Part 2A Normal Anatomy Upper airway and Larynx

Series of Web-based Bronchoscopic Images

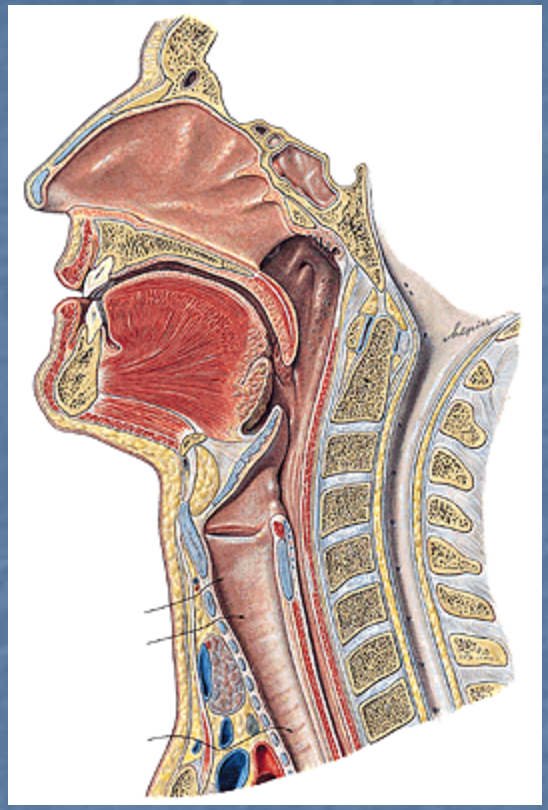
Prepared By
Bronchoscopy International

Contact us at
BI@bronchoscopy.org

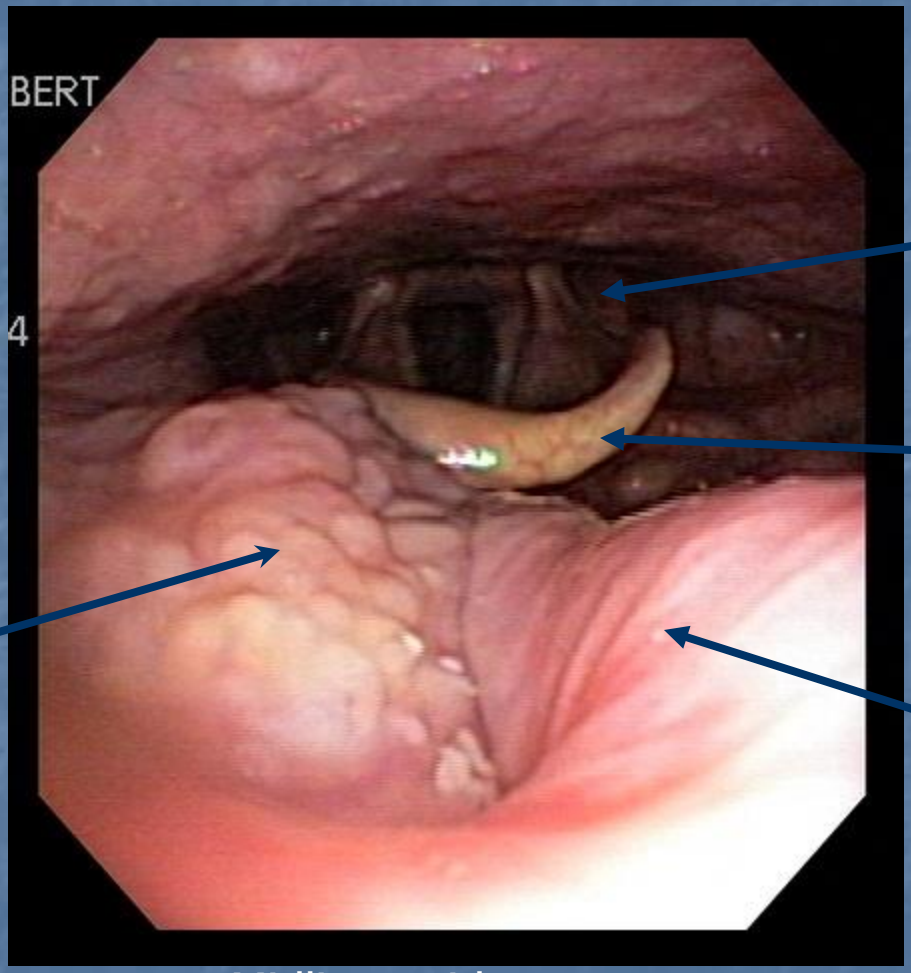
The Upper Airway

- The upper airway starts :
  - At the nostrils, extends through the nasal conchae to the nasopharynx, over the uvula to the hypopharynx and larynx,

    or,
  - At the lips, extends through the oral cavity, over the tongue and below the hard and soft palates, to the hypopharynx and larynx.



Upper Airway: From Pharynx to Larynx



Midline guidance:

"The uvula points to the epiglottis, the epiglottis leads into the larynx".

The Larynx

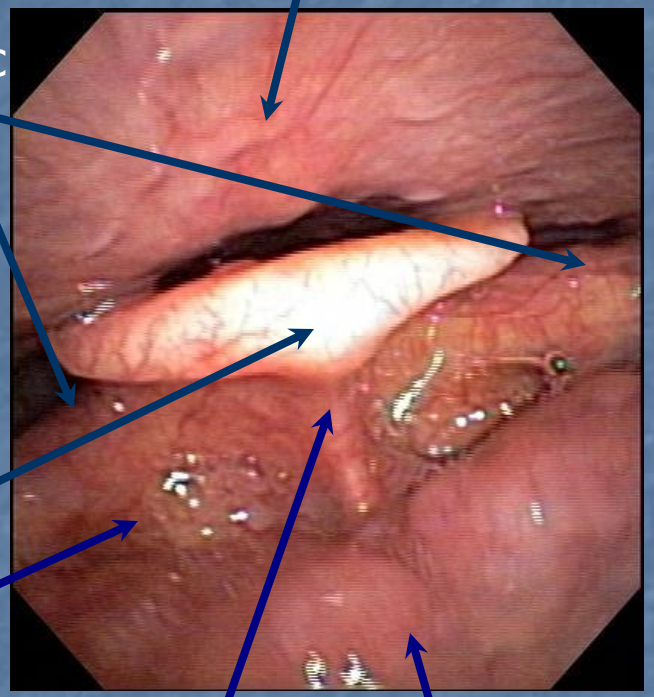
- The larynx is a 5-7 cm long structure.
  - Its upper boundary starts at the tip of the epiglottis, opposite the 3rd to 4th, cervical vertebra.
- Its lower end is at the lower border of the cricoid cartilage.
  - This lies opposite the 6th cervical vertebra.

www.phon.ox.ac.uk

The Larynx

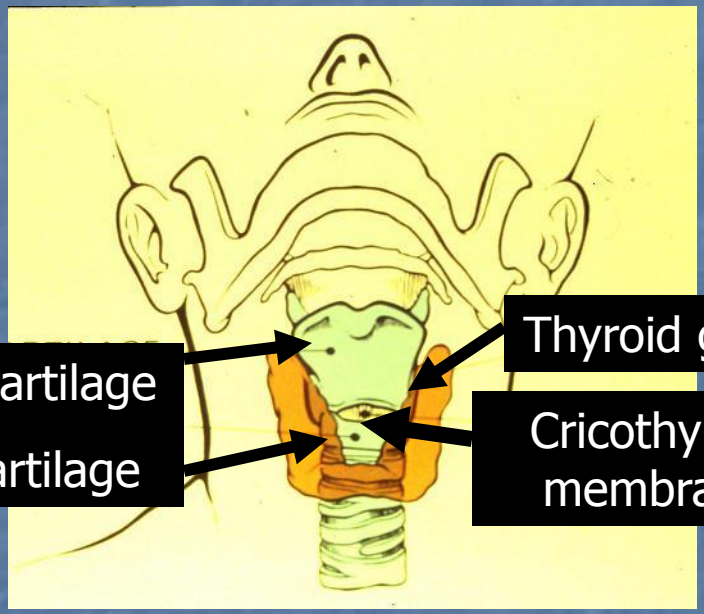
Superior surface anatomy:

Major Landmarks I



http://www.nyee.edu/top#top

The Cricoid cartilage



Cricoid Cartilage

Time Out! … Why is it so important to recognize the surface anatomy?

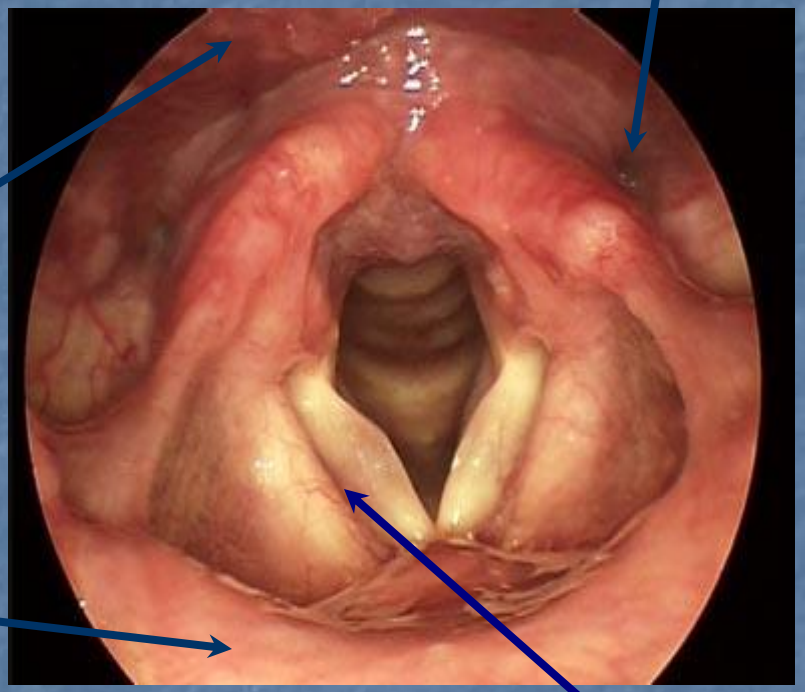
- As a bronchoscopist, we are responsible to report any nasal, oral, pharyngeal or laryngeal pathology that we observe en-route to the lungs.
- We only know that we are correctly positioned and in the midline, when we know *exactly where we are*.
- During a difficult intubation, either with a bronchoscope or a rigid laryngoscope, knowledge of surface anatomy ensures timely intubation and saves a life.
- In a variety of conditions, such as GERD, changes in laryngeal anatomy and structures, are the best clues to pulmonary pathology.

Shall we continue?

The Larynx

Superior surface anatomy:

Major Landmarks - II

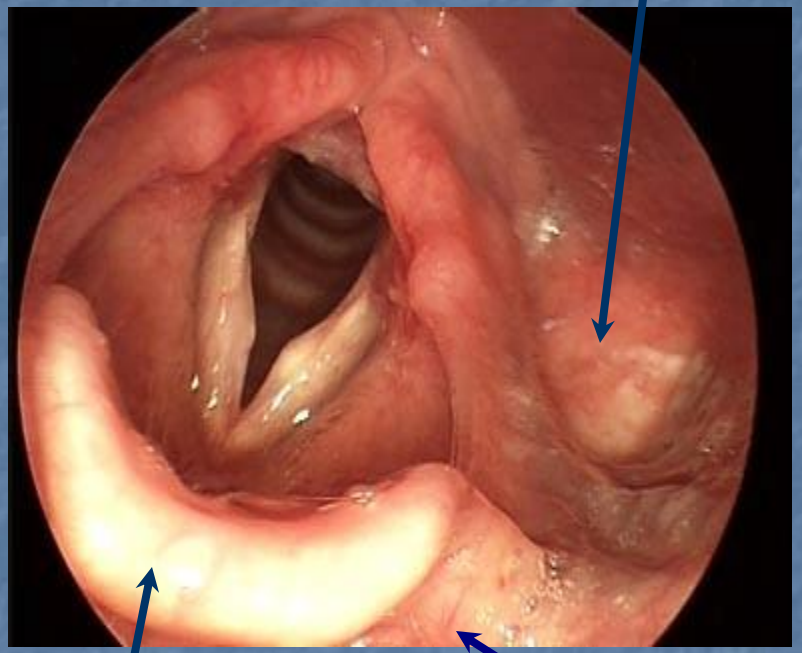


http://www.nyee.edu/top#top

The Larynx

Superior surface anatomy:

Major Landmarks - III

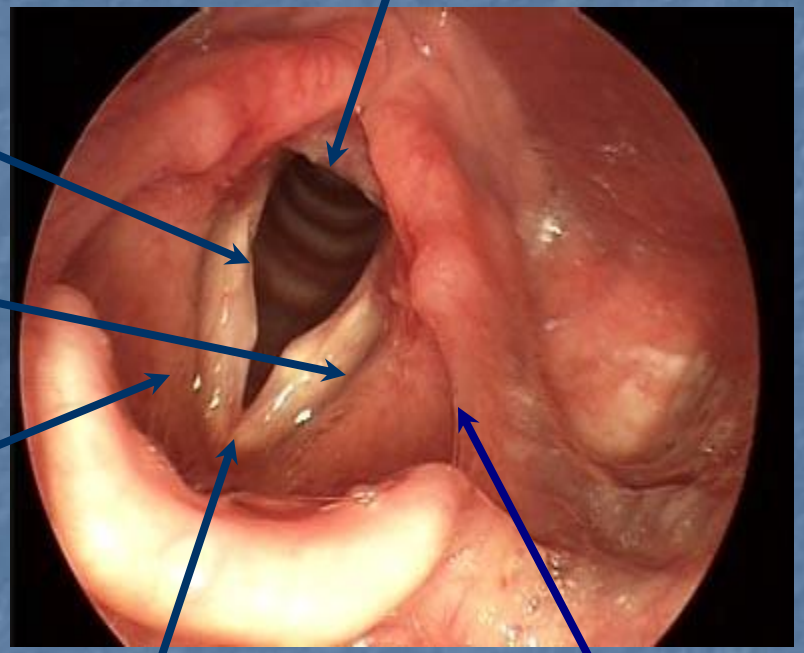


http://www.nyee.edu/top#top

The Larynx

Superior surface anatomy:

Major Landmarks - IV

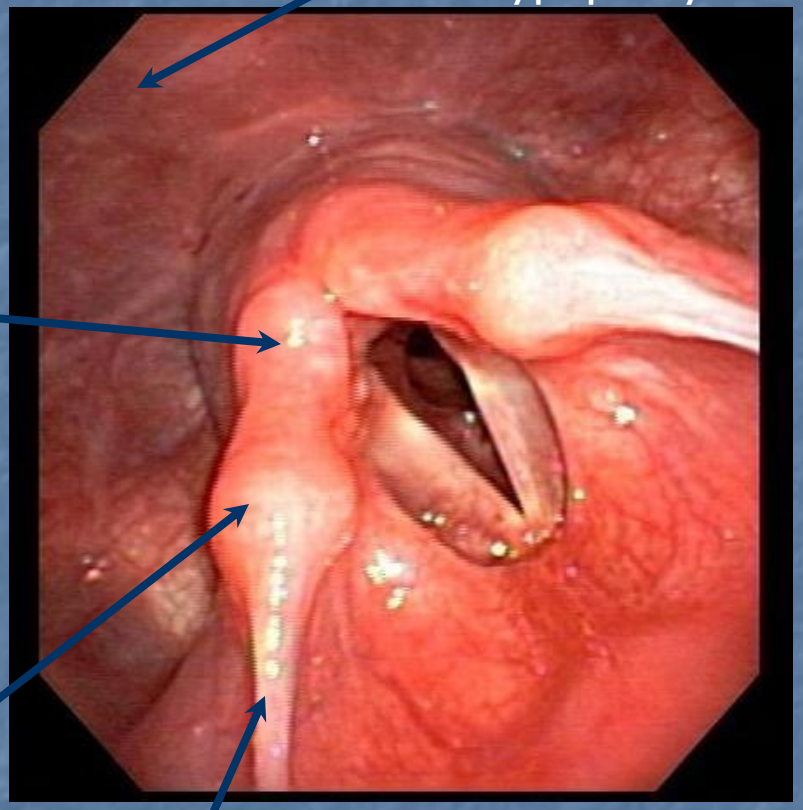


http://www.nyee.edu/top#top

The Larynx

Superior surface anatomy:

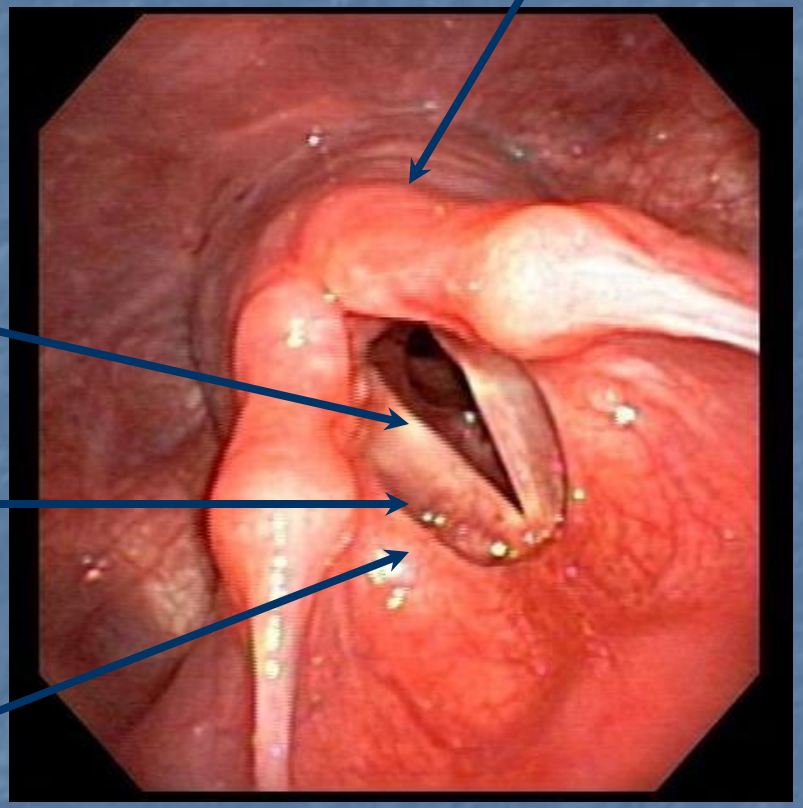
Major Landmarks - V



The Larynx

Superior surface anatomy:

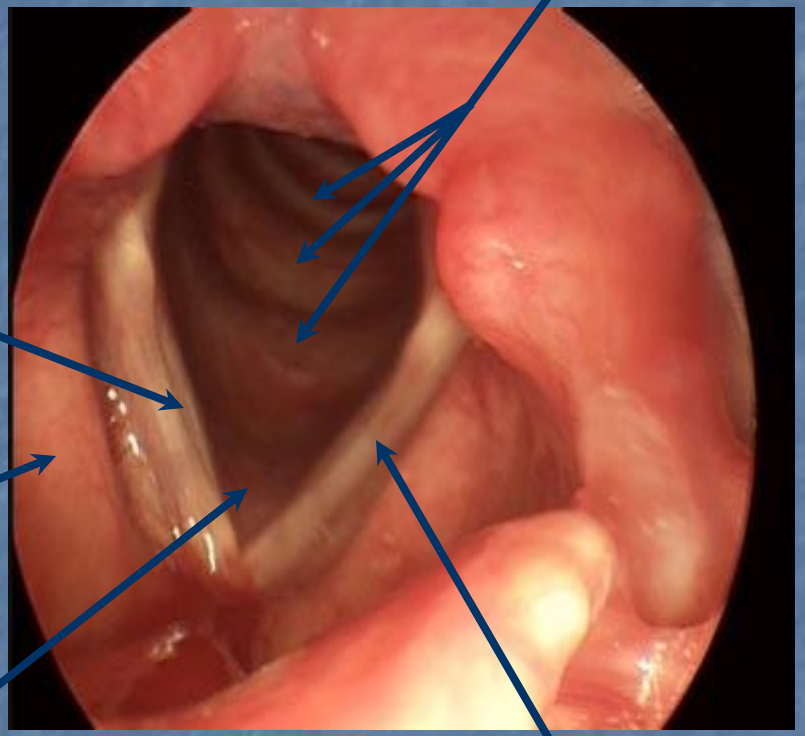
Major Landmarks - VI



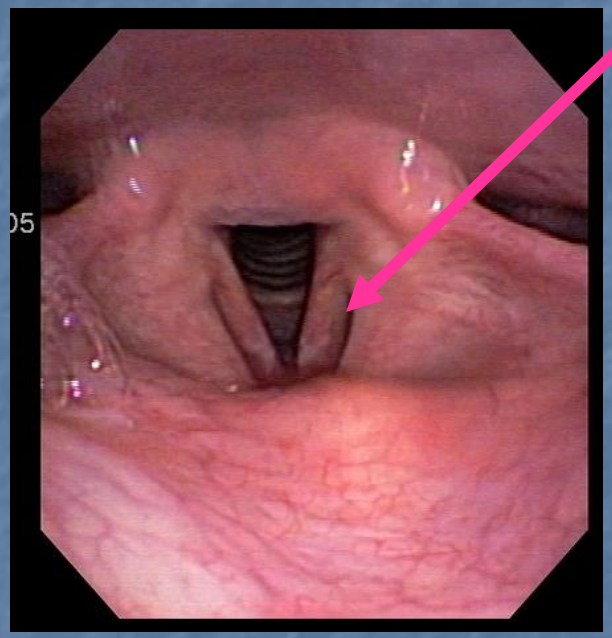
The Larynx

Superior surface anatomy:

Major Landmarks to look for - VII



This is the..



A. The epiglottis
B. The ventricle
C. The arytenoid cartilage
D. The true vocal cord
E. The false vocal cord

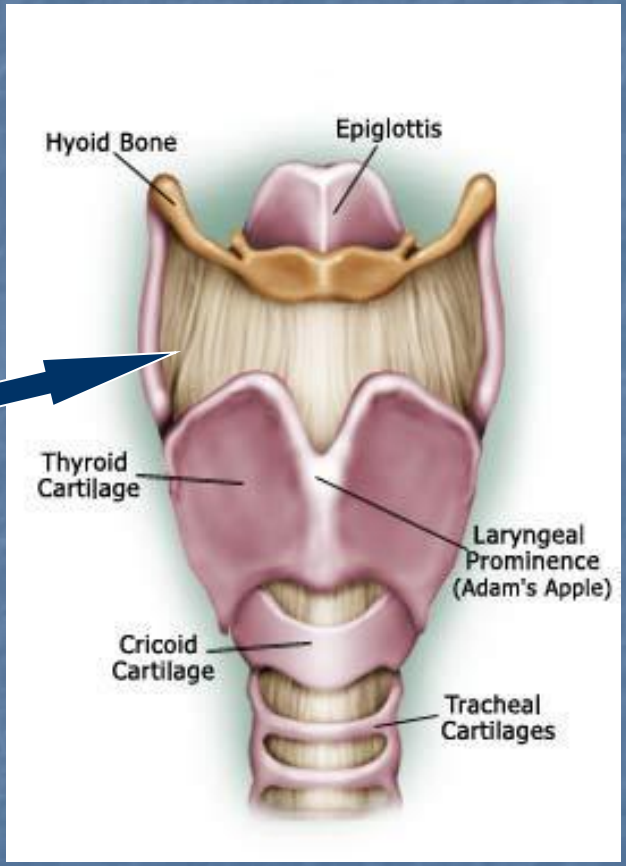
Click for correct answer: **B**

The Larynx: Anatomy

- The structural rigidity of the larynx is provided by the three median cartilages:
  - The epiglottis
  - Thyroid cartilage
  - Cricoid cartilage ,

  along with the hyoid bone.

- The thyrohyoid membrane forms a C-shaped barrier around the anterior and lateral walls of the supraglottis, and inferiorly becomes confluent with the connective tissue in the perichondrium of the tracheal cartilaginous rings.

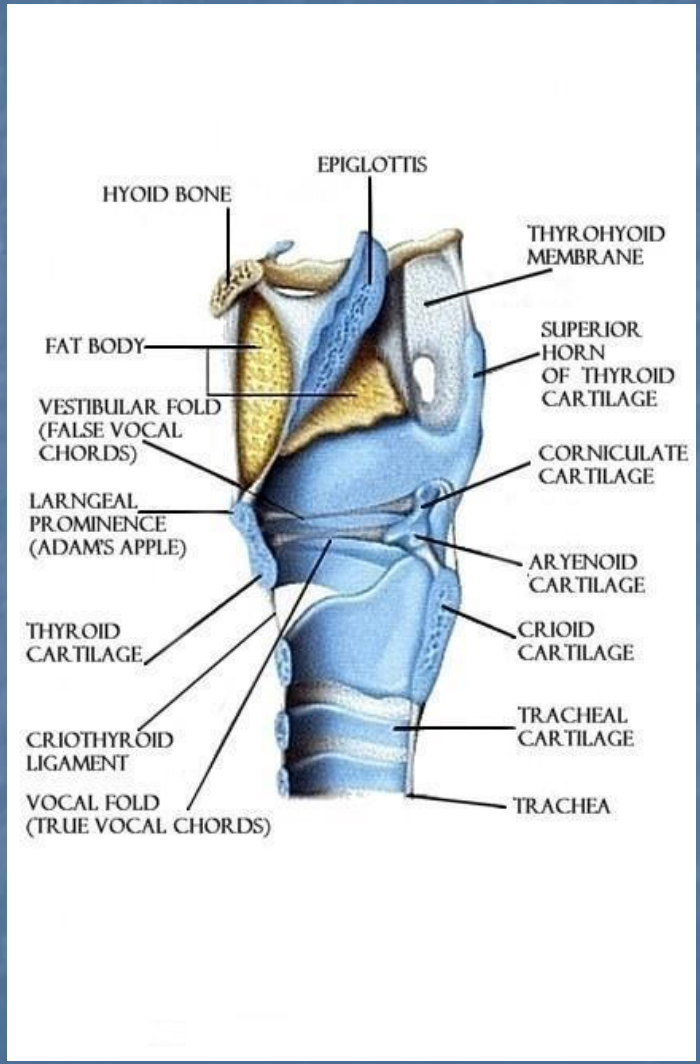


www.throat-cancer-symptoms.com/

The Larynx: Anatomy

- The six smaller cartilages of the larynx (3 pairs) are functionally involved with the movements of the vocal cords. These are:
  - The arytenoids
  - The corniculates
  - The cuneiforms

- The **arytenoid** cartilages are pyramid-shaped and articulate with the superior margin of the cricoid lamina. On their summit, are the **corniculate** cartilages; on their anterior aspect, the **cuneiform** cartilages

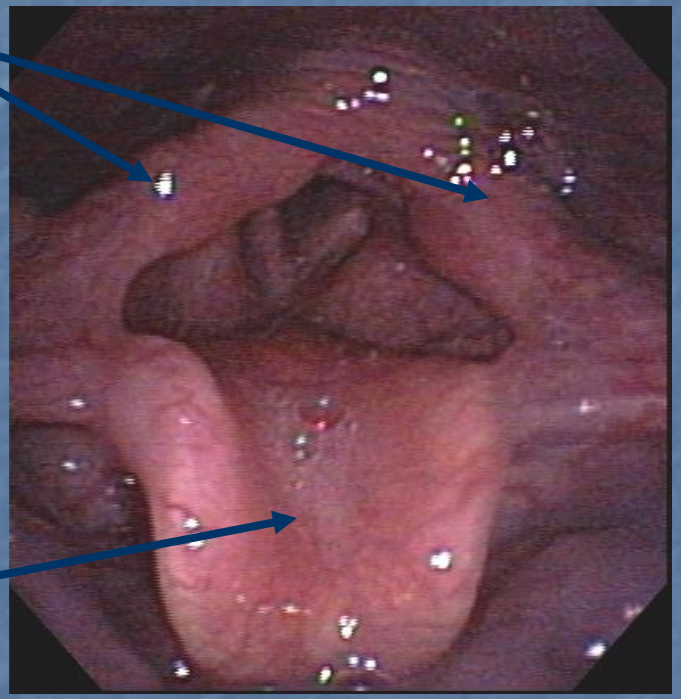


www.polychondritis.com

The Larynx: Anatomy

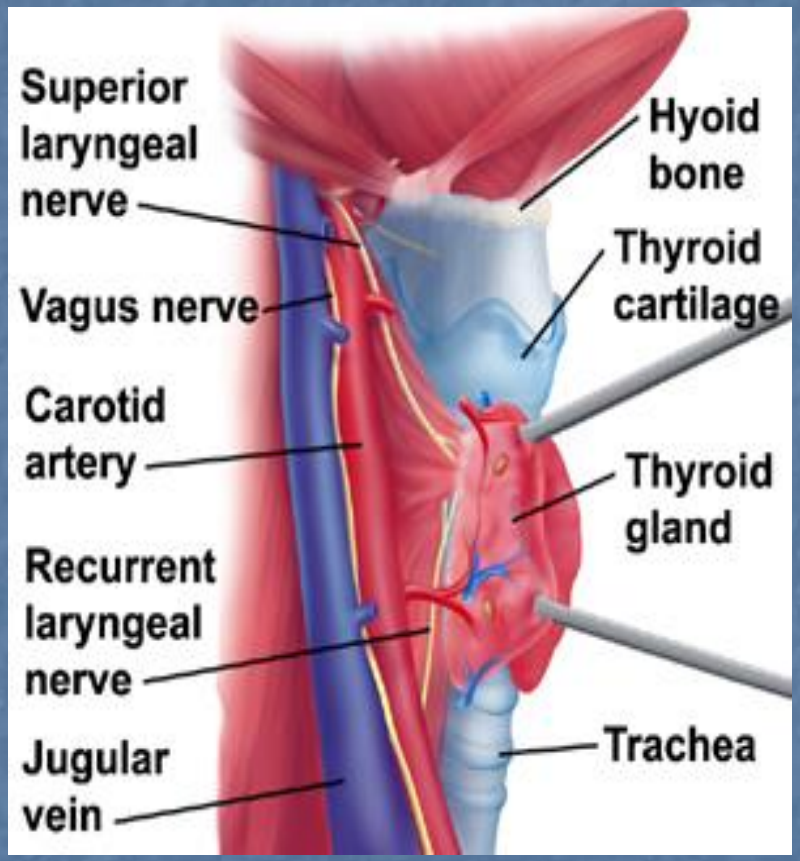
- The **vocal ligaments**, are attached posteriorly to the apex of the arytenoids and corniculates. The cuneiforms extend laterally, between the layers of the vocal cords, from the anterior aspect of the arytenocorniculate complex.

- The **epiglottis** is attached to the base of the tongue by a median and two lateral glossoepiglottic folds.



The Larynx: Critical Structures

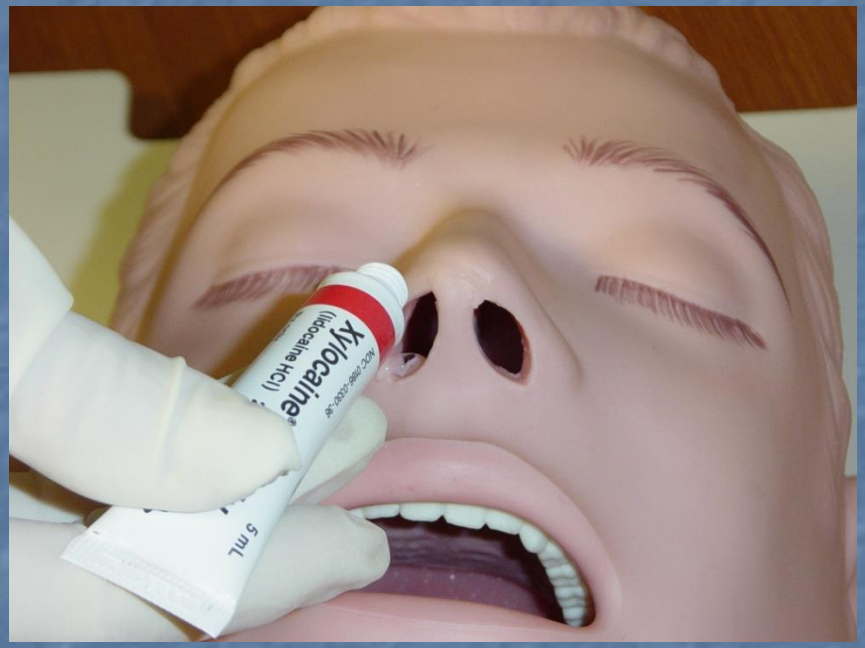
- The Larynx neighbors major critical structures:
  - Carotid arteries and jugular veins, and the vagus nerve
  - Superior and inferior thyroid arteries
  - Superior and recurrent laryngeal nerves



www.yoursurgery.com

The Larynx: Topical Anesthesia

Bilateral nasal administration of anesthetic provides partial posterior pharyngeal anesthesia by affecting the Sphenopalatine nerve fibers, thus diminishing the gag reflex.



Ask patient to inhale deeply through nostril

The Larynx: Topical Anesthesia

Topical anesthetic usually affects the superior laryngeal nerve and blocks sensory innervation to the base of the tongue epiglottis, pyriform fossa, and valleculae.

Click here to view video presentation

Click to continue

The Larynx: Topical Anesthesia

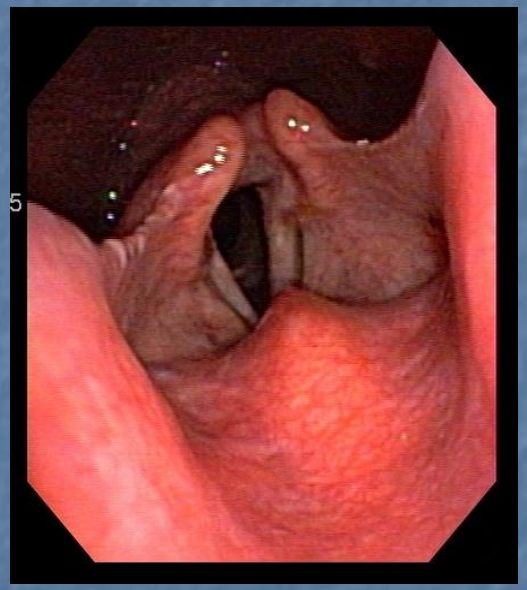
The topical instillation of Lidocaine with the "Spray as you go" method numbs the submucosal plexus of the larynx, derived from the external and internal branches of the superior laryngeal nerve.

Click here to view video presentation

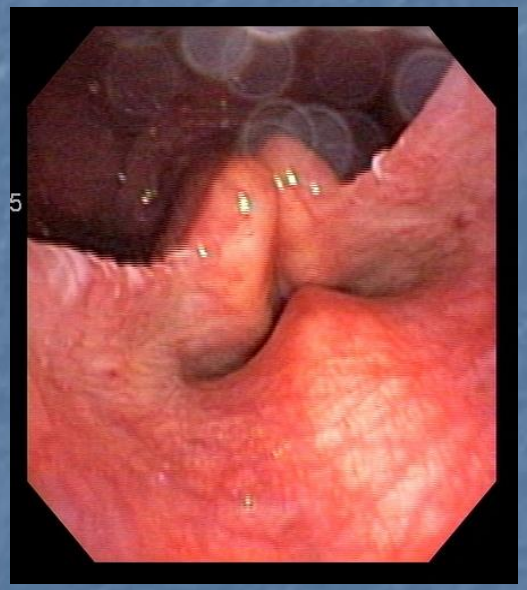
Click to continue

Laryngeal function: Airway Protection

The glottis: open for inspiration and closed for swallowing



Open



Closed

Laryngeal function: Phonation

The vocal cords: Adducted for phonation; abducted for inspiration

Adducted: Talking

Abducted: Breathing

www.voice.northwestern.edu

Laryngeal function: Phonation

Click here to view video presentation

The vocal cords open and close while talking

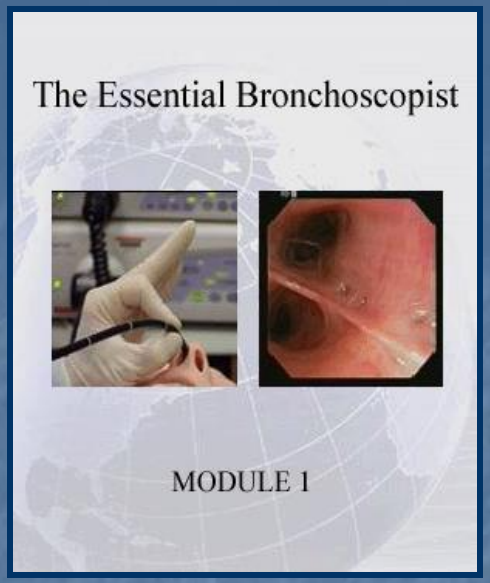
Click to continue

Which of the following defends against aspiration?

A. The epiglottis
B. The false cords
C. The true cords
D. The ventricle
E. All of the above

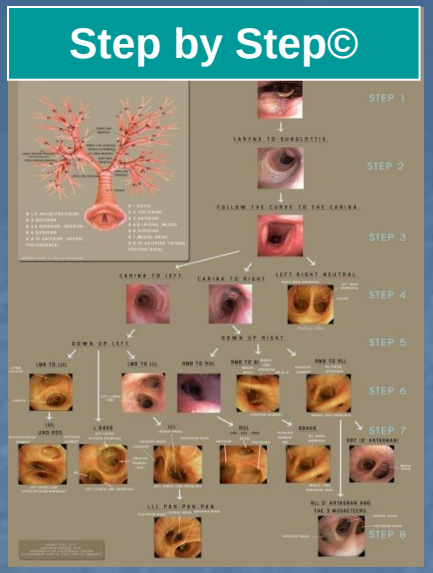
Click for correct answer: **E**

This presentation is part of a comprehensive curriculum for Flexible Bronchoscopy. Our goals are to help health care workers become better at what they do, and to decrease the burden of procedure-related training on patients.

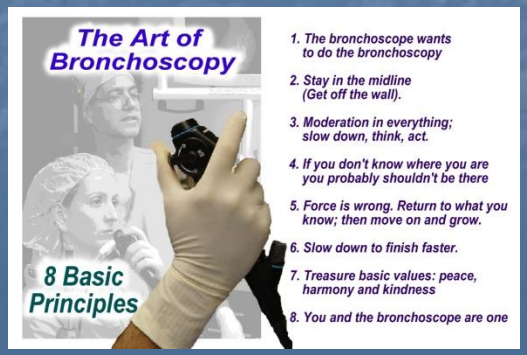


A new curriculum

Assured competency and proficiency



1. **Web-based Self-learning study guide.**
2. **Computer-based simulations, didactic lectures, and image encyclopedia.**
3. **Bronchoscopy step-by-step©: Practical exercises, skills and tasks, competency testing.**
4. **Guided apprenticeship.**
5. **Learning the art of Bronchoscopy.**



DEMOCRATIZATION AND
GLOBALIZATION OF KNOWLEDGE

All efforts are made by Bronchoscopy International to maintain currency of online information. All published multimedia slide shows, streaming videos, and essays can be cited for reference as:

Bronchoscopy International: BronchAtlas©, an Electronic On-Line Multimedia Slide Presentation. http://www.Bronchoscopy.org/Bronchatlas/htm. Published 2005 (Please add "Date Accessed").

Thank you