Respiratory System Module

1st Year MBBS SGD

Larynx & Trachea

Date: 23/04/25

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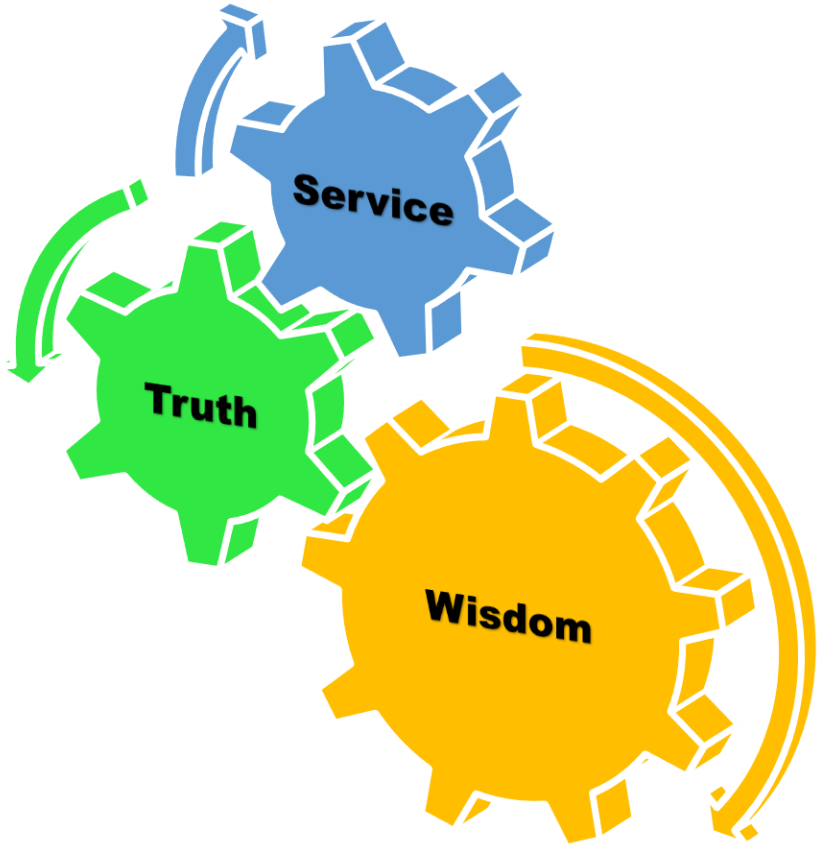
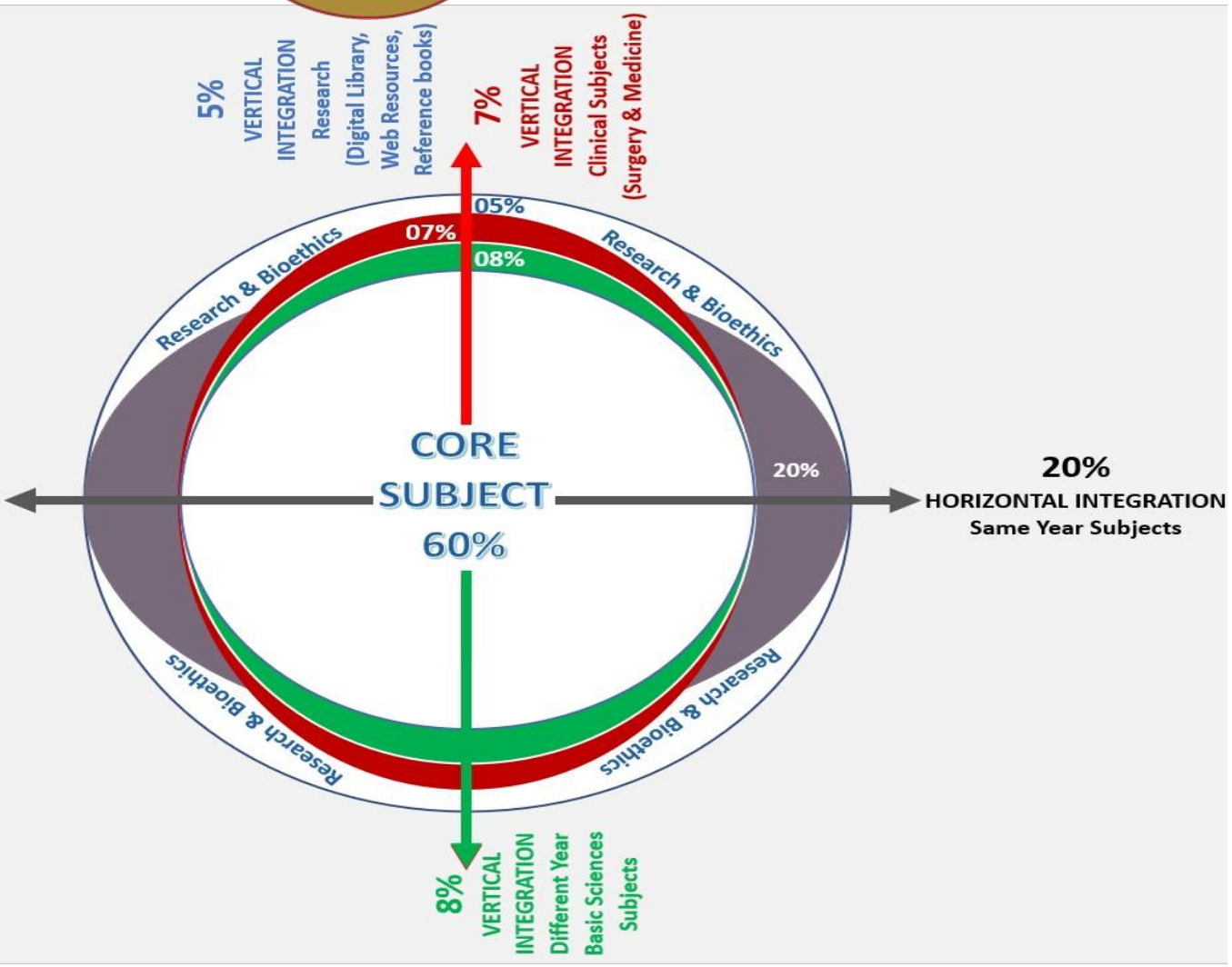
Assistant Professor of Anatomy

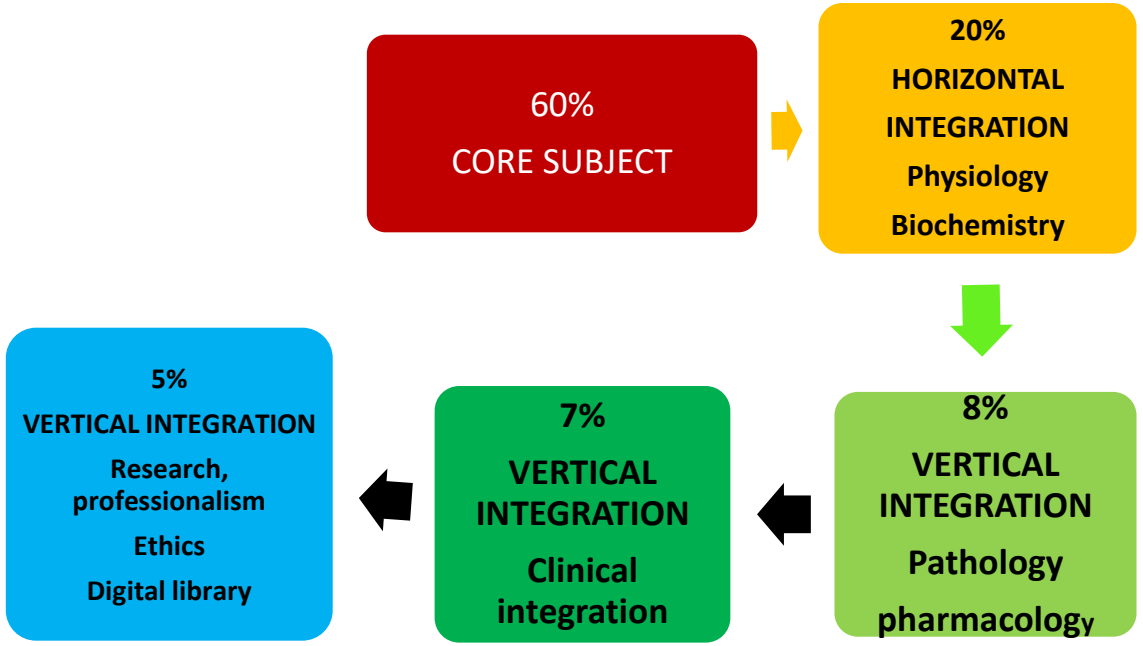
Mission- Vision- Values



- To impart evidence-based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine

Professor Umar Model of Integrated Lecture

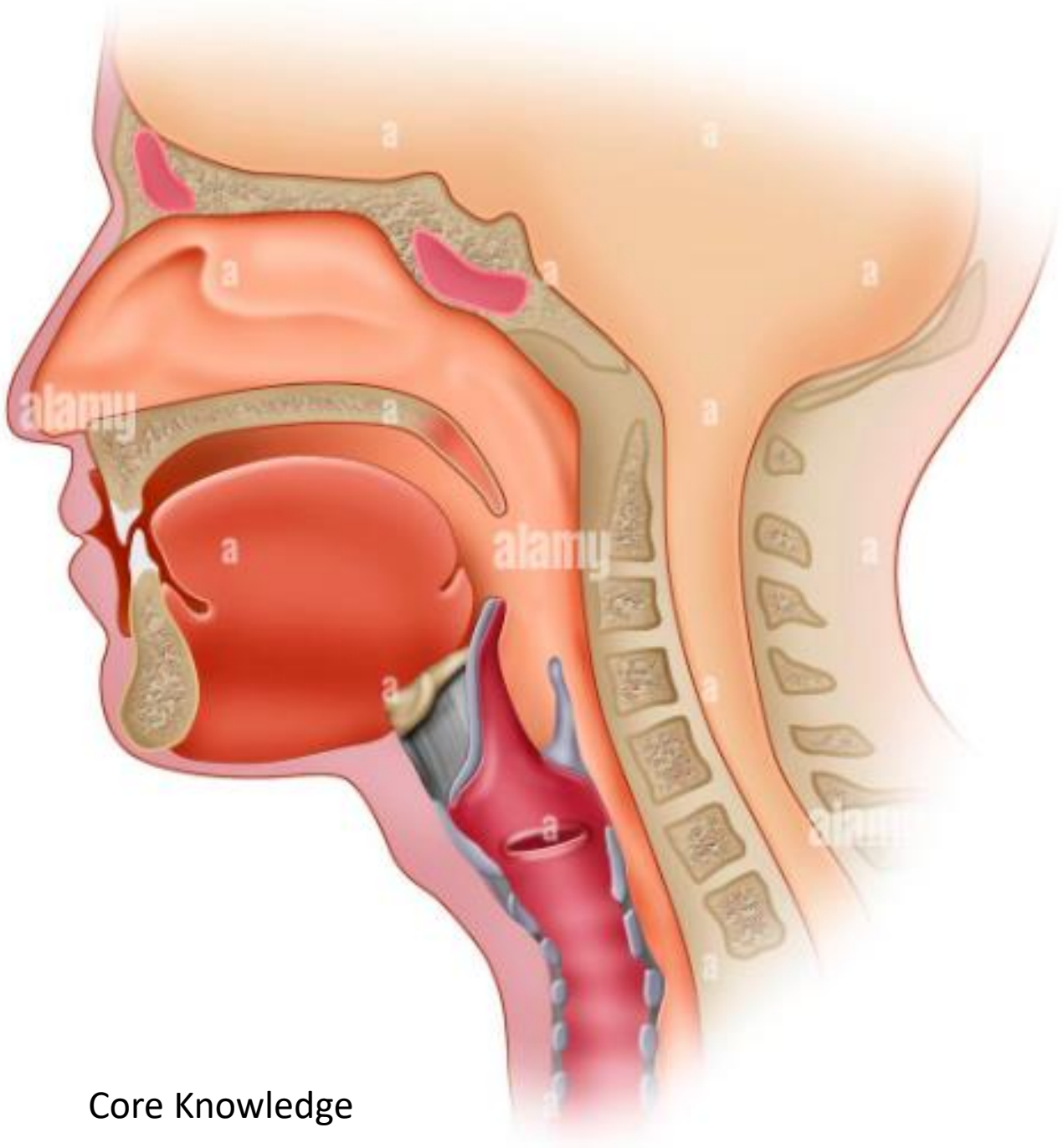




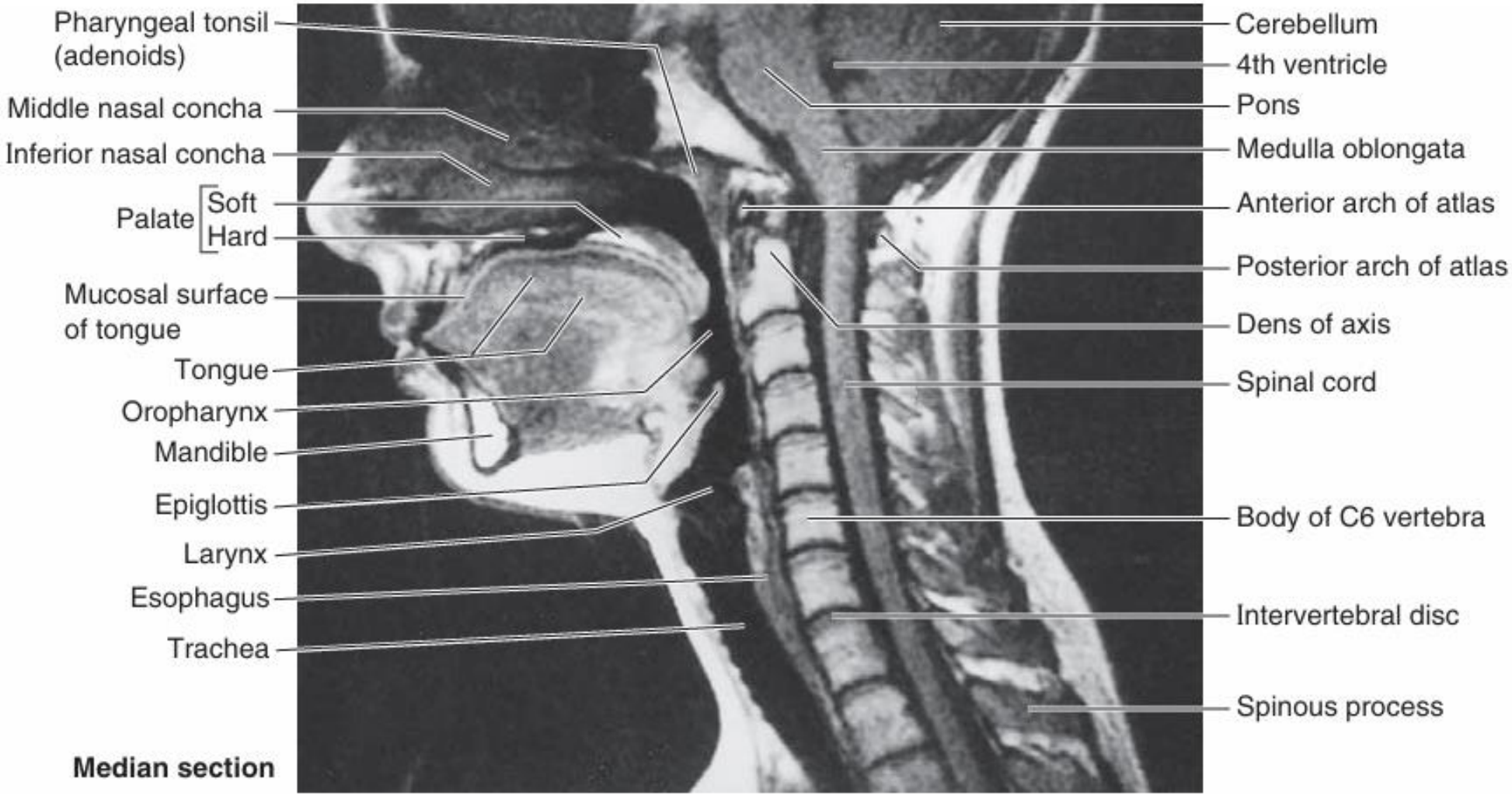
Learning Objectives

- Enumerate the **components of larynx**
- Describe **paired** and **unpaired cartilages** of larynx
- Describe **Intrinsic** and **extrinsic muscles** of larynx (origin, insertion nerve supply and action).
- Describe **Intrinsic** and **extrinsic membrane** (attachments and structure piercing the membranes).
- Discuss the **movements of vocal cords** and their effects on the voice and respiration.
- Discuss the **blood supply** and **nerve supply** of larynx.
- Discuss the **applied** and the related clinical.

Extent of Larynx



Extent of Larynx



Core Knowledge

Functions of Larynx

Phonating Mechanism

Guard the air passages

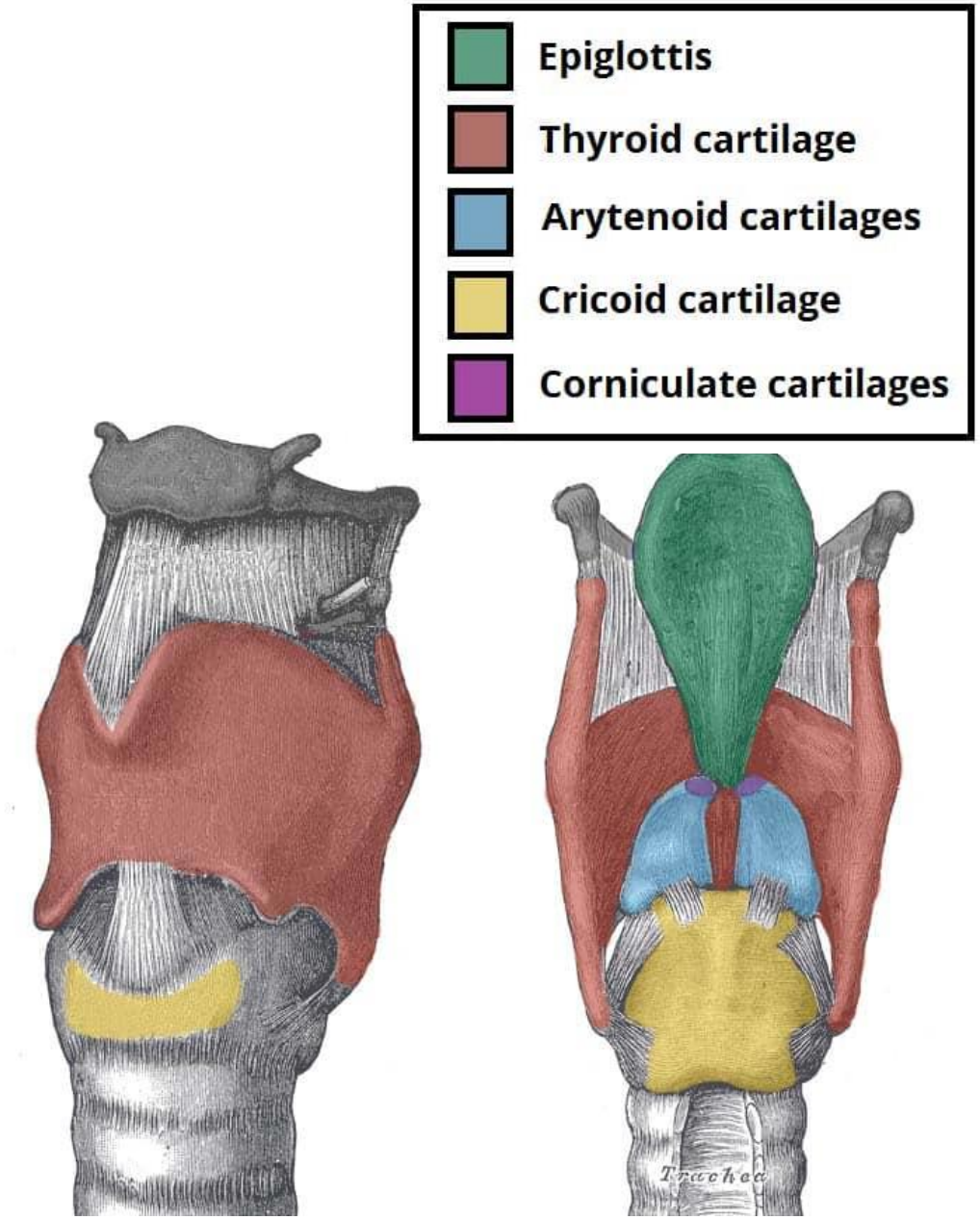
Cartilages

Single

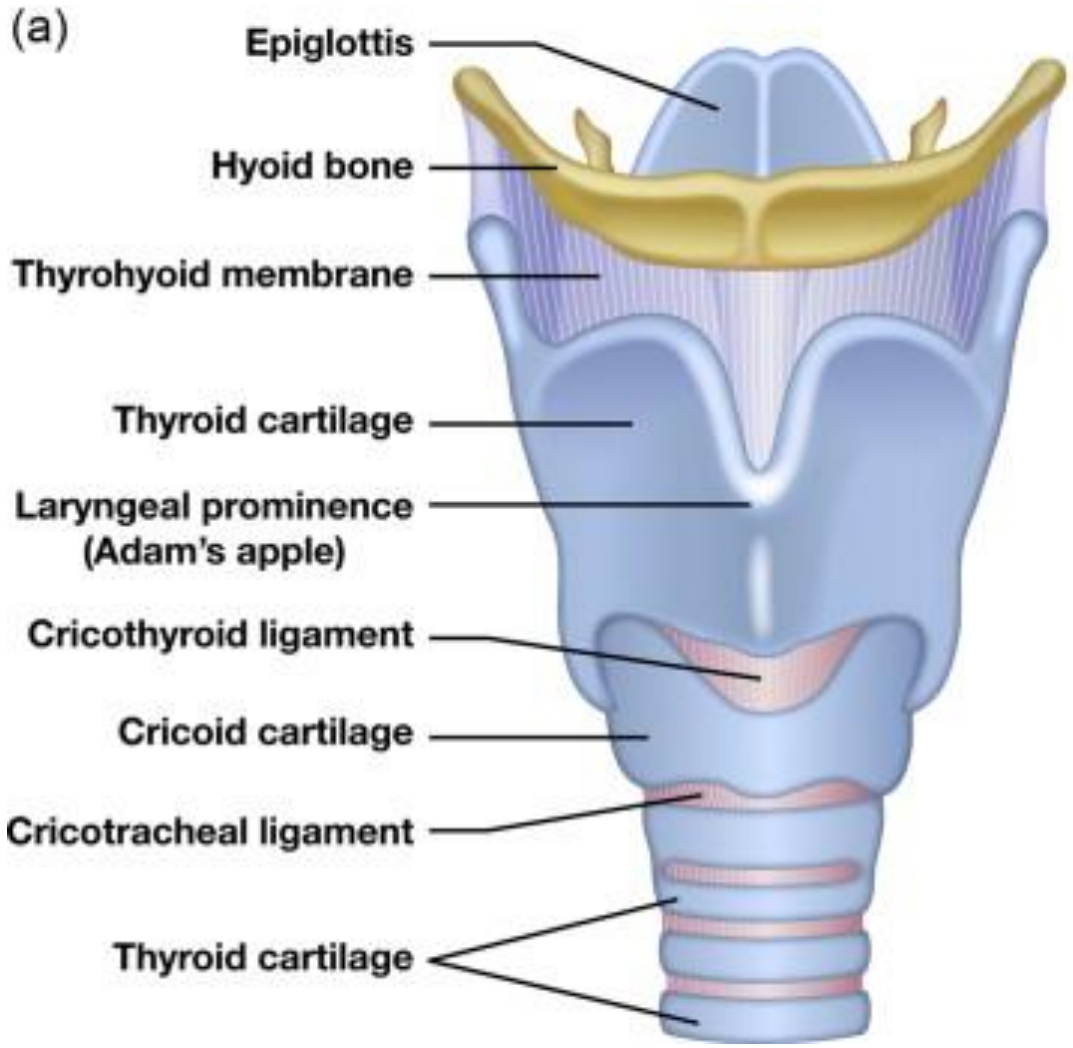
- Thyroid, Cricoid, and Epiglottic

Paired

- Arytenoid, Corniculate, and Cuneiform

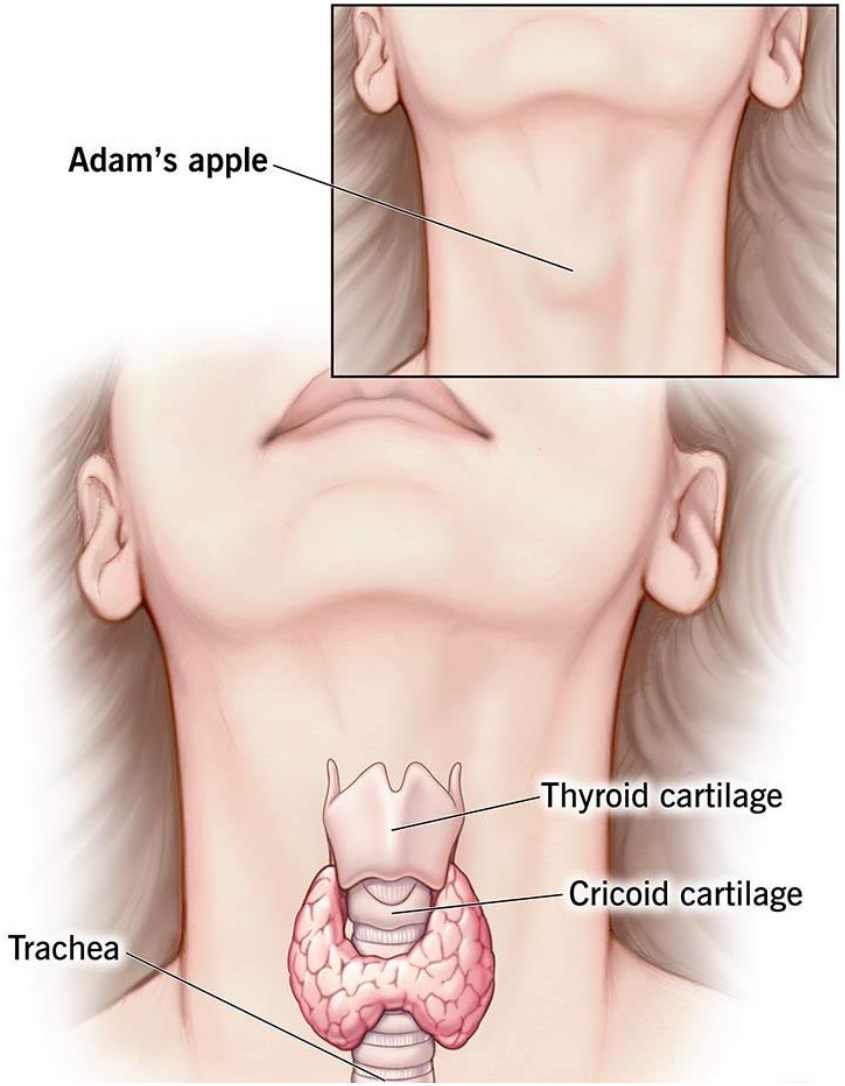


Thyroid Cartilage



Core Knowledge

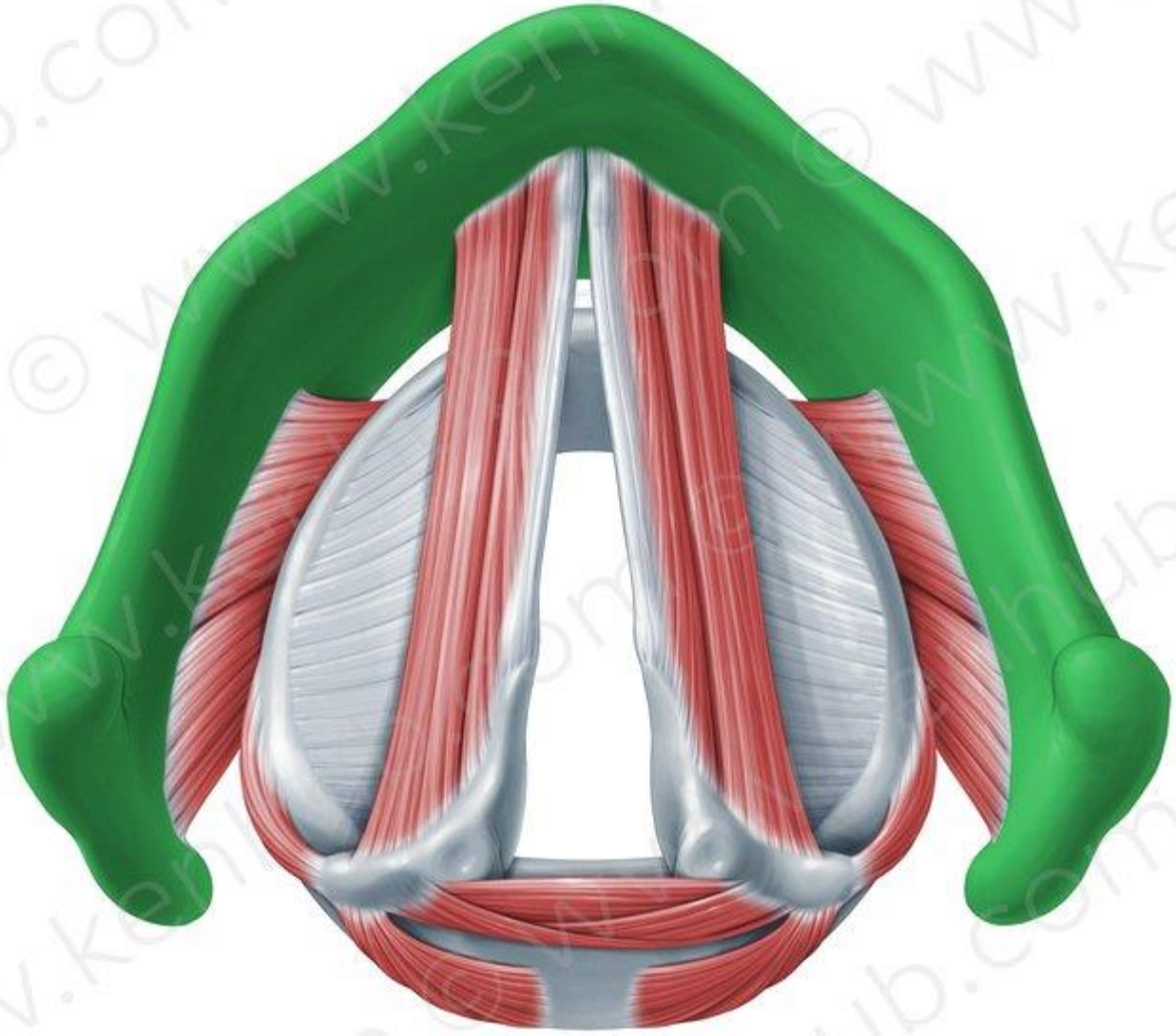
Laryngeal prominence



Core Knowledge

Lateral View

Superior View



Posterior view

Core Knowledge

Thyrohyoid membrane

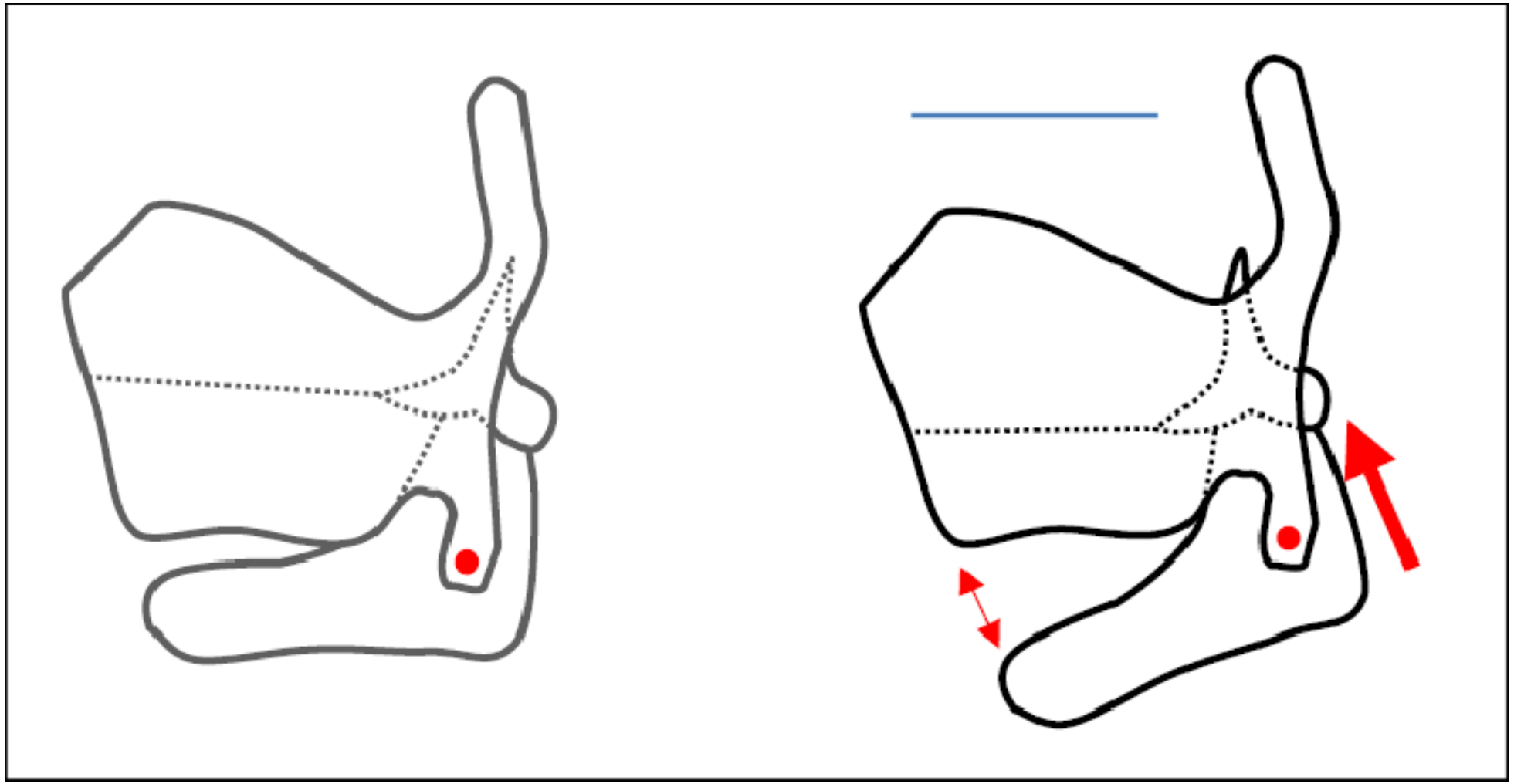
Cricoid Cartilage

Posterior view

Core Knowledge

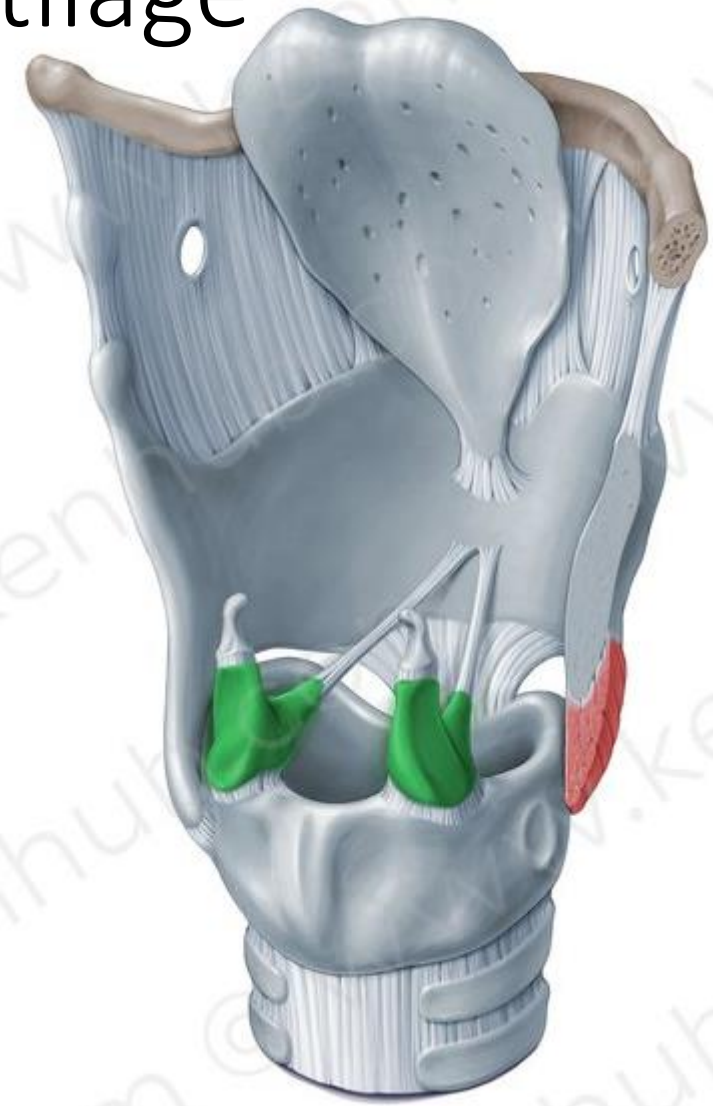
Attachments

Cricothyroid joints



Arytenoid Cartilage

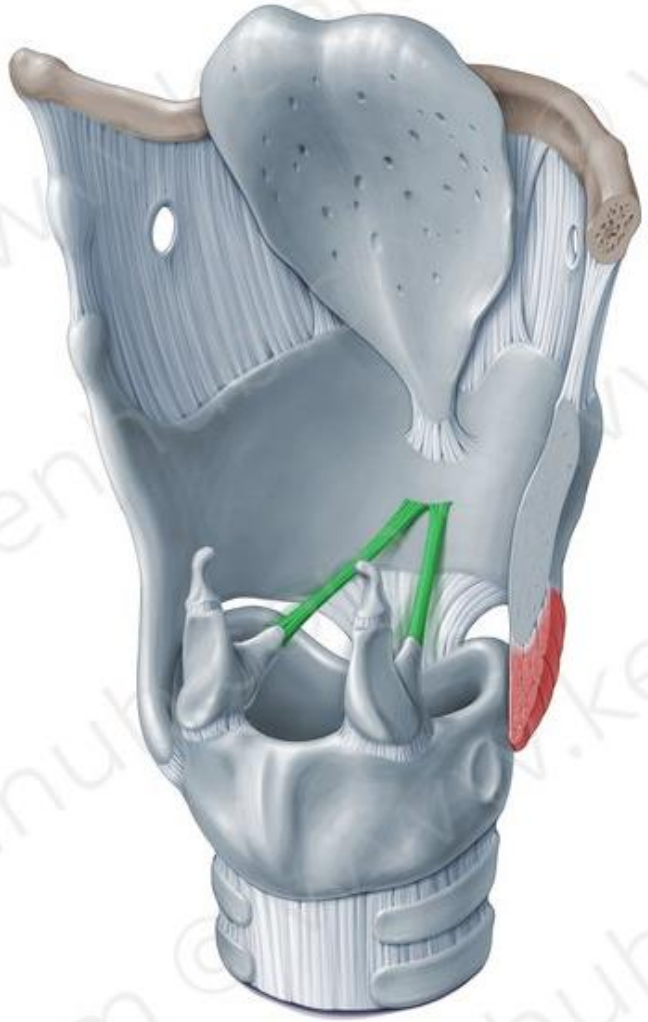
Arytenoid Cartilage



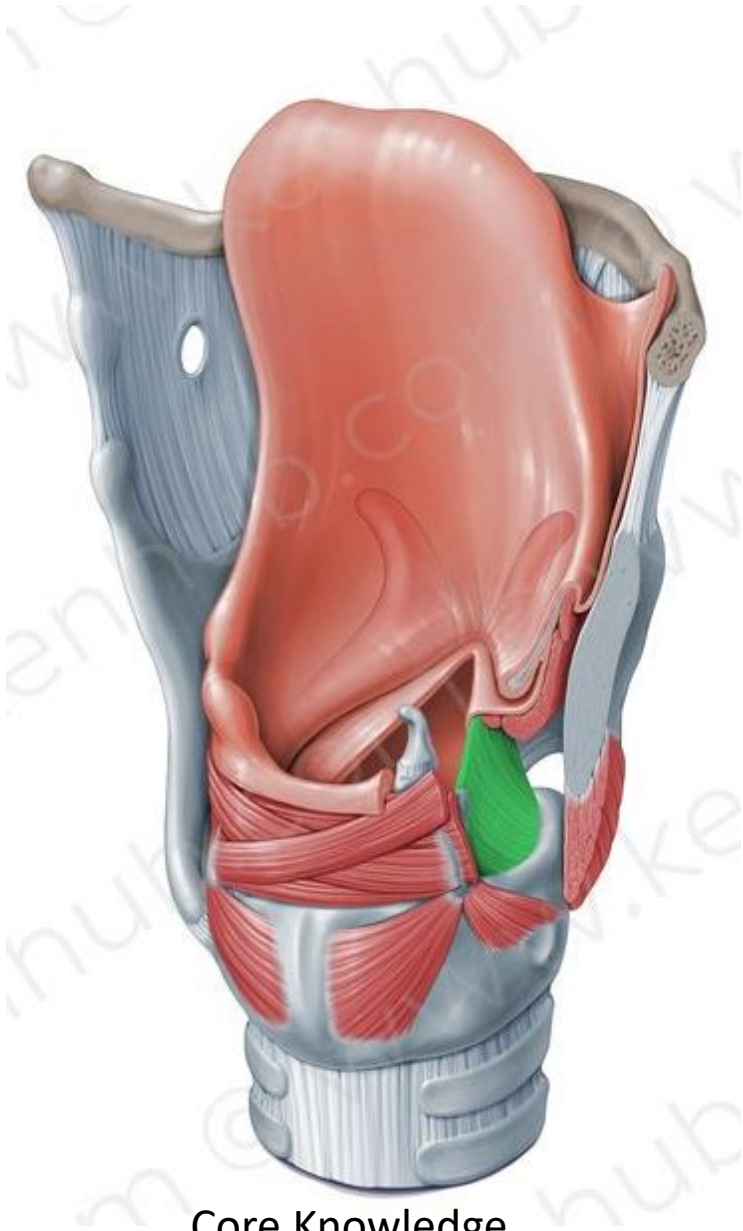
Corniculate

Core Knowledge

Vocal Ligaments

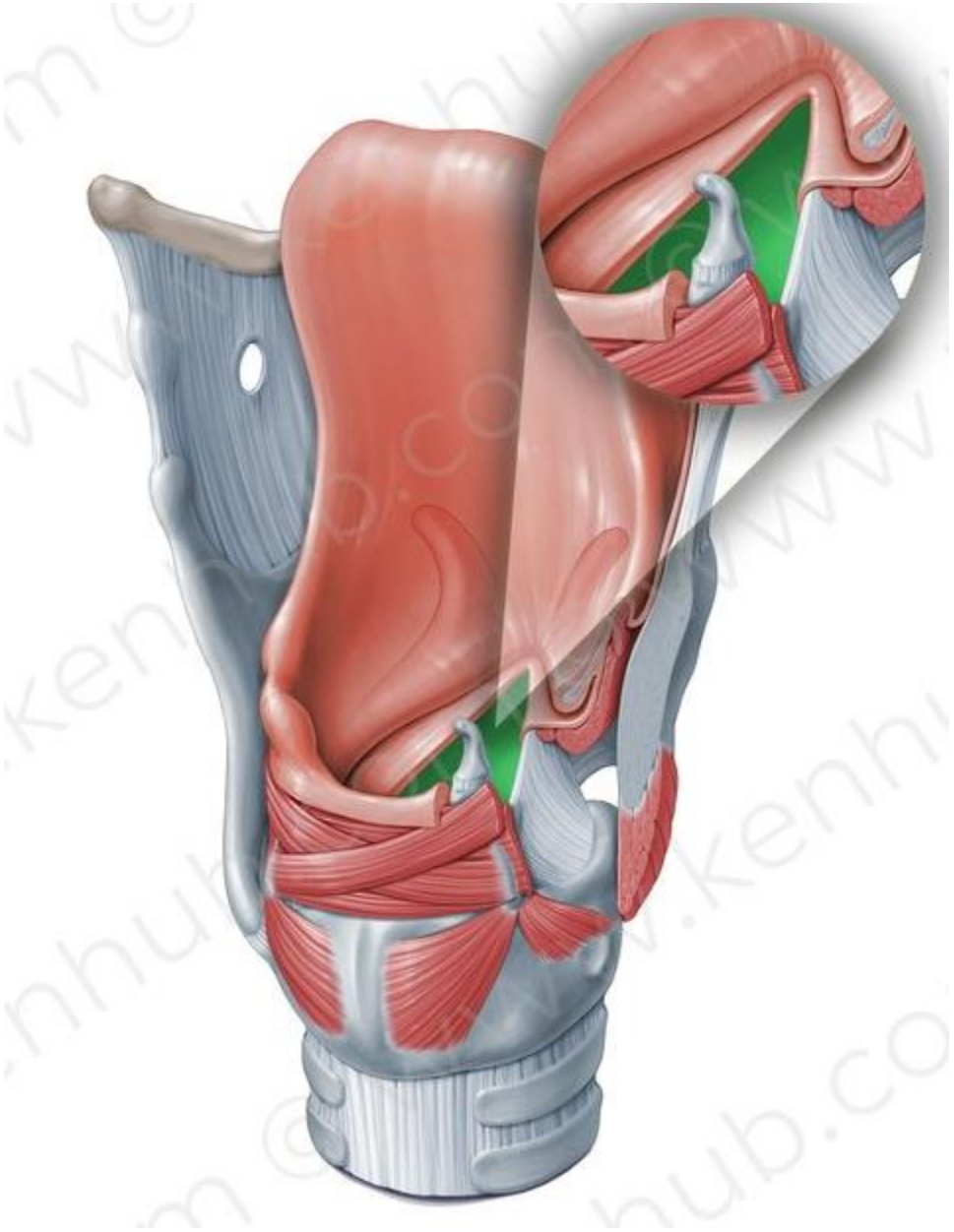


Conus Elasticus



Core Knowledge

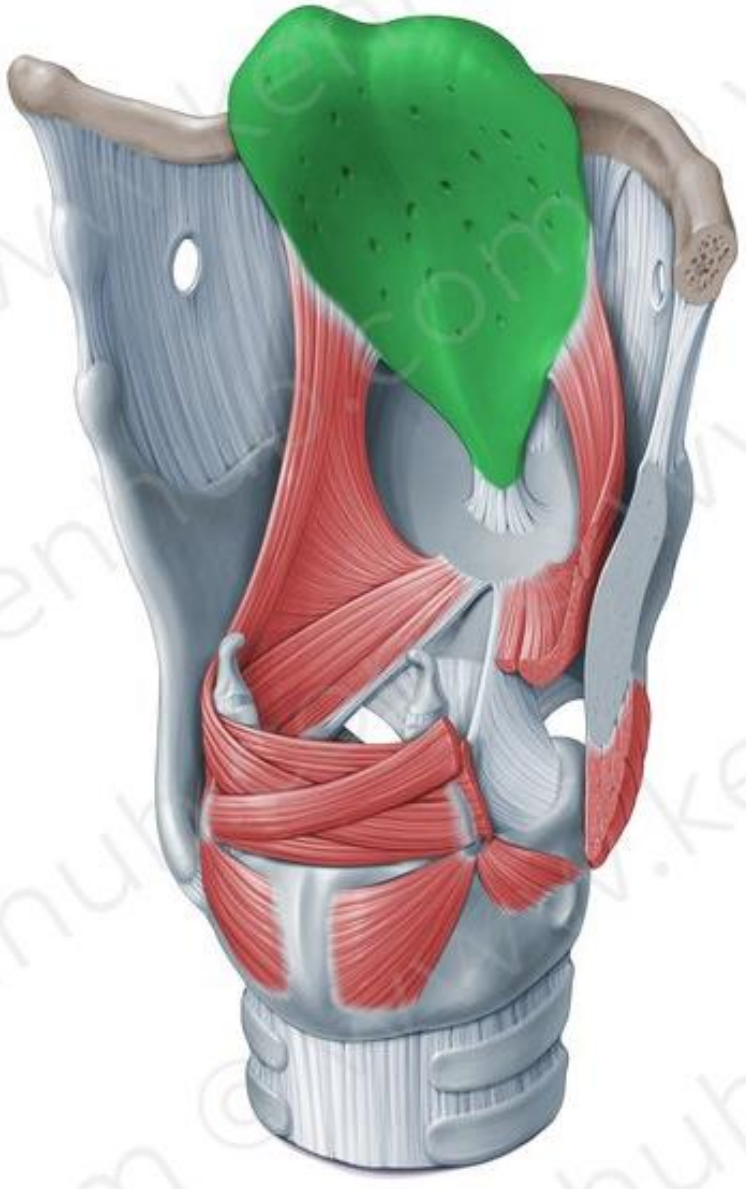
Rima Glottidis



Epiglottis

Core Knowledge

Posterior View

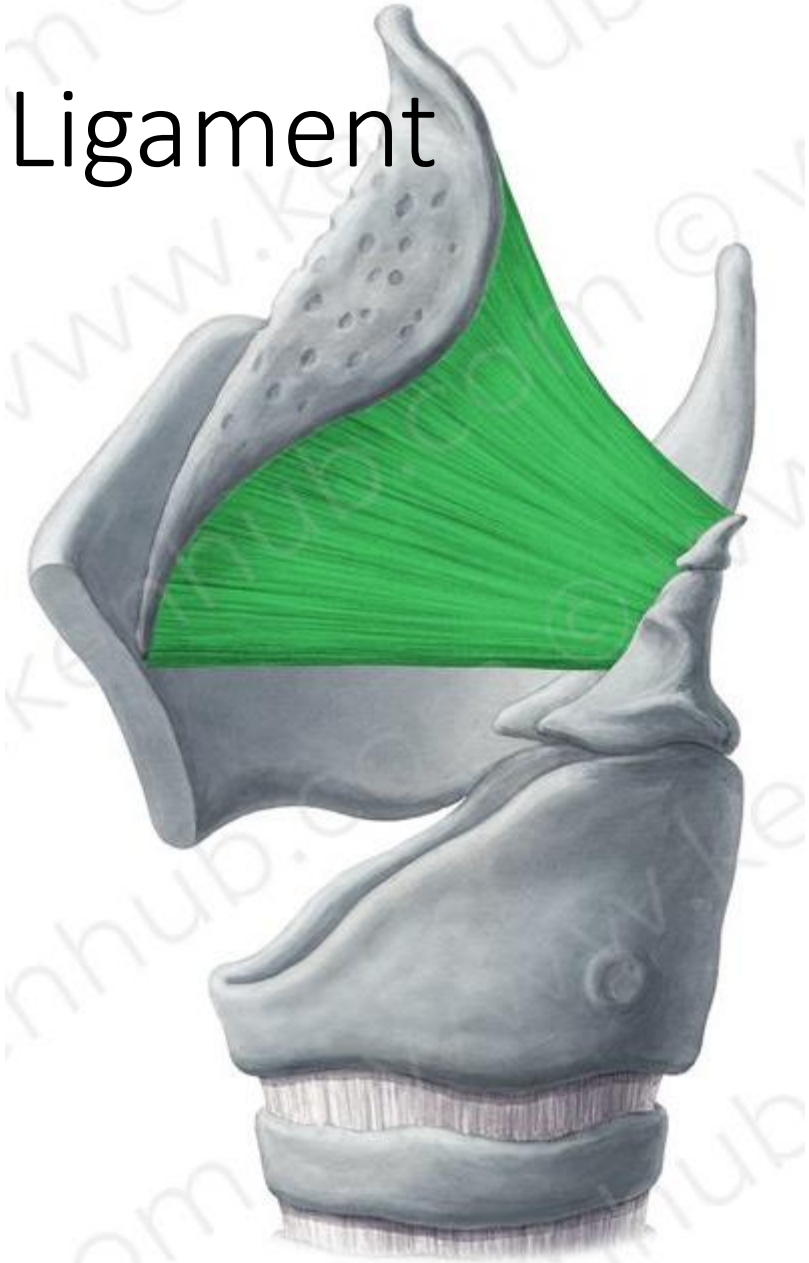


Function of Epiglottis

Core Knowledge

Thyro-epiglottic ligament

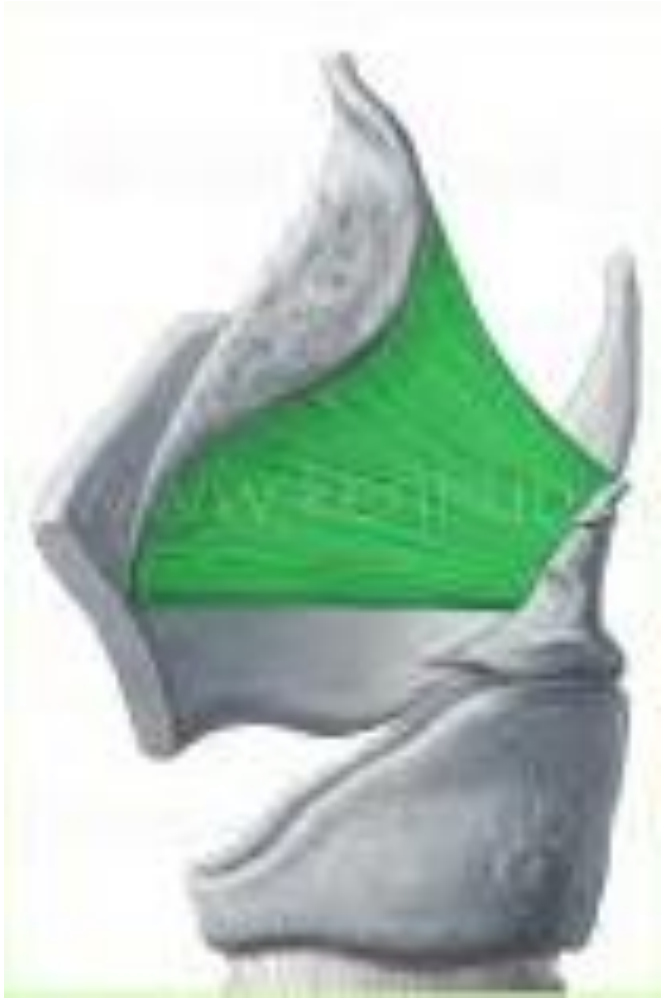
Hyo-epiglottic Ligament



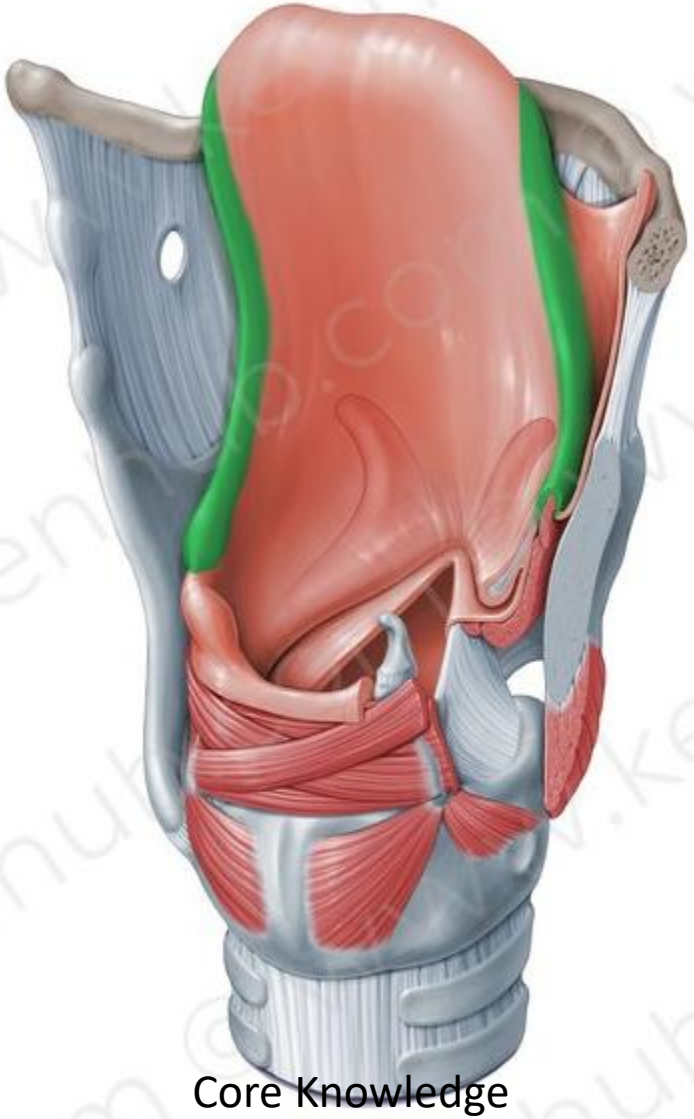
Core Knowledge

Vestibular folds

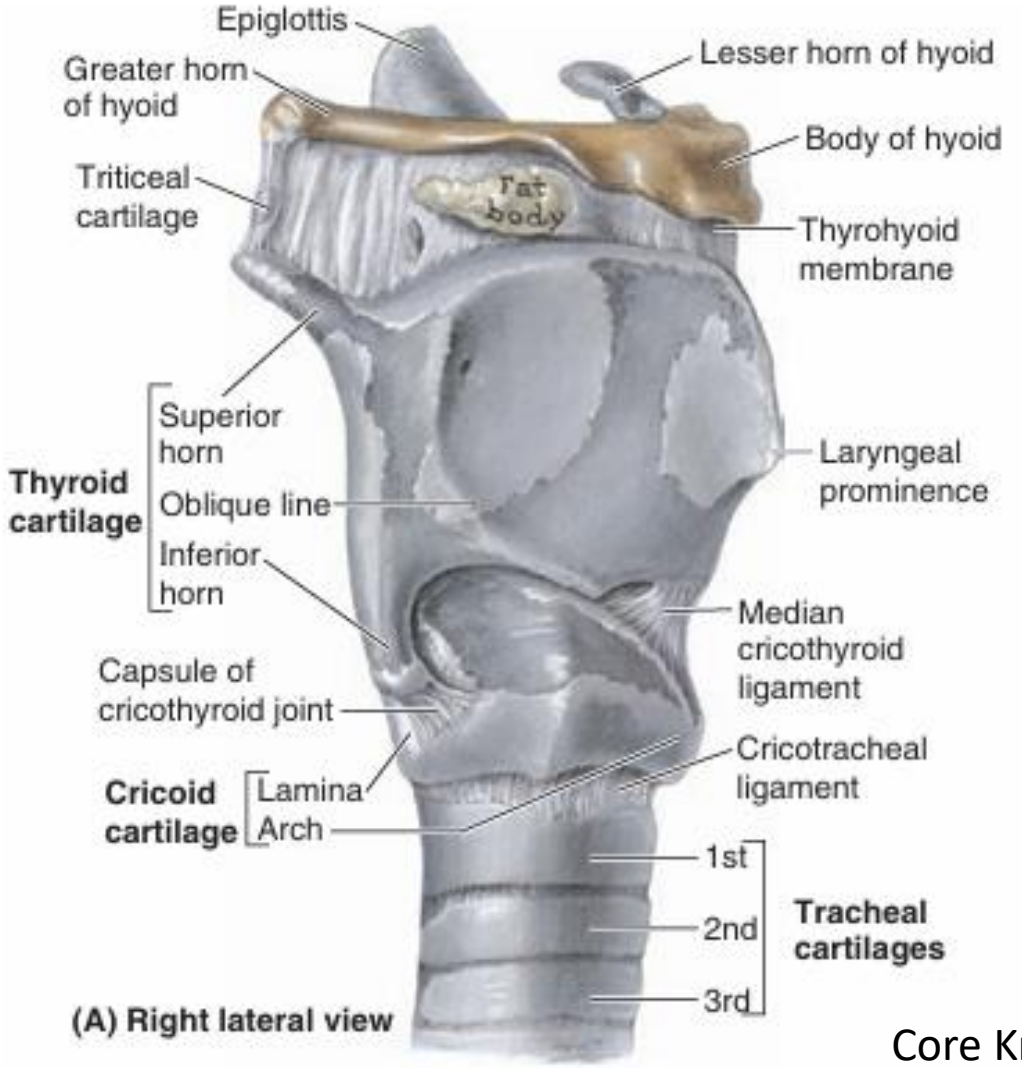
Quadrangular Membrane

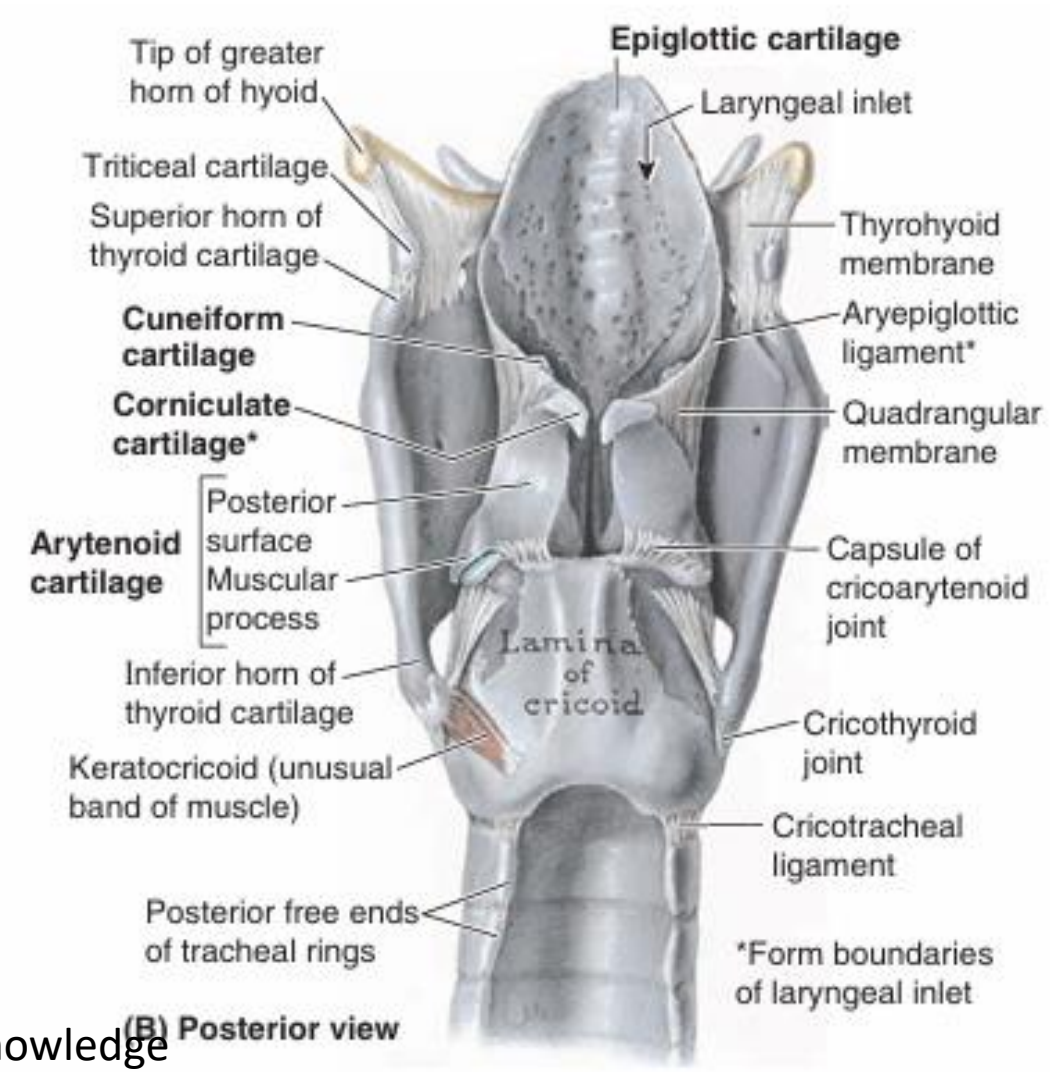


Aryepiglottic folds

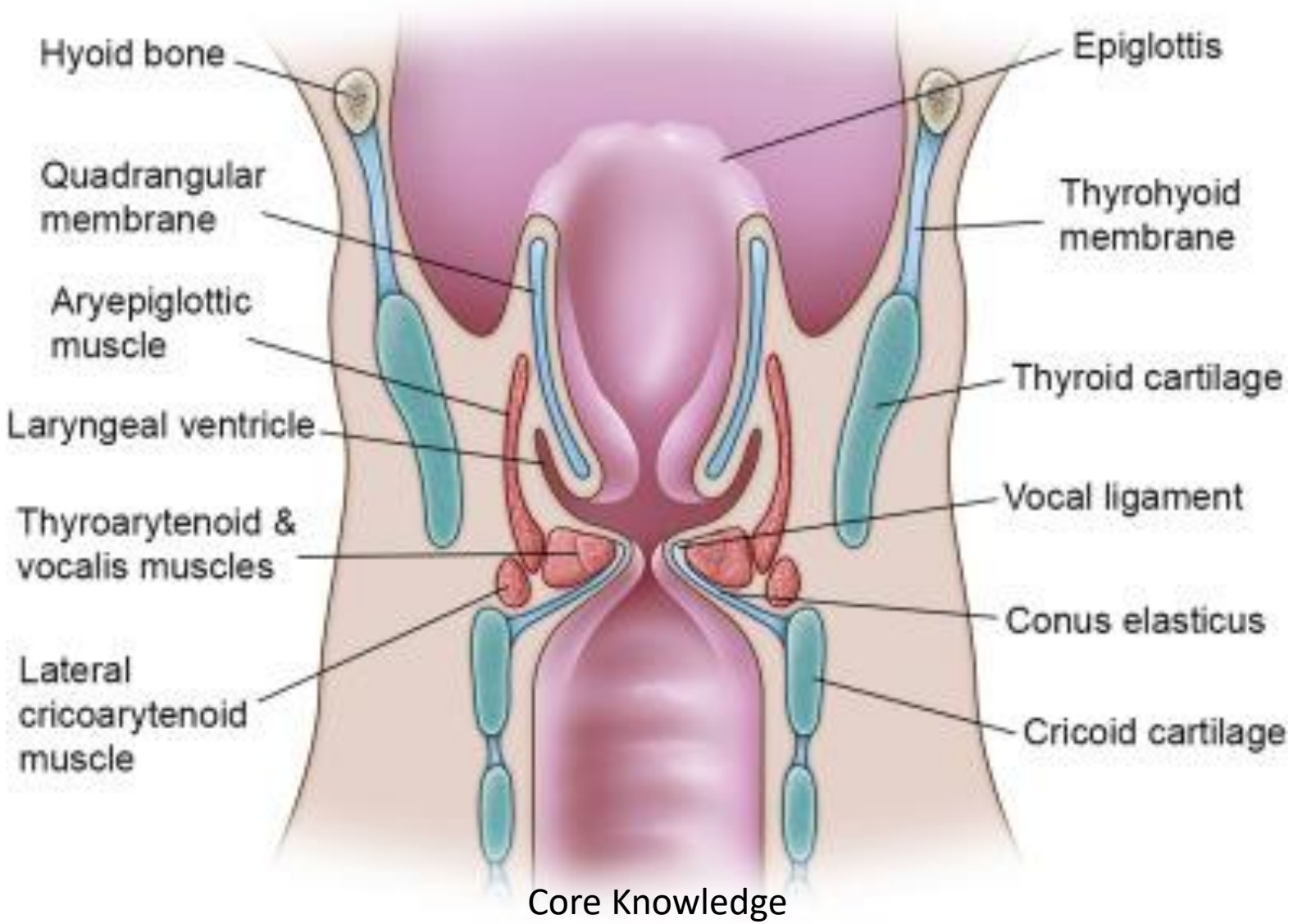


Structure of Larynx



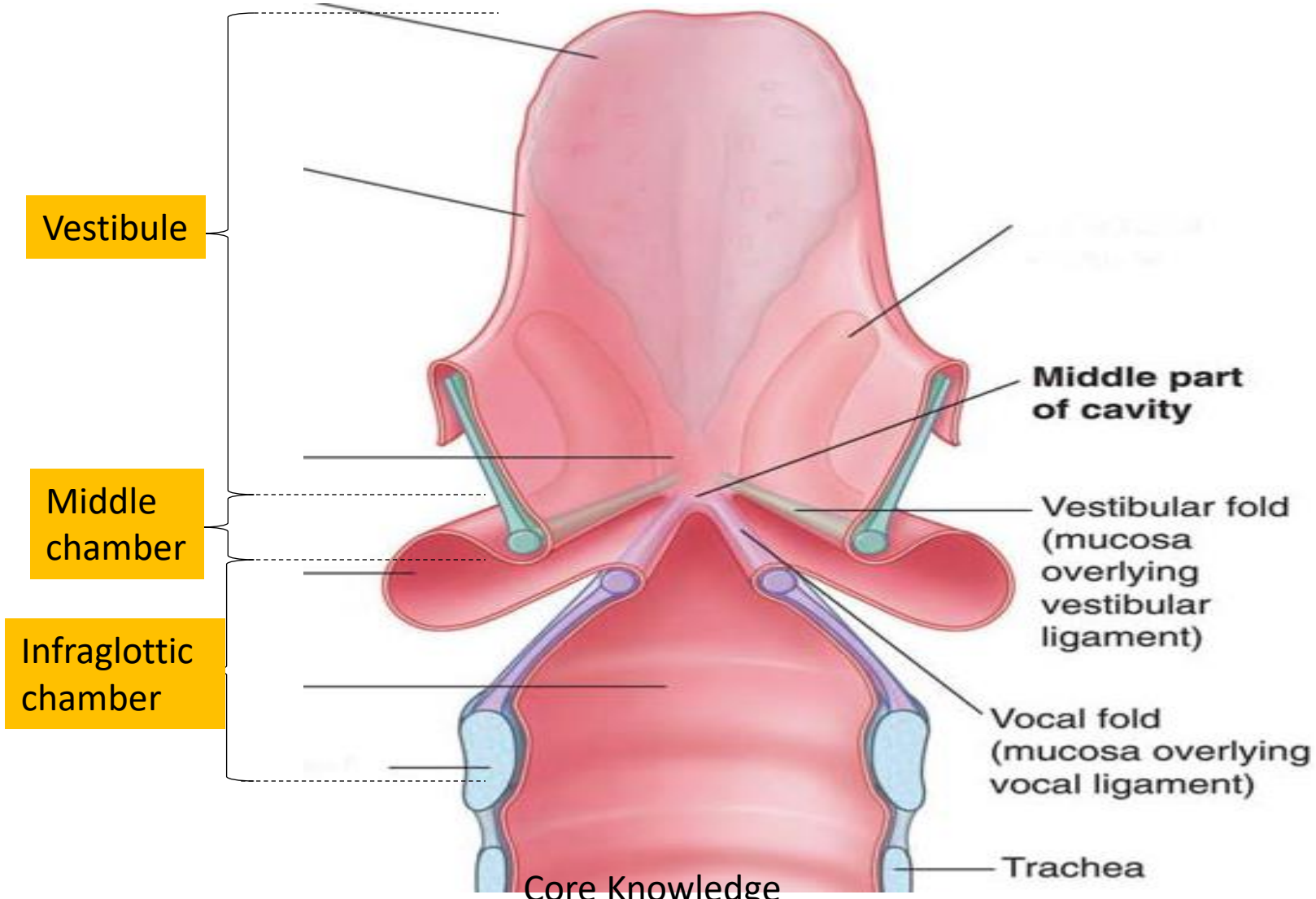


Interior of Larynx



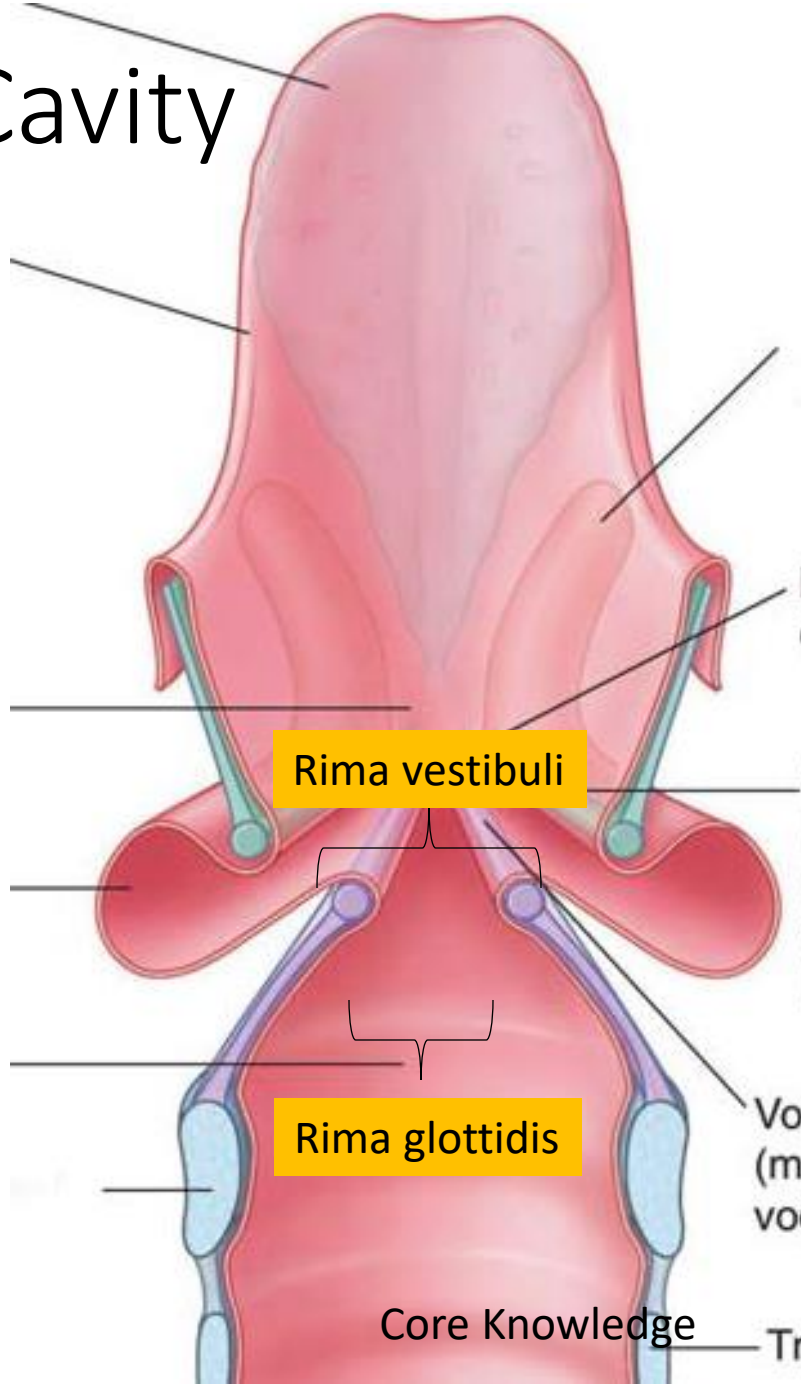
Core Knowledge

Laryngeal Cavity

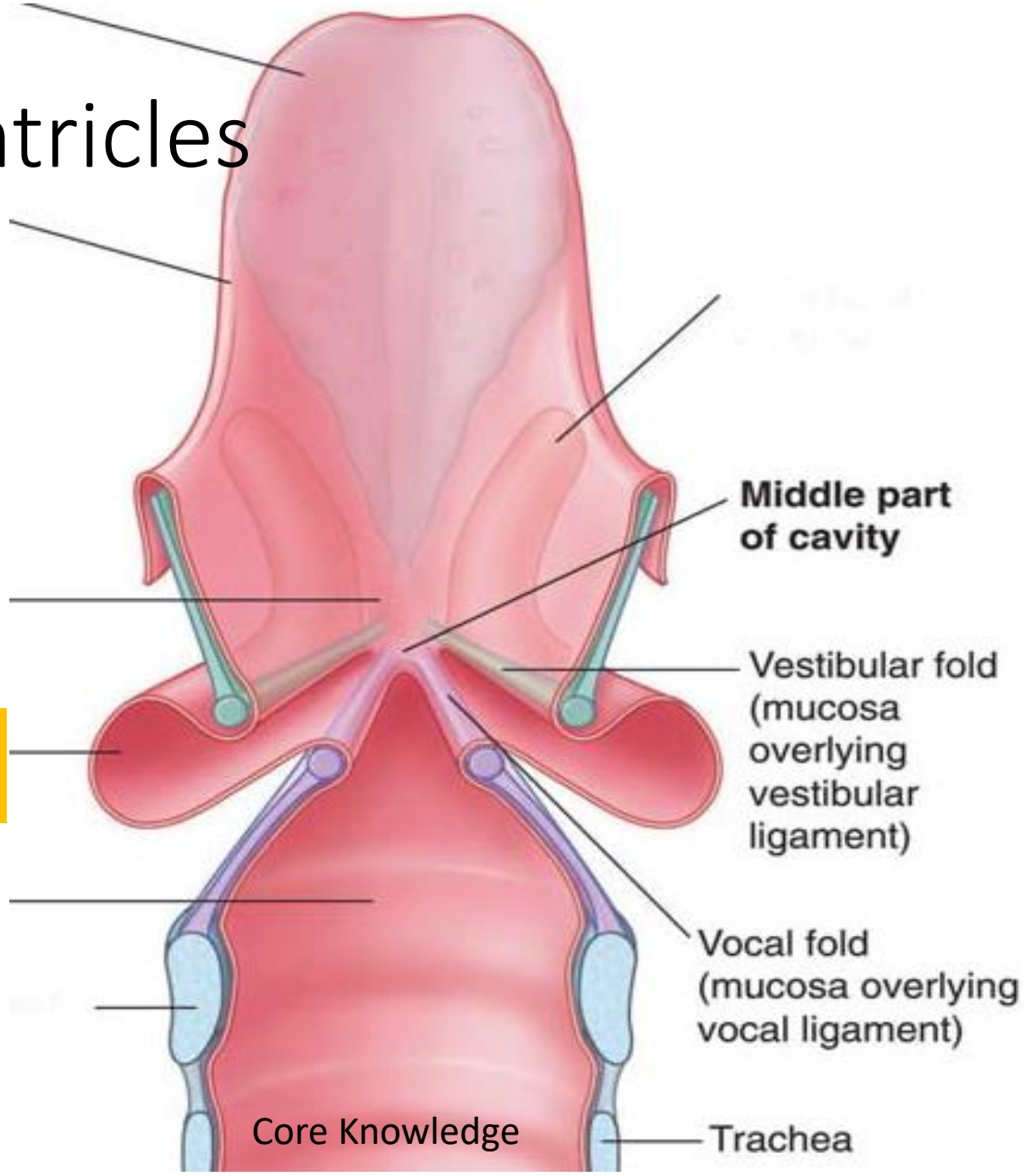


Core Knowledge

Laryngeal Cavity



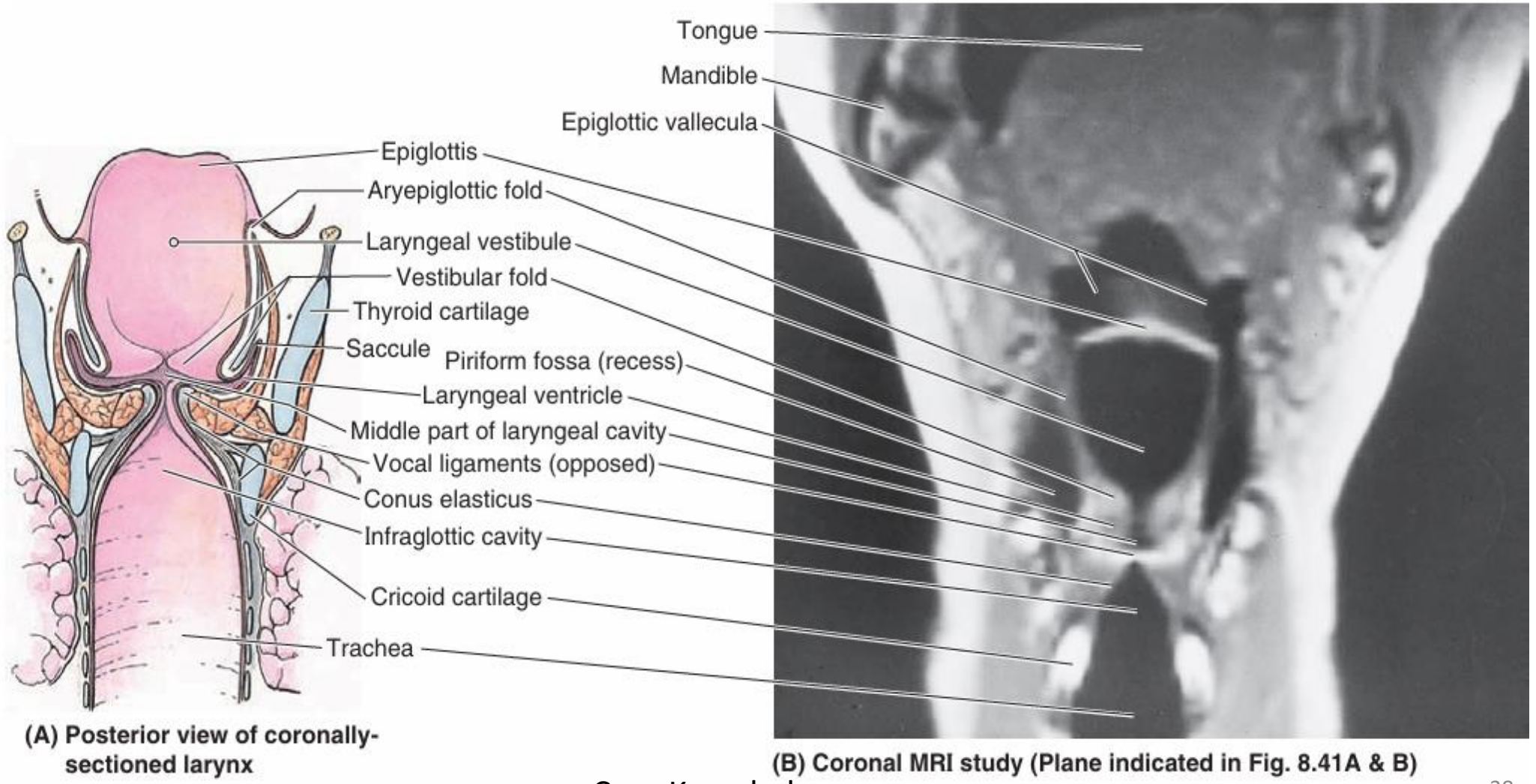
Laryngeal Ventricles



Laryngeal ventricle

Core Knowledge

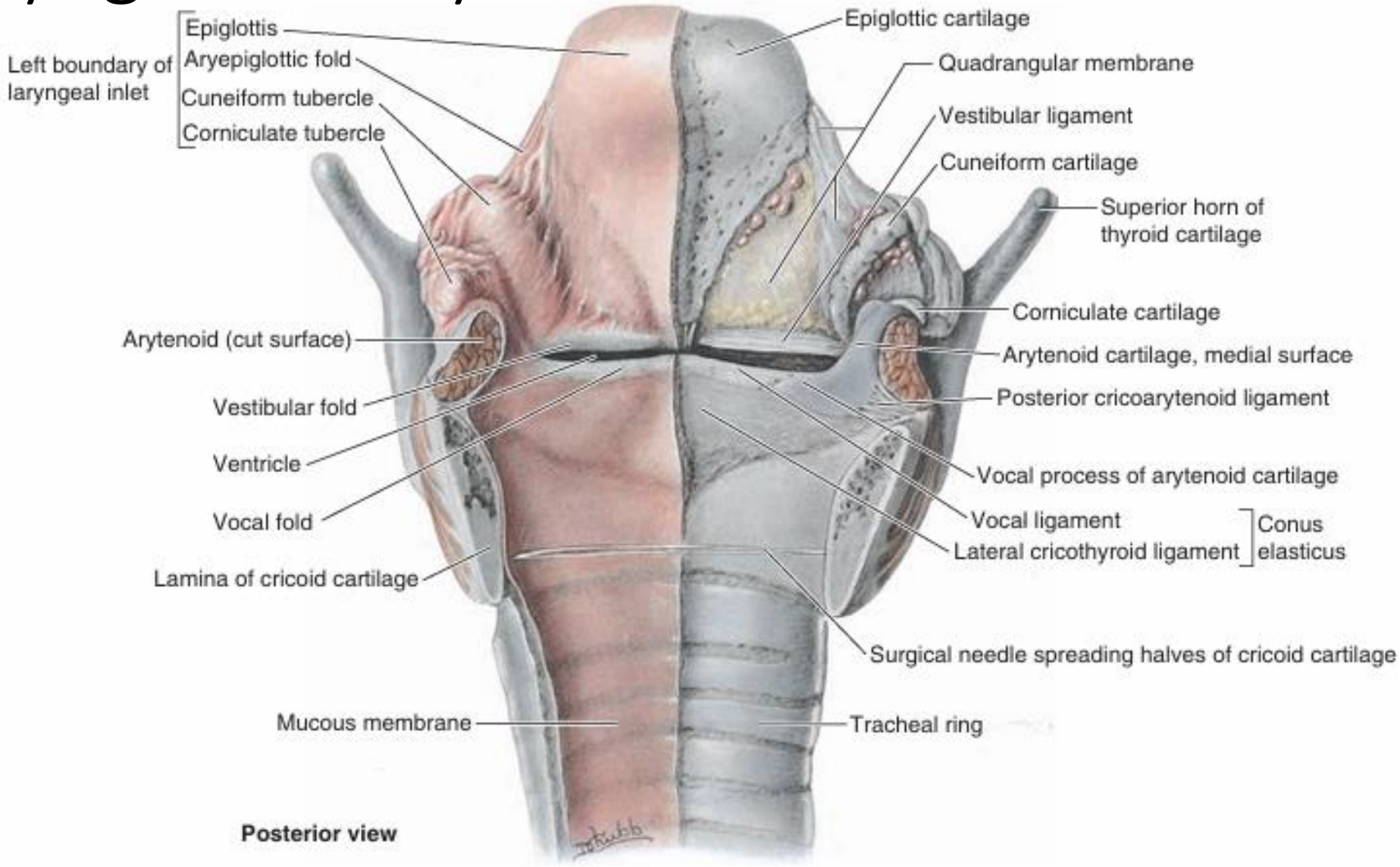
Laryngeal Cavity



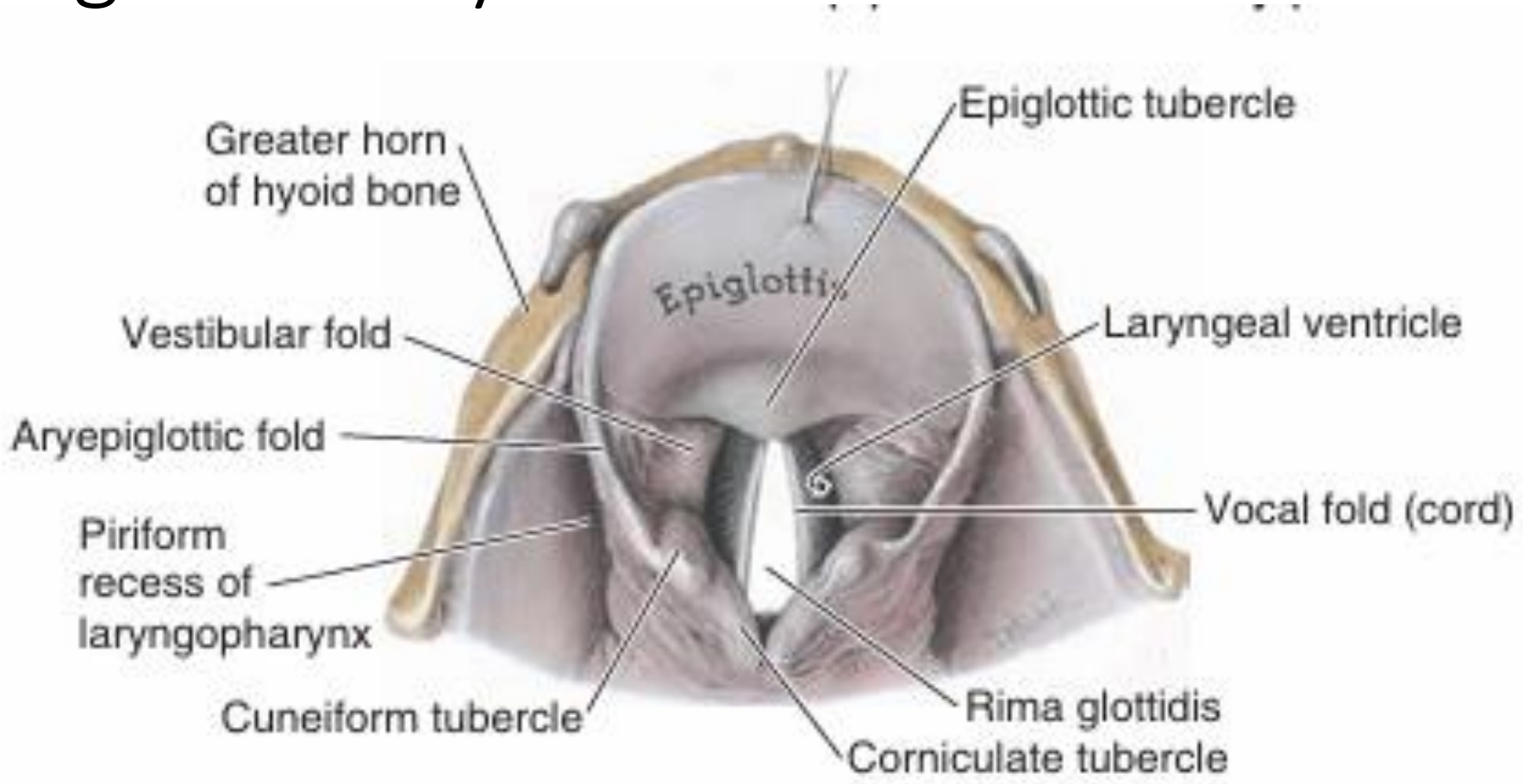
(A) Posterior view of coronally-sectioned larynx

(B) Coronal MRI study (Plane indicated in Fig. 8.41A & B)

Laryngeal Cavity

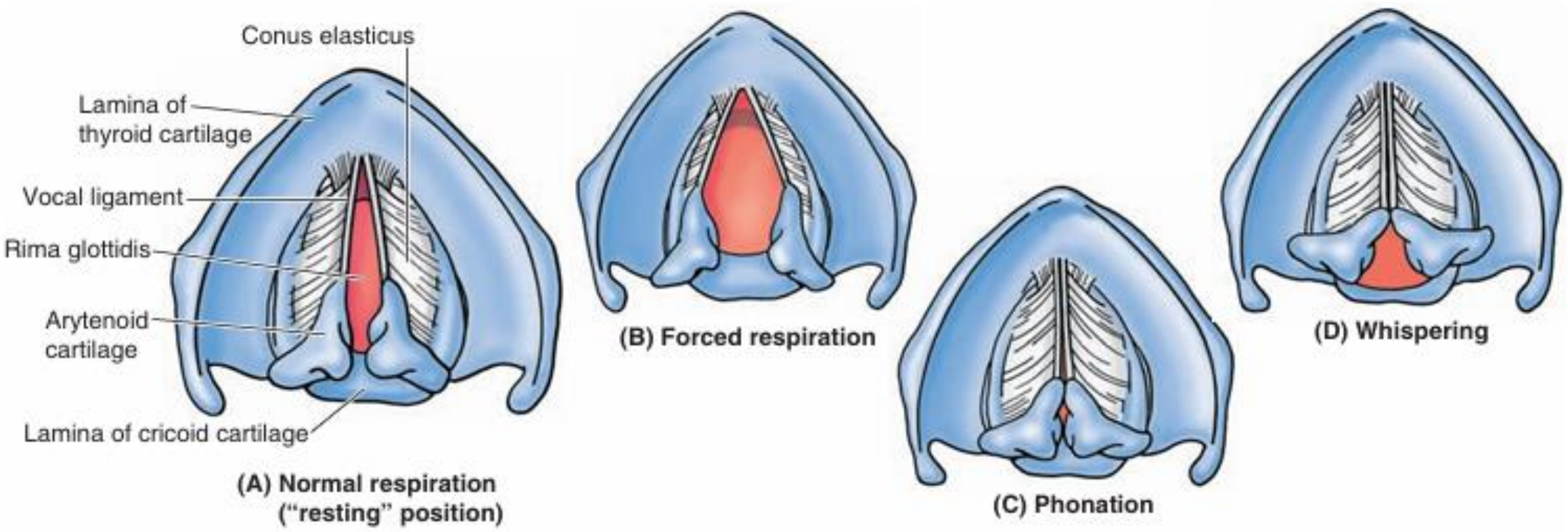


Laryngeal Cavity

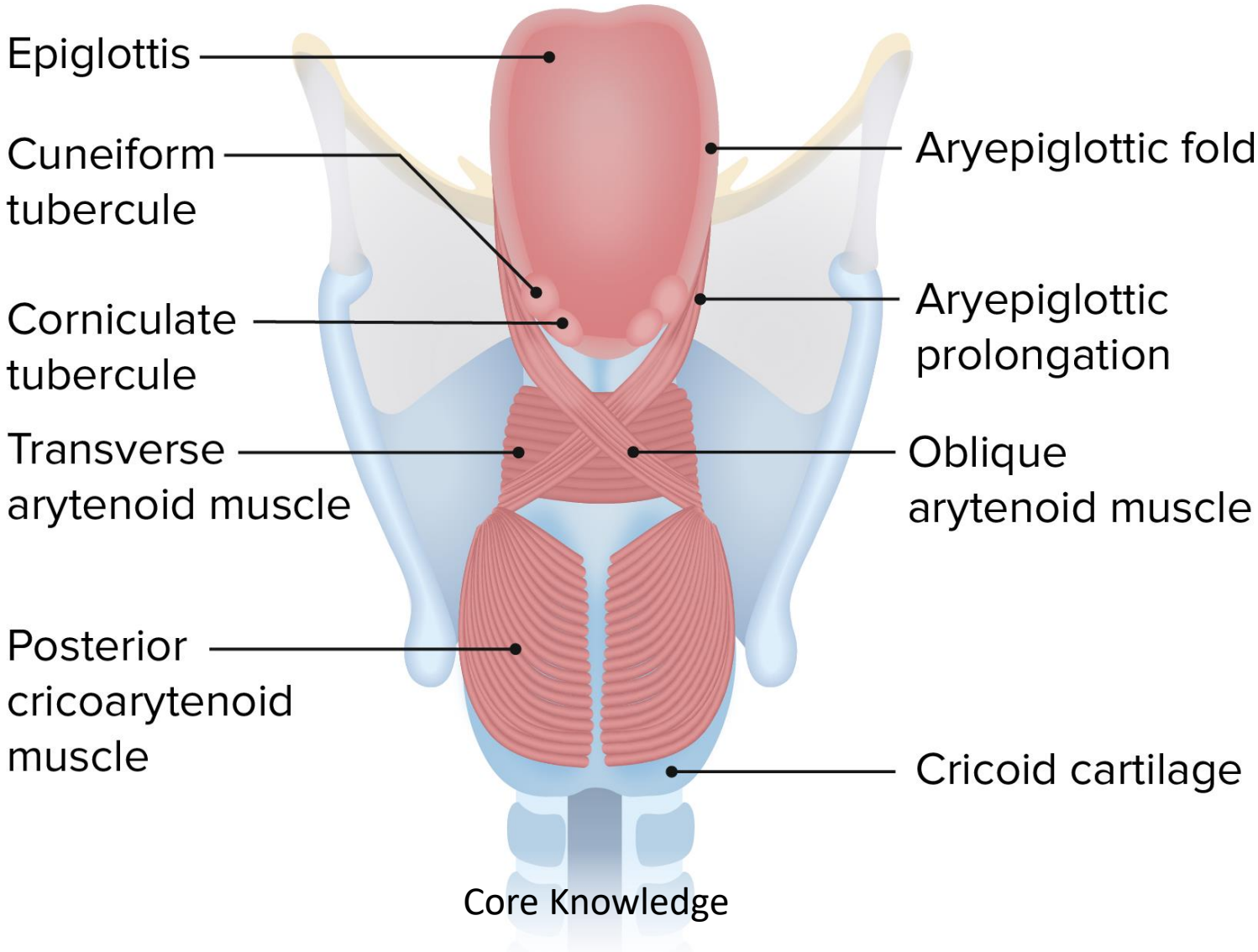


(C) Posterosuperior view, looking anteroinferiorly through laryngeal vestibule and rima glottidis

Variations in shape of Rima glottidis



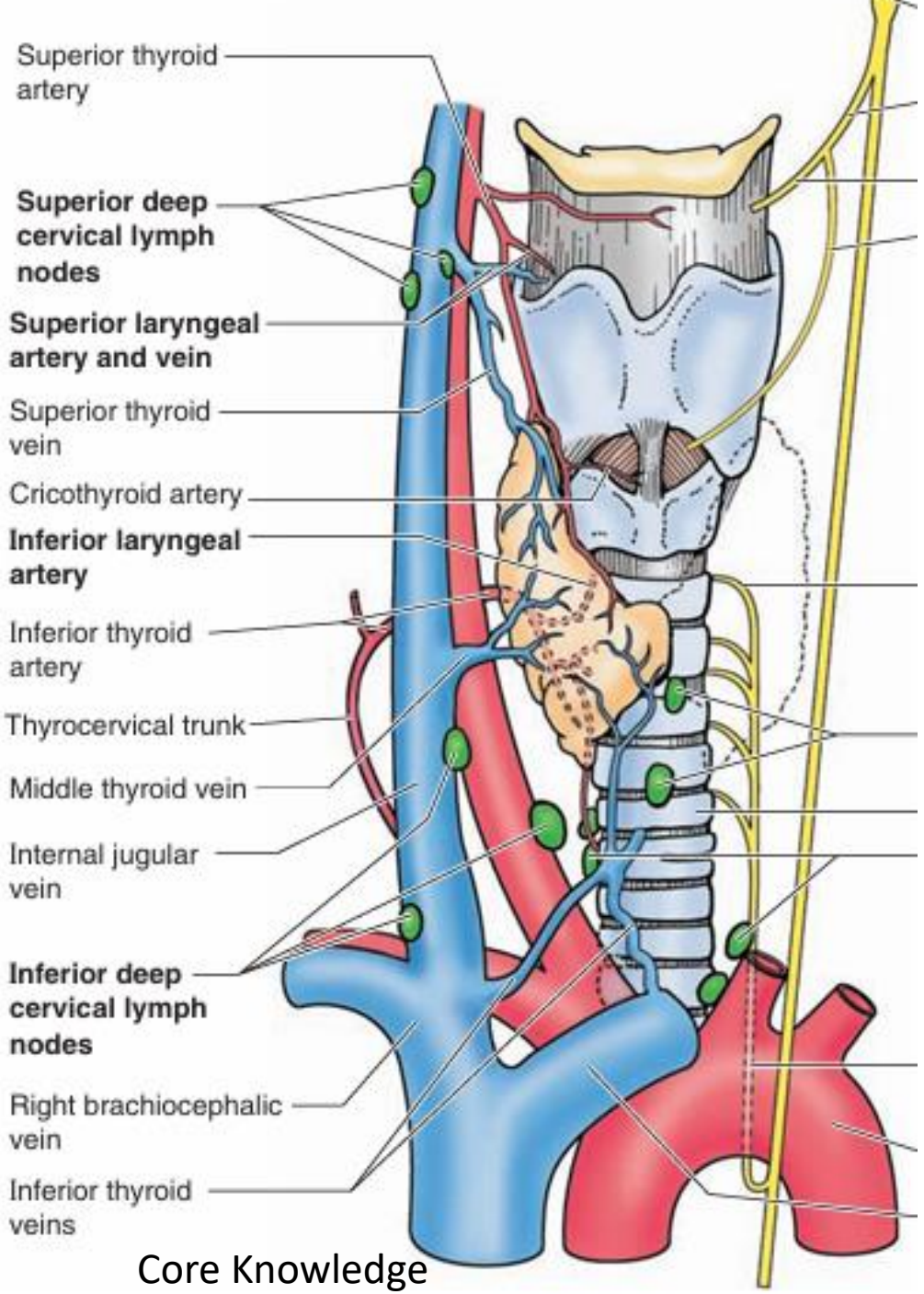
Laryngeal Muscles



Laryngeal Muscles

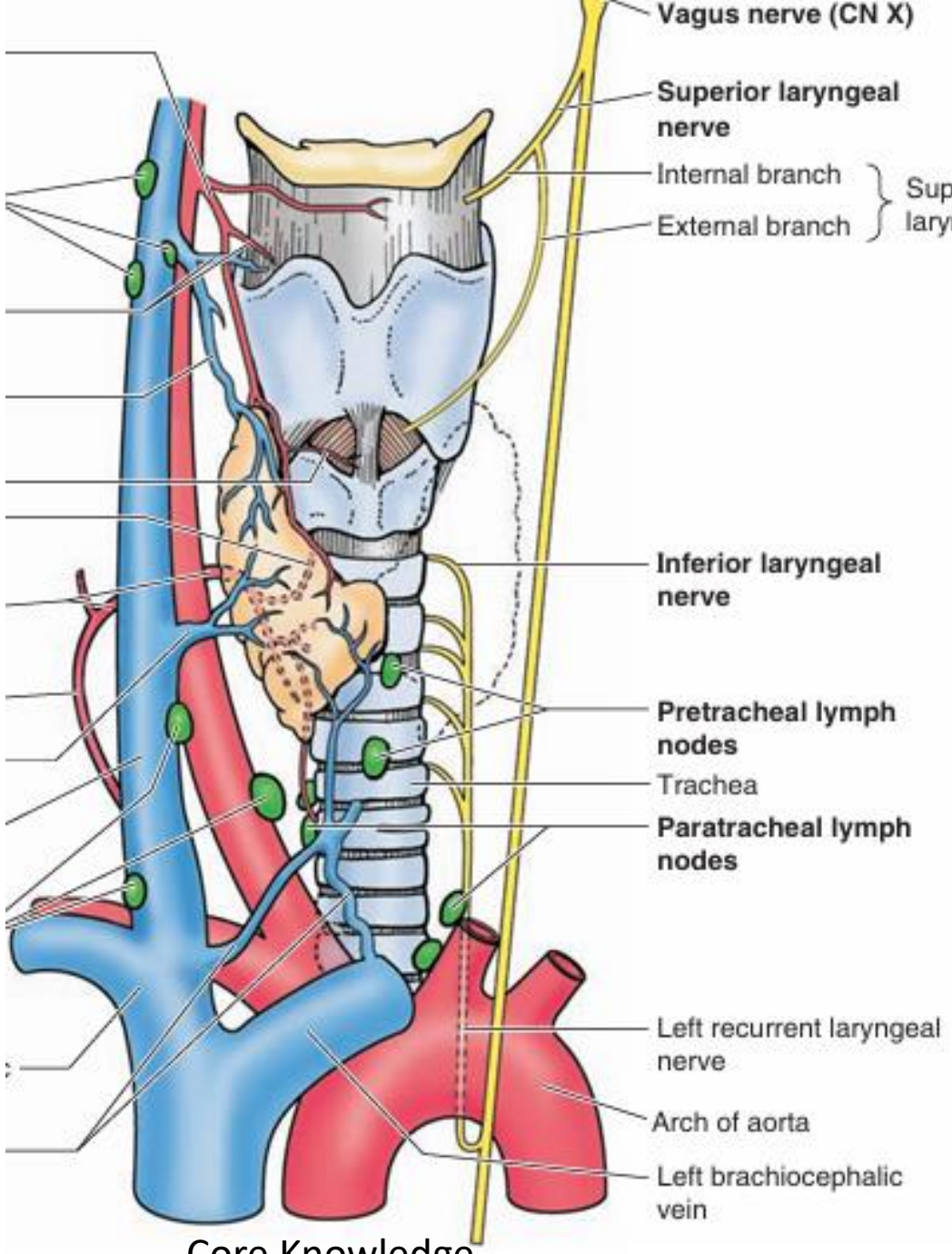
Muscle	Origin	Insertion	Innervation	Main Action(s)
Cricothyroid	Anterolateral part of cricoid cartilage	Inferior margin and inferior horn of thyroid cartilage	External laryngeal nerve (from CN X)	Stretches and tenses vocal ligament
Thyro-arytenoid[a]	Lower half of posterior aspect of angle of thyroid laminae and cricothyroid ligament	Anterolateral arytenoid surface	Inferior laryngeal nerve (terminal part of recurrent laryngeal nerve, from CN X – see Fig. 8.37)	Relaxes vocal ligament
Posterior crico-arytenoid	Posterior surface of lamina of cricoid cartilage	Vocal process of arytenoid cartilage		Abducts vocal folds
Lateral crico-arytenoid	Arch of cricoid cartilage			Adducts vocal folds (interligamentous portion)
Transverse and oblique arytenoids[b]	One arytenoid cartilage	Contralateral arytenoid cartilage		Adduct arytenoid cartilages (adducting intercartilaginous portion of vocal folds, closing posterior rima glottidis)
Vocalis[c]	Lateral surface of vocal process of arytenoid cartilage	Ipsilateral vocal ligament		Relaxes posterior vocal ligament while maintaining (or increasing) tension of anterior part

Blood supply



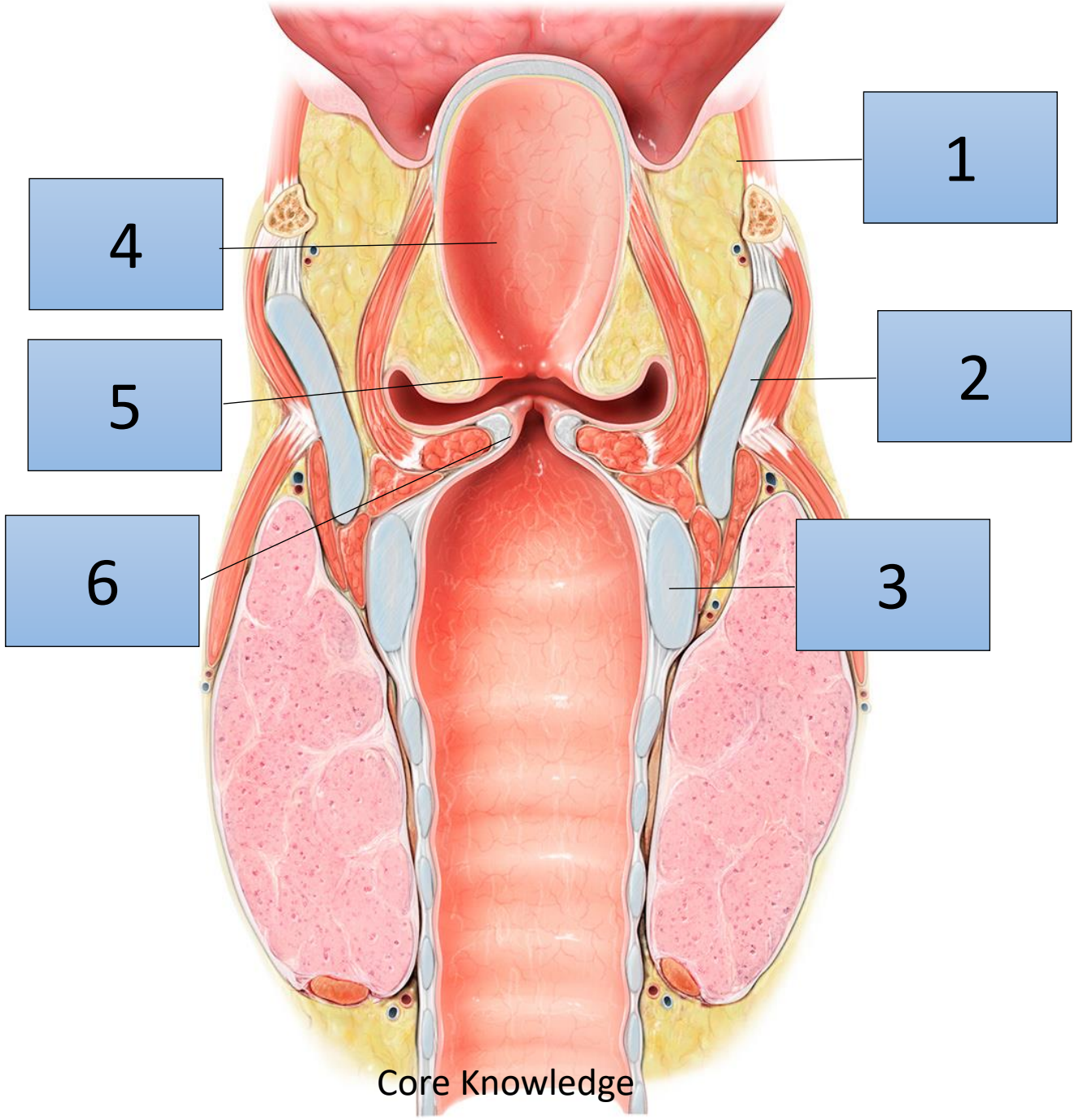
Core Knowledge

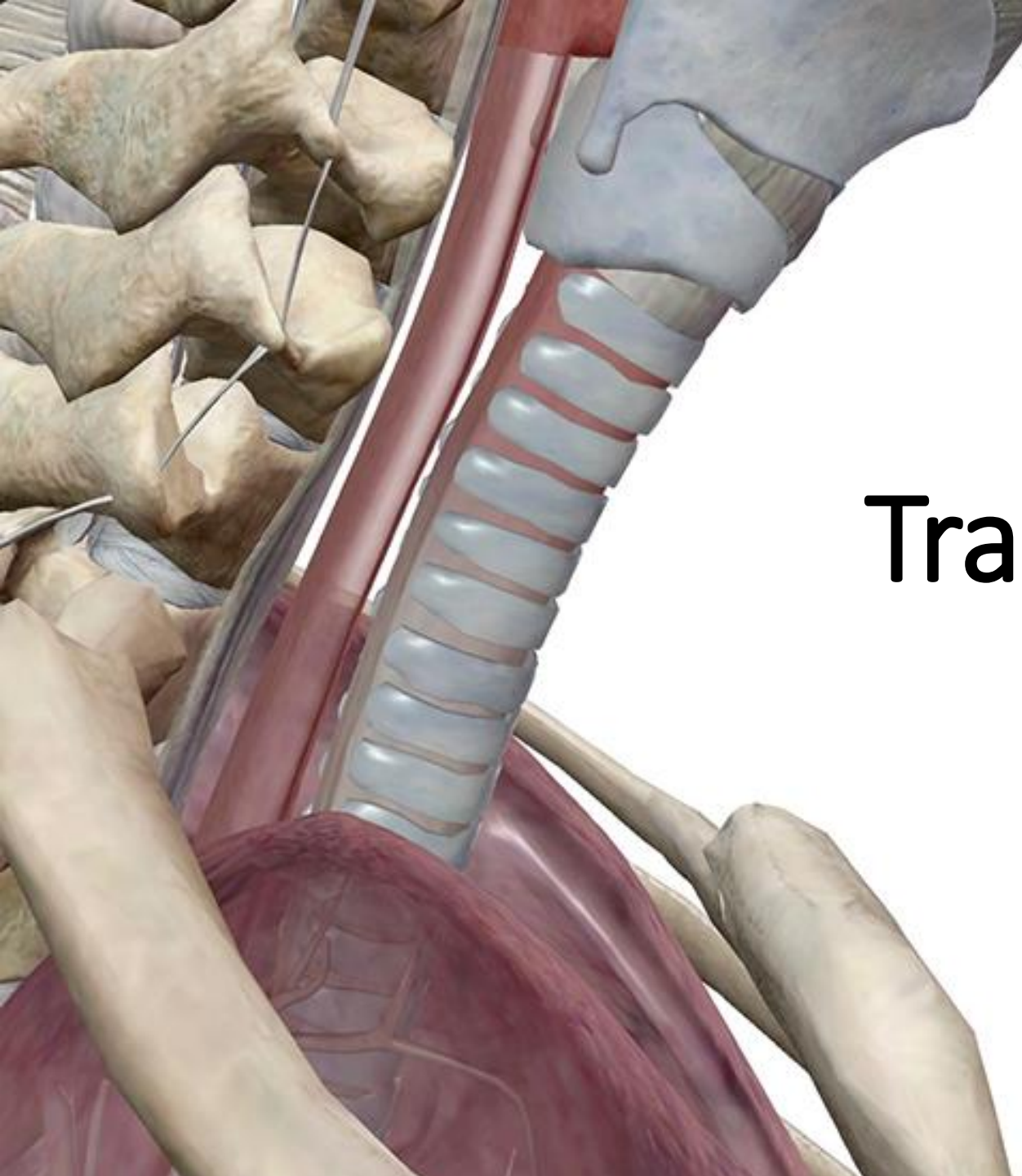
Nerve Supply



Core Knowledge

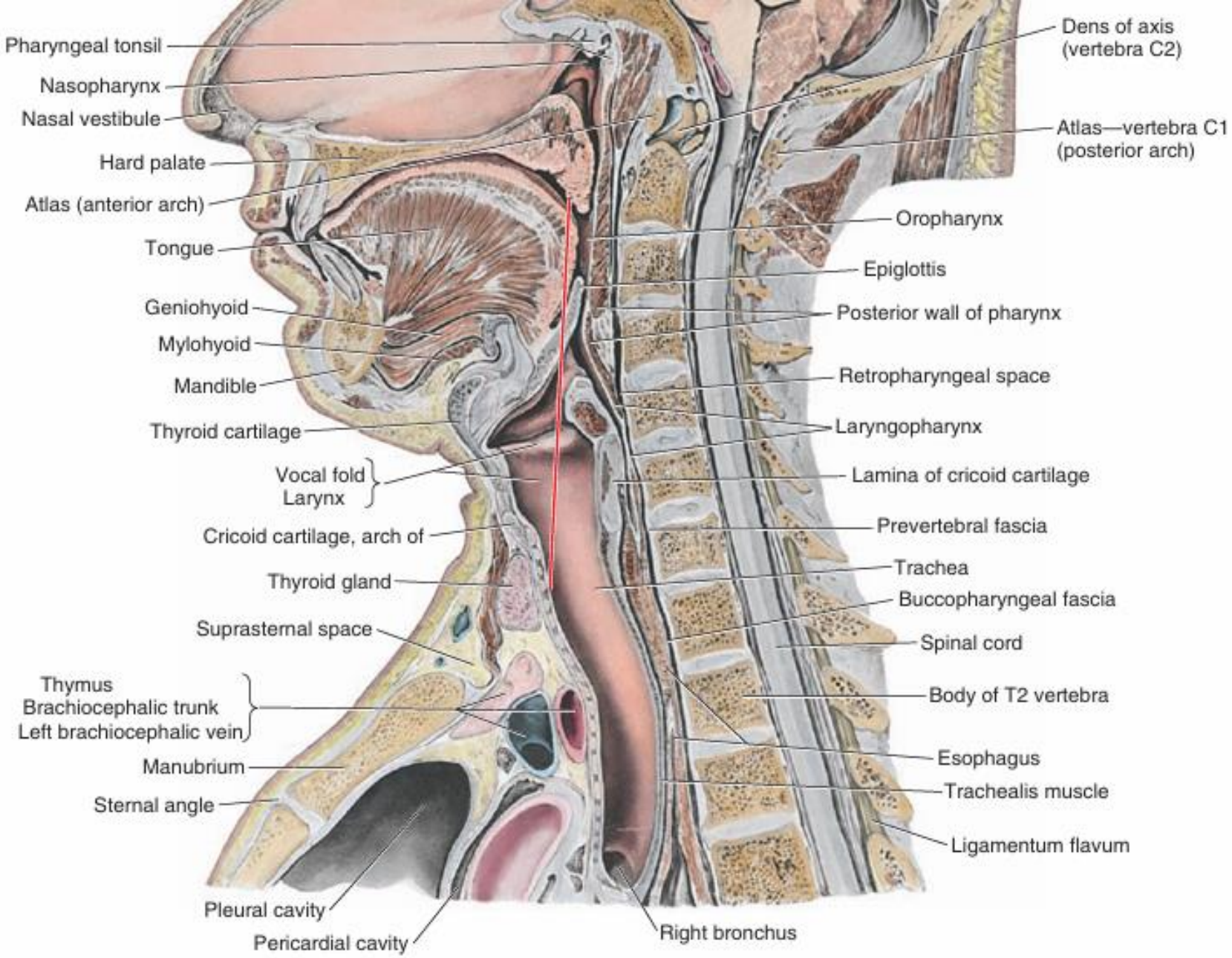
Revise





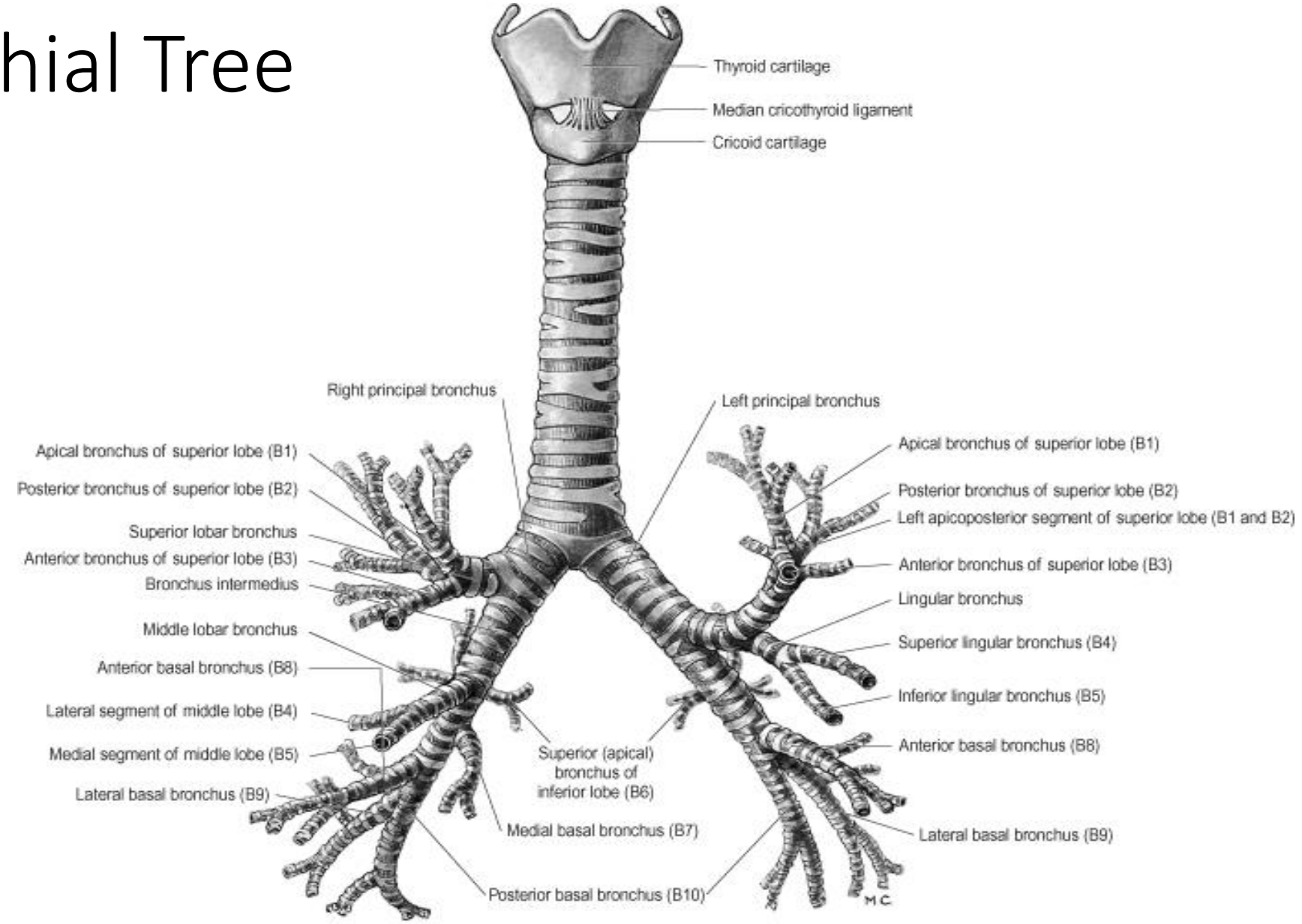
Trachea

Trachea



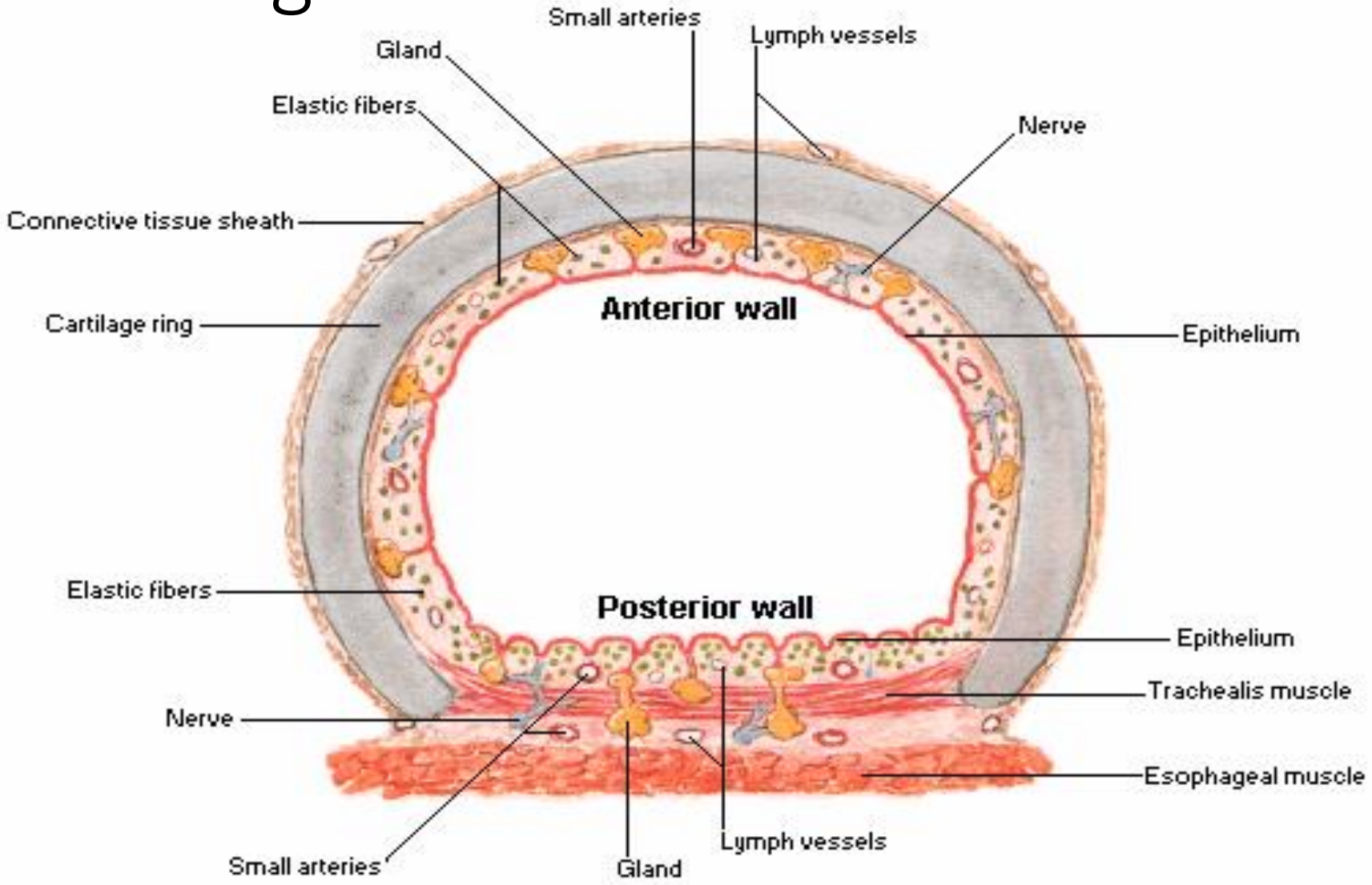
(A) Medial view of right half of bisected head and neck (median section)

Bronchial Tree



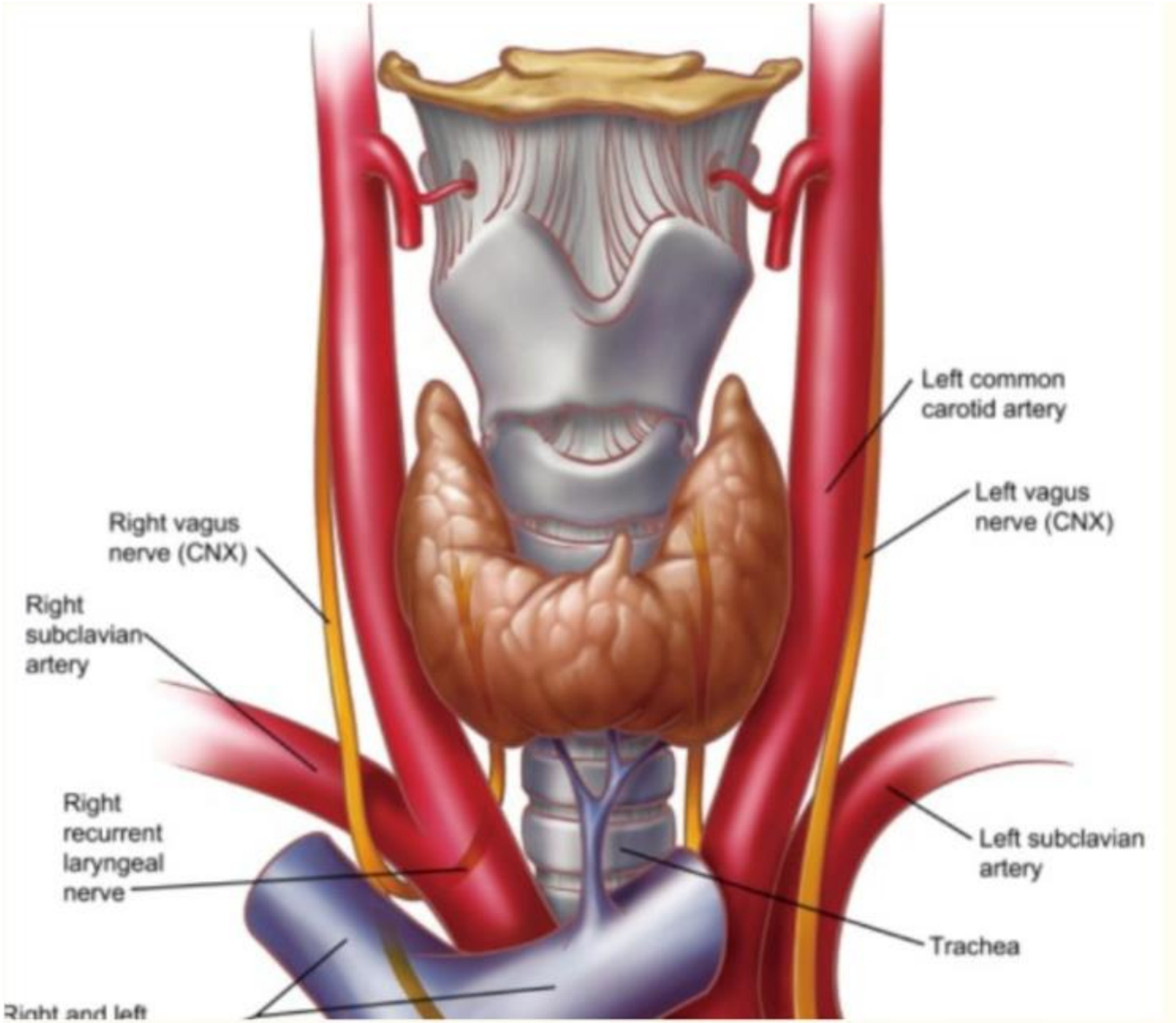
Core Knowledge

Tracheal Ring



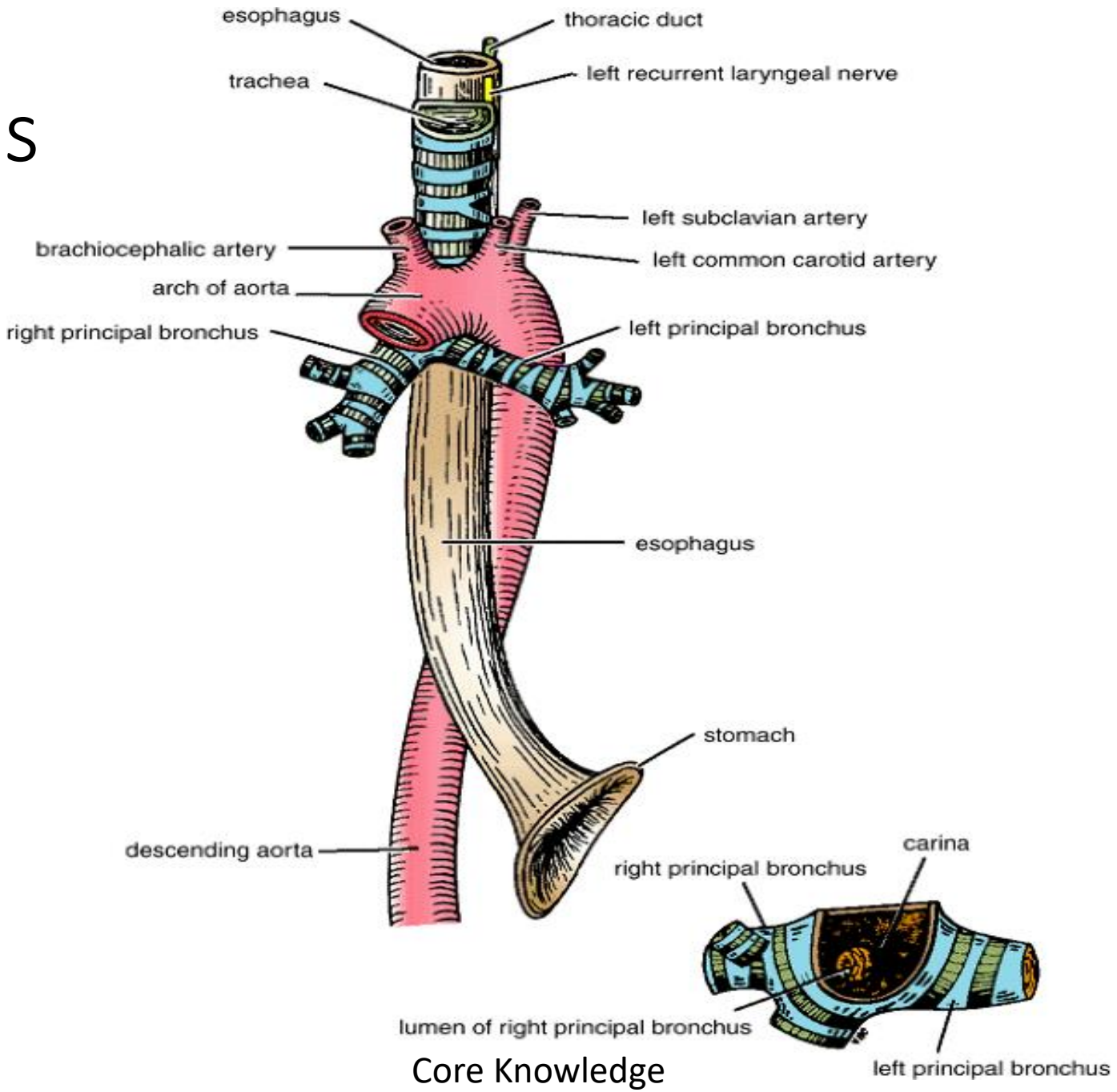
Core Knowledge

Relations



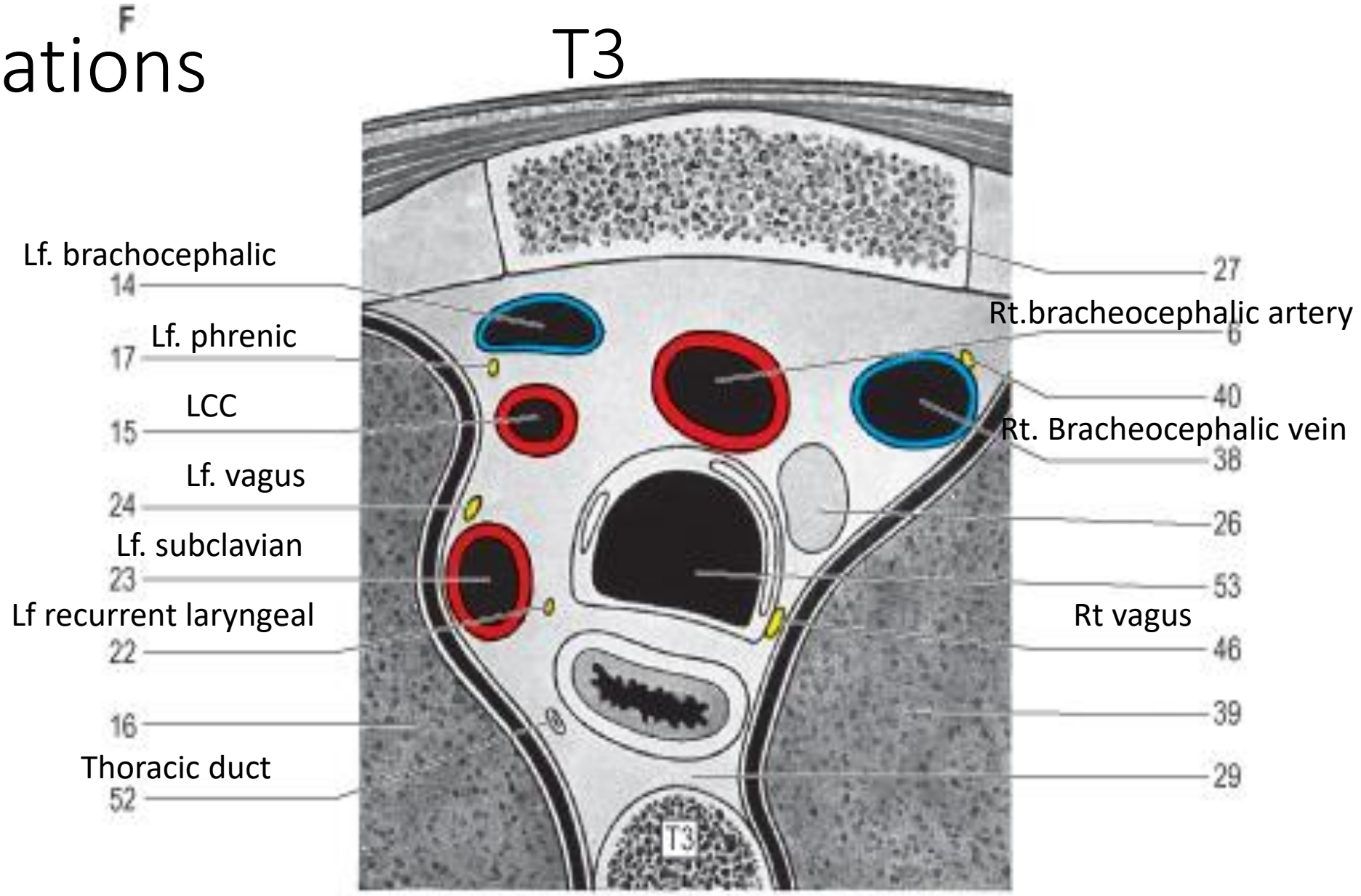
Core Knowledge

Relations



Core Knowledge

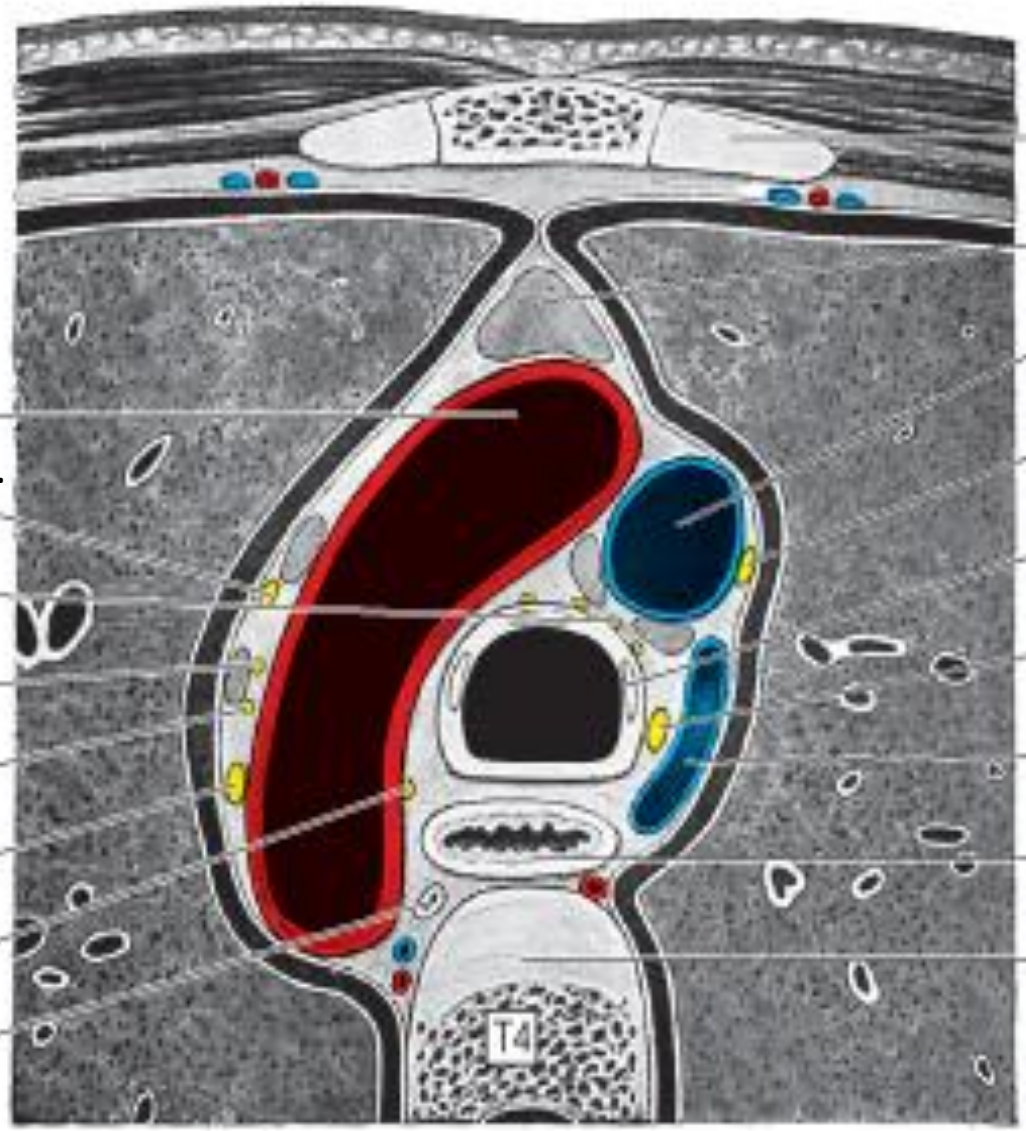
Relations



Core Knowledge

Relations

T4



Arch of aorta

Lt. Phrenic N.

Lt. Vagus N.

Lt. Recurrentlaryngeal N.

Thoracic duct

SVC

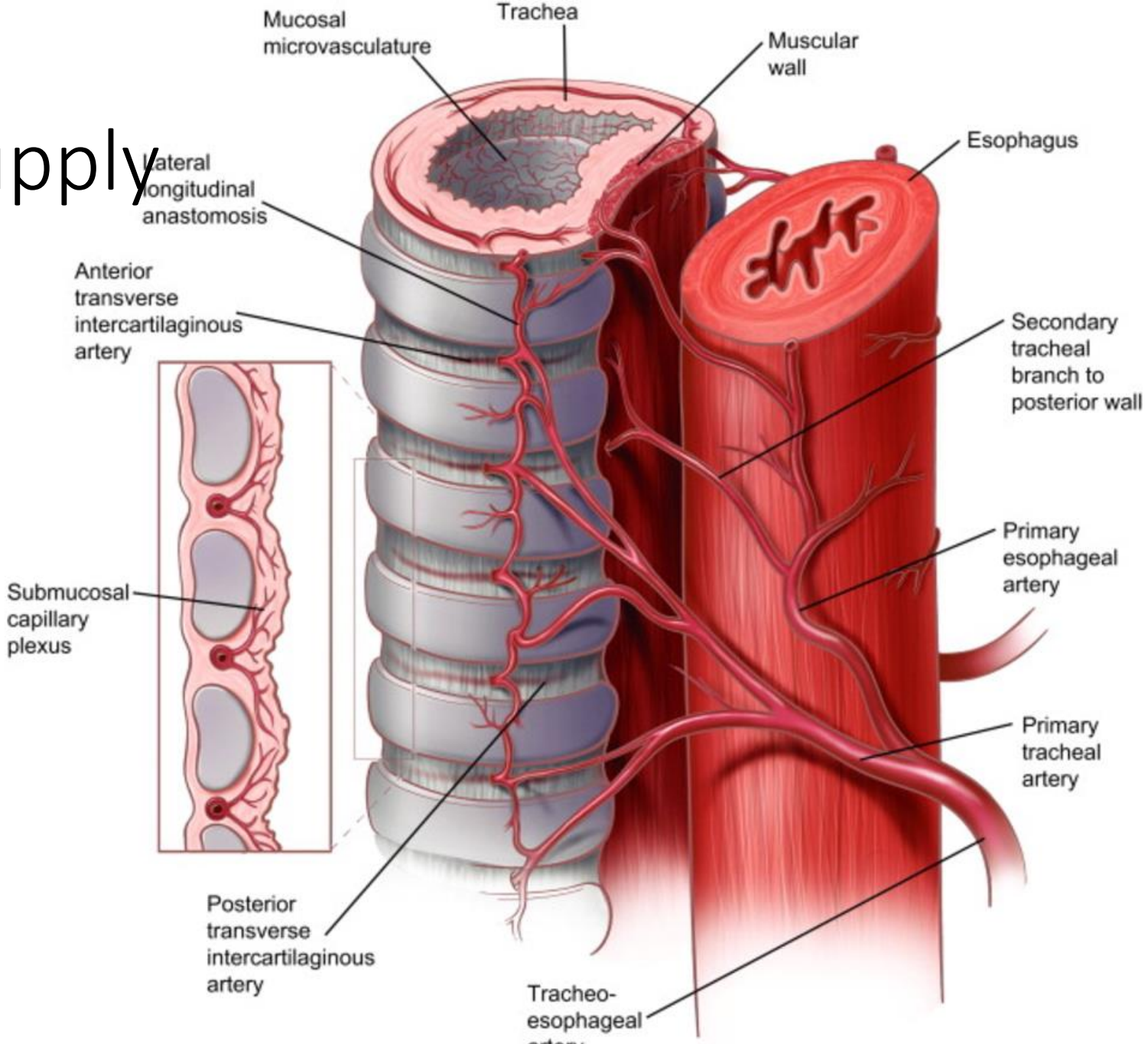
Rt. Vagus N.

Azygous Vein

Esophagus

Core Knowledge

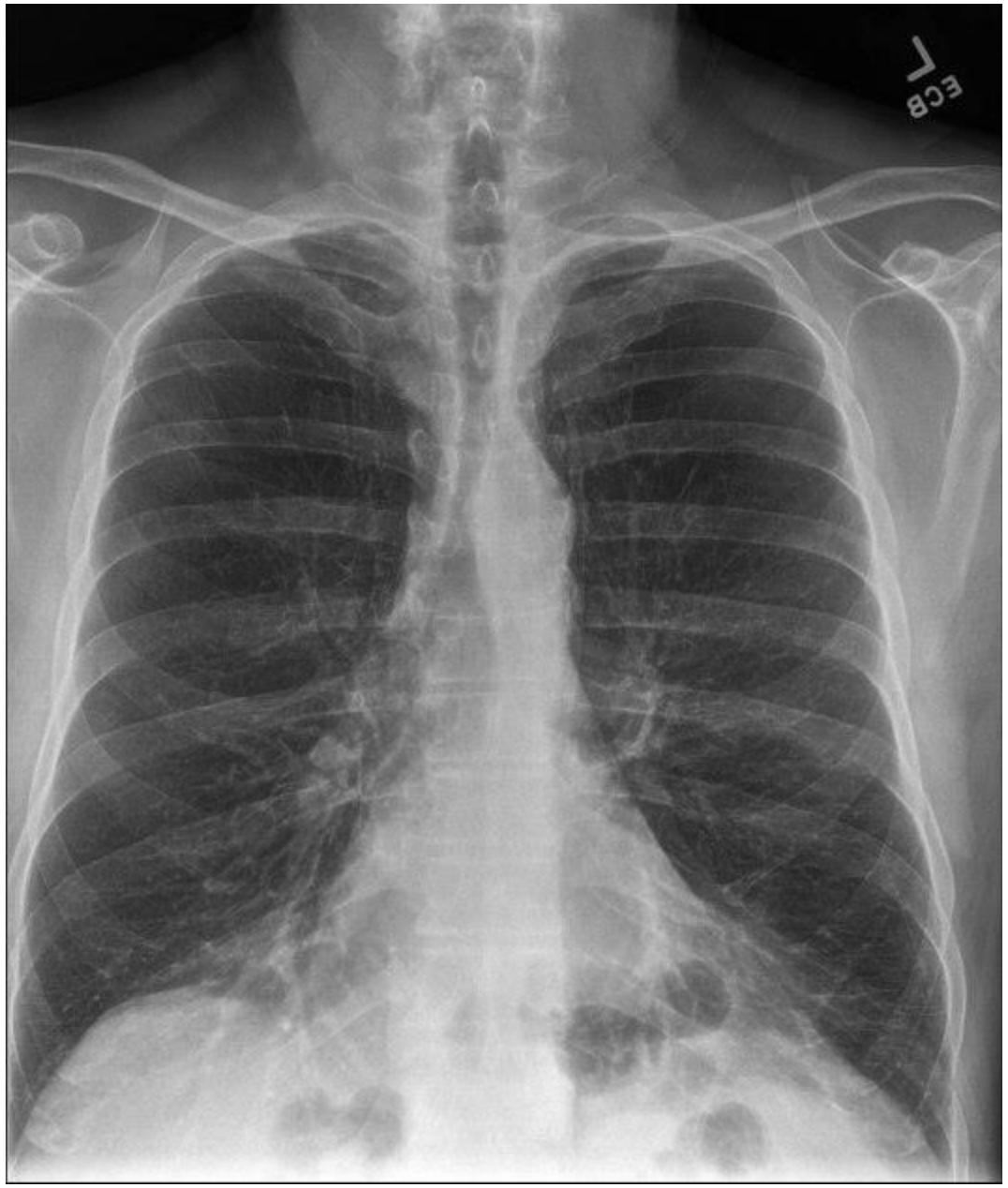
Blood Supply



Imaging

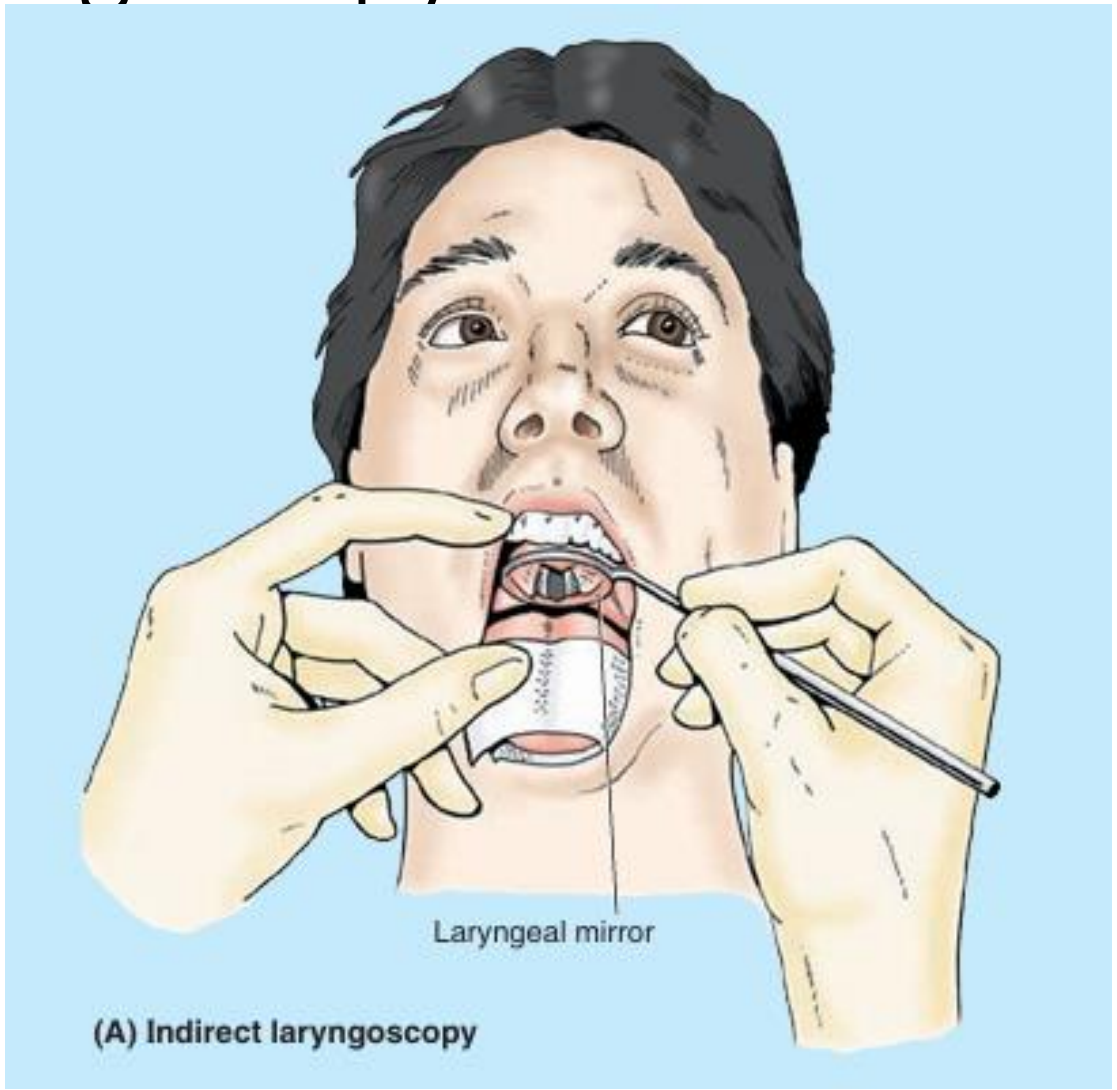
Vertical Integration

Imaging



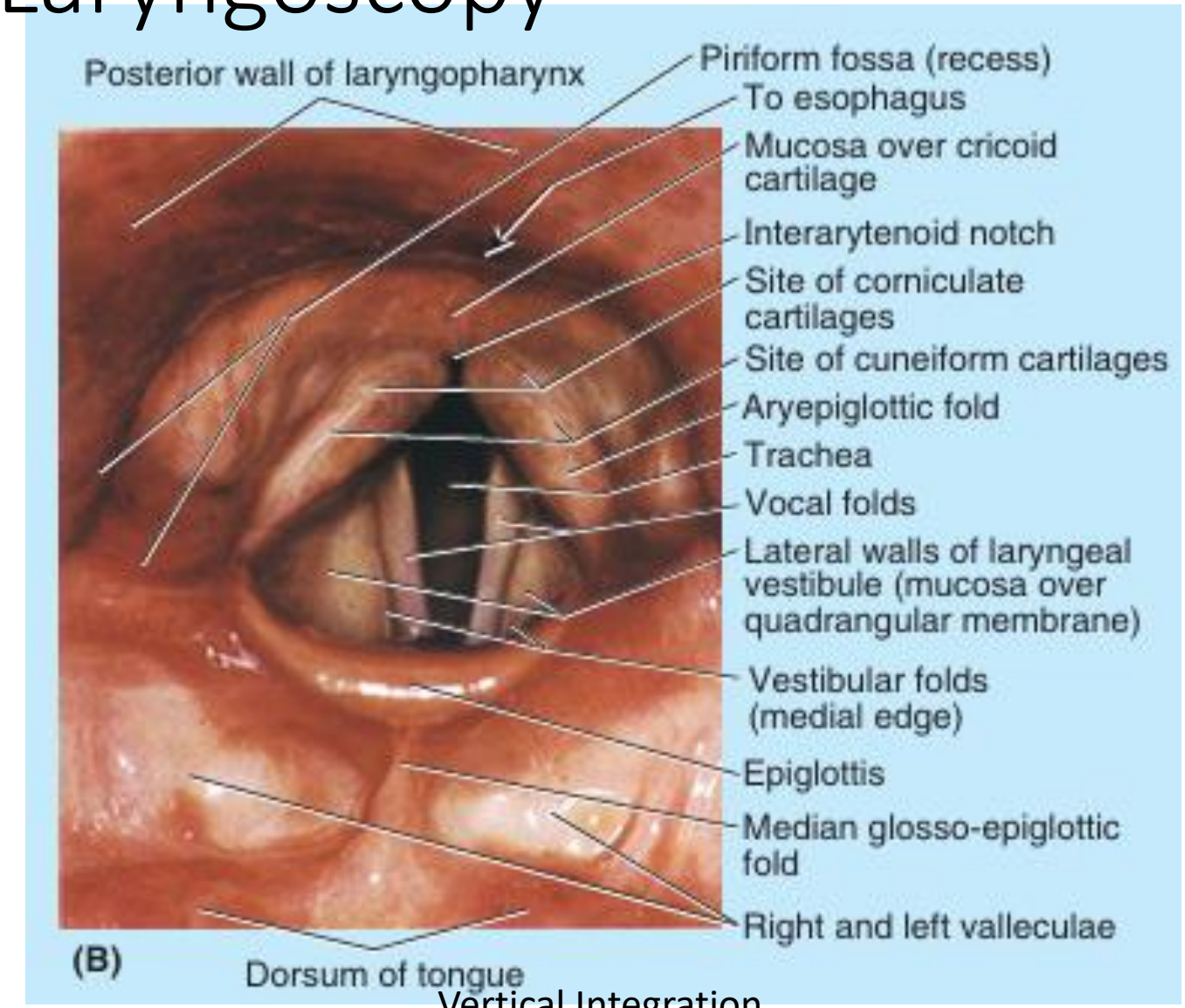
Vertical Integration

Indirect Laryngoscopy



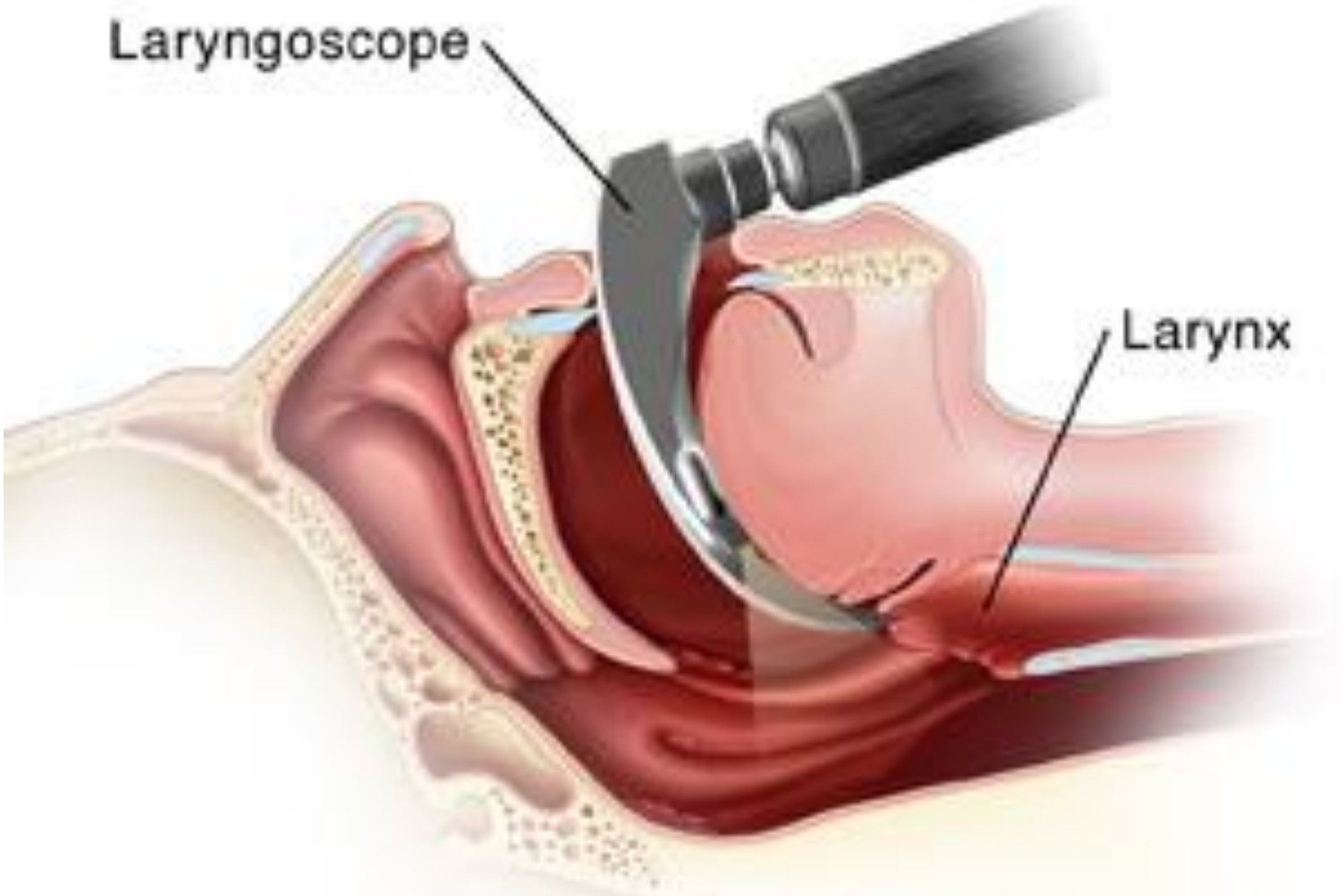
Vertical Integration

Indirect Laryngoscopy



Vertical Integration

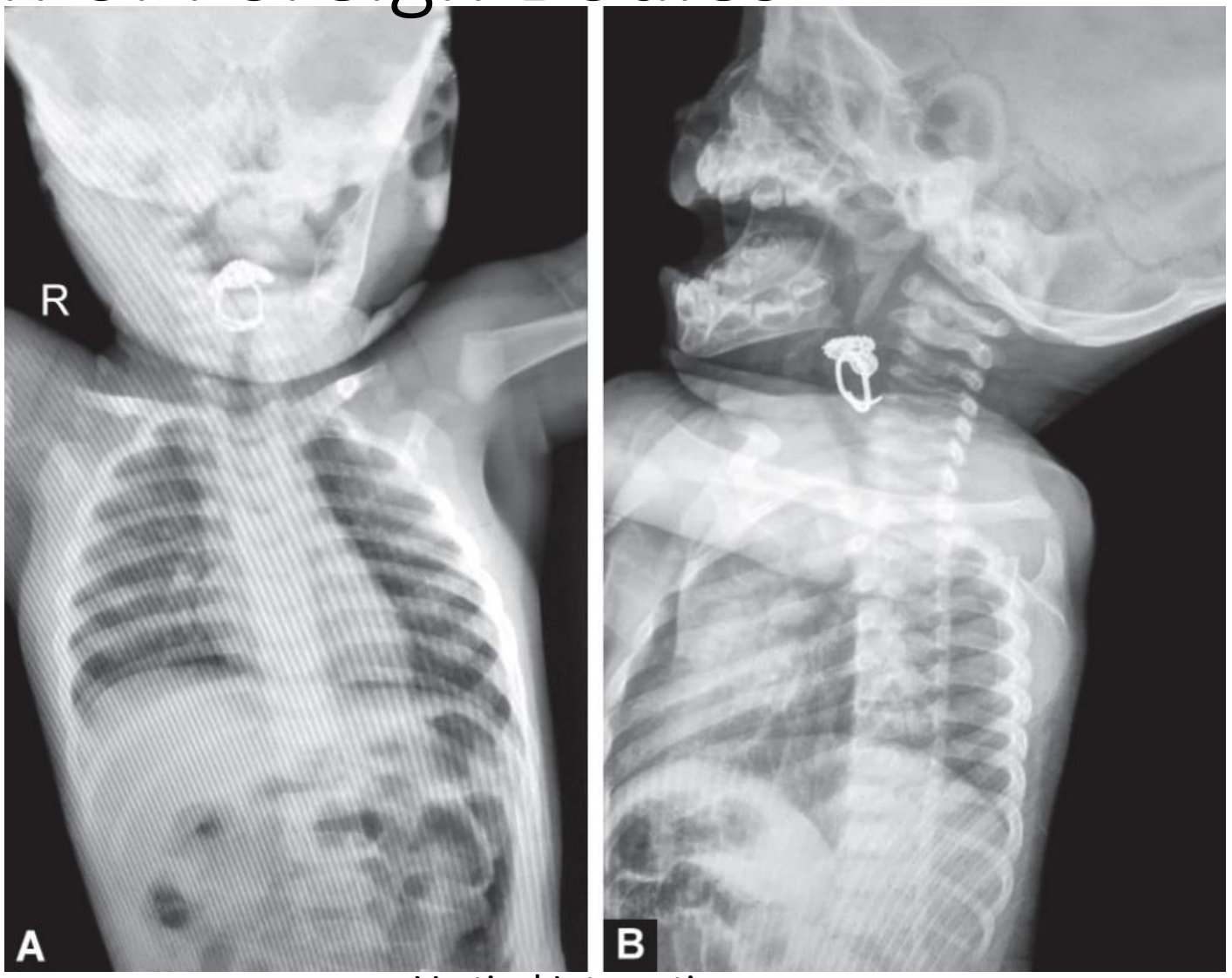
Direct Laryngoscopy



Valsalva Maneuver

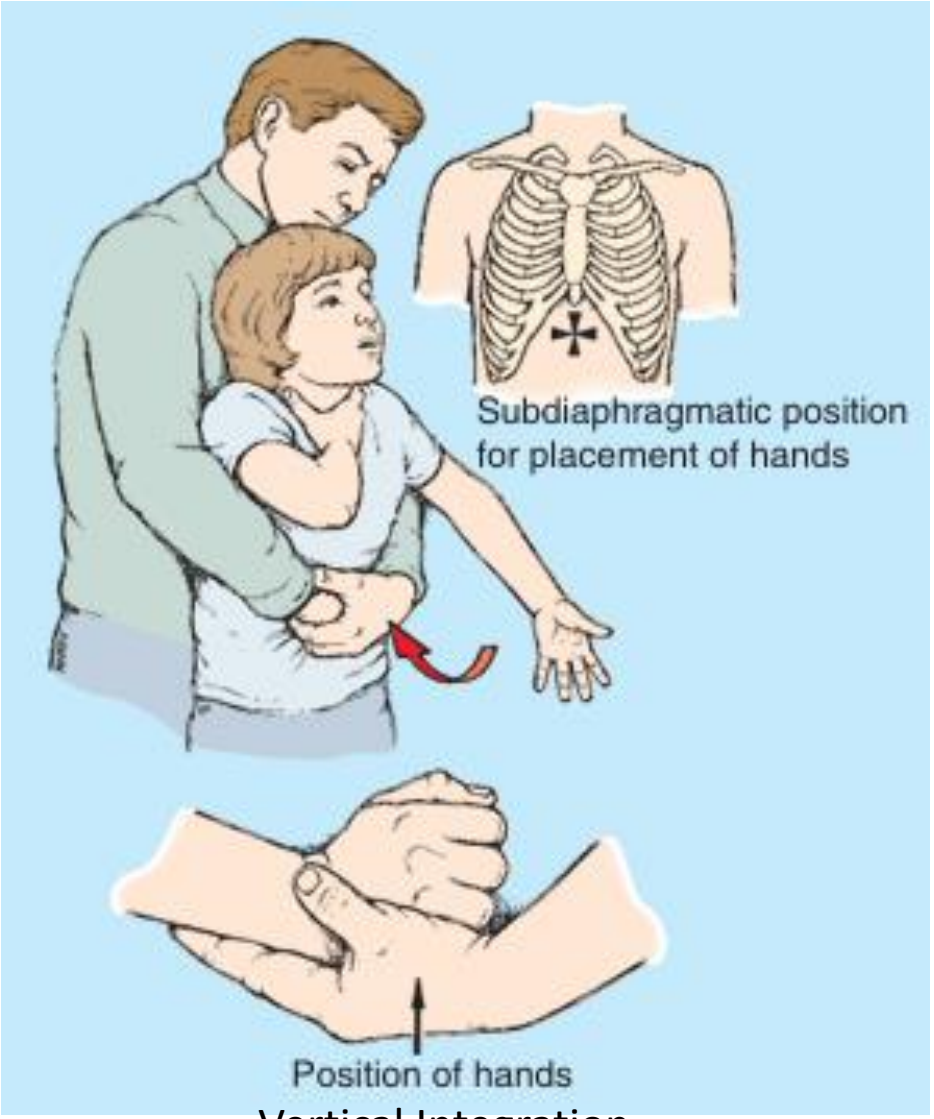
Vertical Integration

Aspiration of Foreign Bodies



Vertical Integration

Heimlich maneuver

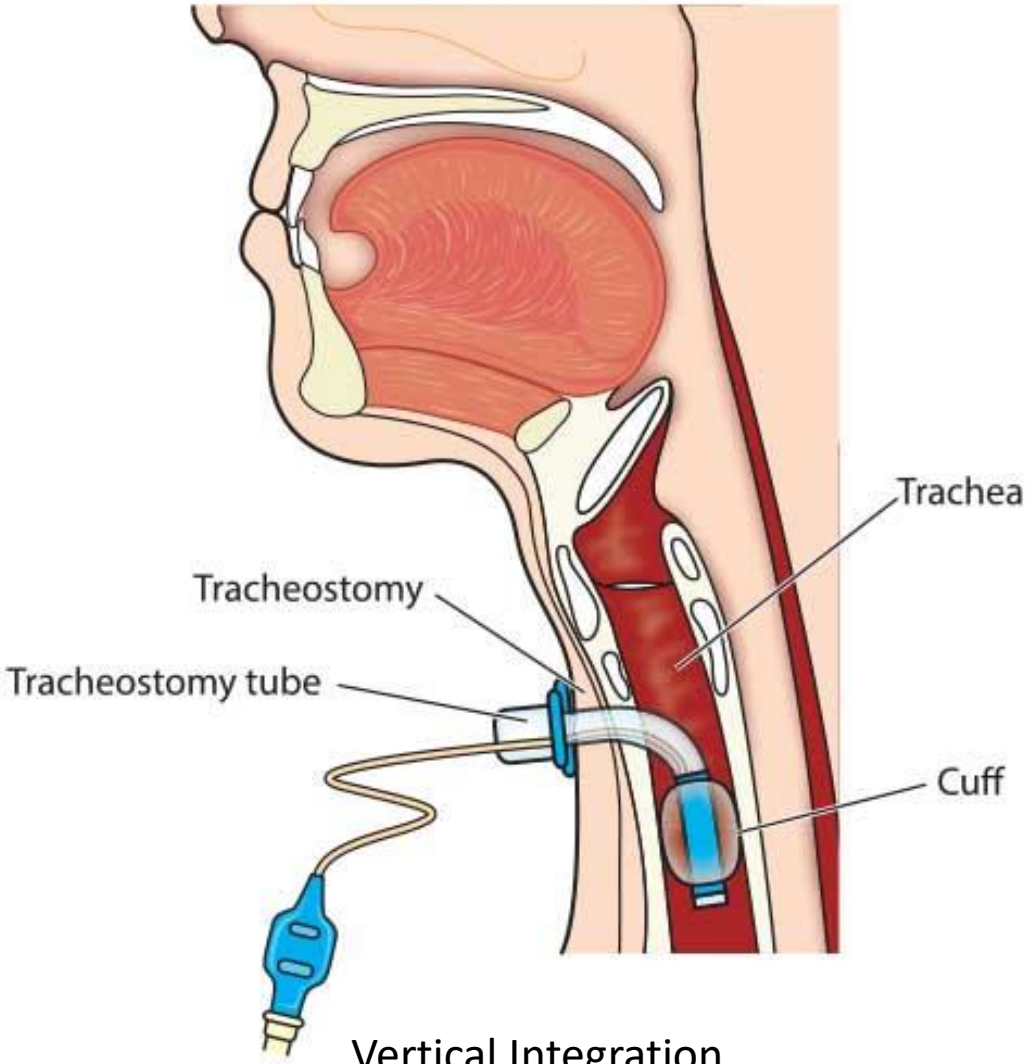


Vertical Integration

Heimlich maneuver

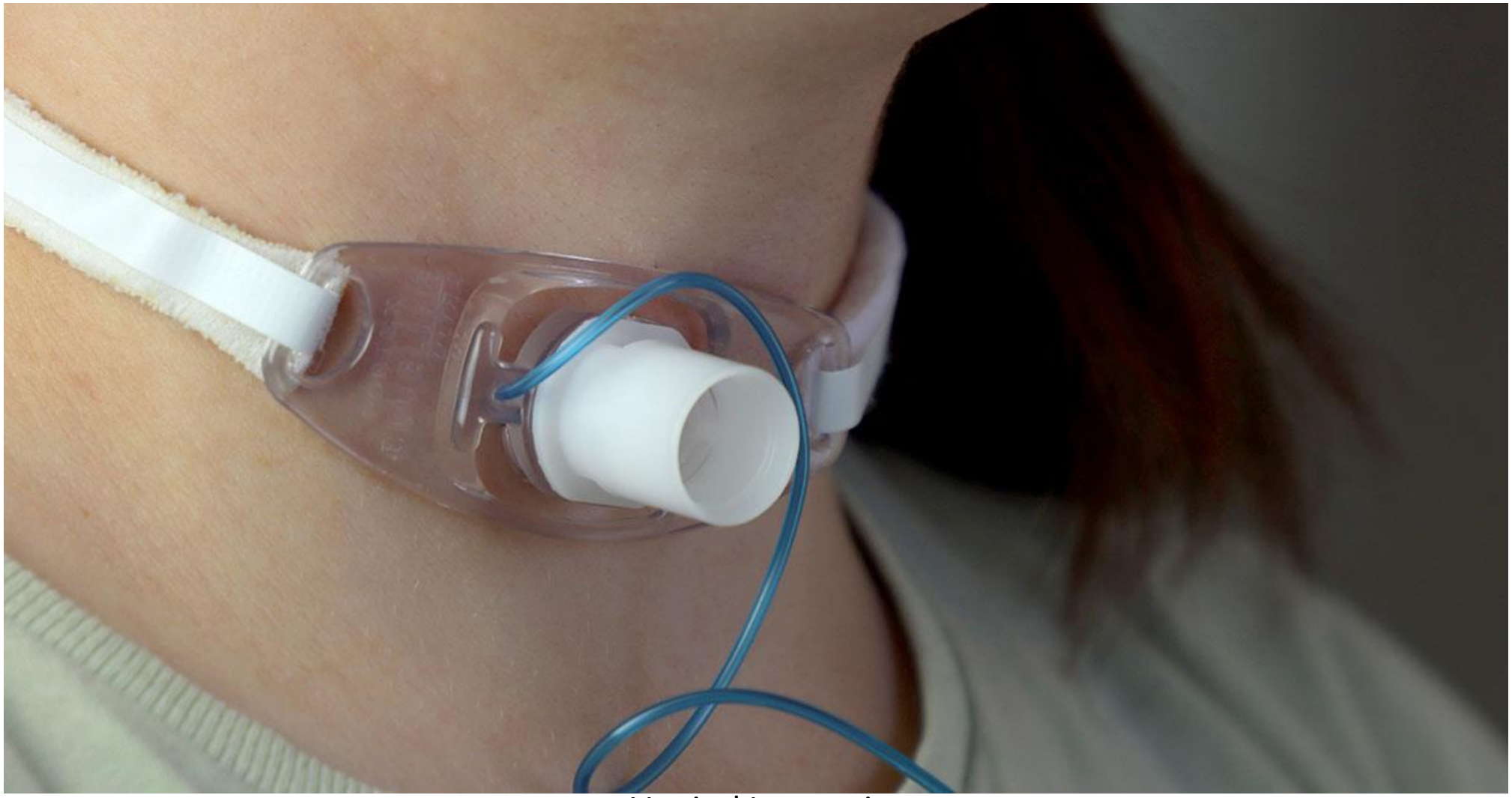
Heimlich maneuver

Tracheostomy



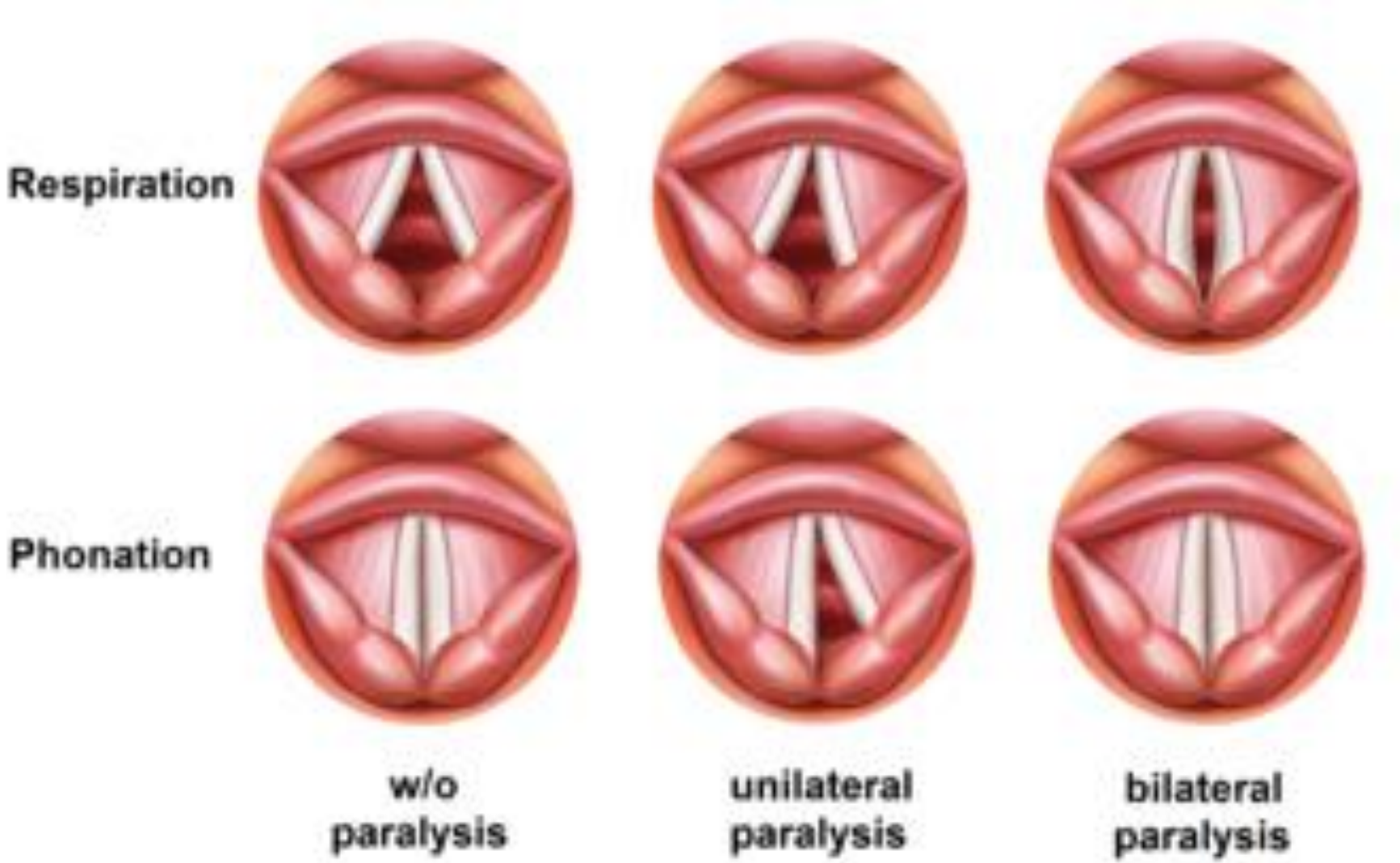
Vertical Integration

Tracheostomy

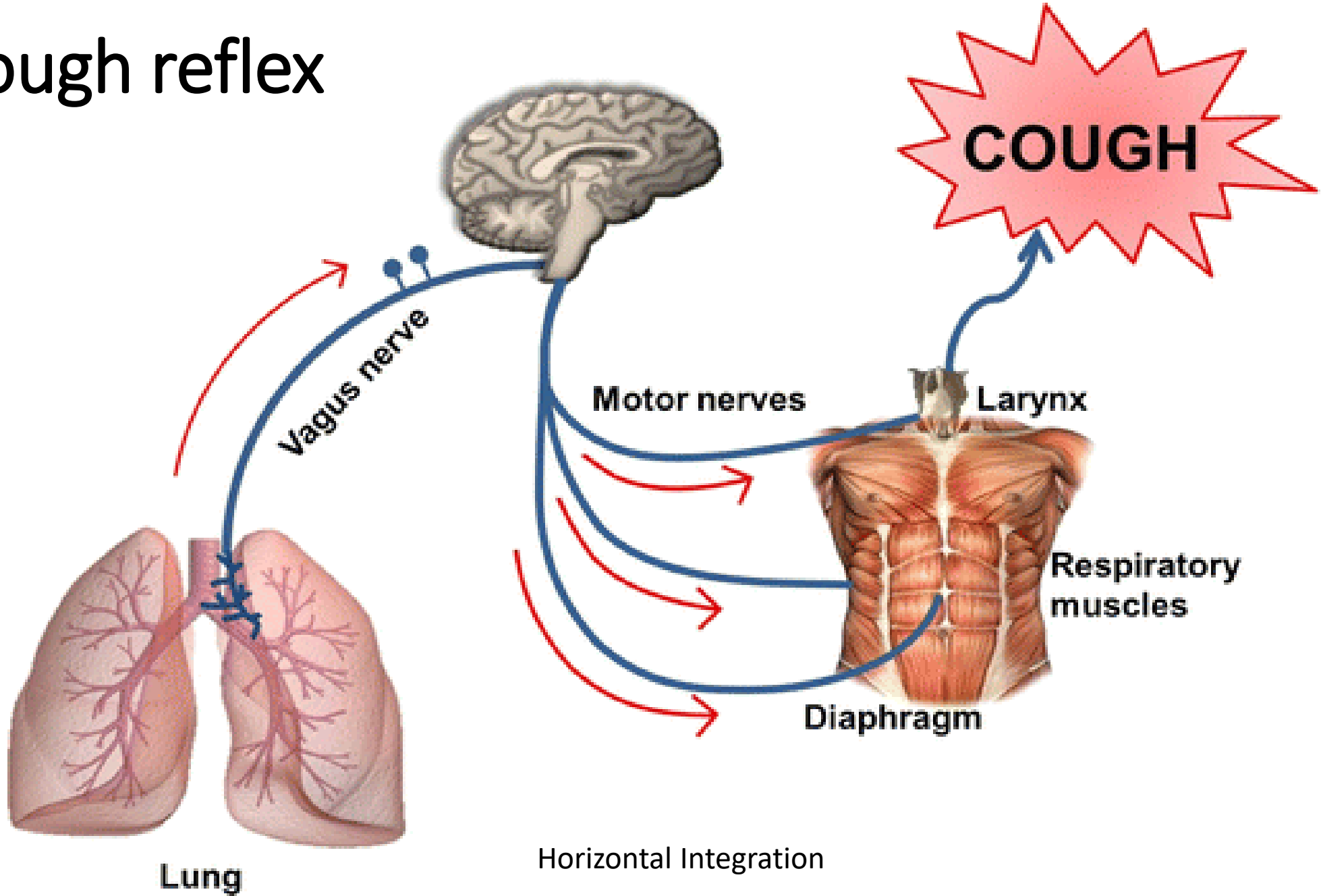


Vertical Integration

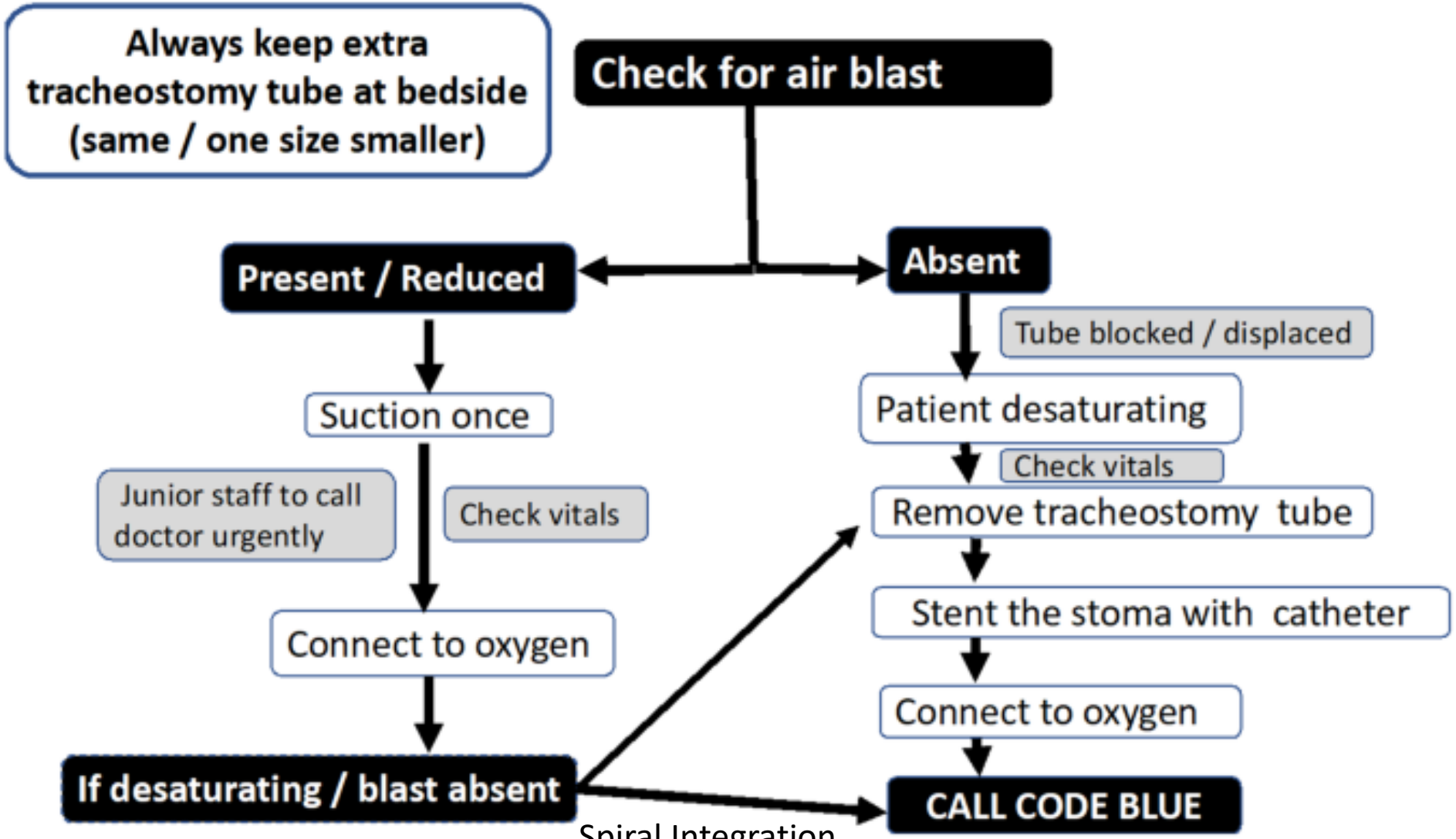
Injury to Laryngeal Nerves



Cough reflex



Tracheostmised Patient with Respiratory Distress



Spiral Integration

Communications Skills

Interpersonal Skills in the Workplace

Active Listening	Affirming the speaker as they're talking and asking clarifying questions when they're done
Collaboration	Facilitating a brainstorm session with teammates to solve a problem together
Empathy	Regularly checking in with coworkers and offering space to talk about anything that's challenging them
Respect	Fostering an inclusive work environment by listening to everyone's contributions and opinions

Spiral Integration

Research

- Open tracheotomy: 3D anatomy
- https://www.sciencedirect.com/science/article/abs/pii/S1043181022000653
- Tracheotomy is a very common surgical procedure in which an incision is made in the anterior tracheal wall and skin to create an airway. The indications for this procedure include prolonged endotracheal intubation, upper airway obstruction from any cause, improved pulmonary toilet, and in the setting of certain otolaryngologic procedures to facilitate access to the oral cavity, pharynx, and larynx, and may in some cases be required urgently or emergently. The background and basic technique are described herein, with a focus on anatomic features encountered with the assistance of 3-dimensional stereoscopic imaging.

Learning Resources

- **Clinically Oriented Anatomy 9th Edition**

  by Keith L. Moore (Author), Anne M. R. Agur (Author), Arthur F. Dalley (Author)
- **Netter's Atlas of Human Anatomy 8th edition**
- **Grey's Anatomy 39th edition**
- **Kenhub**

Any Questions