يّمنع أخذ السلايدات بدون إذن المحرر واي اجراء يخالف ذلك يقع تحت طائلة المسؤولية القانونية

جميع المعلومات للاستخدام التعليمي فقط

أهلا

وسهلا

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الأستاذ الدكتور يوسف حسين

كلية الطب - جامعة مؤتة – الأردن

دكتوراة من جامعة كولونيا المانيا

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Larynx

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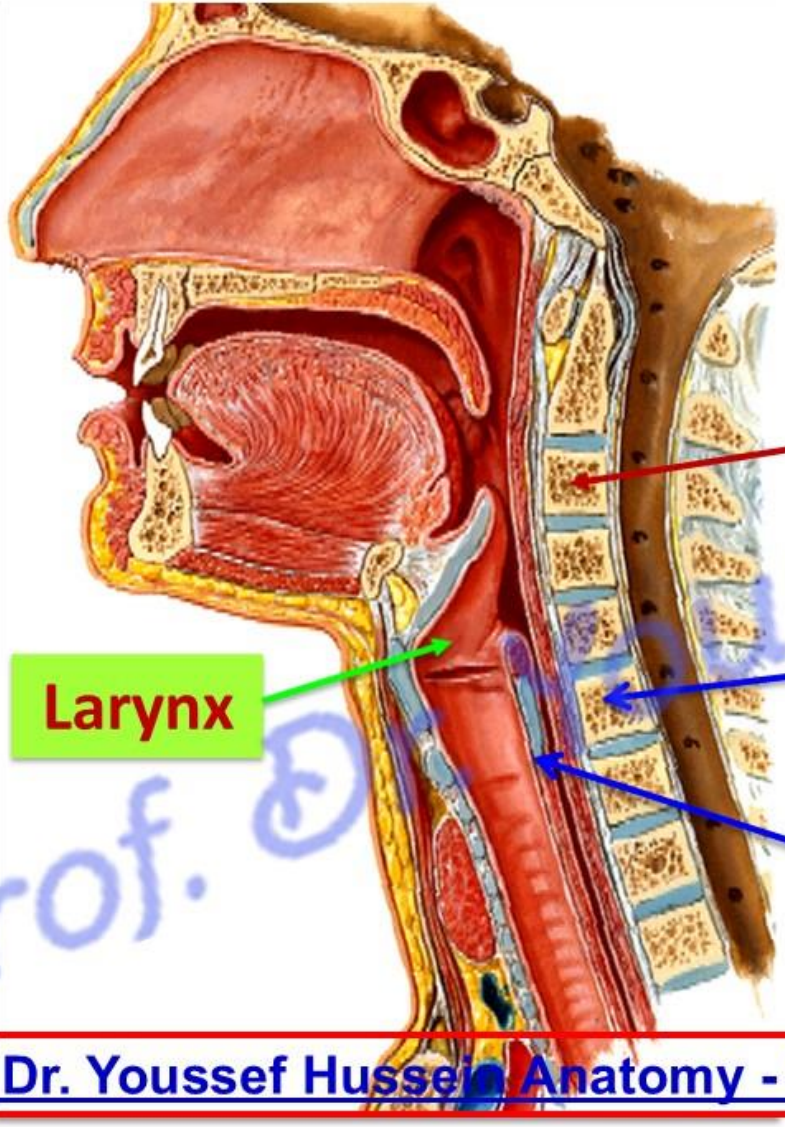
Intended Learning Outcomes (ILOs)

- Cartilages of the larynx
- Synovial joints of the larynx
- Membranes and ligaments of the larynx
- Cavity of the larynx
- Intrinsic muscles of the larynx
- Nerve supply of the larynx
- Clinical notes of the larynx

STRUCTURE OF LARYNX

- The larynx is organ of voice and forms an important part of the respiratory tract
- It is formed number of **cartilages** which are articulated by **synovial joints** and connected together by **ligaments** and **membranes** and moved by number of **muscles**.



- Extending from the root of the tongue to the trachea (from **C3 to C6** vertebra)

C3 vertebra

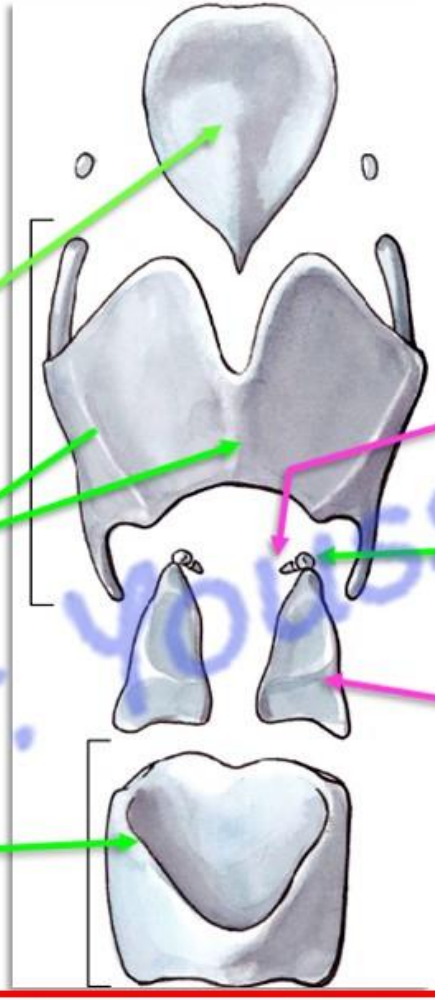
extension

Larynx

C6 vertebra

Lower border of Cricoid cartilage

Cartilages

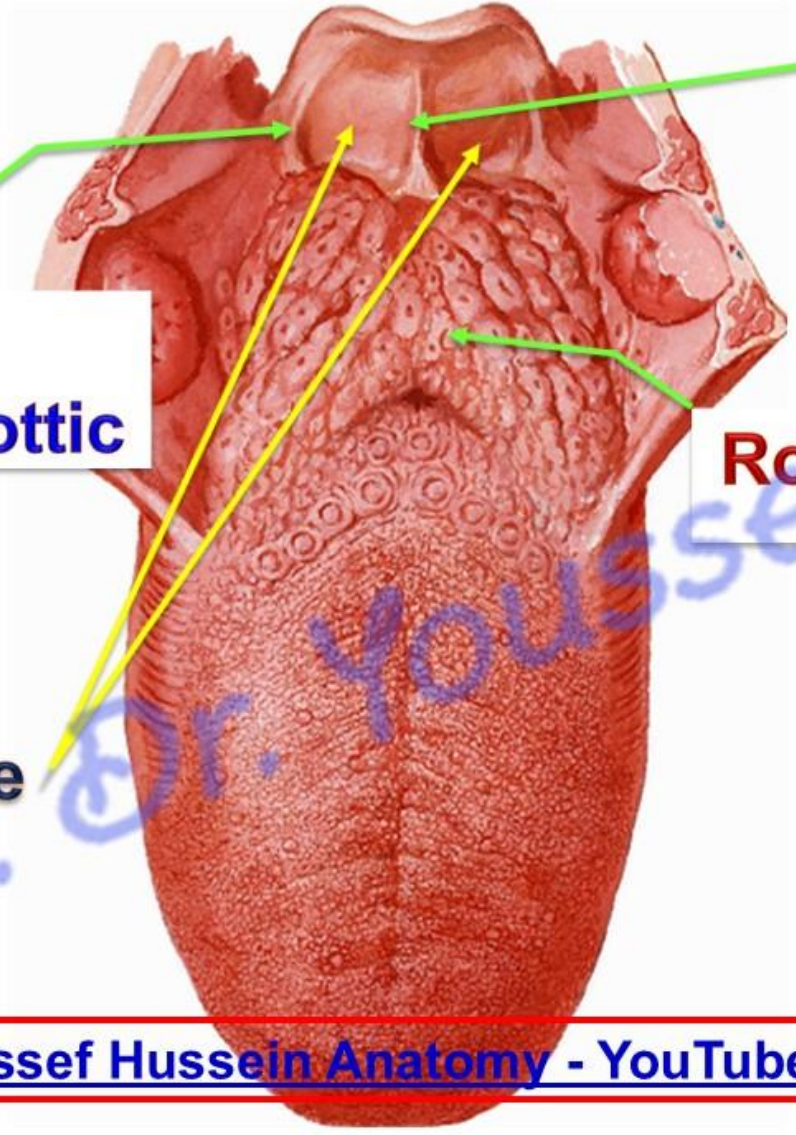


3 single

- Epiglottis
- Thyroid cartilage (Adam's apple).
- Cricoid cartilage

3 paired

- Cuneiform cartilage
- Corniculate cartilage
- Arytenoid cartilage



Median Glossoepiglottic fold

Lateral Glossoepiglottic fold

Root of tongue

Valleculae

Ant. Surface of epiglottis

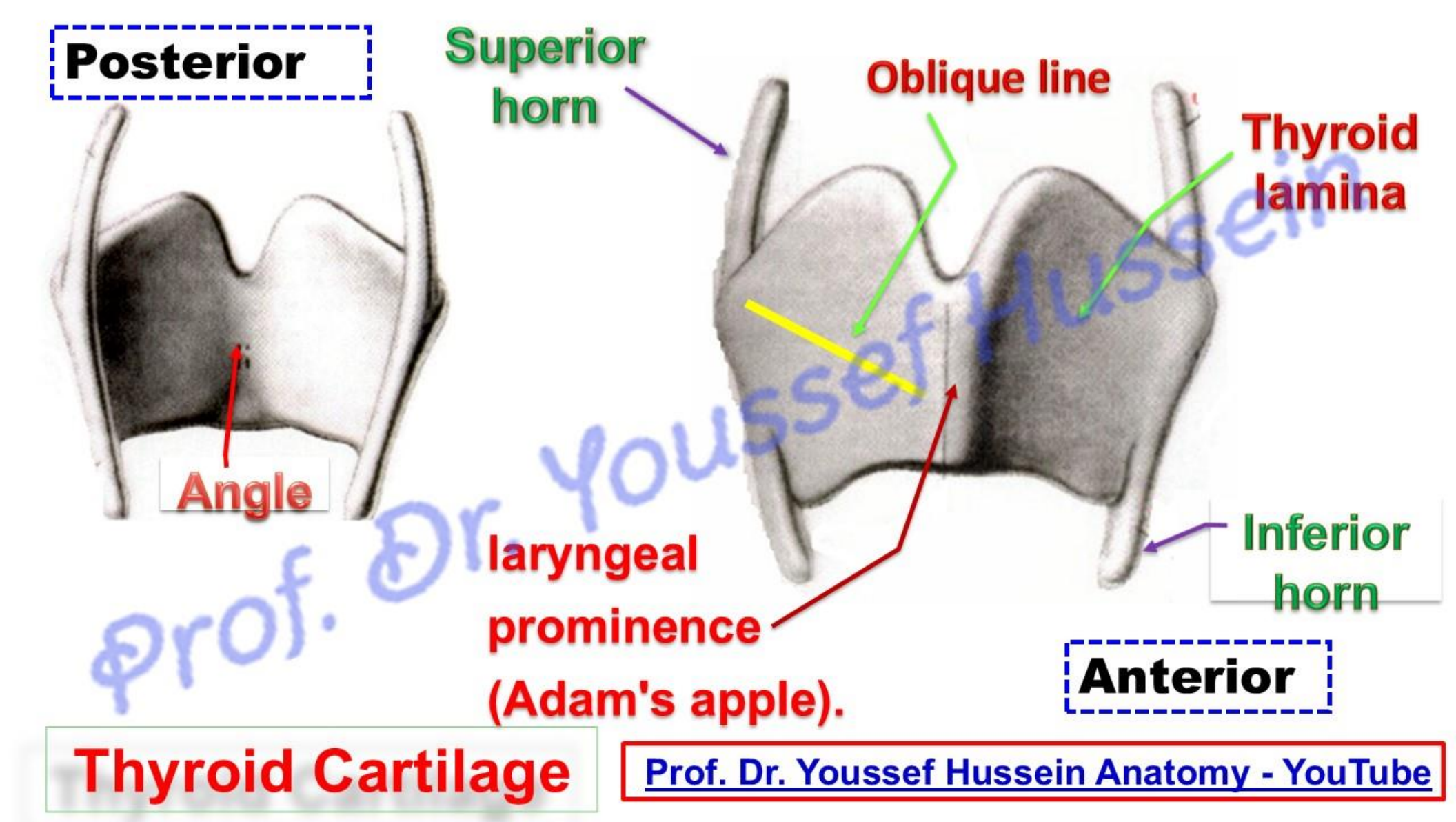
Epiglottis اللهاة

- It is a **leaf-like** lamella of elastic cartilage.
- It projects upwards behind the tongue.
- Its **upper** end is wide and free.
- Its **lower** end is narrow and fixed to the inner aspect of the thyroid prominence.
- **Posterior surface** of the epiglottis is smooth.
- **Anterior surface**, is connected to the root of the tongue by:

- A median fold called median **glossoepiglotic fold**.

- On each side by a lateral **glossoepiglotic folds**.

- The depression between median and lateral folds is called **vallecula** أخدود. **It is an important landmark during oral intubation of the trachea, hold small pools of saliva to prevent initiation of the swallowing reflex.**


Posterior
Superior horn
Oblique line
Thyroid lamina
Angle
laryngeal prominence (Adam's apple).
Inferior horn
Anterior
Thyroid Cartilage
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Thyroid cartilage (the largest one) الدرقي

- It is formed of 2 quadrilateral laminae which are separated posteriorly but united anteriorly to form the laryngeal prominence **(Adam's apple)**.

- **It is more prominent in in male (90 degree) than females (120 degree).**

- The posterior border of each lamina has 2 horns:

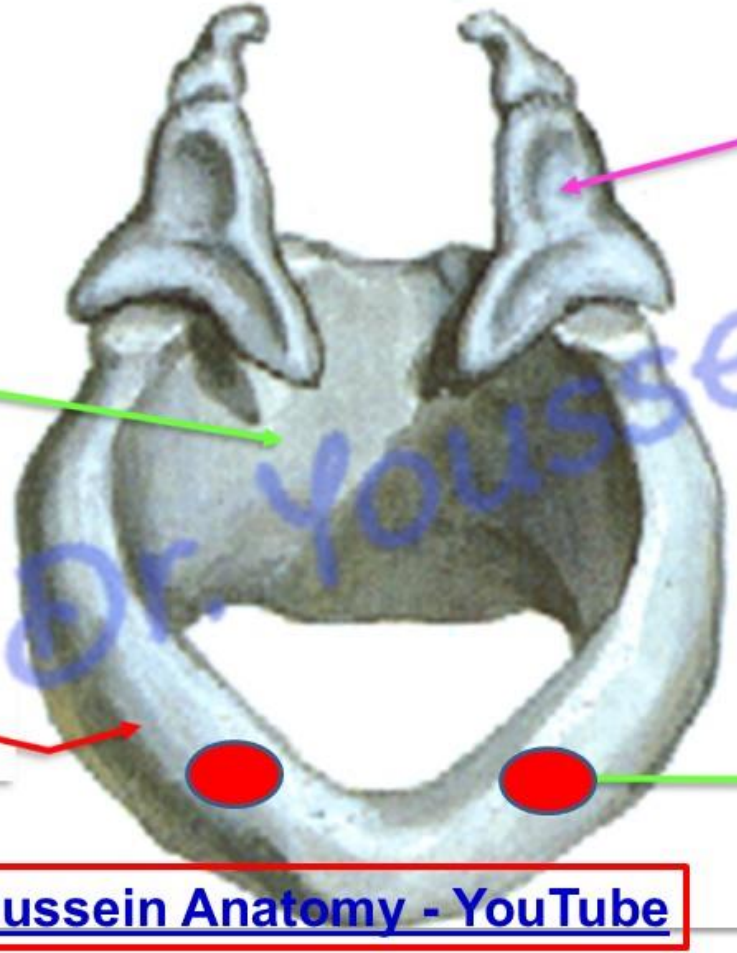
a) Superior Horn: attached to the hyoid bone by the lateral **thyrohyoid ligament**.

b) Inferior horn: articulates with **cricoid cartilage**.

- The lateral surface of the lamina shows an **oblique line** that gives attachment to the muscles (sternothyroid, thyrohyoid and inferior constrictor muscle of the pharynx).

Cricoid cartilage

signet-ring shaped



Arytenoid cartilage

Broad posterior lamina

Is the only complete cartilaginous ring in the whole of air passage

Narrow anterior arch

Inferior horn of thyroid cartilage

• Cricoid cartilage حلقي

- It is **ring-shaped** having a broad **lamina posteriorly** and a narrow **arch anteriorly.**

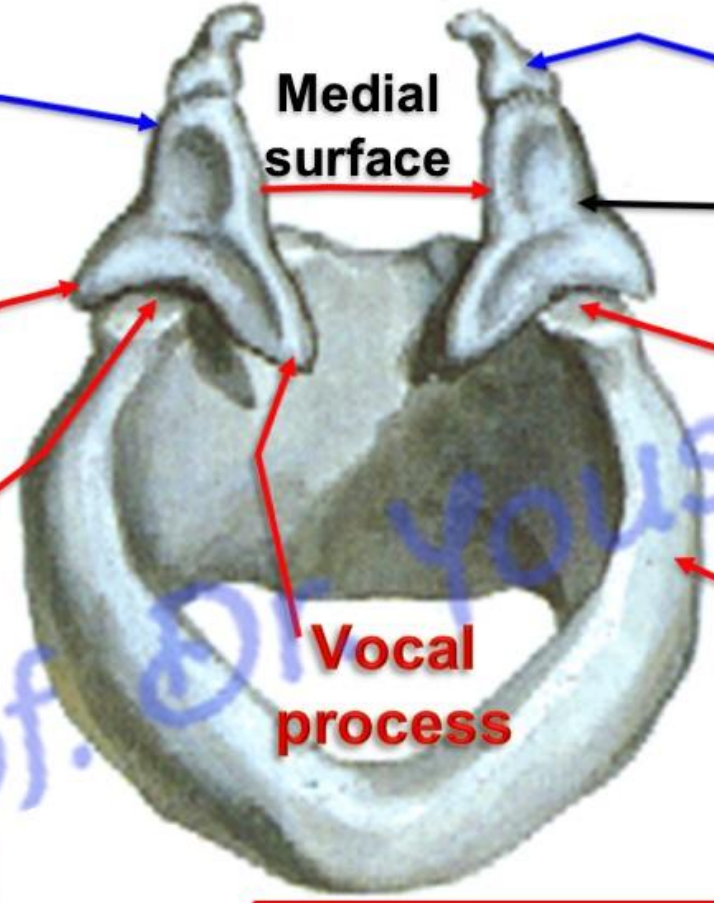
- It lies opposite the **6th** cervical vertebrae.

- **It articulates with**

a- Posteriorly: upper border of the lamina articulates with two arytenoids cartilages (**cricoarytenoid joint**).

b- The anterolateral aspect of the arch articulates with the inferior horn of the thyroid cartilage (**cricothyroid joint**).

Arytenoid cartilages (Key cartilage)



Apex

Medial surface

Corniculate cartilage

Arytenoid cartilage

Muscular process

CricoArytenoid joint

Base

Vocal process

Cricoid cartilage

pyramidal in shape

▪ Arytenoid cartilages

(Key cartilage of the larynx)

- Each one is **pyramidal** in shape having:

1) Apex (above): related to **corniculate cartilage.**

2) Base (below): articulates with **cricoid cartilage**

* Two processes project from the base;

a- Vocal process direct gives attachment to the **vocal fold.**

b- Muscular process gives attachment for the muscles.

• Corniculate cartilages

- Each one lying at the apex of the arytenoid cartilage.

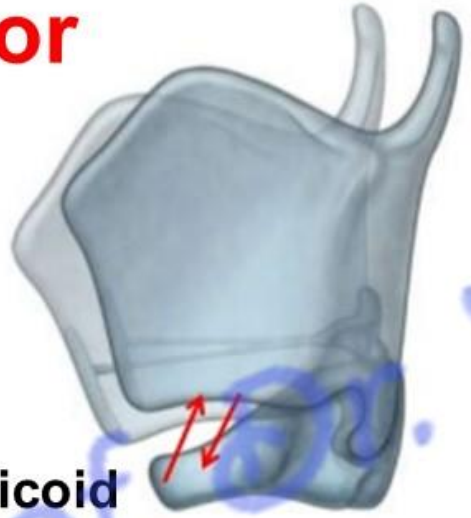
• Cuniform cartilages

- Small cartilage nodule lying in aryepiglottic fold.

Synovial Joints of larynx

Crico-thyroid Joint

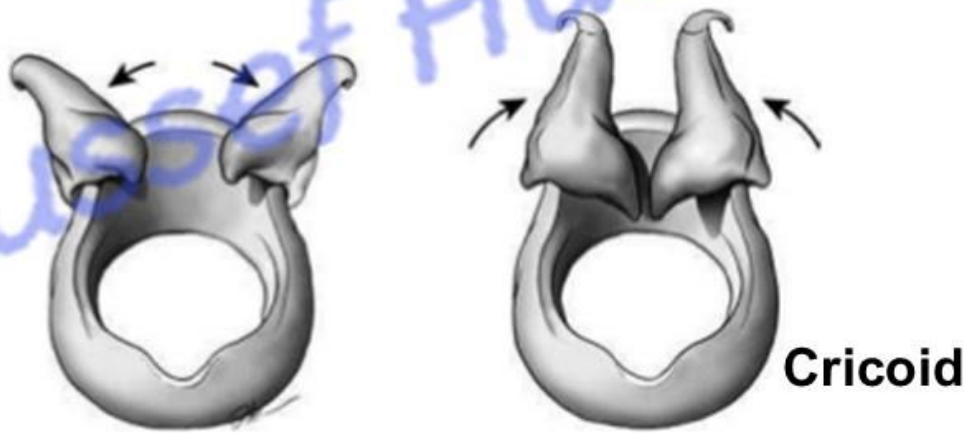
Anterior



Forward and Backward of thyroid cartilage

Crico-arytenoid Joint

Posterior



Abduction and Adduction of vocal cord

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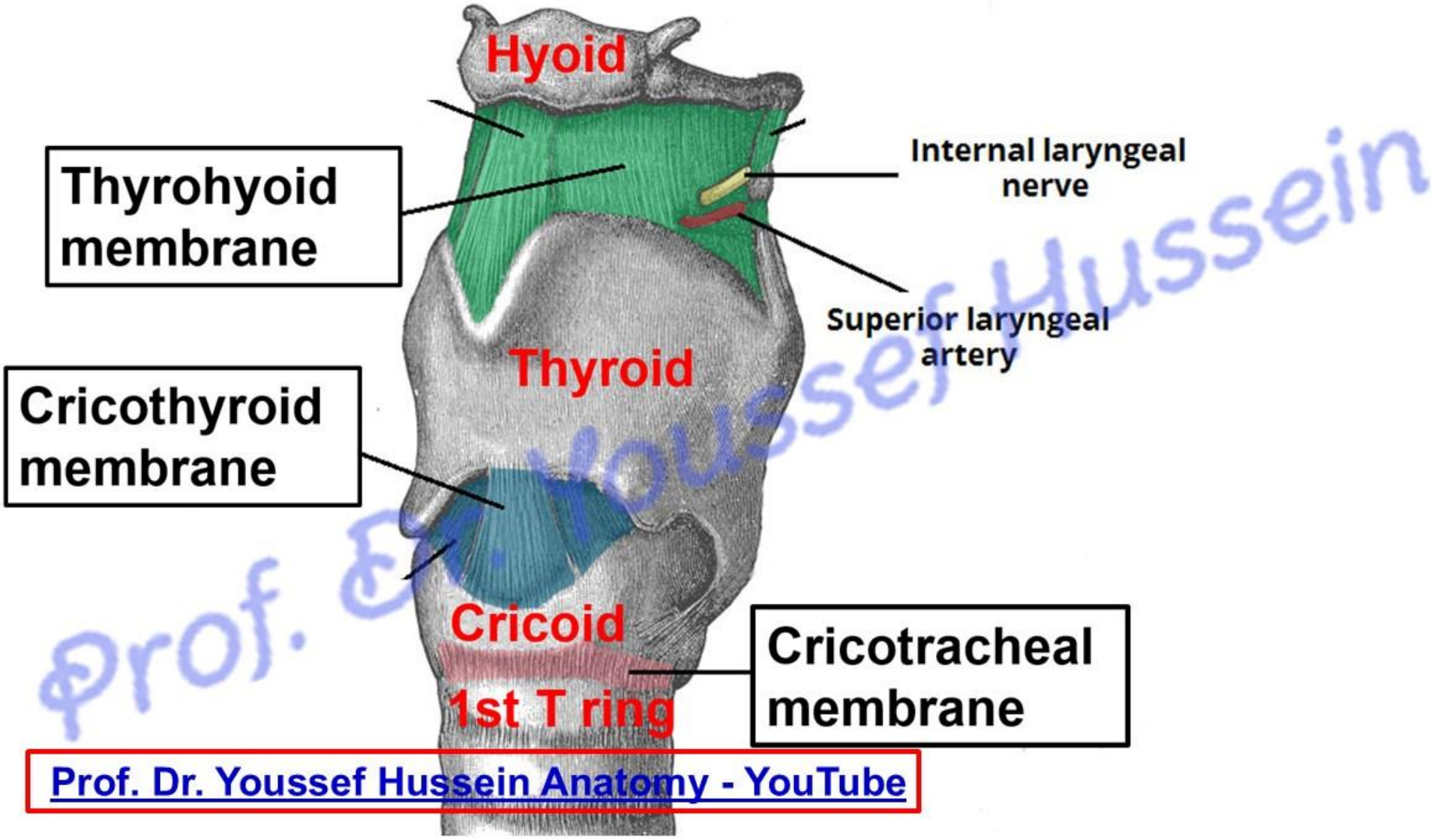
MEMBRANES AND LIGAMENTS OF LARYNX


Hyoid
Thyrohyoid membrane
Internal laryngeal nerve
Superior laryngeal artery
Thyroid
Cricothyroid membrane
Cricoid
1st T ring
Cricotracheal membrane
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Prof. Dr. Youssef Hussein

• Membranes and ligaments of the larynx

❖ **Thyrohyoid membrane:**

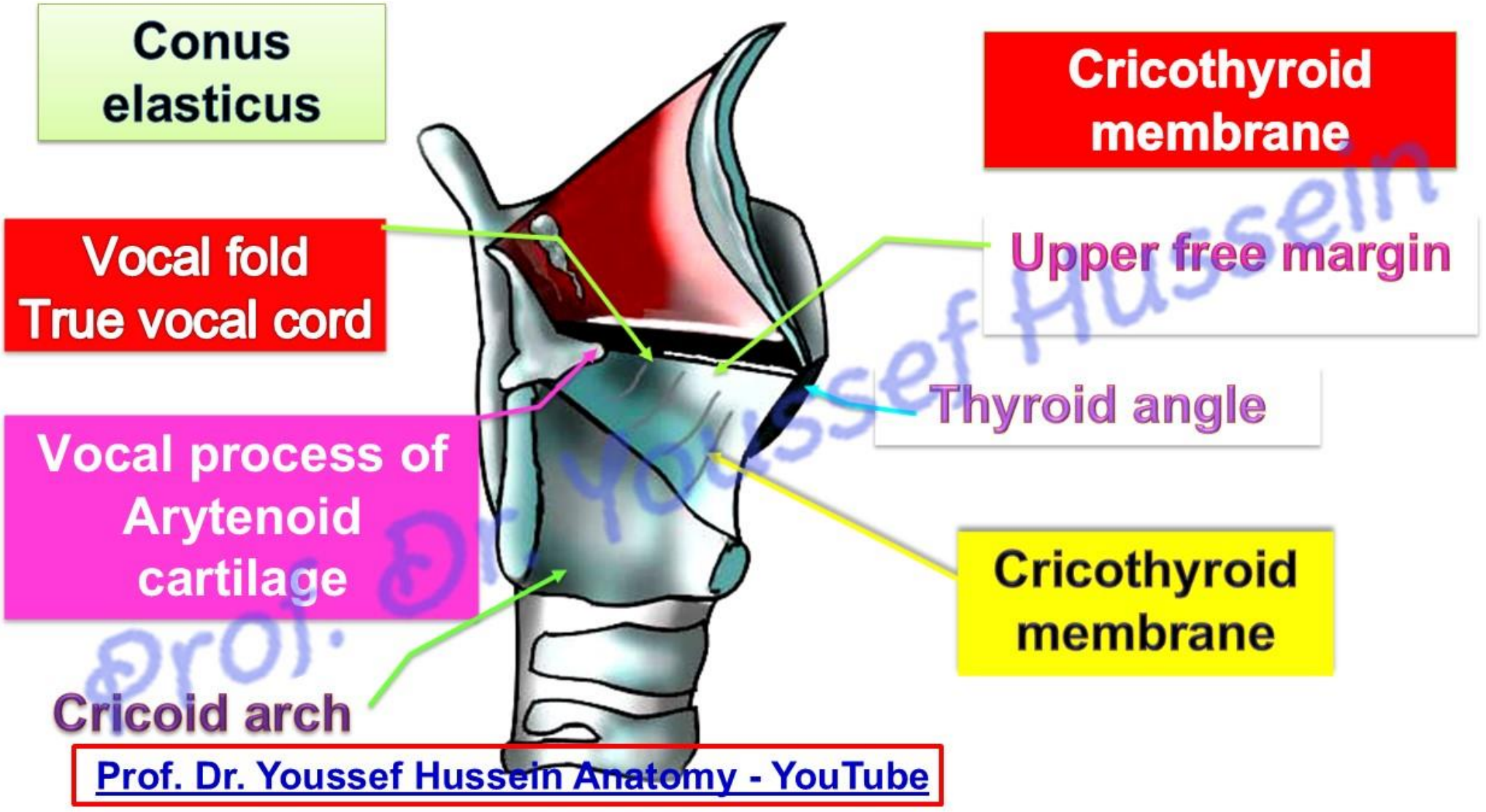
• **Attachment**;

a- From the upper border of the thyroid cartilage.

b- To the hyoid bone.

- The membrane **pierced by**: internal laryngeal nerve and superior laryngeal artery.

❖ **Cricotracheal membrane** from the cricoid cartilage **to the** first ring of the trachea.


Conus elasticus
Cricothyroid membrane
Vocal fold True vocal cord
Upper free margin
Thyroid angle
Vocal process of Arytenoid cartilage
Cricothyroid membrane
Cricoid arch
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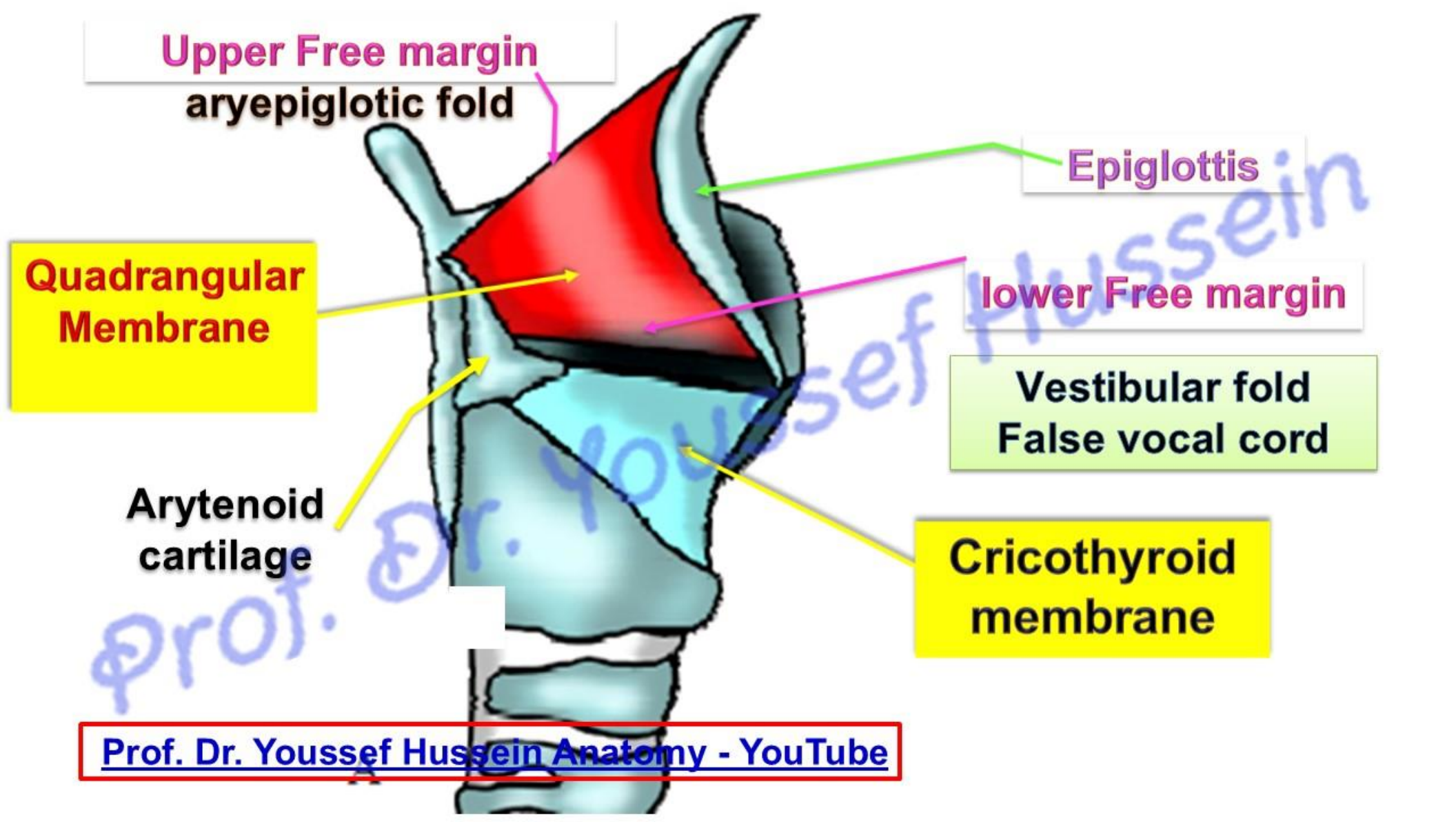
Upper Free margin
aryepiglotic fold
Epiglottis
Quadrangular Membrane
lower Free margin
Vestibular fold
False vocal cord
Arytenoid cartilage
Cricothyroid membrane
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• Membranes and ligaments of the larynx

➢Cricothyroid membrane and ligaments (*conus elasticus*):

- From upper border of cricoid cartilage to lower border of thyroid cartilage.

➢**The upper free border of the lateral cricothyroid membrane (Vocal fold or true vocal cord)** extends between inner surface of angle of **thyroid cartilage** (anterior) and vocal process of **arytenoid cartilage** (posterior).

➢Quadrangular membrane:

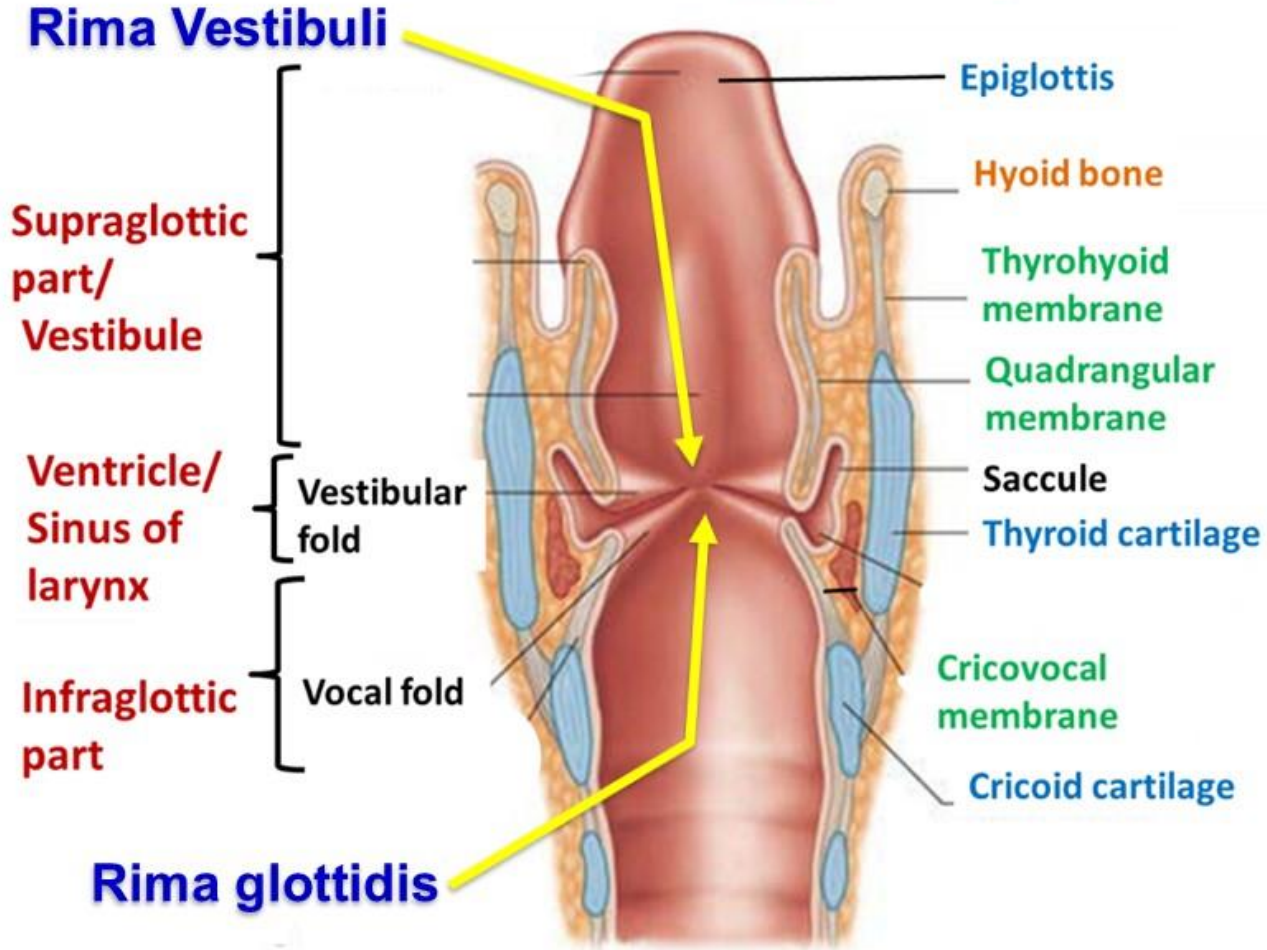
- Extends from **epiglottis** (anterior) & **arytenoid cartilages** (posterior).

a- Upper free border (**aryepiglotic fold**) and forms the laryngeal inlet.

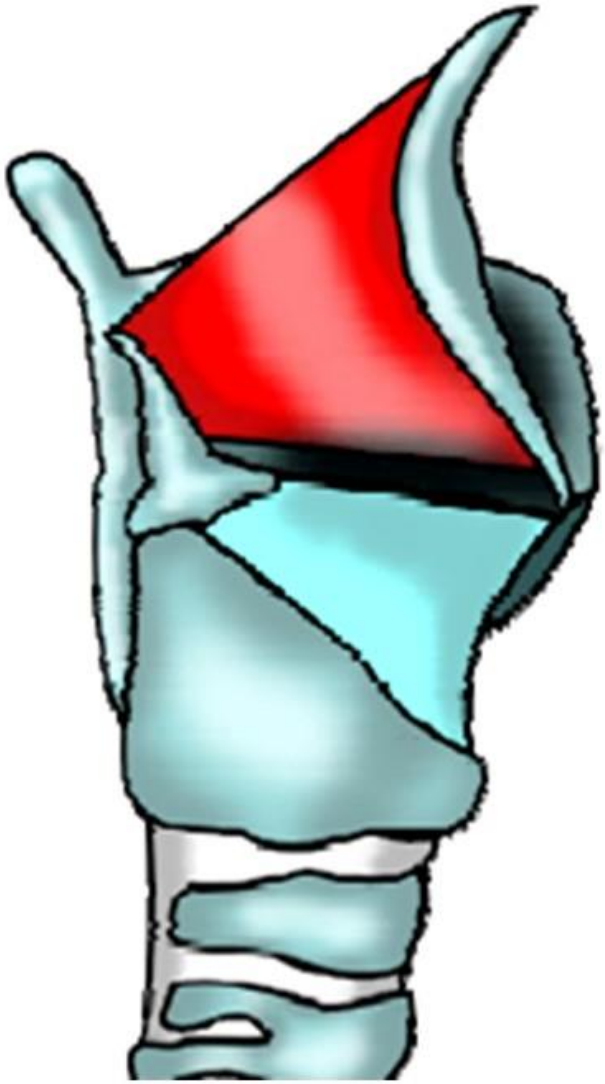
b- Lower free border forms the vestibular fold (**false vocal cord**).

Cavity of larynx

Subdivisions of Laryngeal Cavity



Coronal Section of Larynx



Sagittal section

• CAVITY OF THE LARYNX

- Each side wall presents a pair of folds of mucous membrane.

A- Upper folds called **vestibular folds** (false vocal cords)

B- Lower folds called **vocal folds** (true vocal cords)

- It is divided into 3 Compartments:

1. Vestibule (upper): above the vestibular folds.

2. Sinus or Ventricle (middle): between them.

- Saccules, one on each side, a **pouch** extends up from the anterior part of the sinus, **between vestibular fold and thyroid cartilage**

3. Infraglottic part: (lower) below the vocal folds.

(1) Rima vestibuli: is the space between the 2 vestibular folds.

(2) Rima glottidis: is the space between the 2 vocal folds.

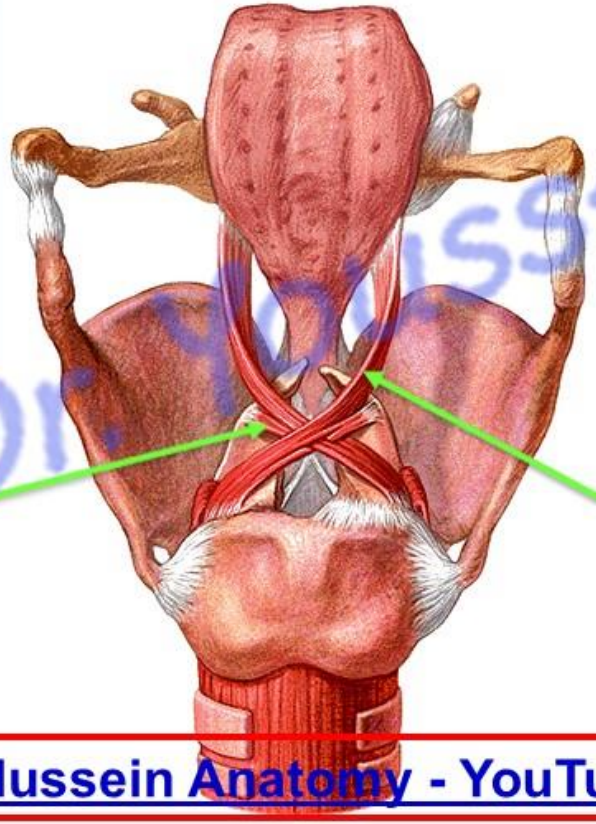
- It is the **narrowest part** of the laryngeal cavity. It is more wide in **male** (about 23 mm) than **female** (17 mm).

INTRINSIC MUSCLES OF LARYNX

Muscles Controls the inlet of larynx (act as sphincter of the inlet)

Oblique arytenoid muscle From muscular process of one arytenoids cartilage to apex of opposite one.

Aryepiglottic muscle From arytenoids cartilage to epiglottis

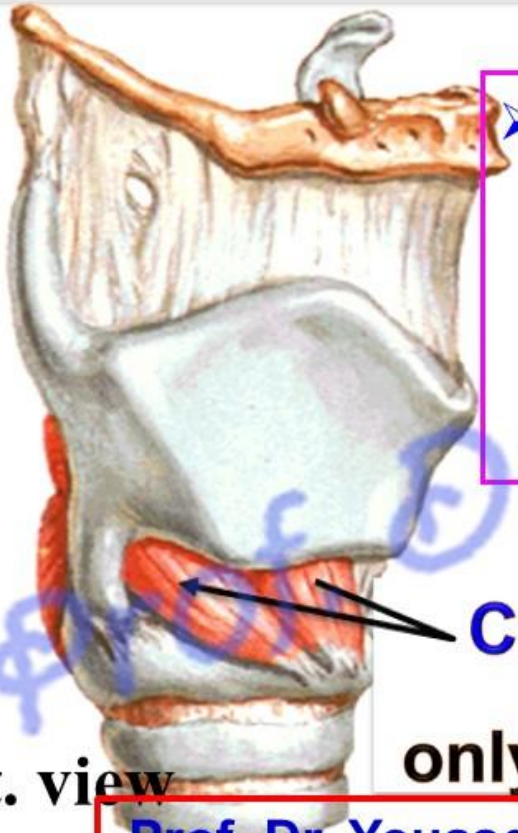


Oblique Arytenoid muscle

Aryepiglottic muscle

Muscles which stretch the vocal cords

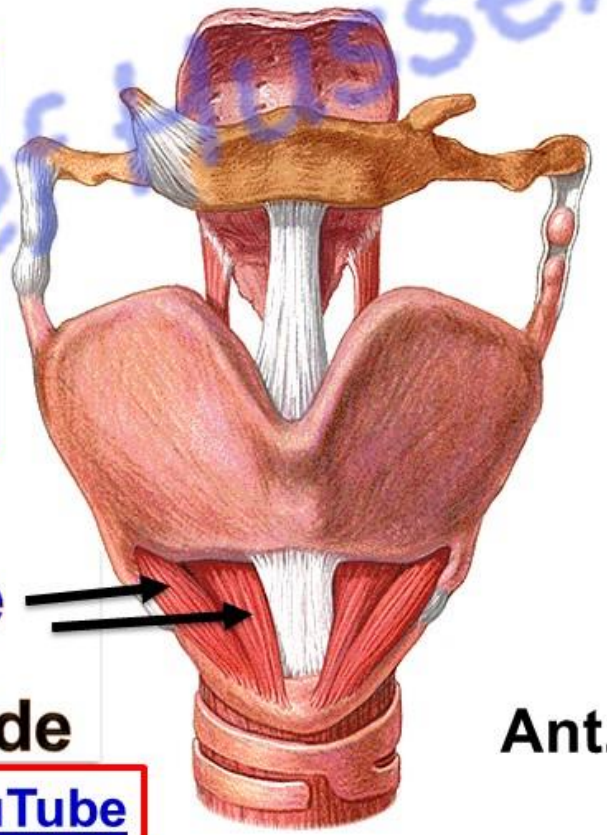
Cricothyroid muscle: From the arch of cricoid cartilage to the inferior horn and lamina of the thyroid cartilage



- **Thyroarytenoid muscles relax vocal cords** : from back of thyroid angle to arytenoids cartilage.

Cricothyroid muscle

only muscle lies outside



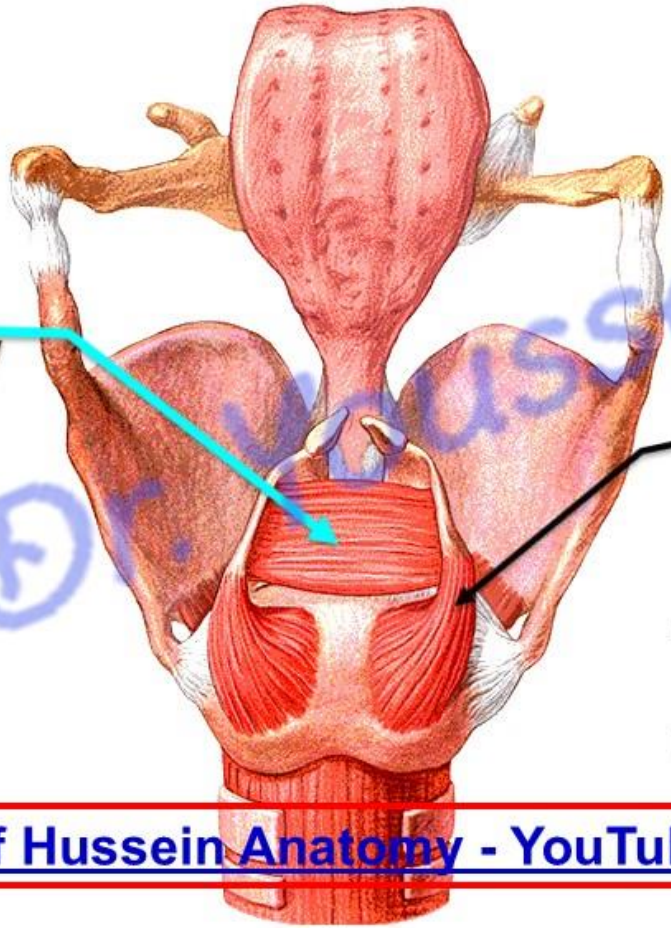
Lat. view

Ant. view

Muscles abduct and adduct the vocal cord

Adduction

Abduction



Transverse Arytenoid (Only single)

- Lateral cricoarytenoid

Posterior Cricoarytenoid

The most important muscle

• Muscles which abduct the vocal cords

*** The posterior cricoarytenoid**

- **Origin** from the posterior surface of the cricoid cartilage.
- **Insertion** into the muscular process of the arytenoid cartilage.
- **Action**; It is the **most important muscle in the larynx** and perhaps in the whole body, since it is the **only abductor** of the vocal fold (open the rima glottidis).

• Muscles which adduct vocal cords

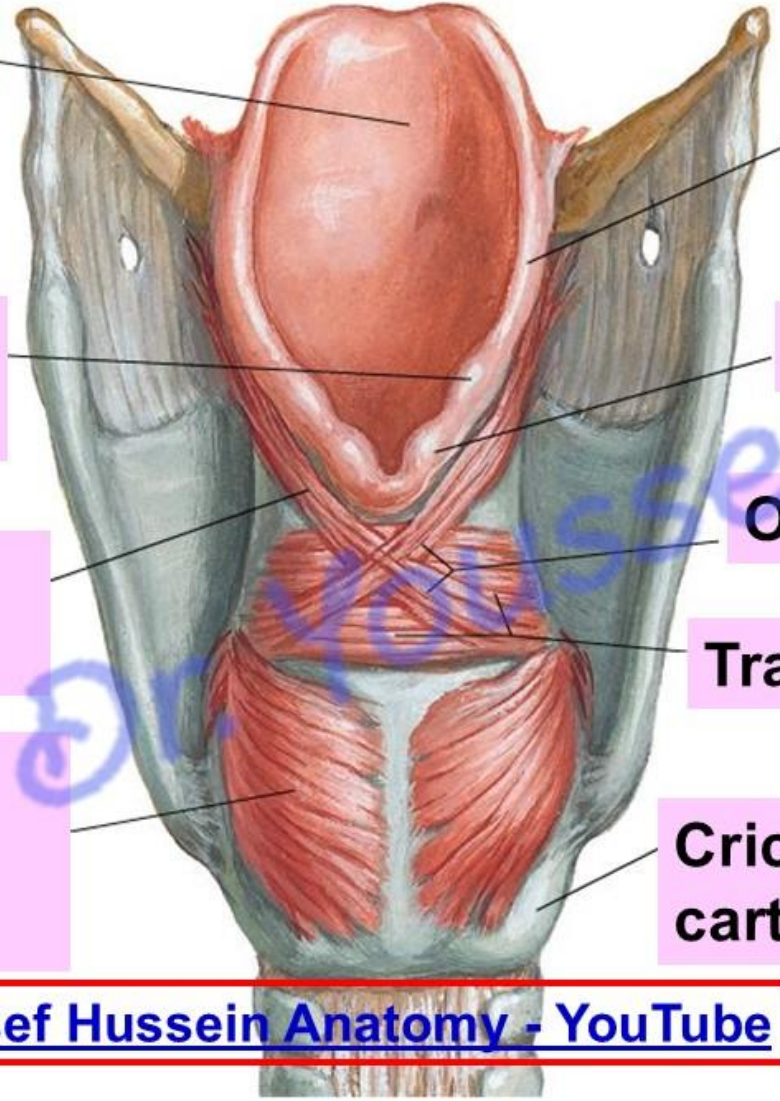
(1) The lateral cricoarytenoids muscles:

- **Origin** from the upper border of the arch of cricoid cartilage.
- **Insertion** into the muscular process of the arytenoid cartilage.

(2) The transverse arytenoid muscle (only single**).**

- **Origin** from the posterior surface of arytenoids cartilage.
- **Insertion** into the posterior surface of arytenoids cartilage of the opposite side.

Posterior View



Epiglottis

Aryepiglottic fold

Cuneiform cartilage

Corniculate cartilage

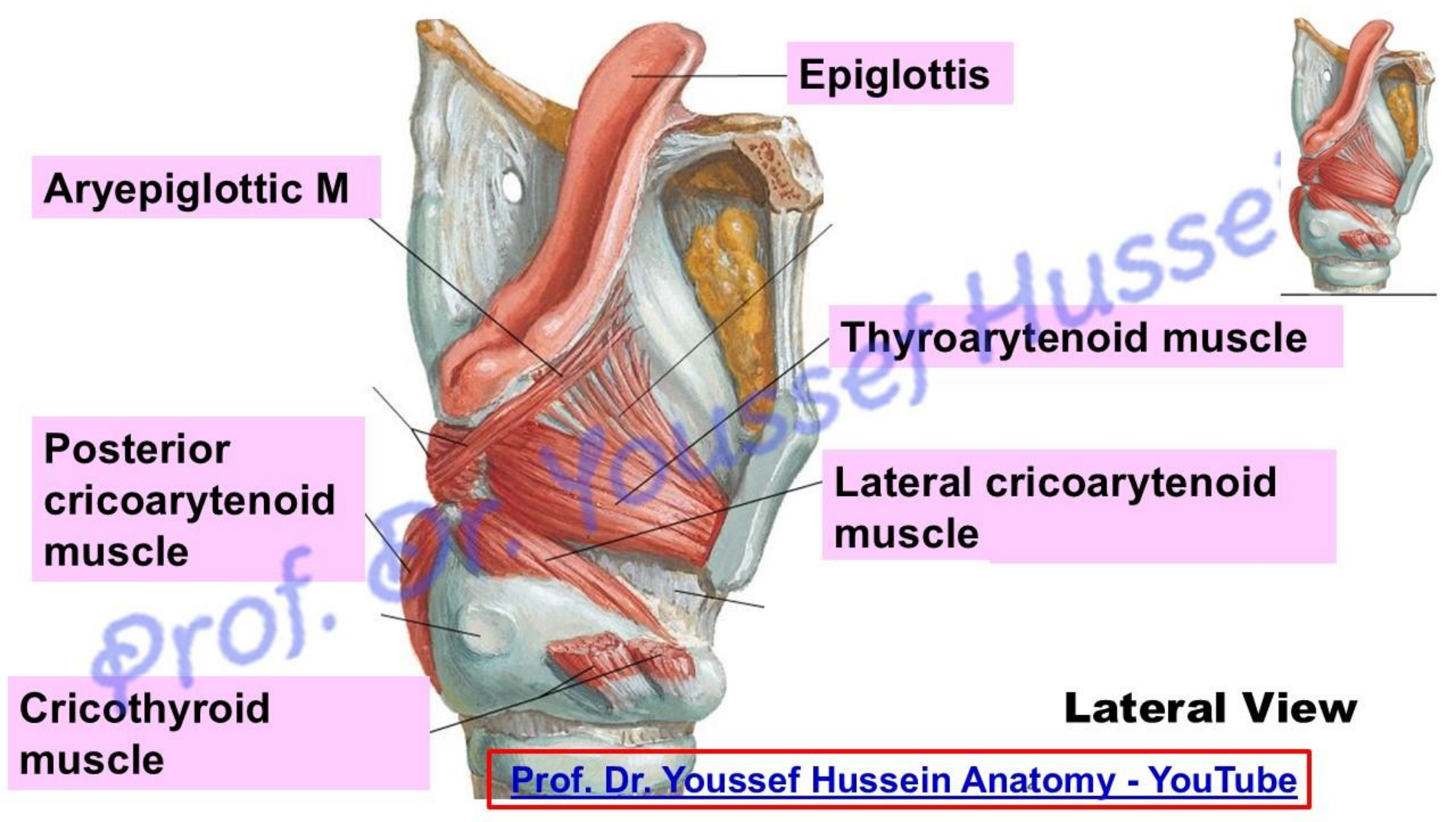
Oblique arytenoid muscle

Aryepiglottic muscle

Transverse arytenoid muscle

Posterior cricoarytenoid muscle

Cricoid cartilage


Epiglottis
Aryepiglottic M
Thyroarytenoid muscle
Posterior cricoarytenoid muscle
Lateral cricoarytenoid muscle
Cricothyroid muscle
Lateral View
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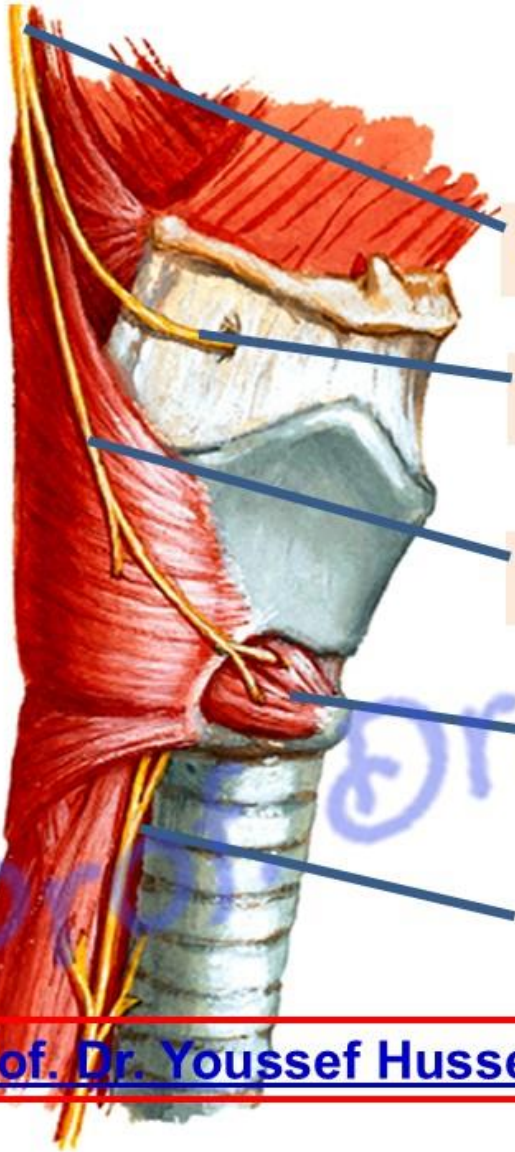
Nerve supply of larynx



1- Superior Laryngeal N

Internal Laryngeal N

External Laryngeal N

Cricothyroid M

2- Recurrent Laryngeal N

• NERVE SUPPLY OF THE LARYNX

(1) Motor supply

- **All the intrinsic laryngeal muscles** are supplied by recurrent laryngeal nerves **except cricothyroid muscle** is supplied by **external** laryngeal nerve.

(2) Sensory supply to the mucous membrane :

a- Internal laryngeal nerve above the vocal cords.

b- Recurrent laryngeal nerve below the vocal cords.

- **Left recurrent laryngeal** nerve hooks around ligamentum arteriosum (longer than right)
- **Right** hooks around the 1st part of subclavian artery

• Blood supply

1- Superior laryngeal A from superior thyroid A (ECA)

2- Inferior laryngeal A from inferior thyroid A (subclavian A)

Paralysis of the laryngeal nerves

1- Paralysis of the external laryngeal nerve

- The nerve is closely related to superior thyroid artery, So it is liable to injury during thyroidectomy leading to paralysis of cricothyroid muscle (legate artery at upper pole of the gland)

a- Unilateral injury leading to hoarsens of voice.

b- Bilateral injury; leading to loss of voice (aphonia)

2- Paralysis of the recurrent laryngeal nerve

- The nerve is closely related to inferior thyroid artery, So it is liable to injury during thyroidectomy (legate the artery away from the gland).

a- Unilateral Injury: vocal fold midway between abduction and adduction, speech is not greatly affected because the other fold compensates and move to the affected fold).

b- Bilateral Injury: Both folds in the midway leading to dyspnea (suffocation due to narrowing of rima glottidis), stridor and snoring.

https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd_cn0PQ

Thank you

Questions

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