LARYNX

I. **CARTILAGES** - larynx consists of cartilages which are connected by membranes and ligaments and moved by muscles; larynx sits above trachea; produces sound, prevents objects from entering respiratory system.

A. Thyroid cartilage - shield shaped cartilage; has horns (cornua) projecting from upper and lower edges; have synovial hinge joints with cricoid cartilage.

B. Cricoid cartilage - complete ring of cartilage resting on first tracheal cartilage; has narrow arch (anterior part) and broad lamina (posterior part).

C. Arytenoid cartilages- two pyramidal shaped cartilages that rest above lamina of cricoid; have synovial joints with cricoid cartilage that allow for swivel and sliding movements.

D. Corniculate cartilages - two small nodule shaped cartilages that articulate with apices of the arytenoid cartilages, give attachment to aryepiglottic folds (see below).

E. Cuneiform cartilages - two small rod shaped cartilages in aryepiglottic folds.

F. Epiglottic cartilage - leaf-shaped cartilage posterior to root of tongue; connected to body of hyoid bone and back of thyroid cartilage.

II. **LIGAMENTS OF LARYNX**

A. Structural ligaments - hold larynx, hyoid and trachea together

1. Thyrohyoid membrane - links thyroid cartilage to hyoid bone; thickened medial part called median thyrohyoid ligament.

2. Cricothyroid membrane - links cricoid to thyroid cartilage; thickened medial and anterior part called Median cricothyroid ligament.

3. Cricotracheal ligament - links cricoid to first tracheal cartilage.

4. Quadrangular membrane - links arytenoid to epiglottis; lower free edge is called vestibular ligament.

5. Thyroepiglottic ligament - links epiglottis to thyroid cartilage.

B. Functional Ligaments

1. Conus elasticus - elastic membrane forming vibrating lips; arises from entire upper edge of arch of cricoid; attaches anteriorly to thyroid cartilage, posteriorly to vocal processes of arytenoid cartilages; upper free edges are thickened to form vocal ligaments; opening between vocal ligaments is called rima glottidis.

C. Functions of conus elasticus

1. Sound production - When the vocal ligaments are brought close together, air forced through rima glottidis causes ligaments to vibrate producing sound.

2. Closing rima glottidis - When vocal ligaments are pressed tightly together the rima glottidis is closed; this prevents upward movement of the diaphragm when the abdominal muscles contract; contraction of the abdominal muscles therefore increases pressure in the abdomino-pelvic cavity; this is useful in childbirth, micturition, defecation, etc.

III. **MUSCLES OF THE LARYNX**

A. Extrinsic muscles of larynx - move entire larynx, active during swallowing; suprahyoid muscles elevate larynx, infrahyoid muscles depress larynx.

B. Intrinsic muscles of larynx - mostly well named for their origins and insertions.

MUSCLE	**ACTION**	**NERVE**
Cricothyroid	Tenses vocal fold, raises pitch of sound	External Laryngeal n. (X)
Thyroarytenoid	Relaxes vocal fold, decreases pitch of sound	Recurrent Laryngeal n. (X)
Posterior cricoarytenoid	Abducts vocal folds, opens rima glottidis	Recurrent Laryngeal n. (X)
Lateral cricoarytenoid	Adducts vocal folds, closes rima glottidis	Recurrent Laryngeal n. (X)
Arytenoid (Transverse arytenoid)	Adducts vocal folds, closes rima glottidis	Recurrent Laryngeal n. (X)
Aryepiglottic muscle	Pulls down epiglottis during swallowing	Recurrent Laryngeal n. (X)

Note: the branch of the Recurrent Laryngeal n. (X) innervating the laryngeal muscles is specifically called the Inferior Laryngeal n. (this was a picky question on the board exams)

IV. **TERMS ASSOCIATED WITH LARYNX**

A. Folds

1. Vocal (True Vocal) folds - overlie vocal ligaments.
2. Vestibular (False Vocal) folds - overlie vestibular ligaments.
3. Aryepiglottic folds - overlie upper edge of quadrangular membrane.

B. Areas

1. Vestibule - inlet above false vocal folds.
2. Ventricle - between false and true vocal folds; laryngeal sinus is lateral extension of ventricle.

V. **INNERVATION** - from Vagus

A. Superior Laryngeal nerve

1. Internal Laryngeal nerve - Visceral sensory to larynx above vocal folds.

2. External Laryngeal nerve - Branchiomotor to cricothyroid muscle.

B. Recurrent Laryngeal nerve - Visceral sensory to larynx below vocal folds; Branchiomotor to all other muscles of larynx.

VI. **BLOOD SUPPLY** - Superior Laryngeal Artery - from Superior Thyroid a.; Inferior Laryngeal Artery - from Inferior Thyroid a.

VII. **LYMPHATICS** - Superior deep cervical nodes - drain larynx above vocal folds; Inferior deep cervical nodes - drain larynx below vocal folds.

Clinical Note: **Anaphylactic Shock** - Mucosa is tightly attached to vocal folds; in Anaphylactic Shock (acute allergic reaction) swelling of Vestibular folds can constrict airway and lead to asphyxiation)

VIII. **OBSTRUCTION OF LARYNX** - asphyxiation may also result if food or foreign object becomes lodged in larynx; in emergency a cut may be made through the cricothyroid membrane to open air passage (**Cricothyrotomy)**; this is preferable to cutting into the trachea (Tracheotomy) because the Thyroid veins overlie the trachea.