I./6.: Anatomy of the larynx

I./6.1.: Laryngeal Cartilages

The laryngeal cartilages form the main framework of the larynx and consist of the following.

1. Thyroid cartilage (unpaired)
2. Cricoid cartilage (unpaired)
3. Epiglottis (unpaired)
4. Arytenoid cartilage (paired)
5. Corniculate cartilage (paired)
6. Cuneiform cartilage (paired)
7. Triticeous cartilage (not always present)

Thyroid Cartilage

The thyroid cartilage (hyaline cartilage) is the largest and encloses the larynx anteriorly and laterally, thus shielding it from all but the most forceful blows. This cartilage is composed of two alae, which meet anteriorly, dipping down from above to form the thyroid notch before meeting at the protuberance of the Adam’s apple. Posteriorly, each wing has a superior cornu, extending upward about 2 cm, and a much shorter inferior cornu that articulates with the cricoid cartilage below.

Cricoid Cartilage

The cricoid cartilage (hyaline cartilage) lies directly below the thyroid cartilage. It is the strongest of the laryngeal cartilages and is shaped like a signet ring. The flat portion of the ring, or lamina, is located posteriorly and extends upwards to form the posterior border of the larynx.

Epiglottis

The epiglottis (fibroelastic cartilage) is a leaf-shaped structure attached to the inside of the thyroid cartilage anteriorly and projecting superiorly and posteriorly above the laryngeal opening.

Arytenoid Cartilages

The arytenoid cartilages (mostly hyaline cartilages) are much smaller in size, yet they are primarily responsible for the opening and closing of the larynx. Roughly pyramidal in shape, they rest on the upper edge of the cricoid lamina at the posterior border of the larynx. The anterior projection of each arytenoid, or vocal process, receives the attachment of the posterior or mobile and of each vocal cord. The lateral prominence of each arytenoid cartilage is known as the muscular process because of the insertion of numerous muscles.

I./6.2.: Laryngeal Ligaments and Membranes

1. Thyrohyoid membrane and ligaments attach the thyroid cartilage to the hyoid bone.
2. Cricothyroid membrane and ligaments connect the thyroid
and cricoid cartilages. This ligament may be pierced for emergency tracheotomy (cricothyrotomy) with little fear of bleeding.

3. The cricotracheal ligament attaches the cricoid cartilage to the first tracheal ring.

4. The thyroepiglottic ligament extends form the epiglottis anteriorly to its attachment on the thyroid cartilage just below the thyroid notch.

**Intrinsic Ligaments**

The elastic membrane is the fibrous framework of the larynx. It lies beneath the laryngeal mucosa and is divided into upper and lower parts by the ventricle of the larynx.

The quadrangular membrane is the upper part of the elastic membrane of the larynx, extending from the lateral margin of the epiglottis to the arytenoid and corniculate cartilages, and inferiorly to the false cord.

Conus elasticus (cricovocal membrane) is the name given to the lower part of the elastic membrane of the larynx. It is composed mainly of yellow elastic tissue.

The median cricothyroid ligament is formed by the thickened anterior part of the conus elasticus.

The vocal ligament, which forms the framework of the vocal cord, is the free upper edge (the strongest part) of the conus elasticus.

**I/6.3.: Clinical Subdivisions**

Clinically, the larynx is divided into three areas.

1. Supraglottis (from the tip of the epiglottis to the junction between respiratory and squamous epithelium on the floor of the ventricle). For practical reasons, the inferior boundary is commonly considered to be the junction between the lateral wall and the floor of the ventricle.

2. Glottis (surrounded by the anterior commisure, the true vocal cords, and the so-called posterior commisure). The vocal folds do not meet posteriorly; consequently, the real posterior border is the arytenoid cartilages and the superior edge of the cricoid lamina.

3. Subglottis (from the junction of squamous and respiratory epithelium on the undersurface of the true vocal folds to the inferior edge of the cricoid cartilage). The superior margin has been arbitrarily assigned to the point 5 mm below the free edge of the true vocal cords.

**1.6.4. Laryngeal Spaces**

Compartments defined by laryngeal structures are as follows.

1. The paraglottic space (bounded by the thyroid cartilage lamina, conus elasticus, and quadrangular membrane).

2. The pre-epiglottic space (bounded by the vallecular
mucosa, thyroid cartilage, thyrohyoid membrane, and epiglottis).

1.6.5. Laryngeal Muscles

The muscles of the larynx may be classified as follows.

1. Extrinsic (depressors and elevators)
2. Accessory (pharyngeal constrictors)
3. Intrinsic (control the positions of the laryngeal cartilages with respect to one another)

The extrinsic muscles of the larynx, concerned with the movement and fixation of the larynx as a whole, consist of elevator and depressor groups.

The depressor group consists of:

1. Sternohyoid (C2, C3)
2. Thyrohyoid (1)
3. Omohyoid (C2, C3)

The elevator group consists of:

1. Geniohyoid (C1)
2. Digastrics (anterior belly - cranial nerve V; posterior belly - nerve VII)
3. Mylohyoid (V)
4. Stylohyoid (VII)

1.6.6. Mucous Membrane

Stratified squamous epithelium is found over the vocal cords and the upper part of the vestibule of the larynx. Ciliated columnar epithelium lines the remainder of the cavity.

Mucous glands are found in:

1. Ventricles and sacculi
2. Posterior surface of epiglottis
3. Margins of aryepiglottic folds (none on the free edges of the vocal cords)

1.6.7. Nerve Supply

The larynx is supplied by two branches of the vagus nerve: the superior laryngeal and inferior (recurrent) laryngeal nerves. The superior laryngeal nerve (SLN) divides extralaryngeally into the internal branch (sensory) and the external branch (motor and sensory).

The recurrent (inferior) laryngeal nerve (RLN) supplies motor innervation to all the intrinsic laryngeal muscles of the same side,
except for the cricothyroid, and to the interarytenoid muscle of both sides. It also supplies sensory innervation to those portions of the larynx below the glottis.

**1.6.8 Blood Supply**

**Upper Larynx**

1. External carotid artery
2. Superior thyroid artery
3. Superior laryngeal artery

**Lower Larynx**

1. Subclavian artery
2. Thyrocervical artery
3. Inferior thyroid artery
4. Inferior laryngeal artery

**1.6.9 Venous Drainage**

**Upper Larynx**

1. Superior laryngeal vein
2. Superior thyroid vein
3. Internal jugular vein

**Lower Larynx**

1. Inferior laryngeal vein
2. Inferior thyroid vein
3. Innominate vein

**1.6.9 Lymphatic Drainage**

The lymphatics arising from the larynx drain mainly into the deep cervical group of lymph nodes. It is of great clinical importance that the vocal cords themselves contain scarcely any lymphatic channels.