

Today's Topics



APPLIED ANATOMY & PHYSIOLOGY OF LARYNX



APPLIED ANATOMY OF LARYNX

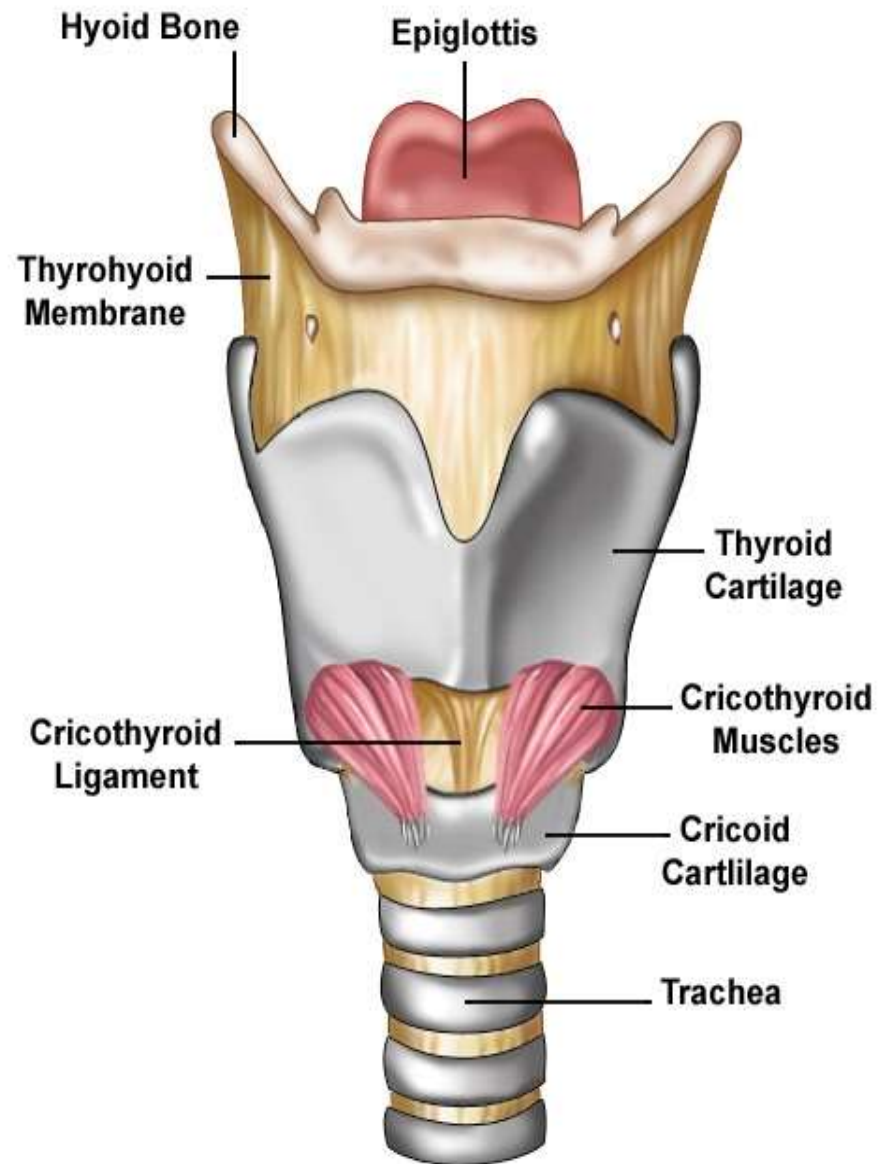
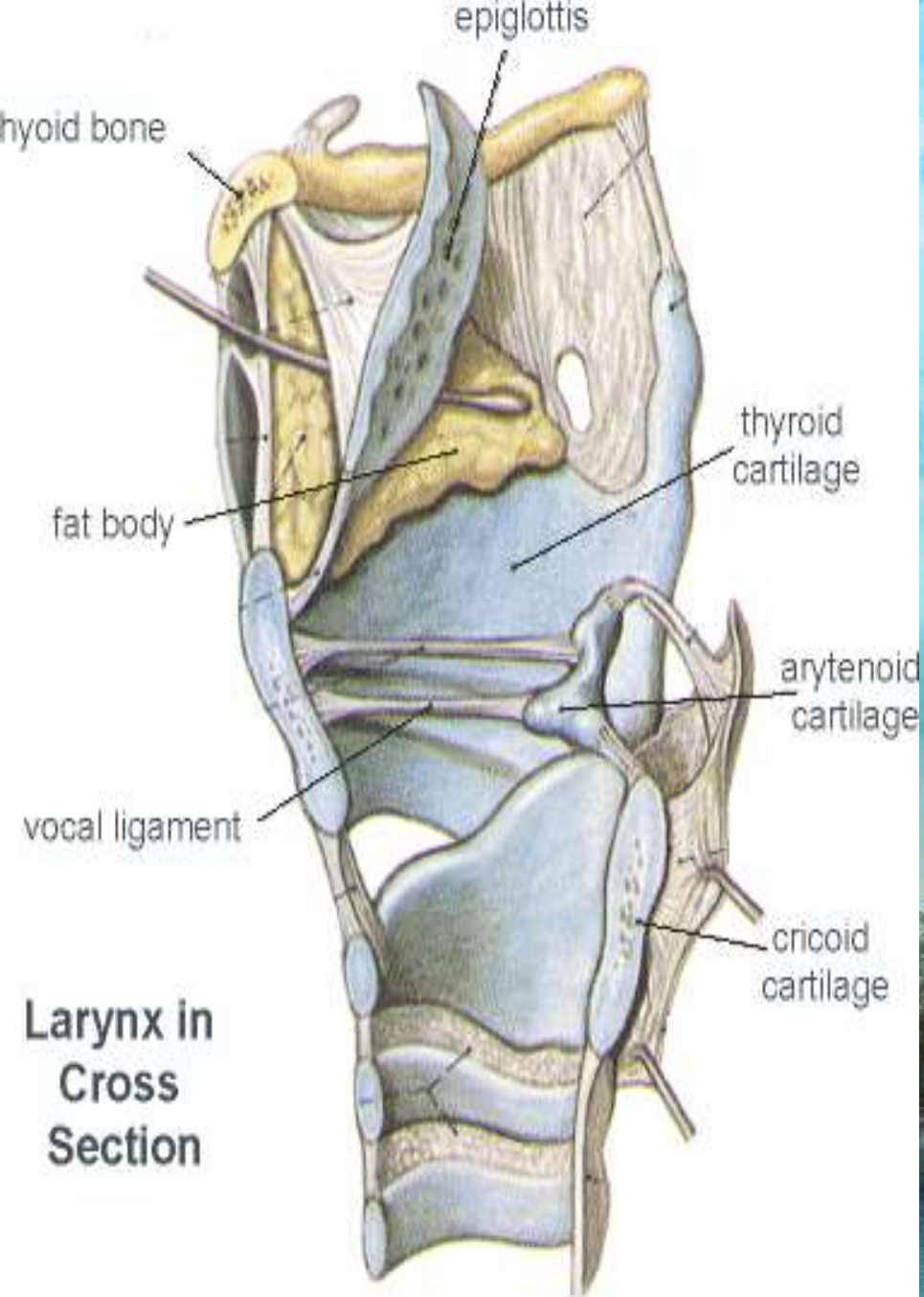
- Larynx lies in front of the hypopharynx opposite the level of 3rd to 6th cervical vertebrae.
- It consists of a framework of cartilages, connected by ligaments and membranes, lined by a mucous membrane and moved by muscles.
- The male larynx increases in size at puberty. All the cartilages enlarge and the projection of the thyroid cartilage produces the **Adam's apple**.





LARYNX

	Male	Female
Length	44 mm	36mm
Transverse diameter	43 mm	41 mm
Anterior-post. diameter	36mm	26 mm





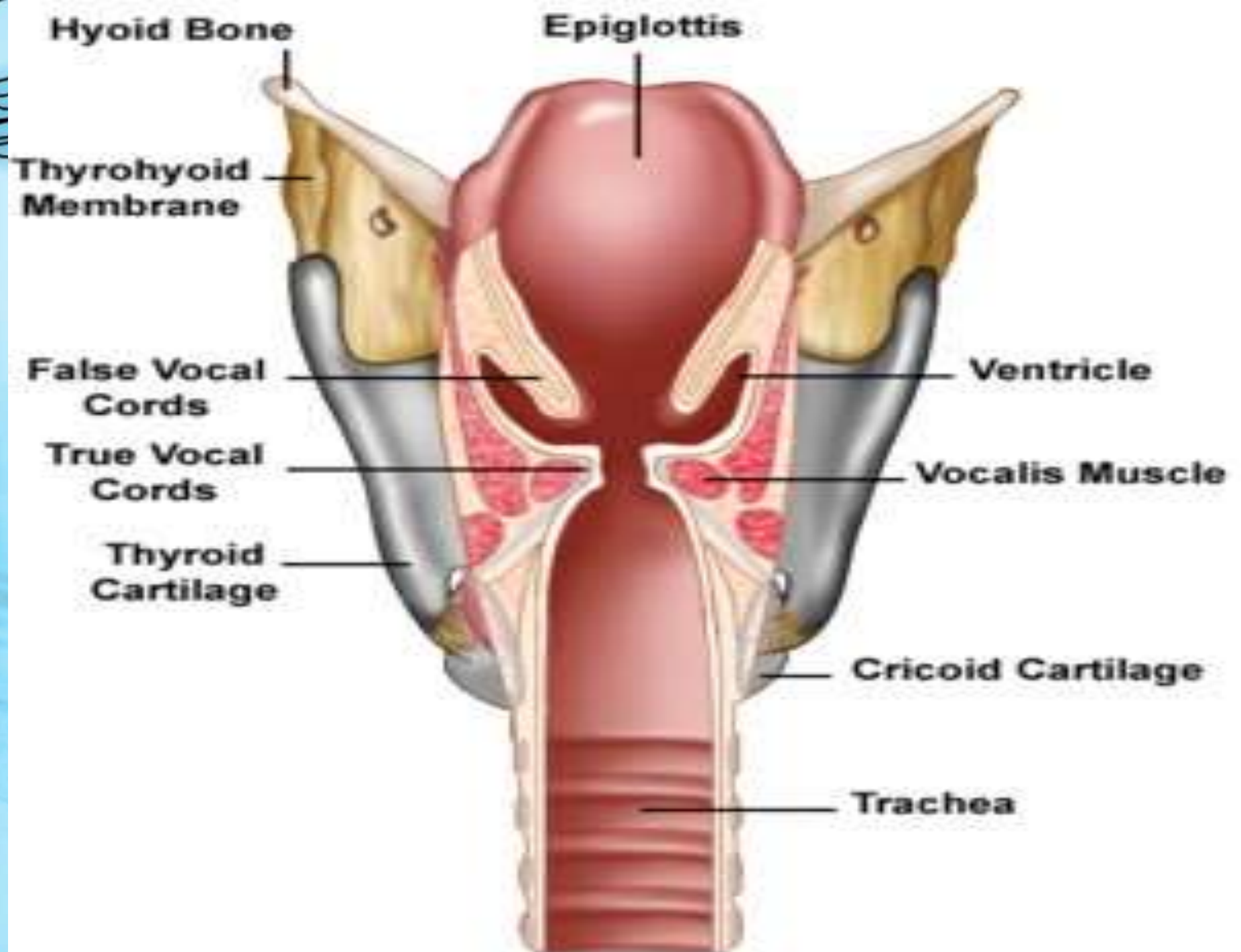
Laryngeal cartilages

<i>Unpaired</i>	<i>Paired</i>
Thyroid	Arytenoid
Cricoid	Corniculate
Epiglottis	Cuneiform



The division of larynx

Division	sub-division
1. Supraglottis	Suprahyoid epiglottis Infrahyoid epiglottis Ary-epiglottic fold Arytenoids vestibular folds (false cord)
2. Glottis	True vocal cords Anterior commissure Posterior commissure
3. Sub-glottis	Sub-glottis





Laryngeal muscles

1. Intrinsic muscles (connecting elements of the larynx)

a) **Abductors of vocal cords** : Posterior crico-arytenoid

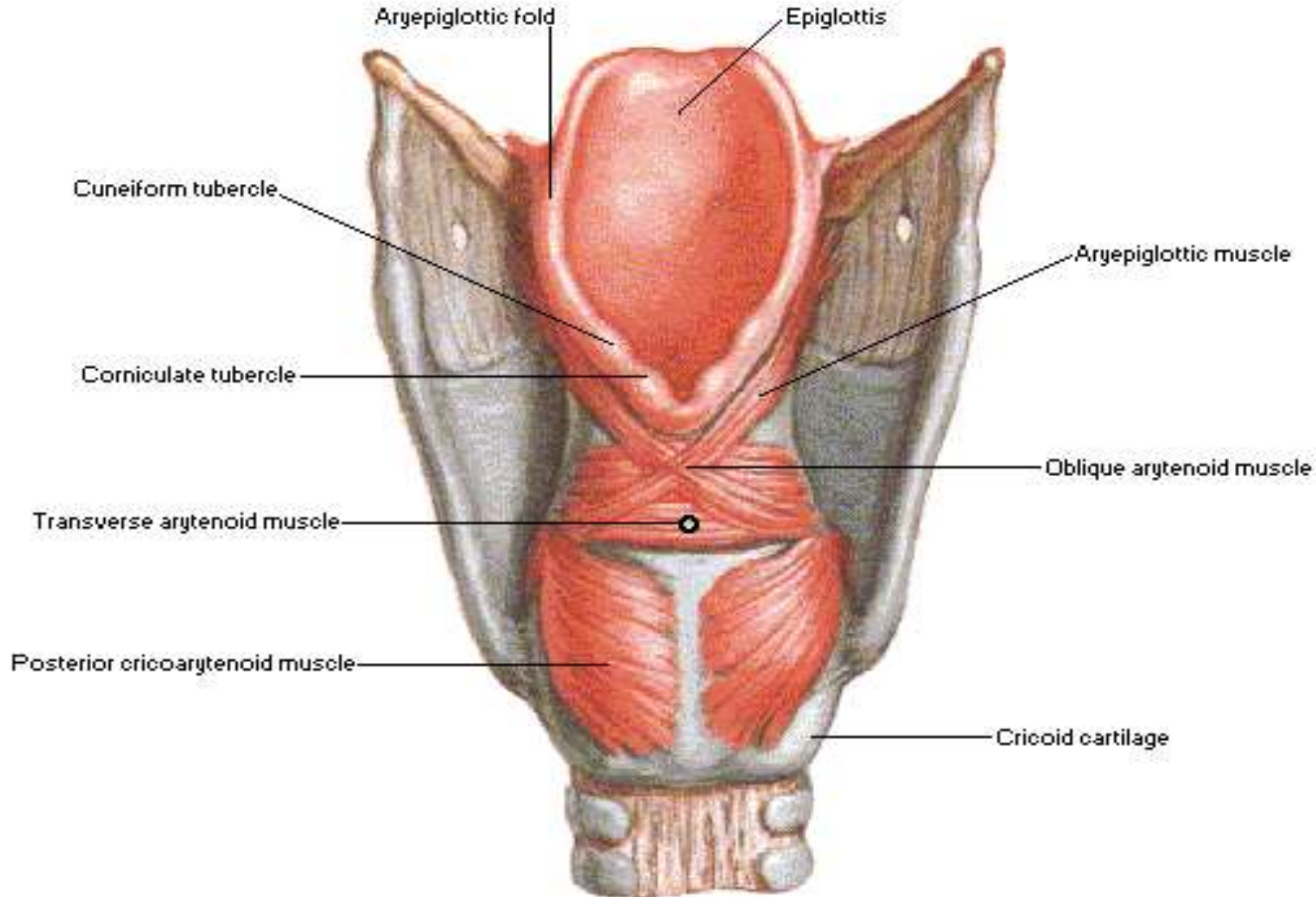
b) **Adductors of vocal cords** : Lateral crico-arytenoid
Interarytenoid
Thyro-arytenoid

c) **Tensors of vocal cords** : crico-thyroid
Thyro-arytenoid
(vocalies)

d) **Opener of laryngeal inlet** : Thyro-epiglottic muscle

Intrinsic Muscles of Larynx

Posterior View



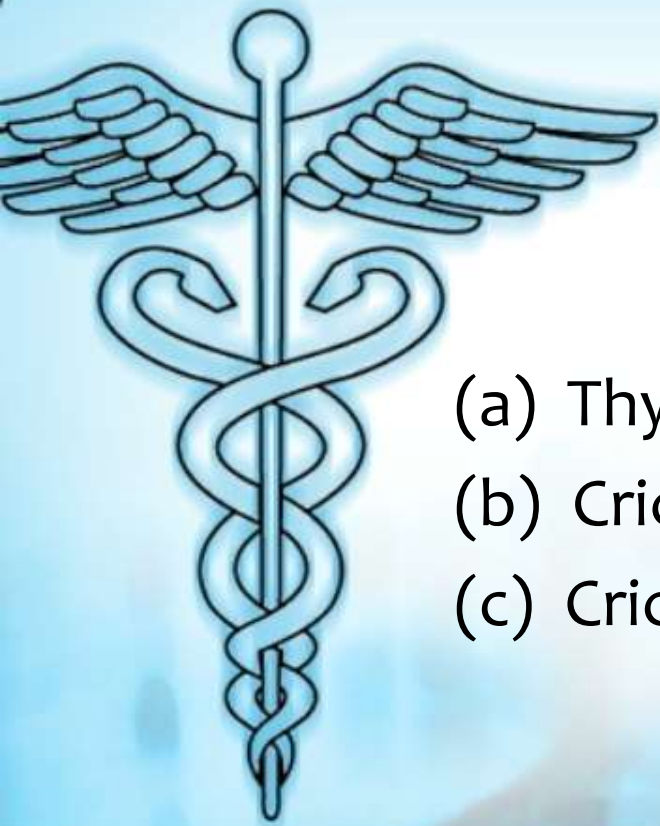


Laryngeal muscles (cont.)

2. Extrinsic muscles: (connect the larynx to other structures)

a) Strap muscles of neck : Sternothyroid muscle.
Thyrohyoid muscle.

b) Pharyngeal muscles: Stylopharyngeus.
Palatopharyngeus.
Inferior constrictor
muscles.



Laryngeal membranes

Extrinsic membranes :

- (a) Thyrohyoid membrane
- (b) Crico-thyroid membrane.
- (c) Crico-tracheal membrane.

Intrinsic membranes :

- (a) Crico-vocal membrane.
- (b) Quadrangular membrane.

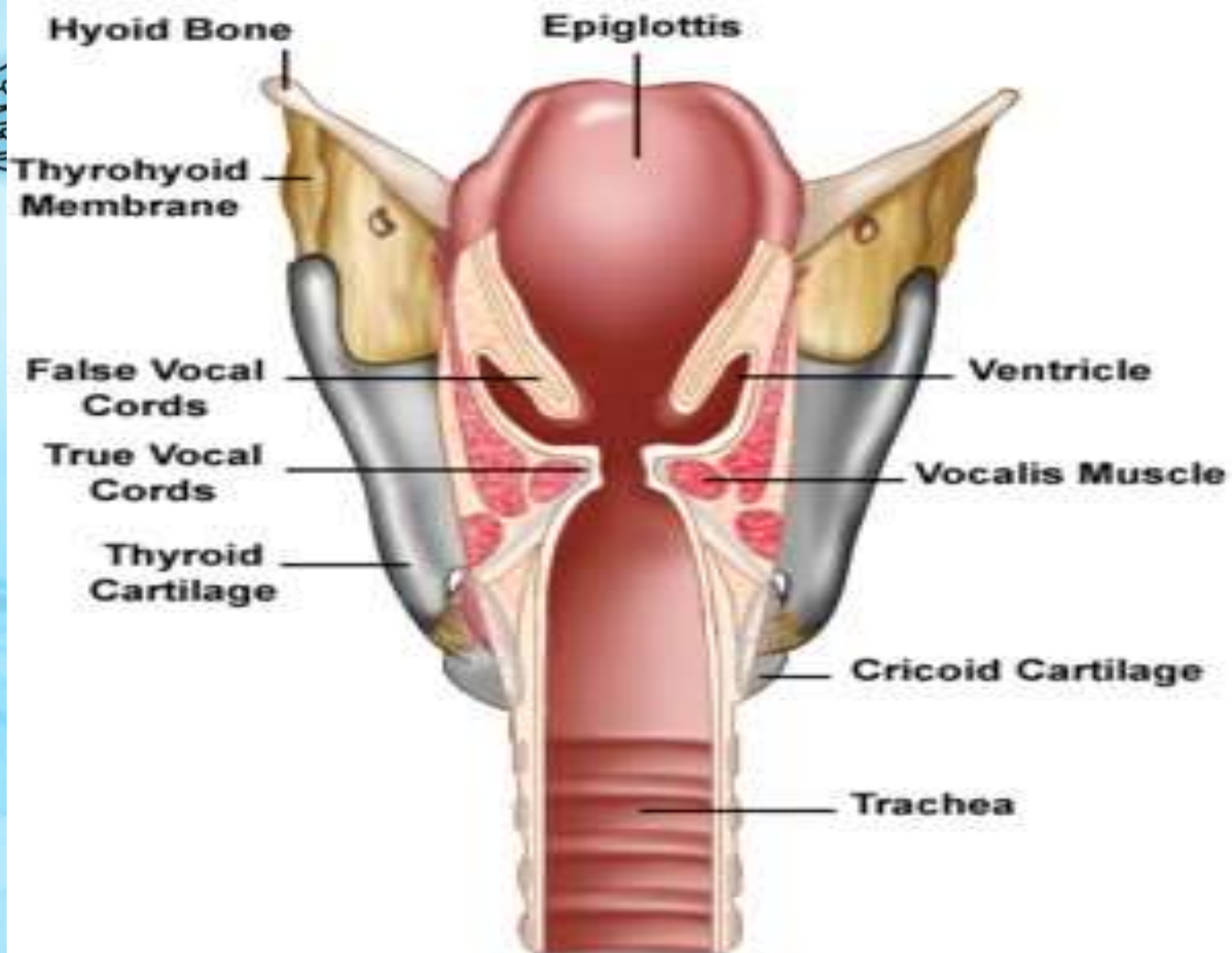
CAVITY OF LARYNX

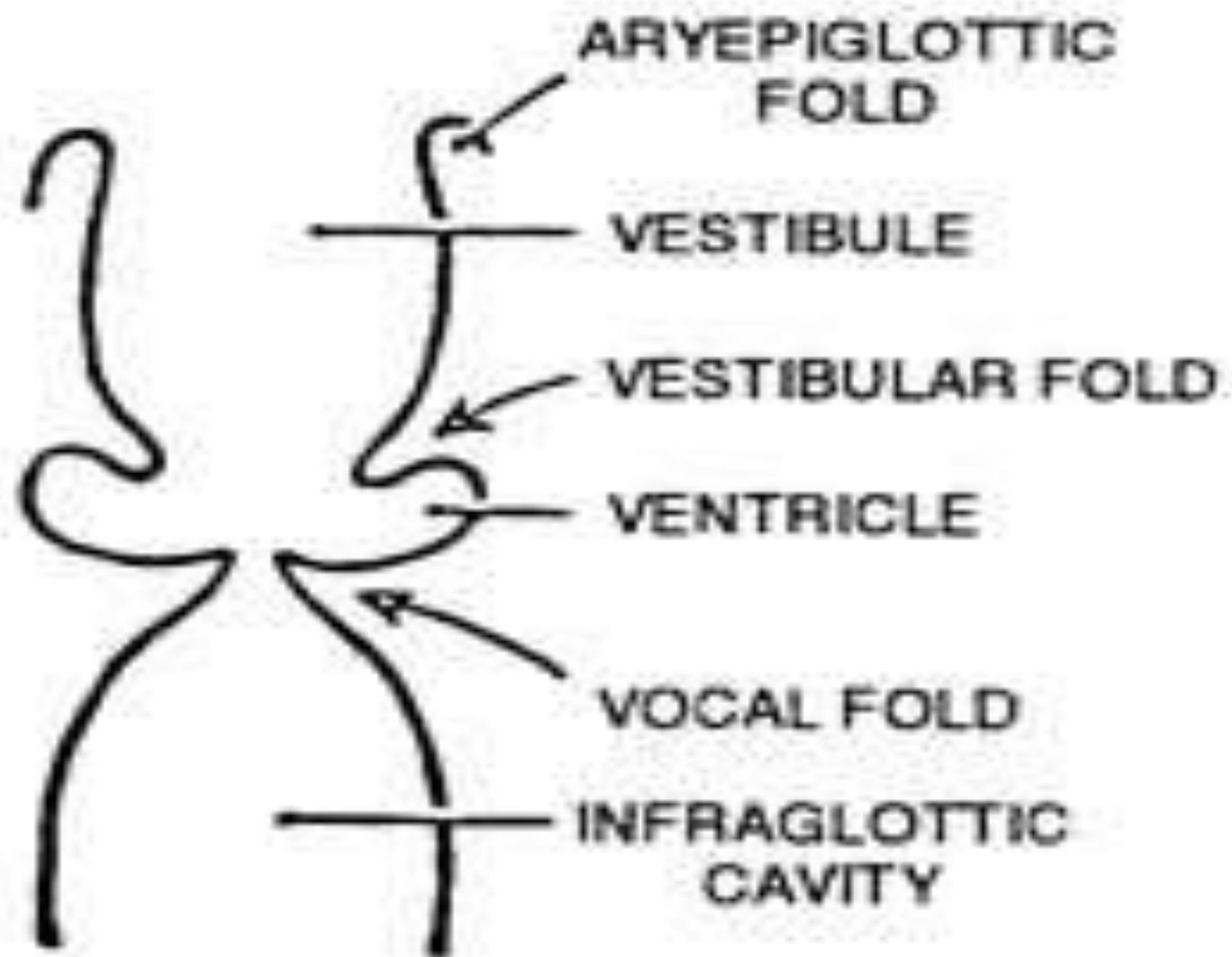


- Extends from the inlet of larynx to the lower border of cricoid cartilage, where it is continuous with the trachea.

Divided into three parts: (by two pairs of folds)

1. **Vestibule:** Extends from laryngeal inlet to vestibular folds.
2. **ventricle:** Deep elliptical space between vestibular and vocal folds.
3. **subglottic space:** Extend from vocal cords to lower border of cricoid cartilage.





MUCOUS MEMBRANE OF LARYNX



- ❖ *Stratified squamous epithelium* is found over-
 - Vocal cords.
 - Upper part of vestibule of larynx.
- ❖ *Ciliated columnar epithelium* lines the remainder cavity.
 - Mucous glands are plentiful on –
Ventricles and saccules.
Posterior surface of epiglottis.
Margins of aryepiglottic fold.



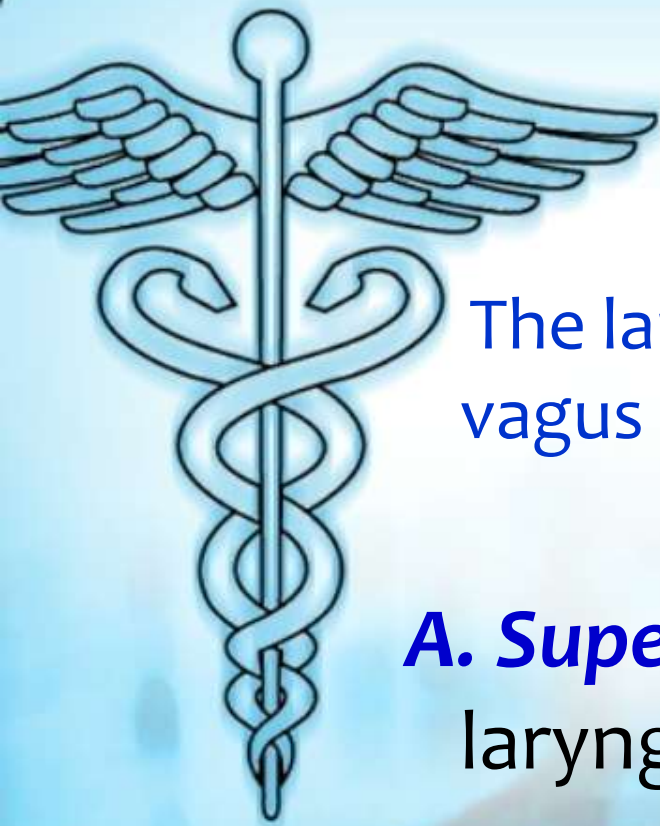
BLOOD SUPPLY OF LARYNX

The larynx is supplied by :

1. Laryngeal branches of superior thyroid artery.
2. Laryngeal branches of inferior thyroid artery.

Venous drainage :

1. Superior laryngeal vessels via sup thyroid & facial to IJV
2. Inferior laryngeal vessels via inferior thyroid vein to brachiocephalic vein.

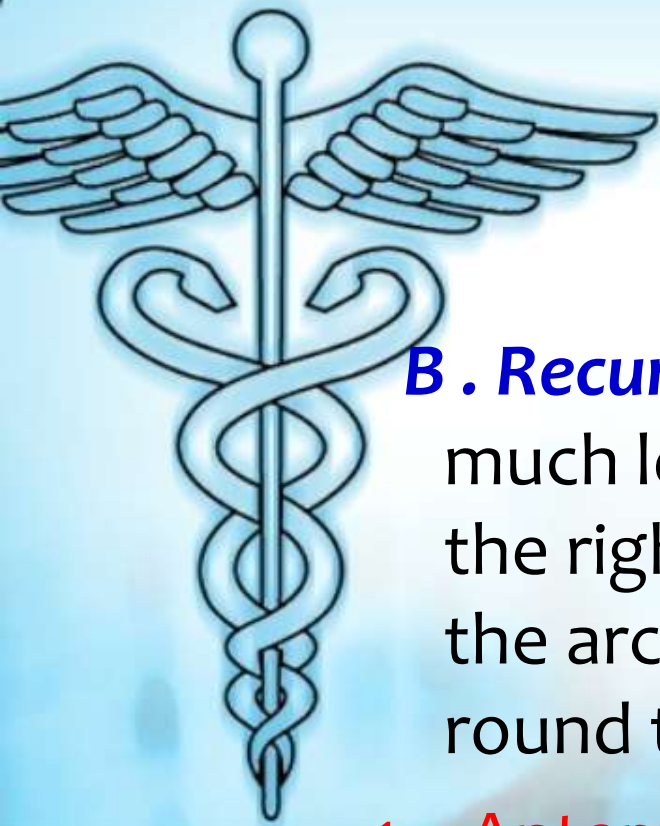


NERVE SUPPLY OF LARYNX

The larynx is supplied by branches of the vagus nerve (motor and sensory both)

A. Superior laryngeal nerve has two laryngeal branches

- 1. Internal branch.** Entirely sensory. It supplies the cavity of larynx as far down as the level of the vocal cords.
- 2. External branch.** It supplies the cricothyroid muscle.



Nerve supply of larynx

B . Recurrent (inferior) laryngeal nerve has a much longer course on the left side than on the right side. On the left side it turns round the arch of aorta .On the right side it turns round the subclavian artery.

1. **Antero lateral (motor) branch-** supplies all the intrinsic muscles **except the Cricothyroid muscle.**
- 2 **Posteromedial (sensory) branch-** supplies the cavity of larynx below the level of the vocal cords.



LYMPHATIC DRAINAGE OF LARYNX

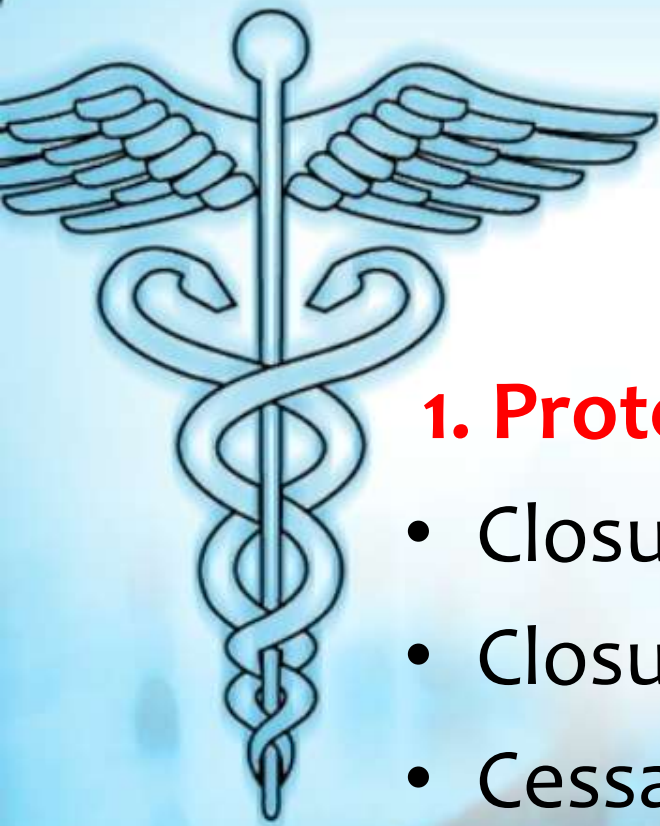
1. Supraglottic above the vocal cords

- * Pre-epiglottic nodes.
- * Upper deep cervical nodes.

2. Subglottic below the vocal cords

- * Pre laryngeal and pre tracheal nodes.
- * Lower deep cervical nodes.

The vocal cords themselves have no lymphatic vessels.



FUNCTIONS OF THE LARYNX

1. Protection of the lower air passages.

- Closure of the laryngeal inlet
- Closure of the glottis
- Cessation of respiration
- Cough reflex

2. Phonation- larynx is like a wind instrument. Voice is produced by different mechanism.



Functions of larynx (cont.)

3. **Respiration**- larynx regulates flow of air into lungs. Vocal cords abduct during inspiration and adduct during expiration.
4. **Fixation of chest**- when larynx is closed, chest wall gets fixed and various thoracic and abdominal muscles can then act best. This function is important during coughing, vomiting, defaecation, micturation and child birth.

MECHANISM OF VOICE PRODUCTION

Larynx is like a wind instrument. Voice is produced by the following mechanism-

- ❖ **Vocal cords are kept adducted.**
- ❖ **Infraglottic air pressure is generated by the exhaled air from the lungs due to contraction of thoracic and abdominal muscles.**
- ❖ **The air force open the cords and is released as small puffs which vibrates the vocal cords and produce sound which is amplified by mouth , pharynx, nose and chest.**



MECHANISM OF VOICE PRODUCTION (cont.)

- ❖ This sound is converted into speech by the modulatory action of lips, tongue, palate, pharynx and teeth.
- ❖ Intensity of sound depends on the air pressure produced by the lungs while pitch depends on the frequency with which the vocal cords vibrate.



Thank you

All