Head & Neck

✓ EAR </l> ✓ ORAL CAVITY ✓ NOSE Done by: Abbas Fadel Group C

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The Larynx:

The larynx lies in the anterior part of the neck in the midline opposite to C4-C6 vertebrae forming the laryngeal prominence (Adam's apple)

At this level the L. is triangular in cross section while lower down at the level of the cricoid cartilage it is circular in cross section

Relations:

- Anterolaterally; Thyroid gland & strap muscles

- Laterally; Carotid sheath
- Posteriorly; Pharynx

Skeleton:

The thyroid cartilage:

- This hyaline cartilage is composed of two quadrilateral laminae meet in the midline
- The meeting angle is 900 in male & 1200 in female (therefore the L is more prominent in male)



- The superior thyroid notch is a V-shape notch just above the prominence
- The posterior border of the cartilage is thick & rounded & extends above & below the laminae as the superior & inferior horns
- The superior & inferior borders are characterized by superior & inferior tubercles between them the oblique line of the cartilage extends which gives attachment to thyrohyoid, sternothyroid & thyropharyngeus
- The upper border is attached to the thyrohyoid membrane which is thickened in the midline as the median thyrohyoid ligament & thickened laterally between the superior horn & tip of greater horn of the hyoid as the lateral thyrohyoid ligament
- The inferior thyroid notch lies opposite to the superior one, from its deep surface the root of the epiglottis arises



- The MPC has the smallest origin of all three - The IPC take origin from the larynx. - The Cricopharyngeus is not inserted in pharyngeal - Most of exterinsic muscles of the pharynx pass to - The upper part of the pharynx is related to - Retropharyngeal space seperates the pharynx from Vertohmul - pharyngeal branch of Vagus "part of pharyngeal plexus" is actually the Granial accessory nerve "CN·XI" which joins the Vagus below the jugular p The absence of pharyngobasilar fascia Causes increase in the muscle Eone of the nasopharynx and this closes it's Wall. Enlargencent Piller - Enlargement of the nasopharyngeoil tonsils occur in children and it may reach the hard palate closing the nasopharynx. - Fossa of Rosenmuller is the most comman site For tumors of nasopharynx. The palatine tonsils are supplies by facture and artery. - The Valleculae are part of the oropharynx. - The piriform recess is the site where fish bones usually resides.

The cricoid cartilage: the only complete ring in the respiratory pathway

- This signet ring-like cartilage is characterized by an anterior arch & posterior broad lamina
- It lies at the level of C6 vertebra & forms the foundation on which the rest of the larynx is built
- The posterior lamina is marked in the midline by a ridge on either side of which lies a shallow depression for the posterior crico-arytenoid muscle
- The arch which is 5 mm in vertical height gives attachment anterolaterally to cricothyroid muscle & posteriorly to the cricopharyngeus just above which the lateral crico-arytenoid arises
- The upper border of the arch gives attachment to the conus elasticus
- The sloping shoulders of the lamina provides a synovial joint for the arytenoid cartilages
- At the junction of the arch & lamina is a synovial joint for articulation of the inferior horns of the thyroid cartilages

The arytenoid cartilage:

- This is a three sided pyramidal hyaline cartilage whose apex projects posteromedially & carries the corniculate cartilages
- The base of the pyramid carries three processes
- The anterior sharp process is the vocal process & to which the upper free end of the conus elasticus is attached as the vocal fold
- The lateral process is the muscular process to which the lateral & posterior crico-arytenoids are attached
- The medial surface of the pyramid is flat & faces the opposite one





The laryn X :--Function of the largn X: - 1) Respiratory pathway 2) Valve action for swollowing 3) Building intra - abdominal pressure "Keeps the air inside the Chest 4) phonation. - The thyroid gland binds the lay nx from 3 sides. - The Cricoid Cartilage is the only complete circle in the respiratory pathway. ridge of - The epiglettis is attached to the posterior lamina of the cricoid Cartilage. - Piriform recess is part of the larynx but it lies out side the inlet. - The larguageal inlet is bounded by argepiglottic fold. - The Vocal folds formed posterior 1/30 Vocal process of arylenoid. Materior 2/3 - D Upper part of conus elasticus. The posterior Cricoarytenoid is the only muscle which opens the vocal cords. - Contraction of Crico thyroid increases the frequence and decrease intensity of sound. - The external largngeal nerve is purely motor.

- The anterolateral surface is curved & gives attachment for the thyroarytenoid muscle
- The posterior surface is smooth & gives attachment for the transverse arytenoid muscle
- The arytenoid cartilage sits on the elongated facet on the sloping shoulder of the cricoid lamina forming the crico-arytenoid synovial joint



The corniculate cartilage:

- This small nodular elastic cartilage lies on the apex of the arytenoid to prolong it backward & medialward
- They are enclosed by the ary-epiglottic folds



The cuneiform cartilage:

•Are rod like elastic cartilages lies on the previous ones in the ary-epiglottic folds

The epiglottis:

•This elastic, leaf-like cartilage is attached by its lower 1/2 to the back of the thyroid cartilage by the thyro-epiglottic ligaments in



the midline, its upper 1/2 stands erect behind the posterior 1/3 of the tongue & the hyoid bone

- The anterior surface of the epiglottis is attached to the hyoid bone by the hyo-epiglottic ligament
- The m.m of the E. is reflected on the posterior 1/3 of the tongue as three folds, the median & two lateral glosso-epiglottic folds which mark the division between the oro- & laryngo-pharynx, on each side of the median one lies a vallecula
- The cartilage is well pitted to receive the multiple mucous glands which cover it
- To the margins of the free upper $\frac{1}{2}$ is attached the quadrate membrane



Laryngeal membranes:

1-Thyro-hyoid membrane:

- Suspends the thyroid cartilage to the hyoid bone
- It passes from the upper border of the thyroid cartilage to the upper border of the hyoid bone passing behind the bone separated from it by a bursa
- It shows one median & two lateral ligaments of the same name
- It is pierced by the superior laryngeal artery & internal laryngeal nerve.
- It forms the lateral boundary of the piriform recess





- 2- Conus elasticus:
 - Is a half-circle ligament whose lower attachment is to the whole length of the upper border of the cricoid arch
 - Its free upper border is attached on either side to the vocal process of the arytenoid cartilage forming the vocal fold (true vocal cord) which contains in its free border muscle fibers (vocalis)
 - Anteriorly the membrane is attached to the back of the thyroid cartilage in the angle between the two laminae in



C Left lateral view with the epiglottis removed.

the midline midway between the superior & inferior notches converting the curved membrane to V-shape membrane

- Its thickening in the midline anteriorly produces the median crico-thyroid ligament



3- Quadrate membrane:

- Is a weak membrane whose posterior border is attached to the anterior surface of the arytenoid cartilage & its anterior border is attached to the sides of the lower half of the epiglottis
- Its upper free border will extend between the epiglottis & the arytenoid cartilage forming the ary-epiglottic fold which involves in its substance the corniculate & cuneiform cartilages
- Its lower free border will be parallel to the upper free border of the conus (true vocal cords) forming the vestibular fold (false cords)
- It forms the medial boundary of the piriform recess

The interior of larynx:

The laryngeal inlet:

- Opens in the anterior wall of the



(cut away)

pharynx in a vertical plane

- Is an inverted triangle whose base is formed by the epiglottis antero-superiorly & its apex is the narrow interval between the two arytenoids postero-inferiorly
- The sides of the triangle is the ary-epiglottic olds

The laryngeal vestibule:

- Is the triangular cavity beyond the laryngeal inlet until the rima glottidis
- It is bounded on each side by the quadrate membrane
- It shows three features:

1- The vestibular folds; are the lower free border of the quadrate membranes

2- The laryngeal ventricle; is a sac like mucosal herniation between the true & false vocal folds whose upper border extends up & may reach the upper border of the thyroid cartilage, it is filled with mucosal glands for lubrication







3- The rima vestibuli; is the opening between the vestibular folds, it is wider than the rima glottidis.

The vocal folds:

- Are formed by the free upper border of the conus stretched between the thyroid cartilage anteriorly & the arytenoids posteriorly
- The anterior 3/5 are true components of the conus while the posterior 2/5 are formed by the vocal process of the arytenoids
- They contain in their free edge the vocalis muscle which increases the apposed surface area of the cords during phonation
- The opening between them is called the rima glottidis
- Glottis, is a term applied to the two vocal cords & the rima glottidis as they are the main structure involved in phonation

The rima glottidis:

- Is the interval between the two vocal cords
- Is 23 mm long in male & 17 mm in female
- It could be opened either in Vshape or diamond shape manner according to the type of movement of the arytenoid
- Downward movement of the arytenoid on the sloping shoulders of the cricoid lamina pulls the two ends of the conus downward separating them &





opens the rima in a V-shape manner, here the vocal processes of the arytenoids are parallel to each other, this occurs in quite respiration

- Rotation of the arytenoids around their vertical axes pulls the free ends of the conus away & opens the rima in a diamond shape manner, the back of the diamond is formed by the vocal processes of the arytenoids which become perpendicular on each other, this occurs in forced respiration
- During phonation the folds come in contact with each other & the rima becomes slit like

Intrinsic muscles:

The ary-epiglottic muscle:

- Extends in the ary-epiglottic fold from the arytenoids to the lateral border of the epiglottis
- The oblique inter-arytenoids are regarded as the continuation of the muscle to the vocal process of the opposite arytenoid
- Contraction of both brings the arytenoids near each other & oppose the ary-epiglottic folds & pull the epiglottis as a shelf over the constricted laryngeal inlet producing an effective sphincteric action for the inlet

The posterior crico-arytenoid: the only muscles open vocal folds

Origin; from the back of cricoid lamina from the fossa on each side of the midline ridge

Insertion; upper fibers go horizontally to the vocal process of the arytenoid while the lower fibers go vertically to the to the same process

Action; upper fibers rotate the arytenoids so they open the rima glottidis in a diamond shape while the lower fibers pull the

arytenoids away from each other so they open the rima in a V-shape

The transverse arytenoid:

- This is a muscle formed of fine & short fibers stretched between the two arytenoids deep to the oblique one
- Its contraction opposes the vertical fibers of the posterior c-a muscle مهم

The lateral crico-arytenoid:

- Arises from the posterior part of the cricoid arch
- Inserted into the vocal process of the





arytenoid

- Its contraction opposes the horizontal fibers of the posterior c-a muscle *The crico-thyroid:*

- This muscle arises from the anterolateral surface of the cricoid arch
- Its fibers radiate upward & backward to be inserted into the lower border & medial aspect of the thyroid cartilage
- Its contraction approximates the thyroid & cricoid cartilages diminishing the area between them, this will bring the thyroid cartilage away from the arytenoid increasing the length & hence tension of the vocal cords affecting consequently the type of the voice

The thyro-arytenoid: page 9

- This muscle arises from the inner surface of the thyroid lamina
- Its fibers pass backward to be inserted into the muscular process of the arytenoid
- Its contraction approximates the thyroid & arytenoid cartilages diminishing the area between them, this will decrease the length & hence tension of the vocal cords affecting consequently the type of the voice, this movement also acts as a laryngeal sphincter



Arteries of the larynx:

1- Superior laryngeal artery;

- A branch of the superior thyroid a.
- pierces the thyrohyoid membrane together with the internal laryngeal nerve to lie underneath the m.m of the floor of the piriform recess
- supplies the larynx to supply mucosa down to the level of the vocal cords.





2 -

Inferior laryngeal artery;

-A branch of the inferior thyroid artery

-enters the lower part of the larynx deep to the inferior pharyngeal constrictor

-supplies it up to the vocal cords (vocal cords are supplied by the inferior one).

-Nerves of the larynx:

-Motor:

-All muscles of the larynx are supplied by the recurrent laryngeal

n. except cricothyroid which is supplied by the external laryngeal branch of the superior laryngeal nerve (X nerve).

-Sensory:

•Above the vocal folds : internal laryngeal branch of superior laryngeal nerve (X nerve) accompanies the sup. laryngeal artery.

•Below the vocal folds: recurrent laryngeal nerve accompanies the inferior laryngeal artery

