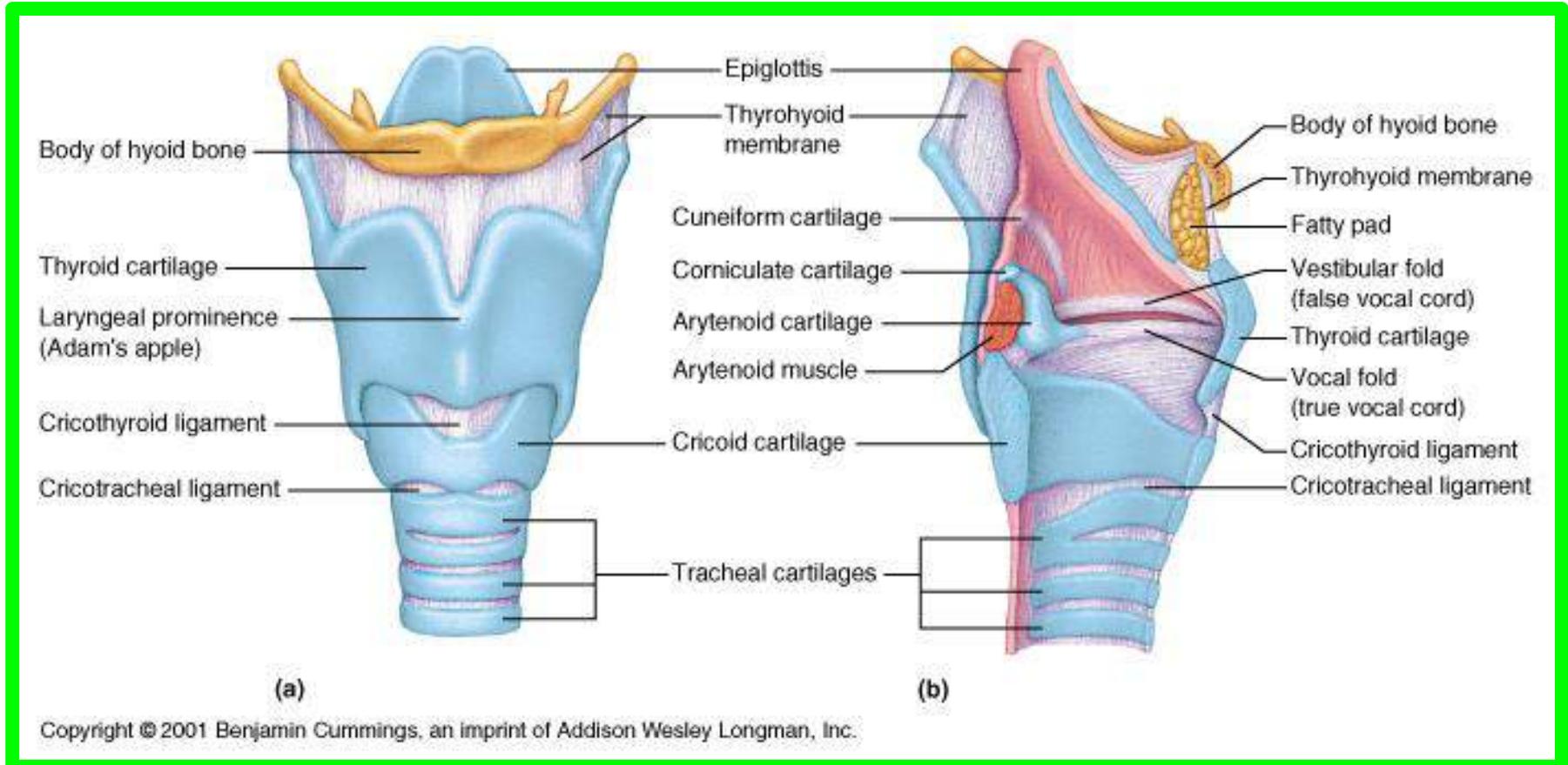
❖ **A muscular process** that projects laterally gives attachment to **the posterior** and **lateral cricoarytenoid muscles**.



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**4. Corniculate cartilages:** Two small **conical-shaped cartilages** articulate with the **arytenoid cartilages**. They give attachment to the aryepiglottic folds.

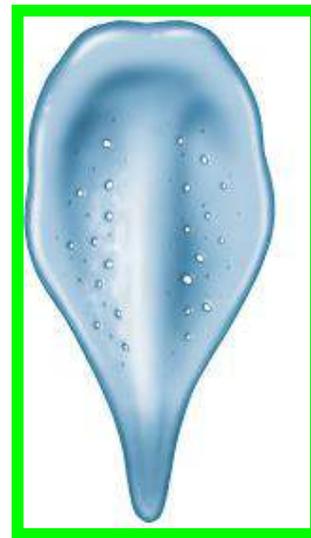
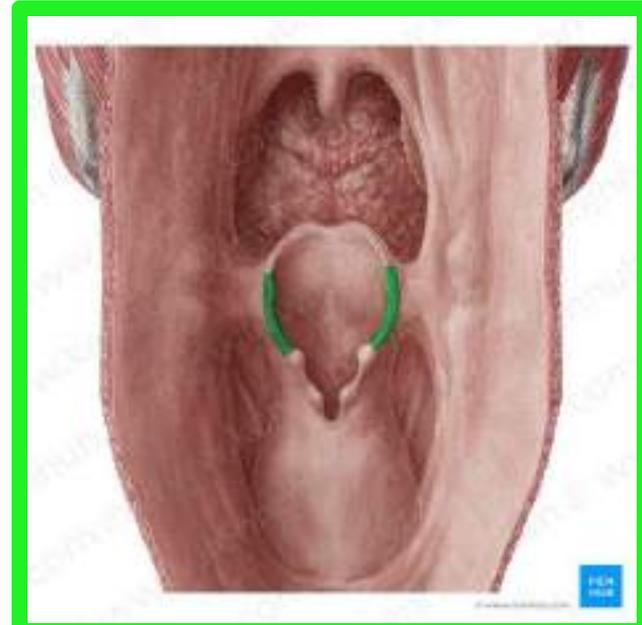
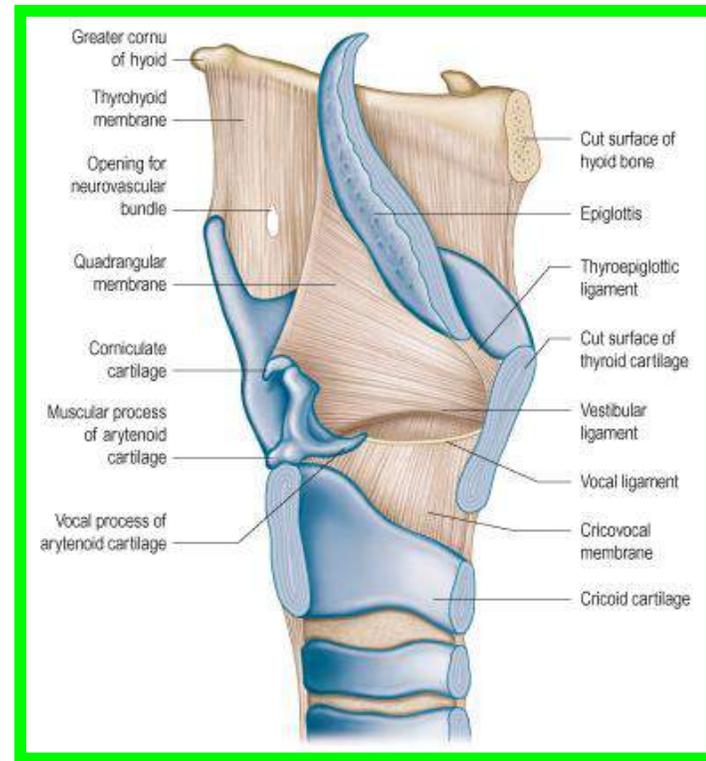


**5. Cuneiform cartilages:** These two **small rod-shaped cartilages** are found in the aryepiglottic folds and serve to strengthen them.

# The Larynx

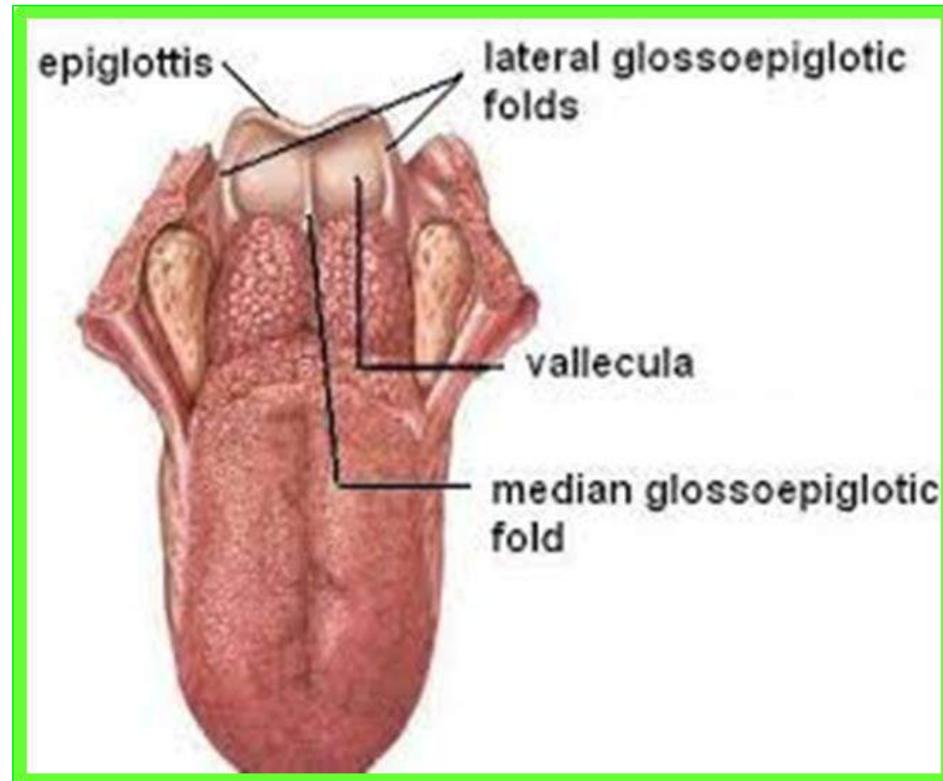
## 6. Epiglottis:

- ✓ This leaf-shaped lamina of elastic cartilage lies behind the root of the tongue.
- ✓ Its stalk is attached to the back of the thyroid cartilage.
- ✓ The sides of the epiglottis are attached to the arytenoid cartilages by the aryepiglottic folds of mucous membrane.
- ✓ The upper edge of the epiglottis is free.



# The Larynx

- ✓ The covering of mucous membrane passes forward onto the posterior surface of the tongue as **the median glossoepiglottic fold**;
- ✓ the depression on each side of the fold is called **the vallecula**
- ✓ Laterally, the mucous membrane passes onto the wall of the pharynx as **the lateral glossoepiglottic fold**.

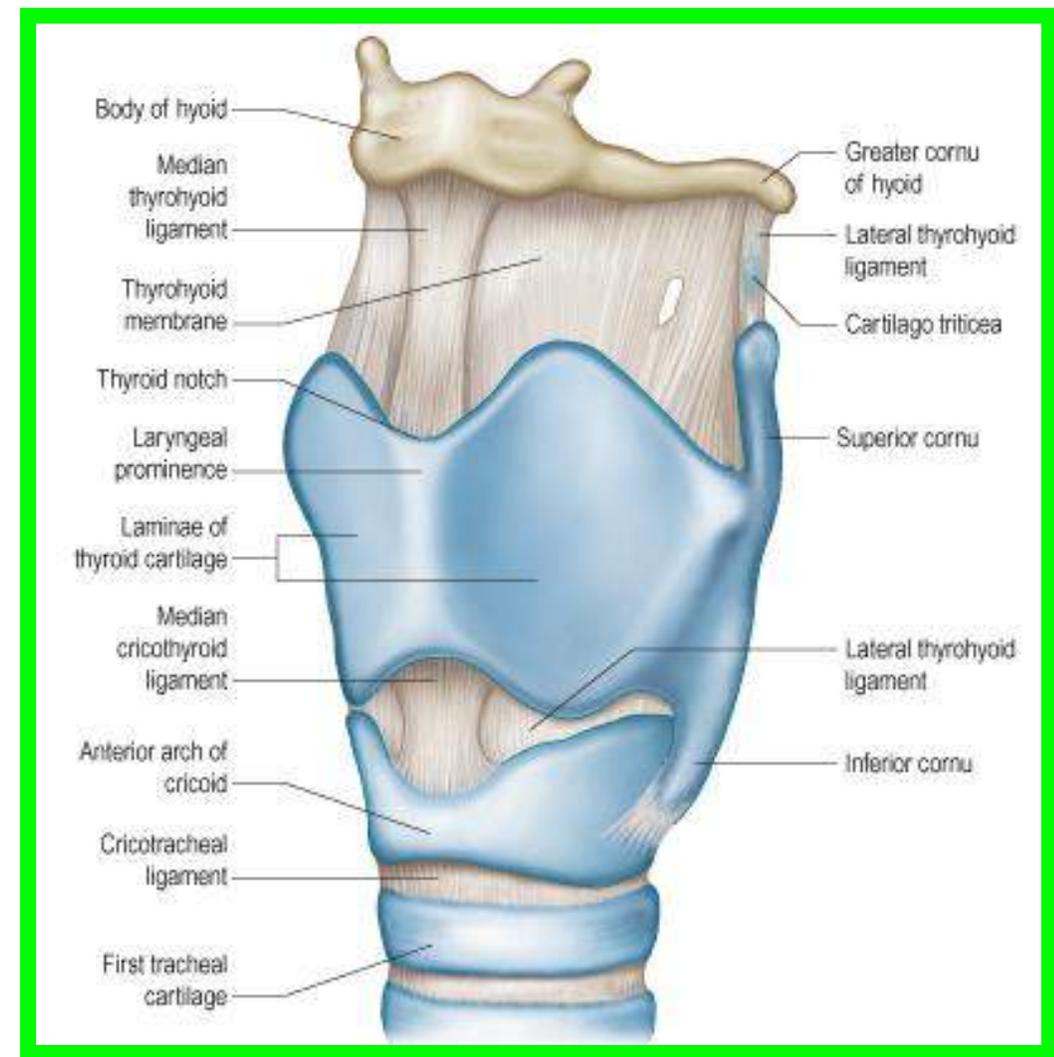


# The Larynx

## Membranes and Ligaments of the Larynx

**Thyrohyoid membrane:** This connects the upper margin of the thyroid cartilage to the hyoid bone

In the midline, it is thickened to form the **median thyrohyoid ligament.**

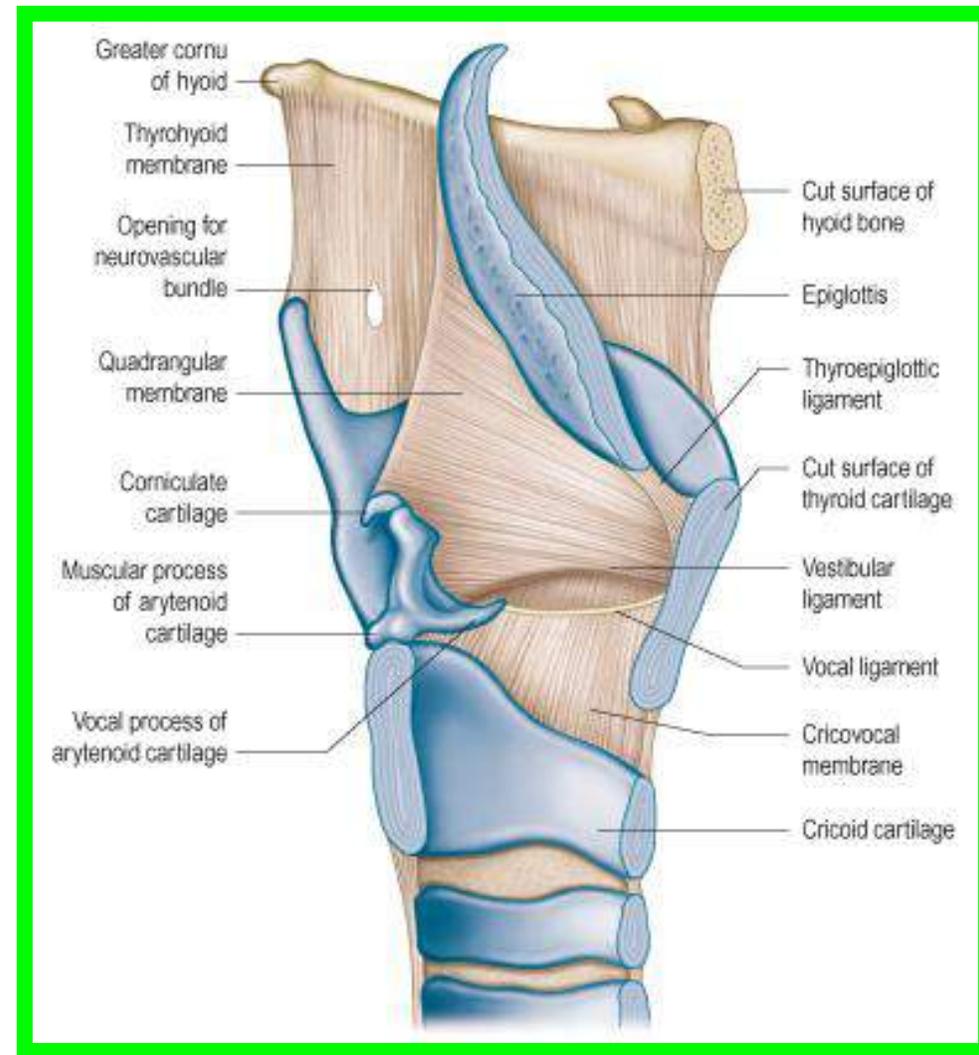
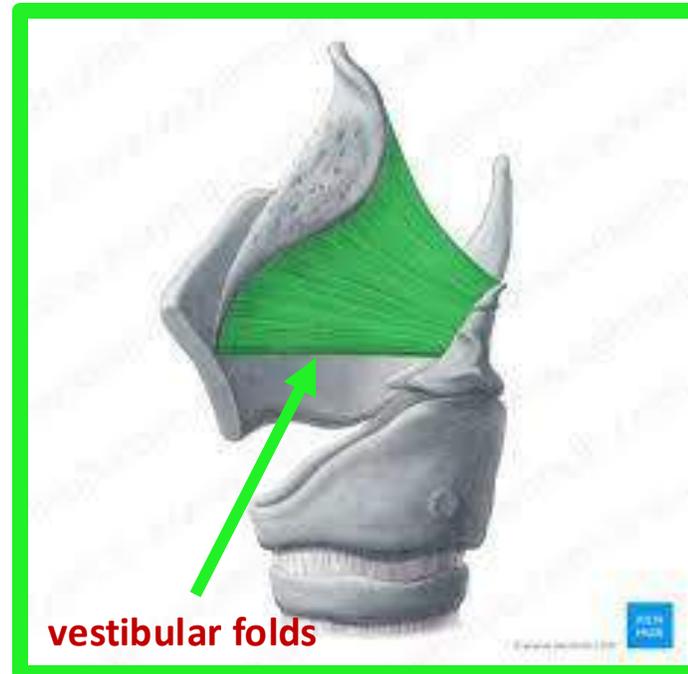


❖ The membrane is pierced on each side by the **superior laryngeal vessels** and the **internal laryngeal nerve**, a branch of the **superior laryngeal nerve**

# The Larynx

**Quadrangular membrane:** This extends between the **epiglottis** and the **arytenoid cartilage**

Its thickened inferior margin forms the **vestibular ligament**, and the vestibular ligaments form the interior of the **vestibular folds**

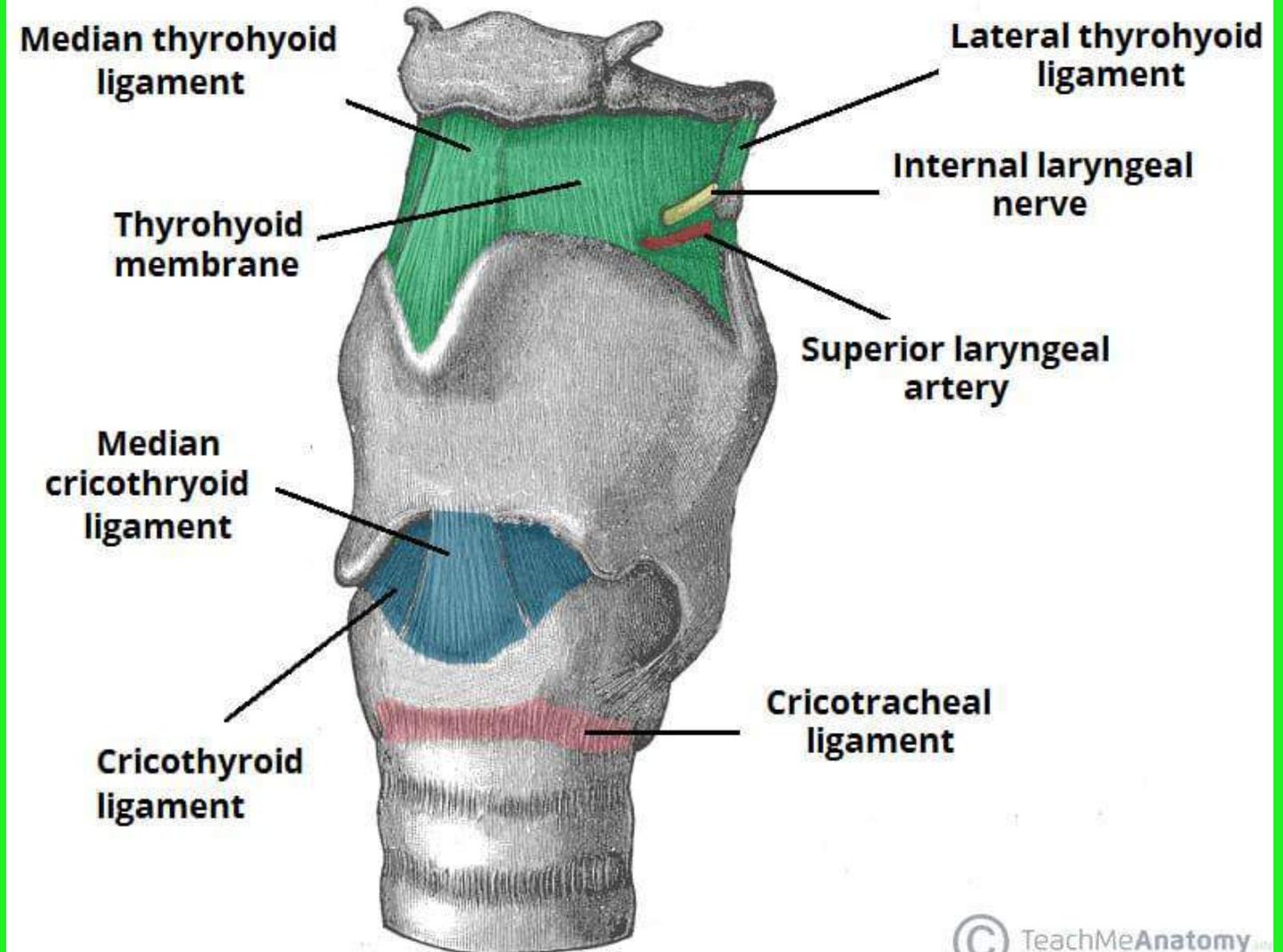


# The Larynx

**Cricothyroid ligament:** The lower margin is attached to the upper border of the cricoid cartilage .

The superior margin of the ligament, ascends on the medial surface of the thyroid cartilage

**Cricotracheal ligament:** This connects the cricoid cartilage to the first ring of the trachea

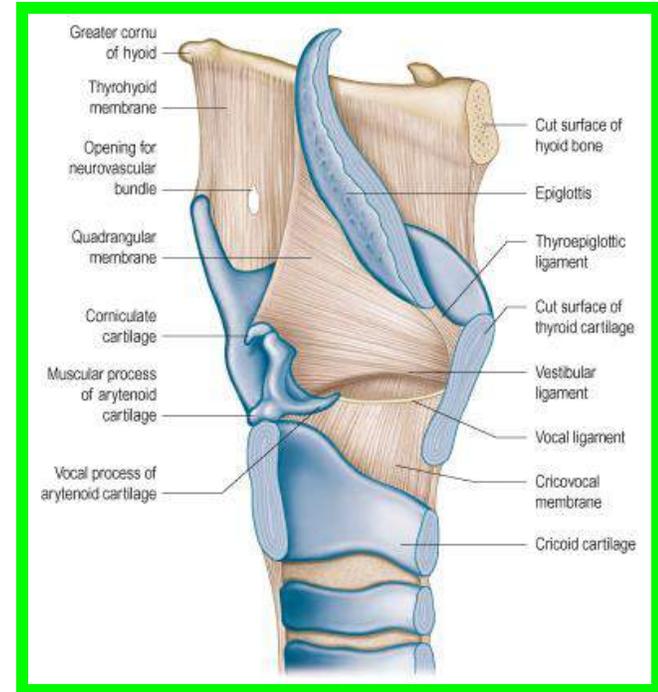


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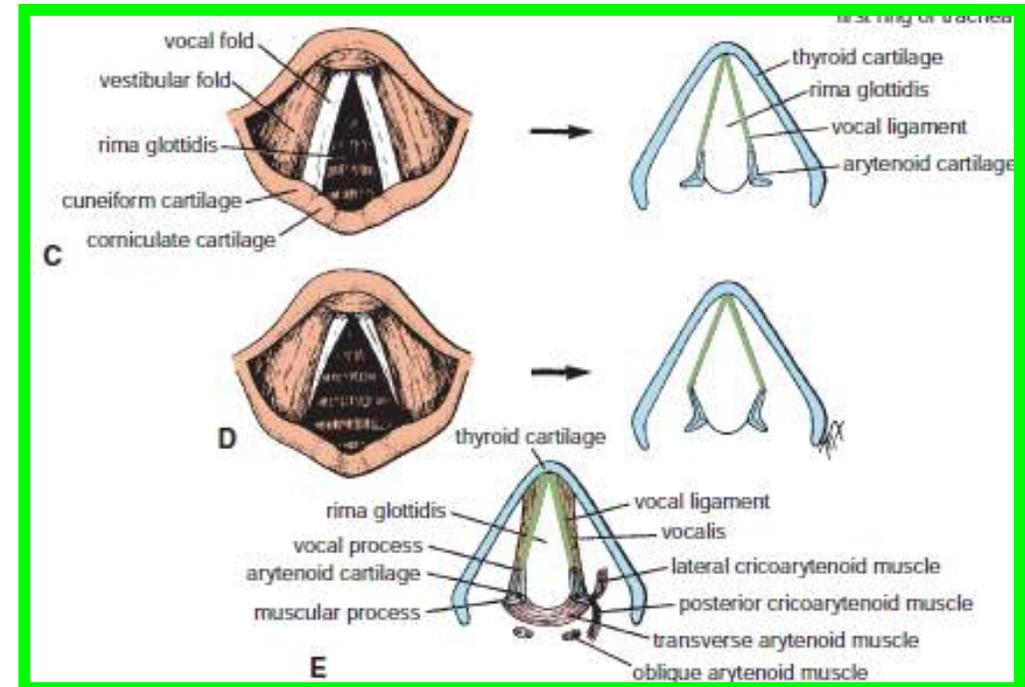


## Cricothyroid ligament:

- ✓ Its upper free margin forms the important **vocal ligament** on each side.
- ✓ The **vocal ligaments** form the interior of the **vocal folds (vocal cords)**

✓ The anterior end of each vocal ligament is attached to the **thyroid cartilage**,

✓ The posterior end is attached to the **vocal process of the arytenoid cartilage**



# The Larynx

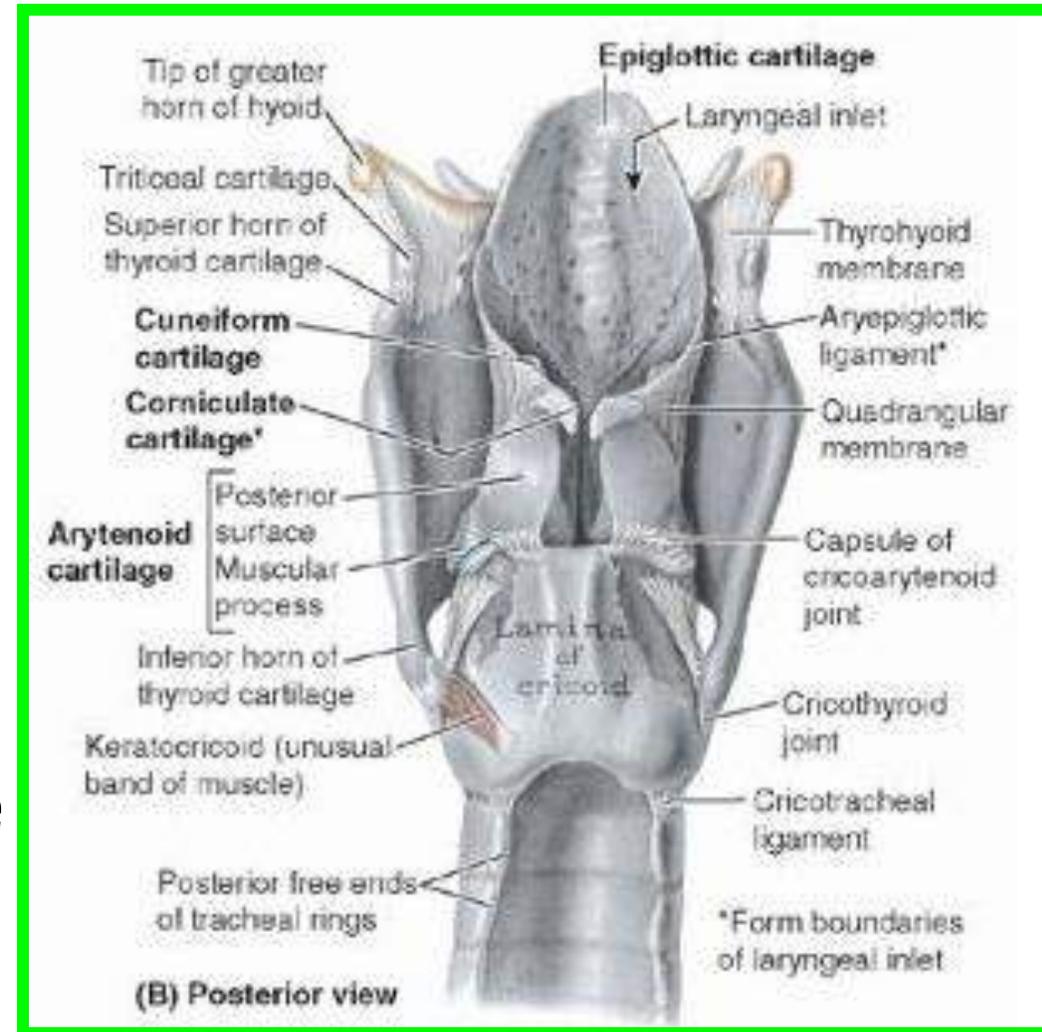
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## Inlet of the Larynx

The inlet of the larynx looks backward and upward into the laryngeal part of the pharynx

The opening is bounded in front by the epiglottis, laterally by the aryepiglottic fold of mucous membrane, and posteriorly by the arytenoid cartilages with the corniculate cartilages

The cuneiform cartilage lies within and strengthens **the aryepiglottic fold** and produces a small elevation on the upper border

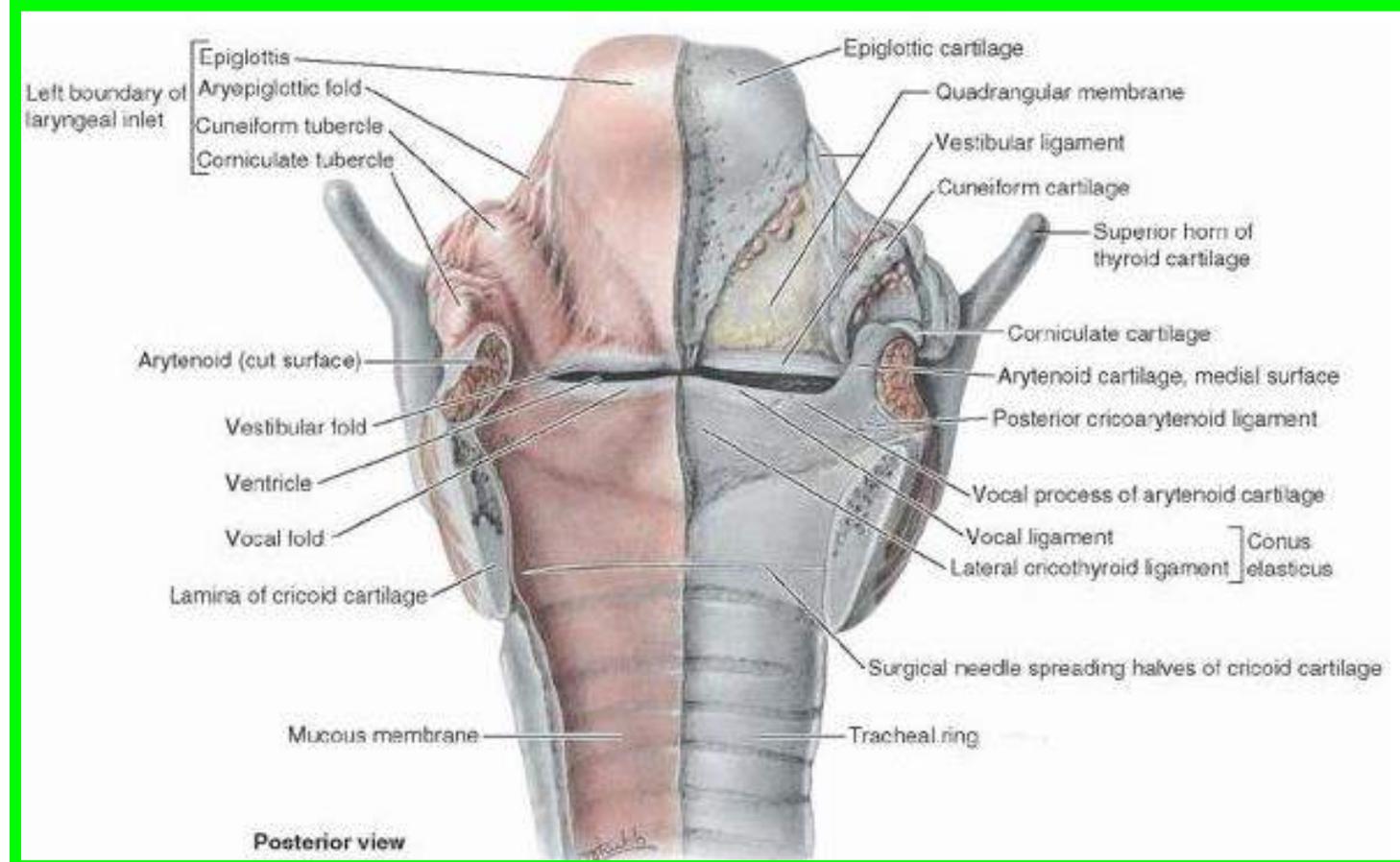


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## Laryngeal Folds

### Vestibular Fold:

Is a **fixed fold** on each side of the larynx It is formed by mucous membrane covering **the vestibular ligament** and is **vascular** and **pink in color**.



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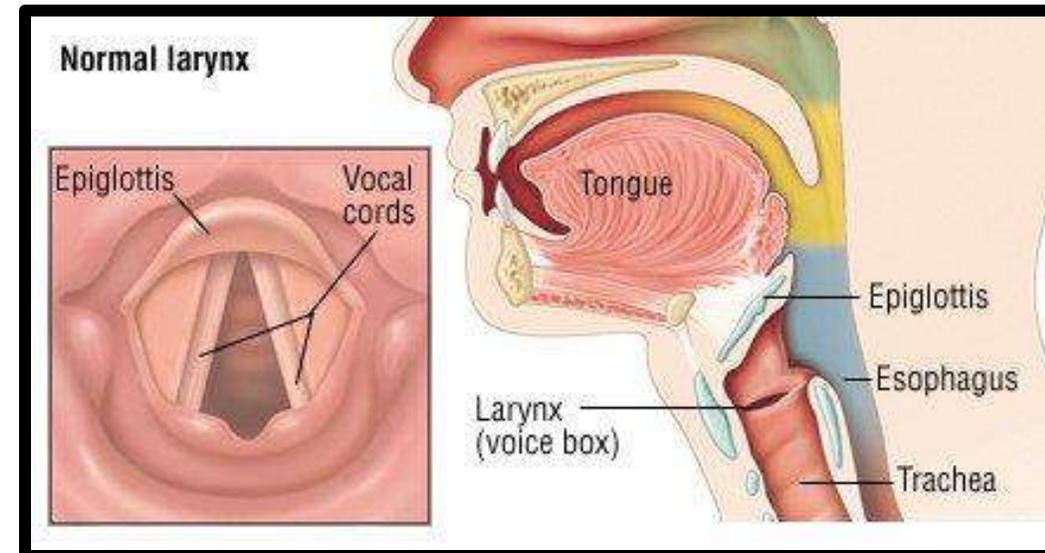
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## Vocal Fold (Vocal Cord)

- ✓ The vocal fold is **a mobile fold on each side of the larynx** and is concerned with voice production.
- ✓ It is formed by mucous membrane covering the **vocal ligament** and it is **a vascular and white in color**.

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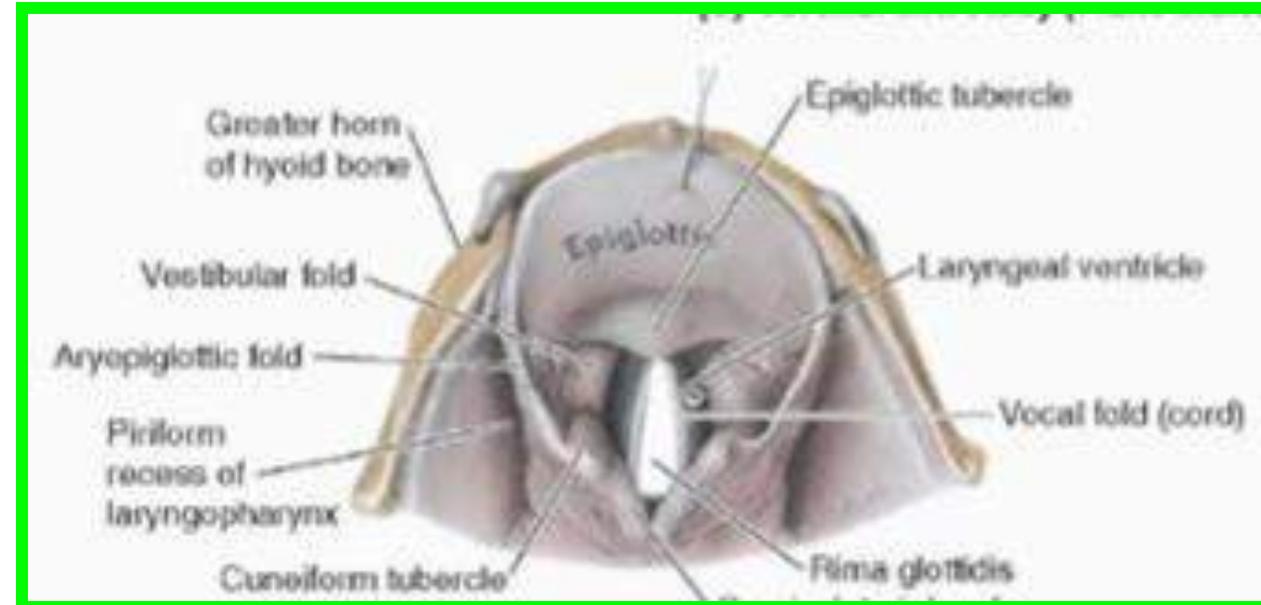
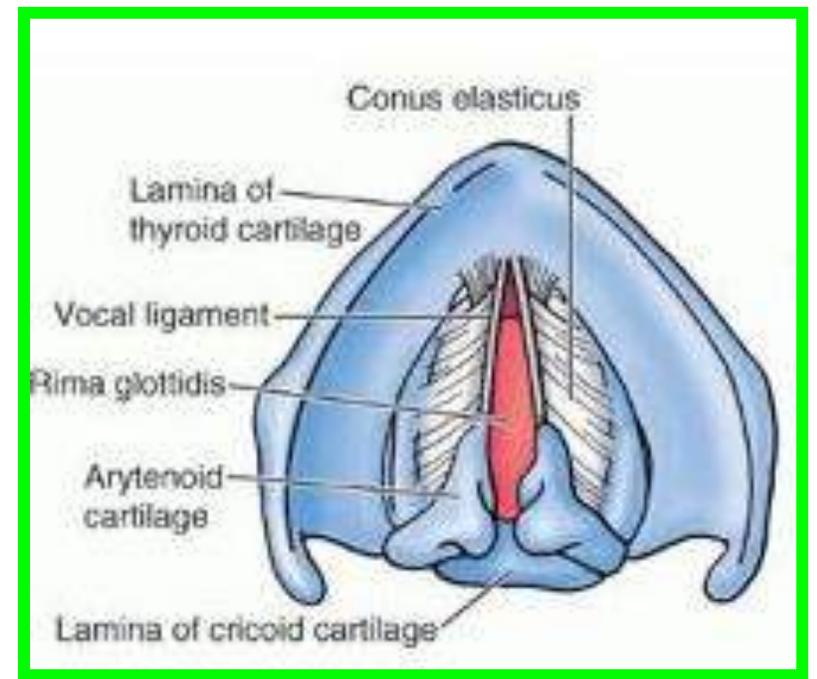
- ✓ The vocal fold moves with respiration and its white color is easily seen when viewed with a laryngoscope

# The Larynx

The gap between the vocal folds is called the **rima glottidis** or **glottis**

The glottis is bounded in front by the **vocal folds** and behind by the medial surface of the arytenoid cartilages.

The glottis is the narrowest part of the larynx and measures about **2.5 cm** from front to back.



# The Larynx

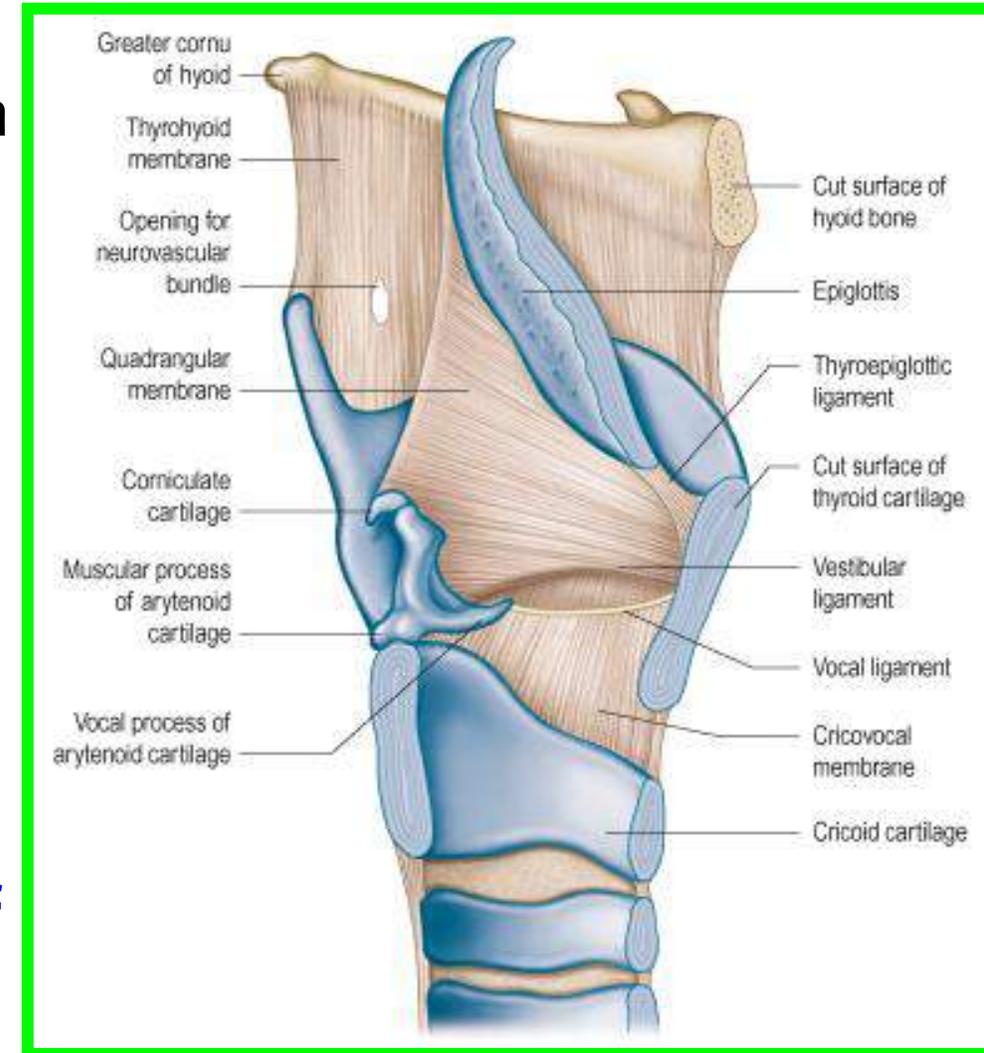
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## Cavity of the Larynx

Extends from the inlet to the lower border of the cricoid cartilage, where it is continuous with the cavity of the trachea.

It is divided into three regions:

- ✓ **The vestibule**, which is situated between the **inlet** and the **vestibular folds**.
- ✓ **The middle region**, which is situated between the **vestibular folds** above and the **vocal folds** below
- ✓ **The lower region**, which is situated between the **vocal folds** above and the **lower border of the cricoid cartilage** below the vocal cords.



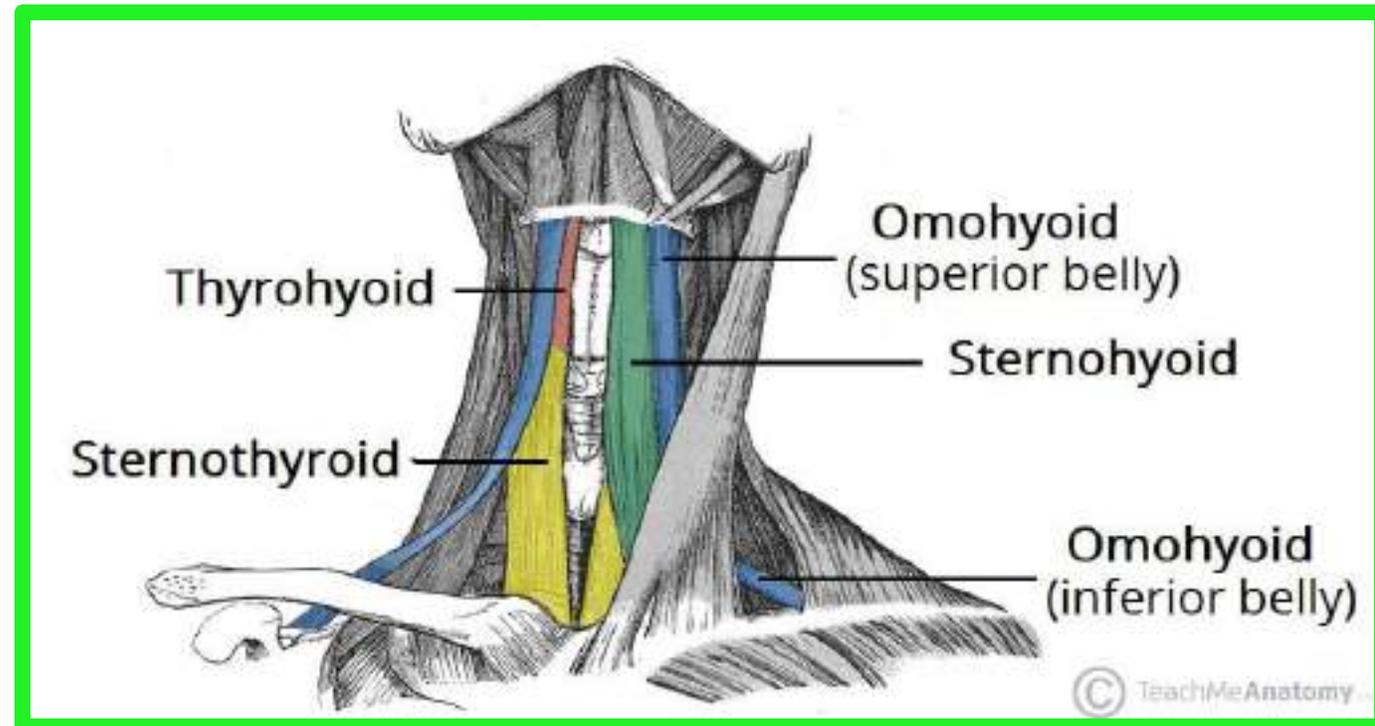
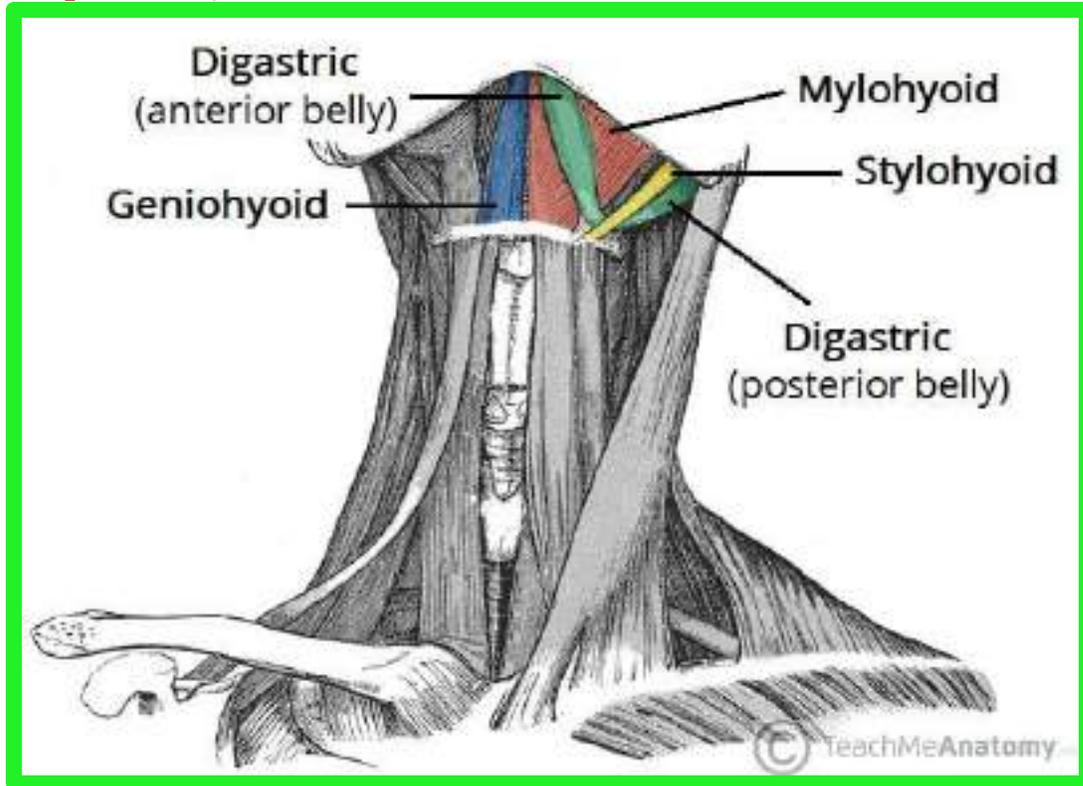
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## Laryngeal Muscles.

The laryngeal muscles are divided into extrinsic and intrinsic groups.

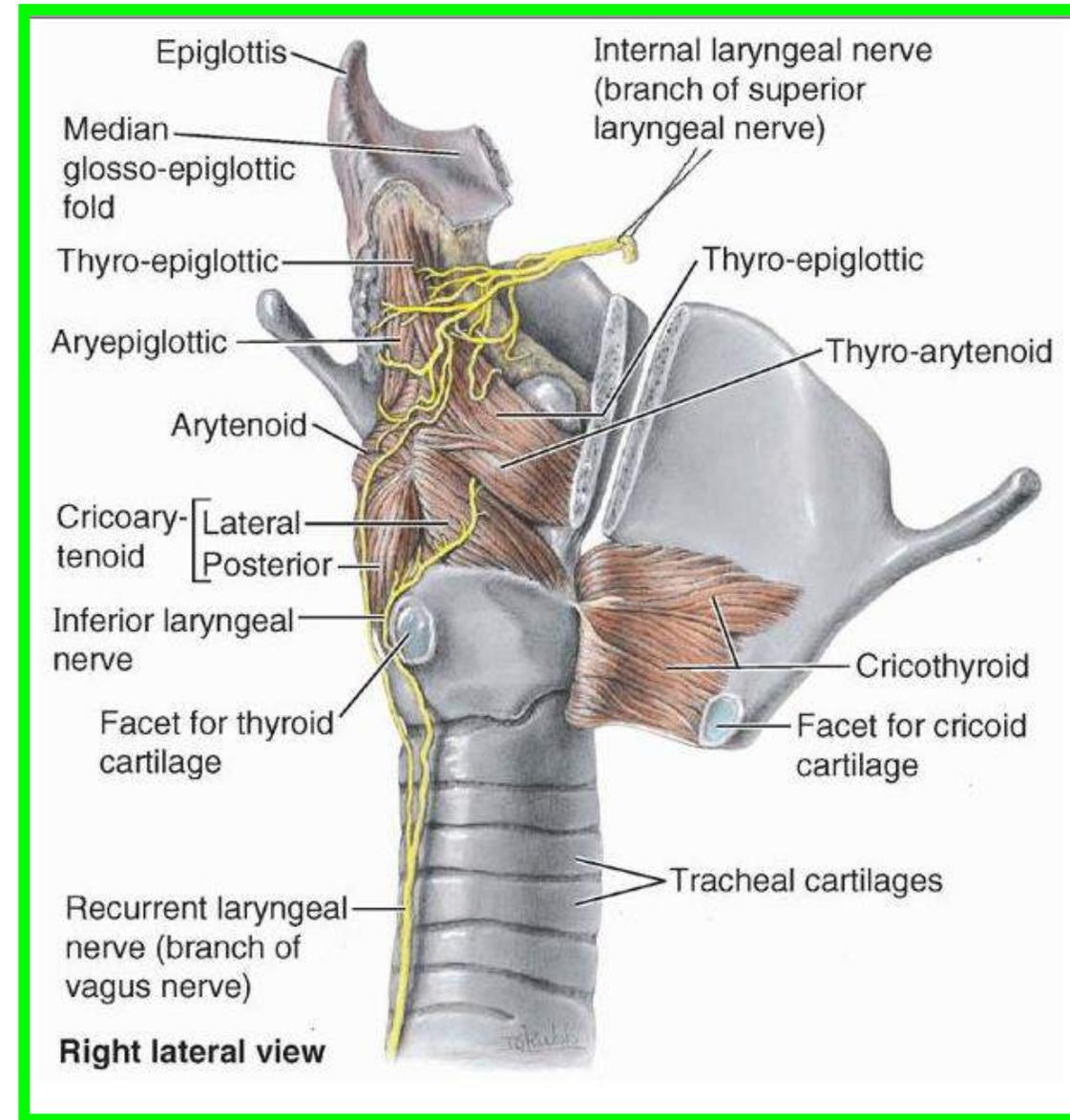
**Extrinsic laryngeal muscles** move the larynx as a whole.

The **infrahyoid muscles** are depressors of the hyoid and larynx, whereas the **suprahyoid muscles** are elevators of the hyoid and larynx.



# The Larynx

**Intrinsic laryngeal muscles** move the laryngeal components, **altering the length and tension of the vocal folds and the size and shape of the rima glottidis**



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## Nerve Supply of the Larynx

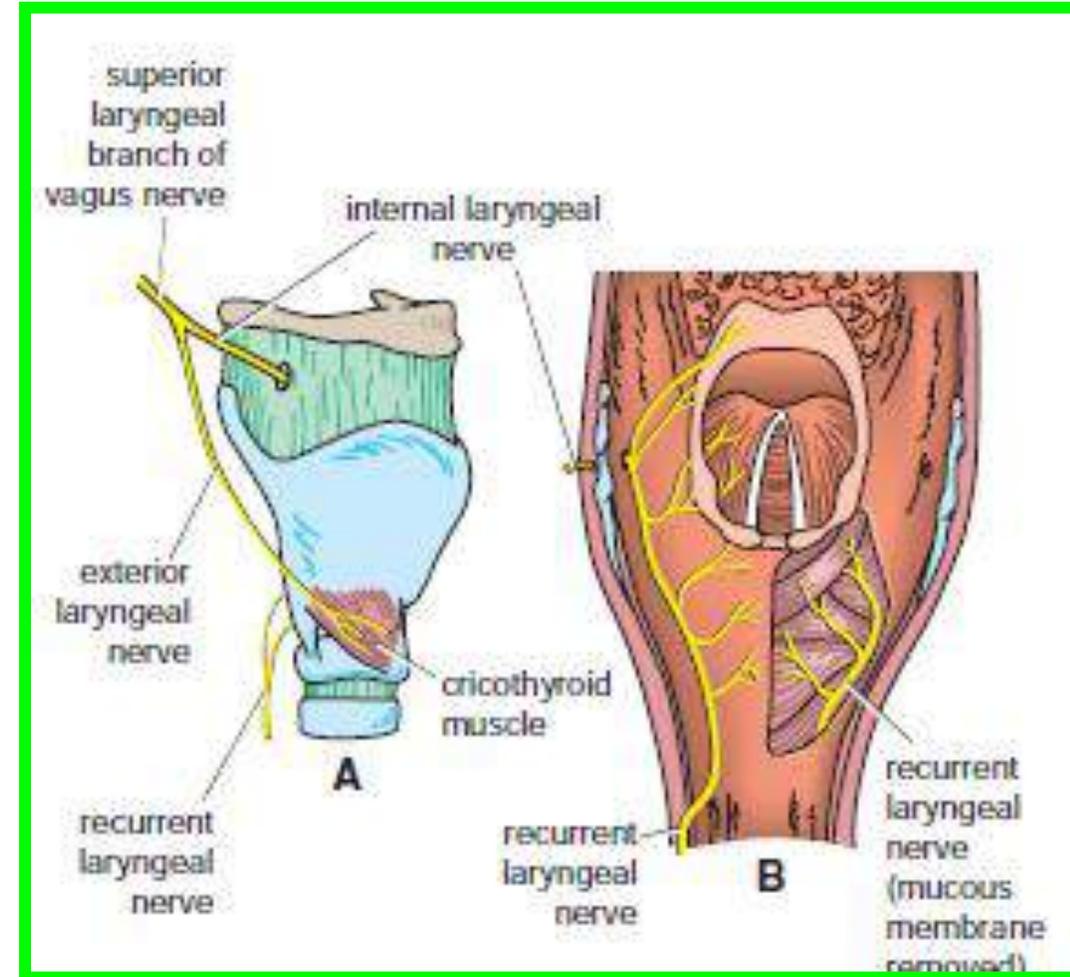
### Sensory Nerves

■ ■ **Above the vocal cords:** The internal laryngeal branch of the superior laryngeal branch of the vagus

■ ■ **Below the level of the vocal cords:** The recurrent laryngeal Nerve.

**Motor Nerves** All the intrinsic muscles of the larynx except the cricothyroid muscle are supplied by the recurrent laryngeal nerve.

The cricothyroid muscle is supplied by the external laryngeal branch of the superior laryngeal branch of the vagus.



# The Larynx

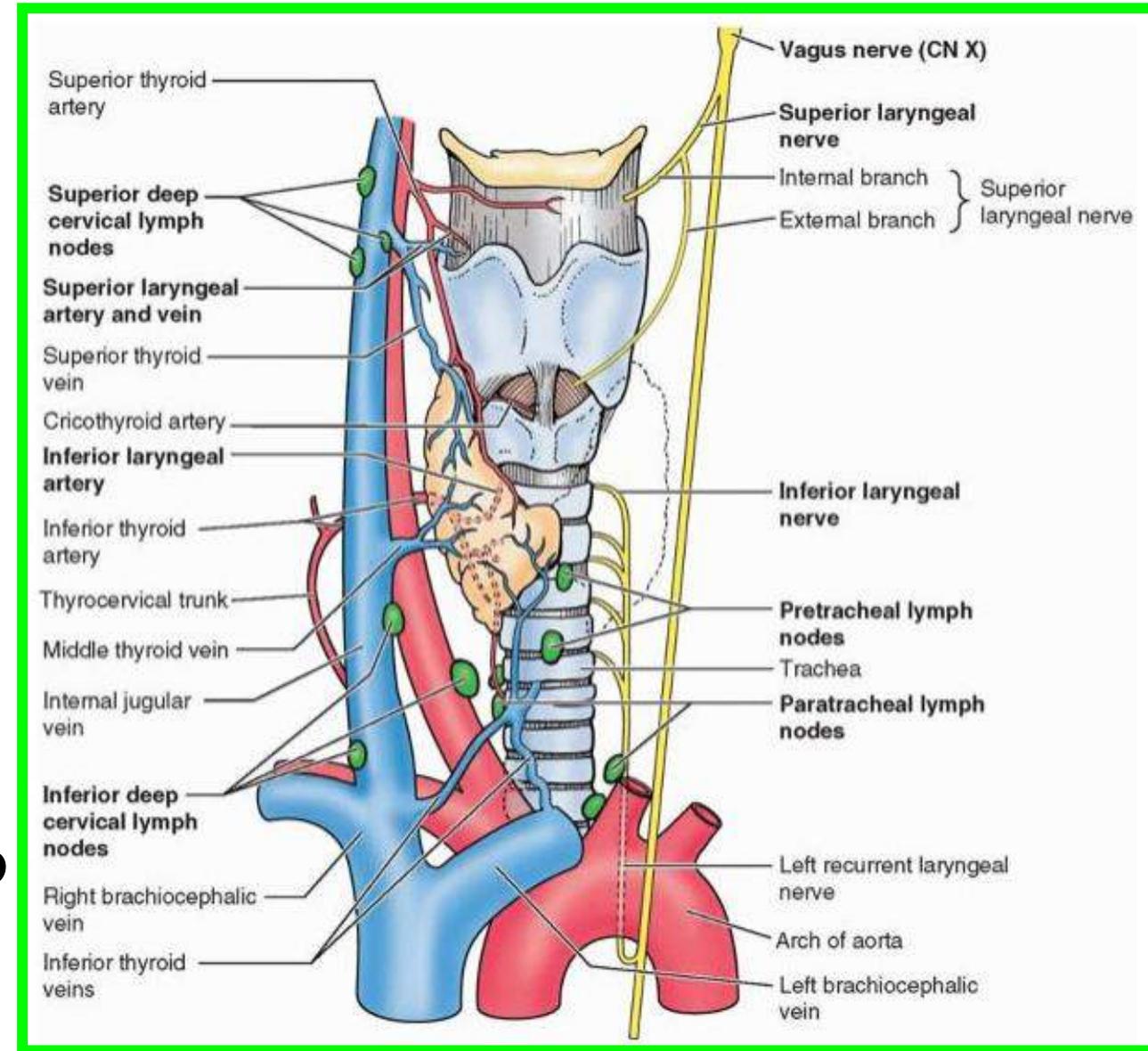
## Blood Supply of the Larynx

■ ■ **Upper half of the larynx:** The superior laryngeal branch of the superior thyroid artery

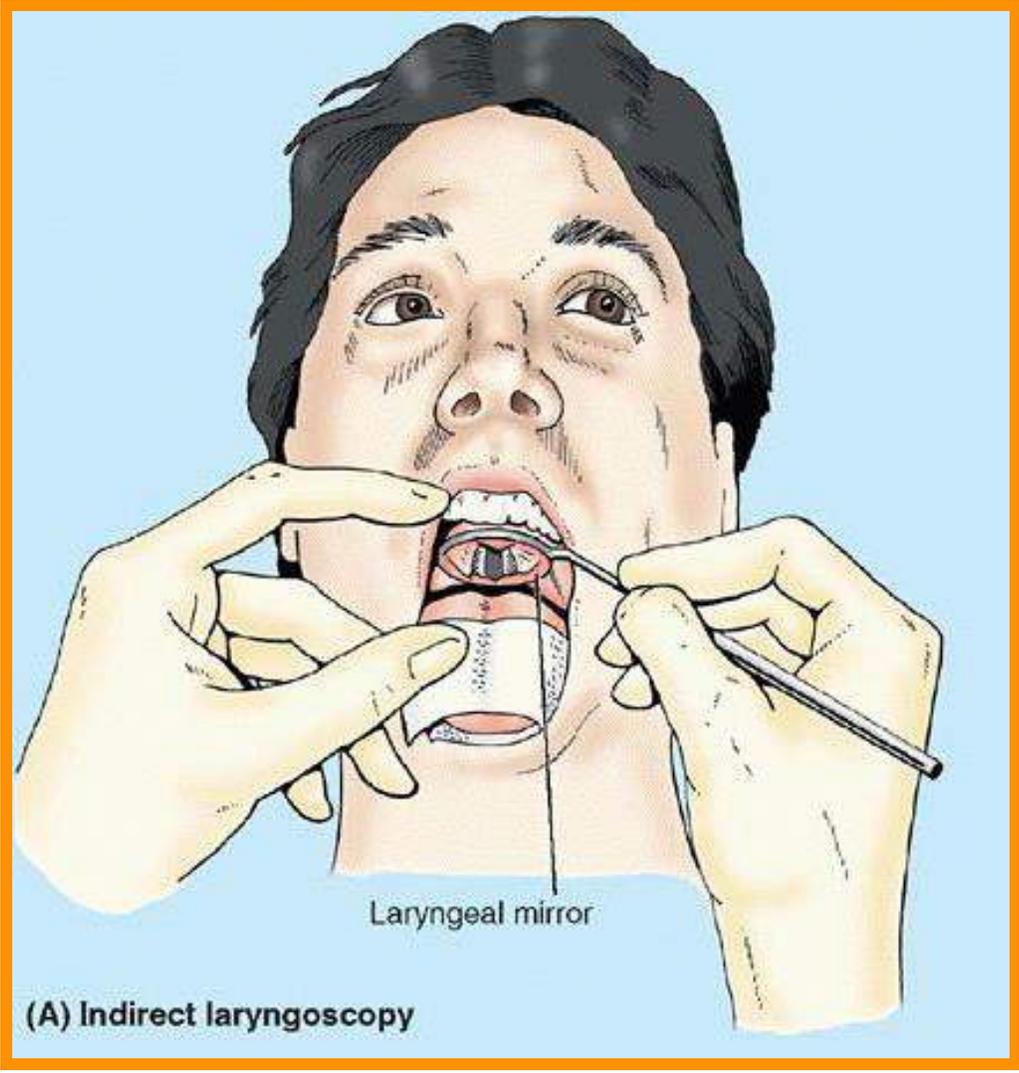
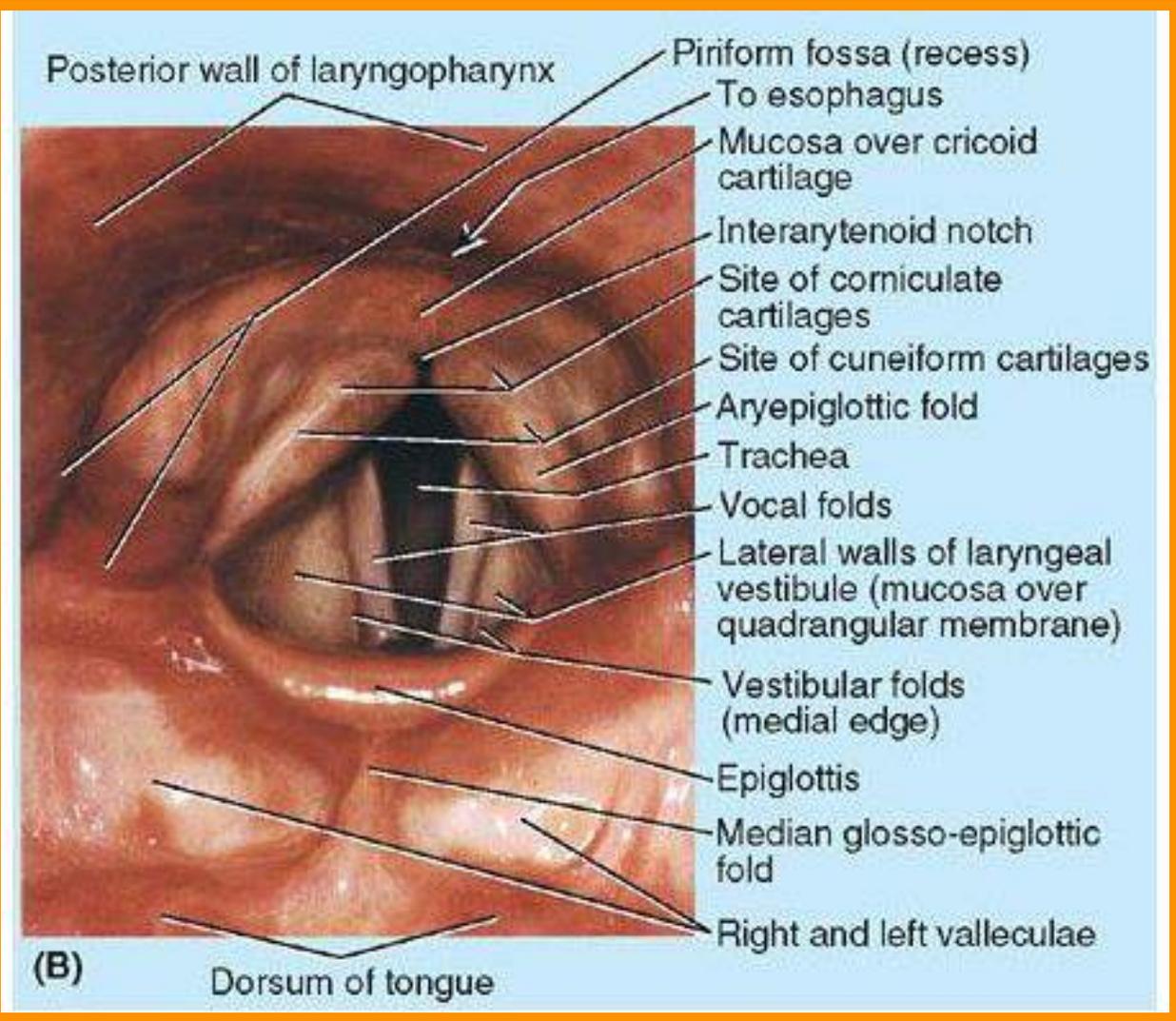
■ ■ **Lower half of the larynx:** The inferior laryngeal branch of the inferior thyroid artery

## Lymph Drainage of the Larynx

The lymph vessels drain into the deep cervical group of nodes



# The Larynx



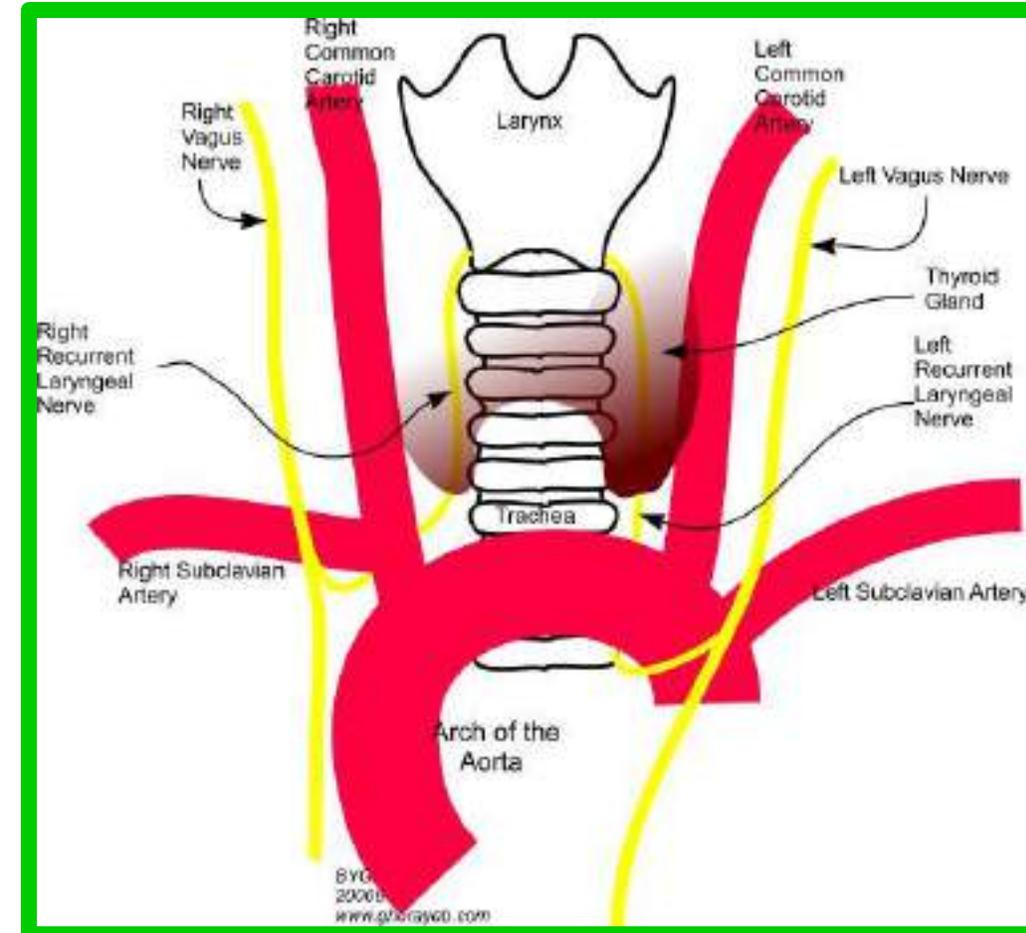
# Important Branches of the Vagus Nerve in the Neck

## ■ Recurrent laryngeal nerve

On the right side, the nerve hooks around the first part of **the subclavian artery**

On the left side, the nerve hooks around the **arch of the aorta**

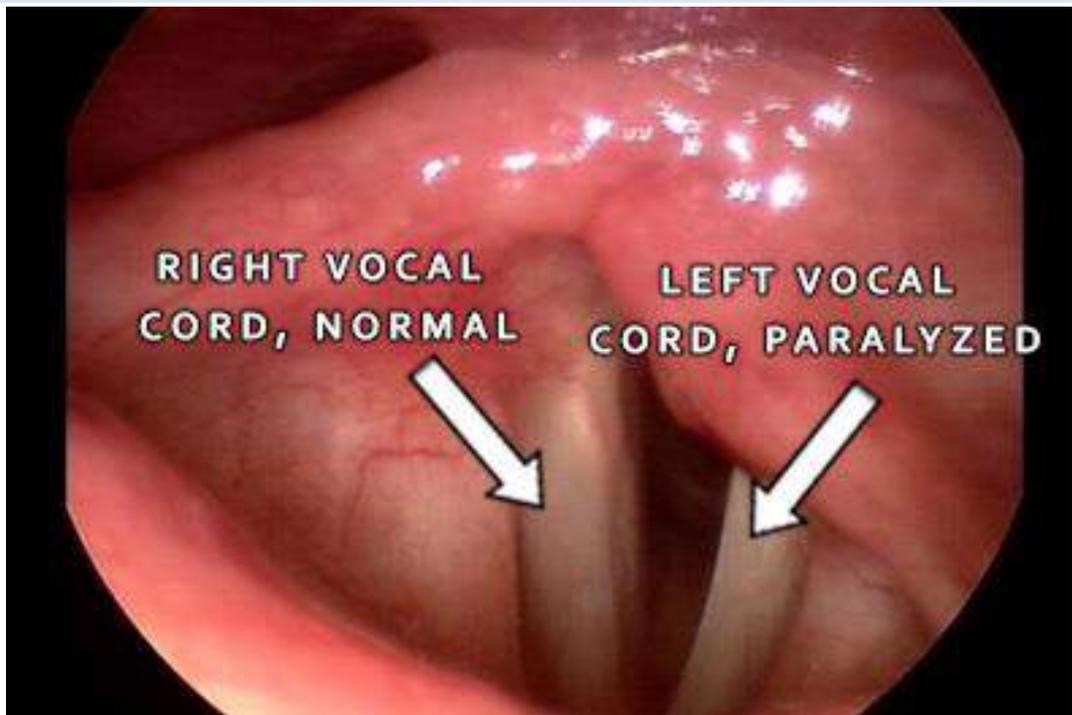
The nerve is closely related to **the inferior thyroid artery**, and it supplies all the muscles of the larynx, except the cricothyroid muscle, the mucous membrane of the larynx below the vocal cords, and the mucous membrane of the upper part of the trachea.



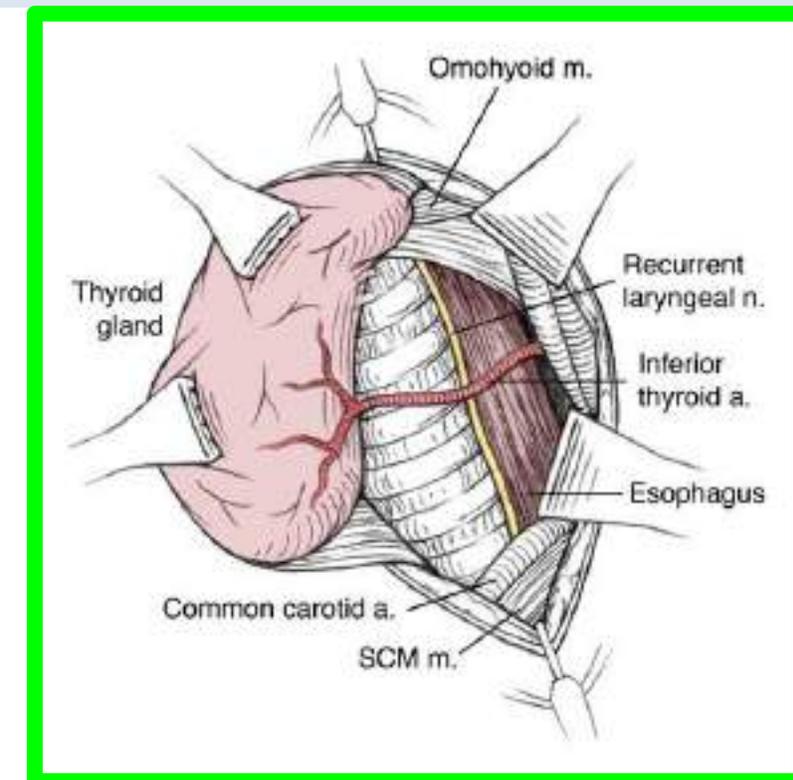
**VAGUS NERVE INJURY** Injury to **pharyngeal branches of CN X** results in dysphagia (difficulty in swallowing).

Injury of the **recurrent laryngeal nerve** causes hoarseness and dysphonia (difficulty in speaking) because of paralysis of the vocal folds (cords).

Paralysis of **both recurrent laryngeal nerves** causes aphonia (loss of voice) and inspiratory stridor (a harsh, high pitched respiratory sound). All these may results from **cancer of the larynx** and **thyroid gland** and/or from **injury during surgery on the thyroid gland, neck**.



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