

Larynx II

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Larynx II

- Laryngitis
 - Acute
 - Chronic
- Non-specific laryngitis
- Specific laryngitis
 - Acute epiglottitis
 - Croup
- Laryngeal paralysis
 - Unilateral
 - Bilateral

Healthy Vocal Cords

- Smooth
- straight edges
- white in color





Laryngitis

- Inflammation of the vocal cords
- Laryngitis can be
 - acute (short term)
 - chronic (long term).

Presentation

- Dysphagia
- Dysphonia
- Stridor
- Acquired
 - Inflammation
 - Trauma
 - Foreign bodies

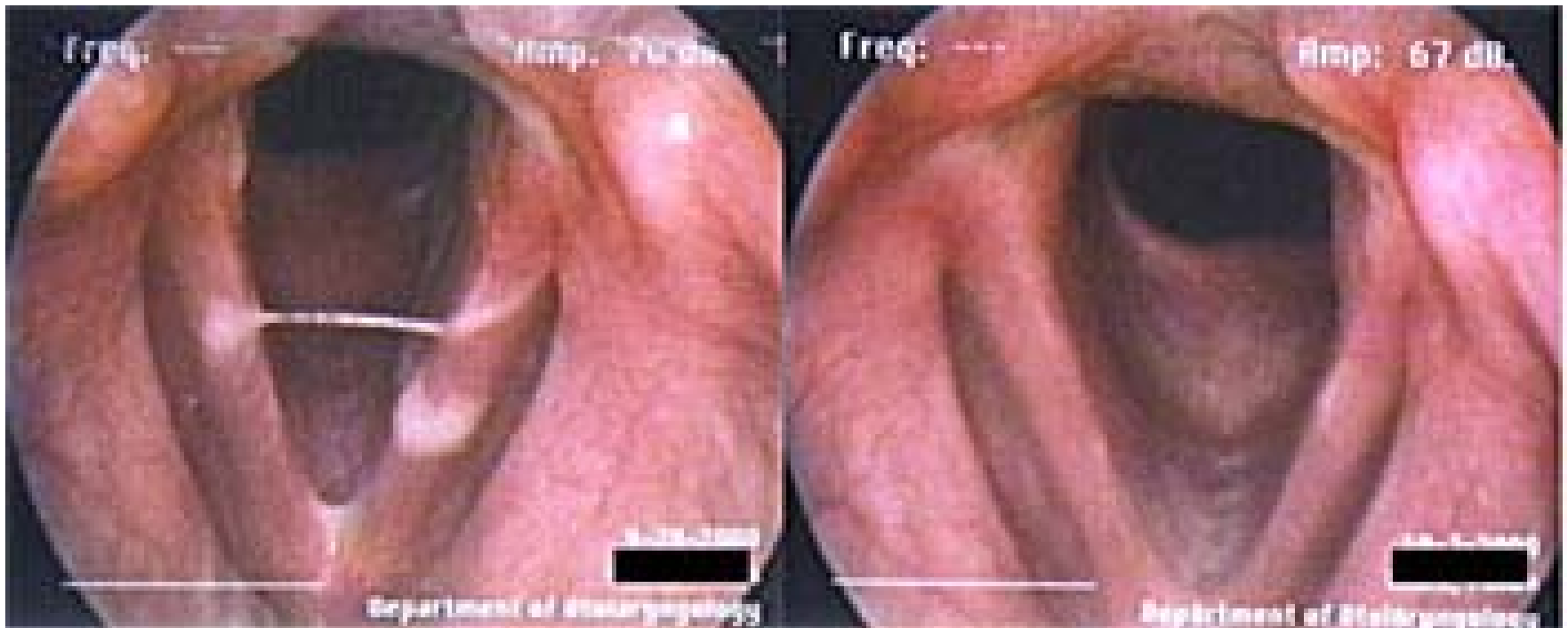
Stridor

- Inspiratory Supra-glottis
- Expiratory Intra-Thorax
- Biphasic Glottis & subglottis

Acute laryngitis

- Short term
- Follows upper respiratory infections.





The second picture was taken four days after the first, and demonstrates the resolution of the infection

Treatment for acute laryngitis

- Vocal rest
- lots of water,
- Humidifier

Chronic laryngitis

- Long term laryngitis
- Misuse and overuse
- Exposure to irritants
 - Smoke
 - Dust
 - Acid reflux



Treatment for chronic laryngitis:

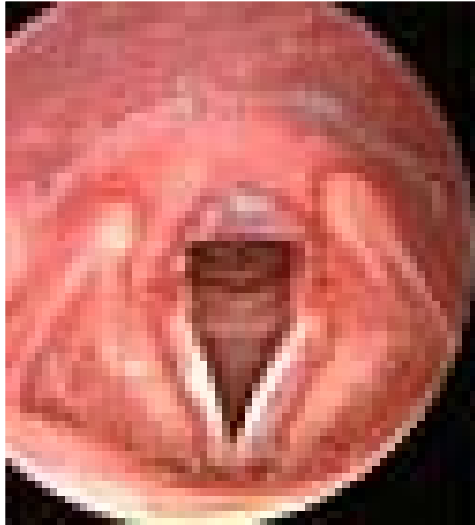
- Same as acute laryngitis
- Rx underlying cause

Larynx II

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Acid Reflux

- Stomach acid → Larynx
- Most common cause of laryngitis
- Small amounts of reflux can cause considerable damage.
- Without GERD symptoms



Rx →



Granulomas
Another result of acid reflux.

Symptoms

- Hoarseness
- Bad/bitter taste in mouth (especially in morning)
- Chronic (on-going) cough
- Asthma-like symptoms
- Frequent throat clearing

Symptoms

- Referred ear pain
- Pain or sensation in throat
- Problems while swallowing
- Feeling of "lump" in throat

(globus pharyngeus)

Complications

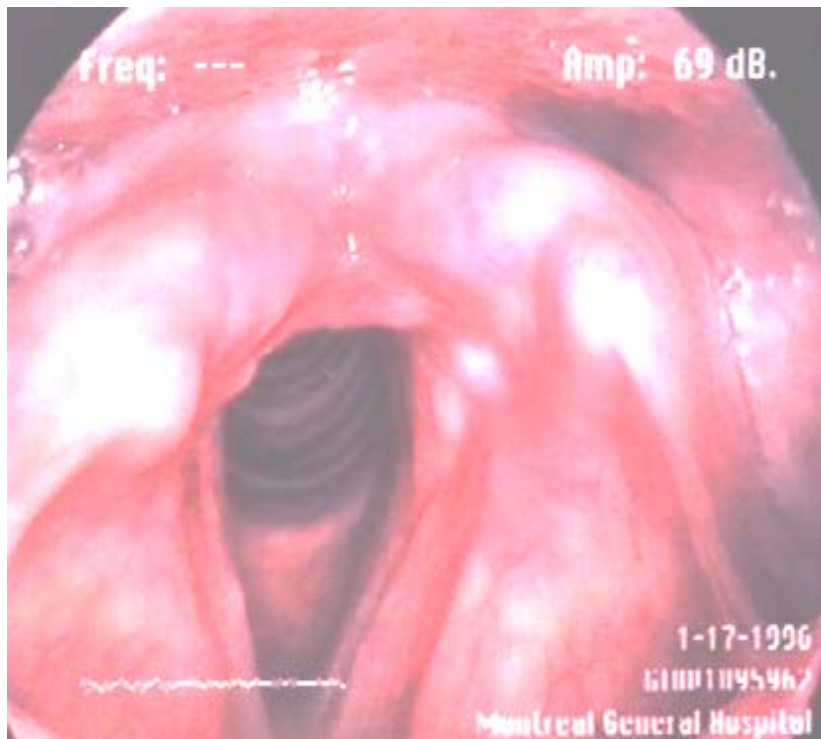
- Stenosis
- Recurrent spasm
- C-A fixation
- Dysphagia
- Laryngeal CA.

Reflux laryngitis

- Examination:
 - Grade I : Normal
 - Grade II : Erythema / Edema
 - Grade III : Pachydermia
 - Grade IV : ulcer & granuloma



Reflux laryngitis



Reflux laryngitis

- Dx:
 - Hx
 - Examination
 - 24 H double probe PH monitoring.
 - Ba-swallow.
 - Gastroscope



Reflux laryngitis

- Treatment:
 - Dietary and Lifestyle modifications.
 - Antacids.
 - Systemic H₂-blockers.
 - Prokinetic agents.
 - Mucosal cytoprotectants.
 - Proton pump inhibitors; Omebrazole

Other inflammatory disease

Granulomatous Conditions That May Affect the Larynx

<i>Disease</i>	<i>Laryngeal Involvement</i>
Tuberculosis	Posterior one-third of larynx involved
Syphilis	Painless ulcers; positive syphilis serology
Leprosy	Supraglottic involvement
Histoplasmosis	Anterior larynx involved
Blastomycosis	Painless ulcers; microabscesses
Actinomycosis	Draining sinuses; sulfur granules
Rhinoscleroma	Catarrhal stage, Mikulicz's cells
Sarcoidosis	Supraglottic swelling, nodules, granulomas
Wegener's granulomatosis	Subglottic involvement; necrotizing vasculitis; pulmonary or renal involvement

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Biphasic Stridor

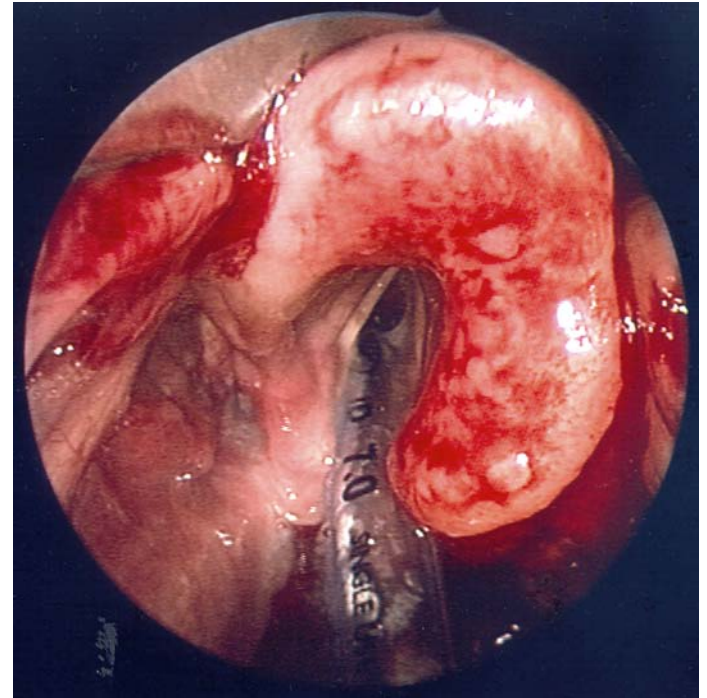
- Result of extrathoracic tracheal obstruction including
 - Glottis
 - Subglottis
- Intermediate pitch

Epiglottitis

- Bacterial cellulitis of epiglottitis
- 2 to 7 years old
- Rapid presentation over 2-6 hrs
- *Haemophilus influenzae* type B most common
- ↑↑ winter and spring.
- incidence greatly decreased since vaccine

Acute epiglottitis

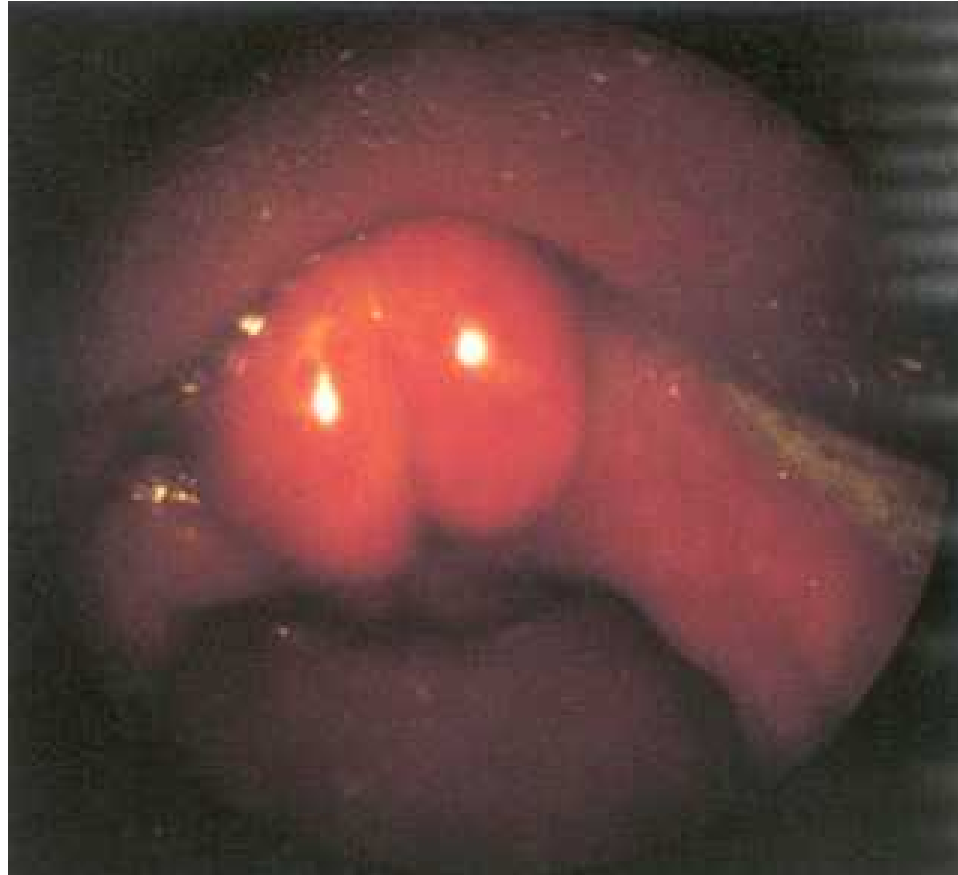
- Fever
- Sore throat
- Muffled voice
- Inspiratory stridor
- Sitting upright
- Ill-appearing
- Drooling,



Acute epiglottitis

- Examination of the epiglottis may precipitate laryngospasm → not recommended.
- Lateral X-ray → classic “thumb” sign.
- Tx: operating room immediately to establish the diagnosis and secure an airway

Epiglottitis



Epiglottitis

- lateral neck film - “thumb sign”
- if suspected, diagnose by direct laryngoscopy in OR
- Nasotracheal intubation
- IV antibiotics
- extubate - usually within 48 hours



Laryngotracheobronchitis

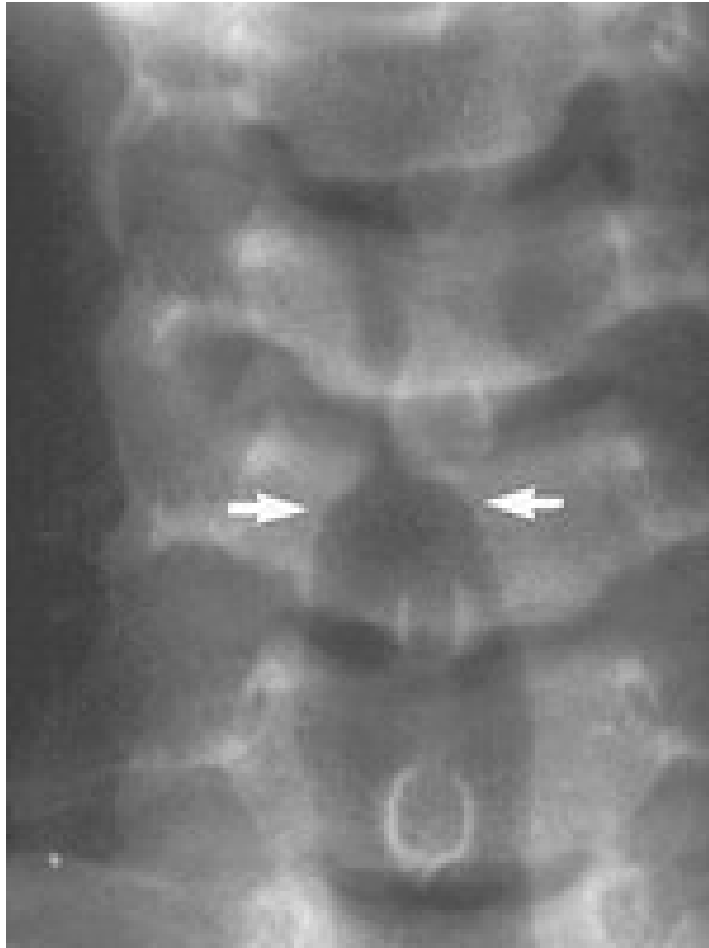
- *croup* - Scottish for barking cough
- 6 months to 3 years old
- Parainfluenza viruses types 1 and 2 most common

Laryngotracheobronchitis

- URI symptoms
- Barking cough
- Hoarseness
- Low-grade fever

Laryngotracheobronchitis

- laryngoscopy for those with respiratory distress
- AP neck - “steeple sign”
- supraglottis normal



Differential Dx

- Epiglottitis
- Bacterial tracheitis
- Foreign body
- Subglottic stenosis
- Peritonsillar abscess
- Retropharyngeal abscess
- Diphtheria
- Laryngomalacia
- Vocal cord paralysis
- Smoke inhalation
- Burns/Thermal injury
- Neoplasm
- Laryngeal fracture

Complication of Croup

- **Airway obstruction**
- **Pneumothorax and pneumomediastinum**
- **Extend into the lower airway**
- **Dehydration.**
- **Subglottic stenosis**

Croup Vs Epiglottitis

Characteristics of Laryngotracheitis and Epiglottitis

Feature

Age

Laryngotracheitis

<3 years

Onset

Gradual (days)

Cough

Barky

Posture

Supine

Drooling

No

Radiograph

Steeple sign, narrowed subglottis

Epiglottitis

>3 years

Acute (hours)

Normal

Sitting

Yes

Thumb sign, enlarged epiglottis, dilated hypopharynx

Cause

Viral

Bacterial

Treatment

Supportive (croup tent)

Airway management (intubation or tracheotomy), antibiotics

Larynx II

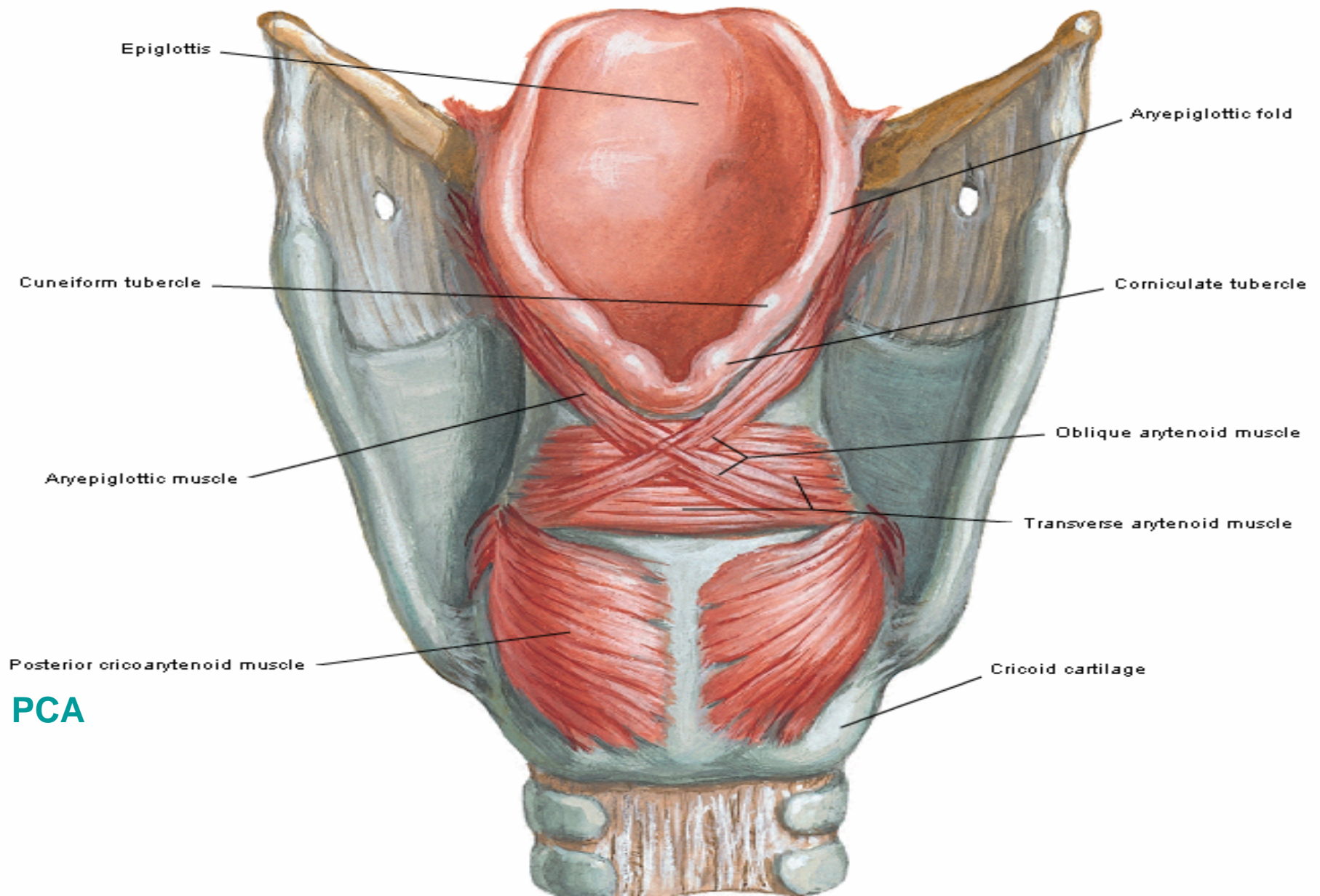
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Intrinsic muscles of the larynx

- Cricothyroid → tenses and lengthens the vocal lig.
- Posterior cricoarytenoid → abduct (OPENS)
- Lateral cricoarytenoid → adduct (CLOSE)
- Transversearytenoid → adduct (CLOSE)
- Oblique arytenoids → adduct (CLOSE)
- Thyroarytenoid → decreases the tension & length
- Vocalis (portion of the thyroarytenoid lying within the vocal fold)
- Thyroepiglotticus → depresses the epiglottis
- Aryepiglotticus → same

Intrinsic Muscles of Larynx

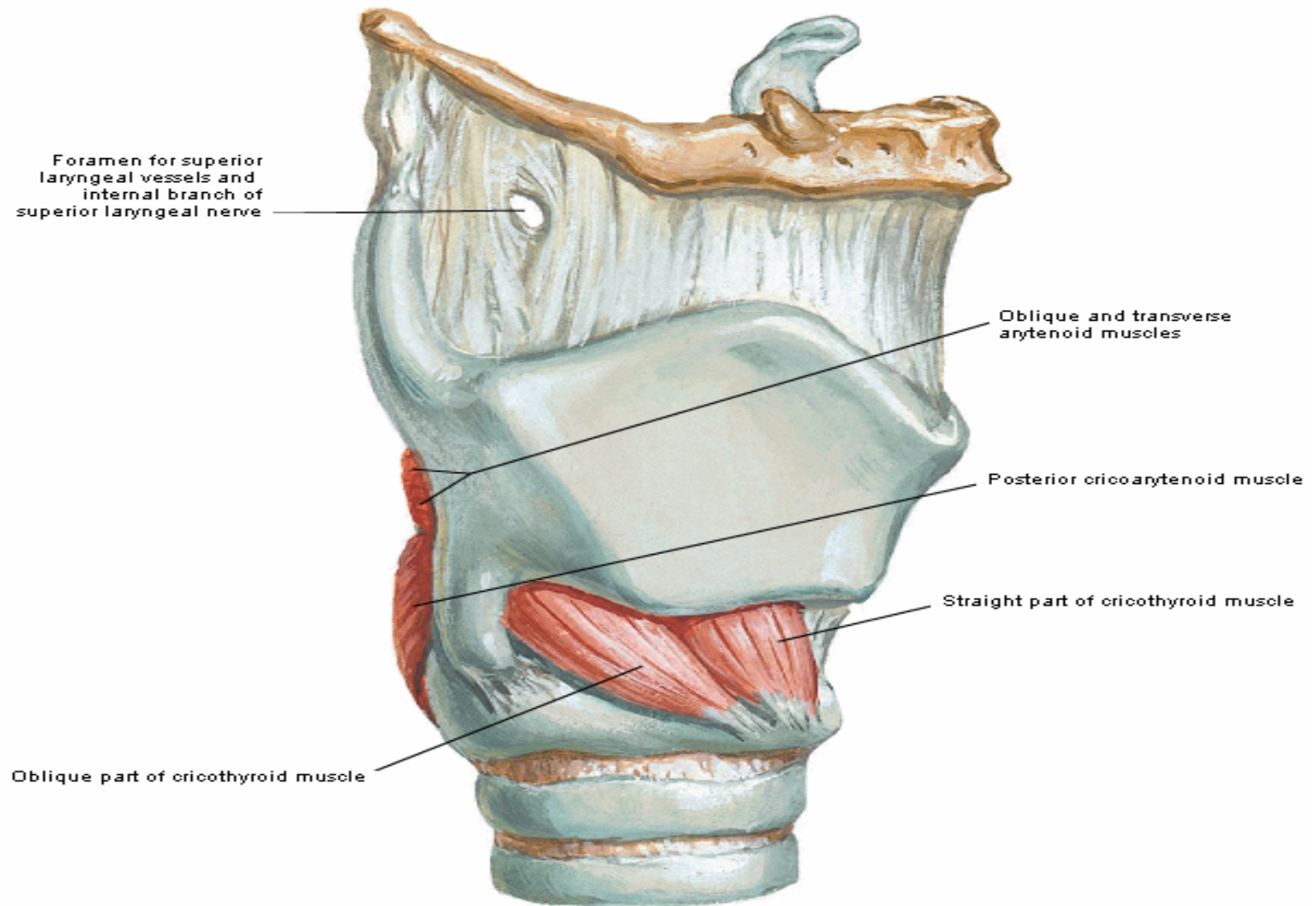
Posterior View



PCA

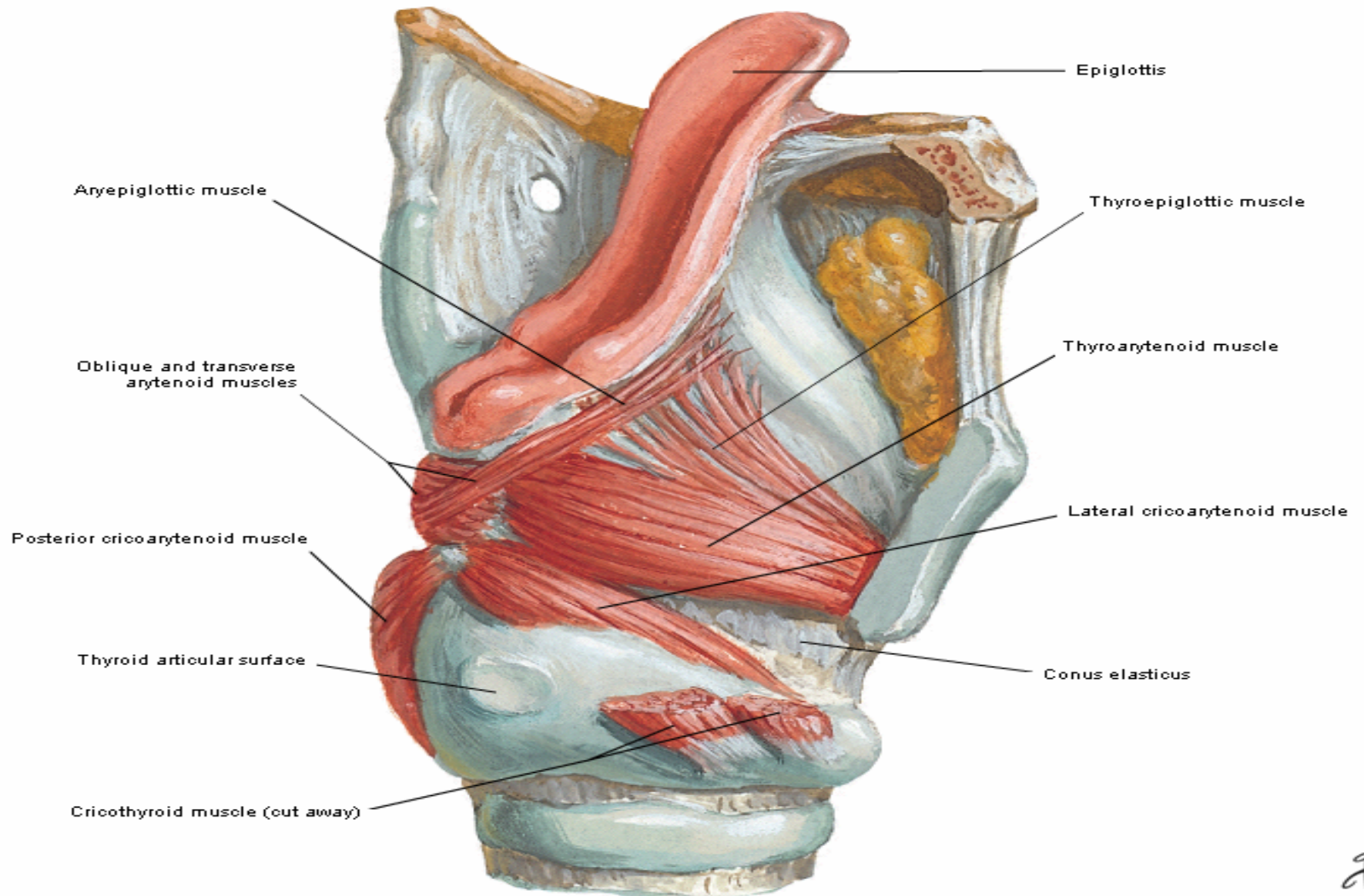
Intrinsic Muscles of Larynx

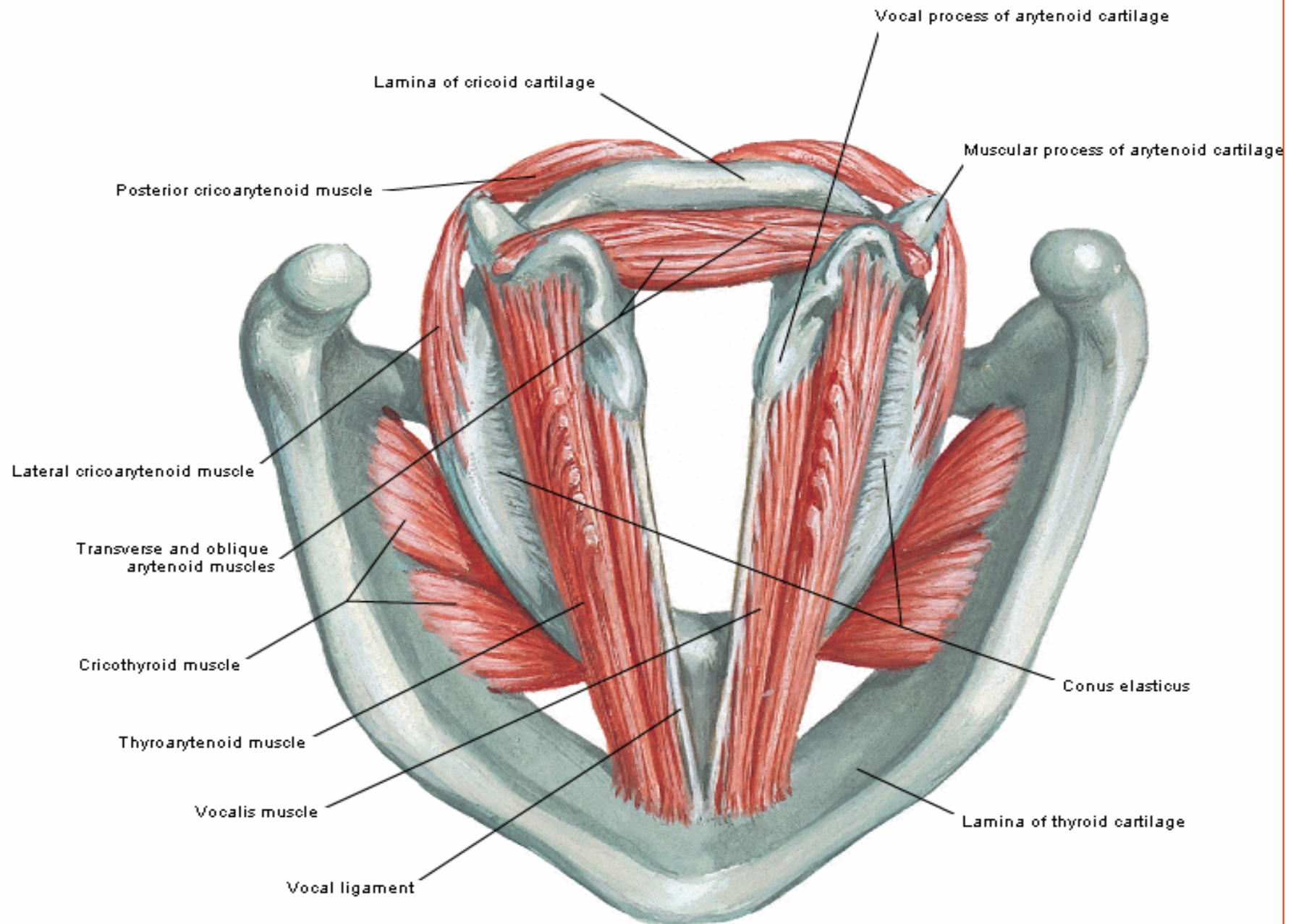
Right Lateral View



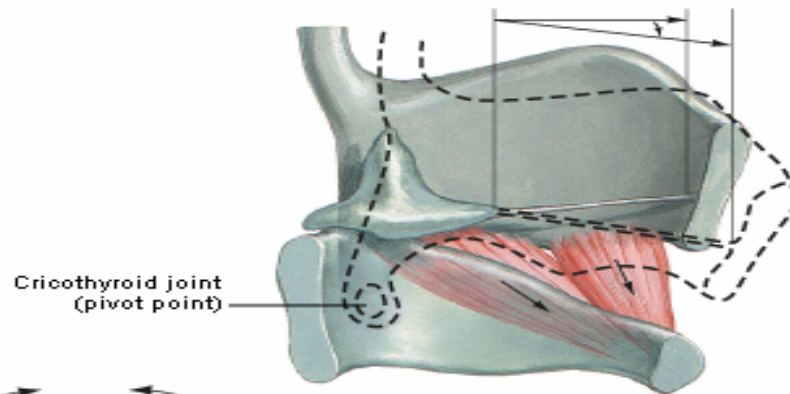
Intrinsic Muscles of Larynx

Lateral Dissection



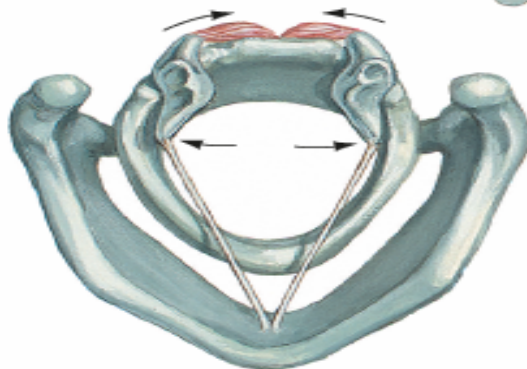


Action of Intrinsic Muscles of Larynx

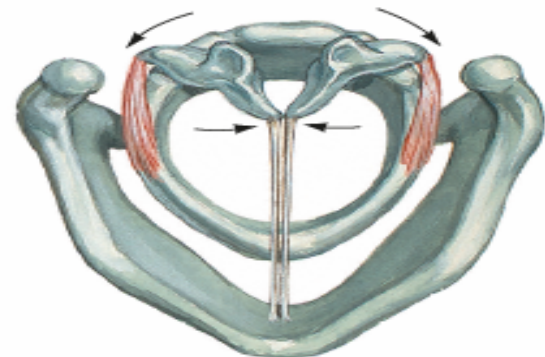


Cricothyroid joint
(pivot point)

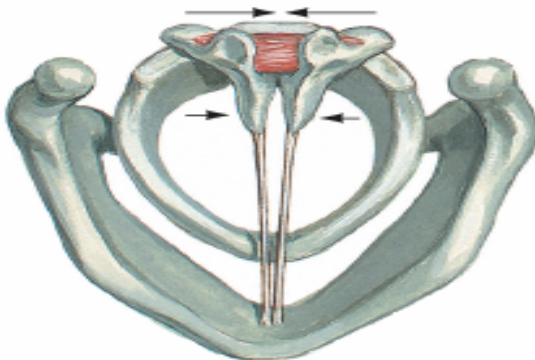
Action of cricothyroid muscles
Lengthening (increasing tension)
of vocal ligaments



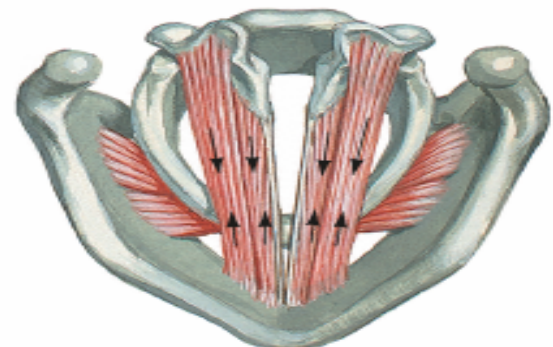
Action of posterior cricoarytenoid muscles
Abduction of vocal ligaments



Action of lateral cricoarytenoid muscles
Adduction of vocal ligaments



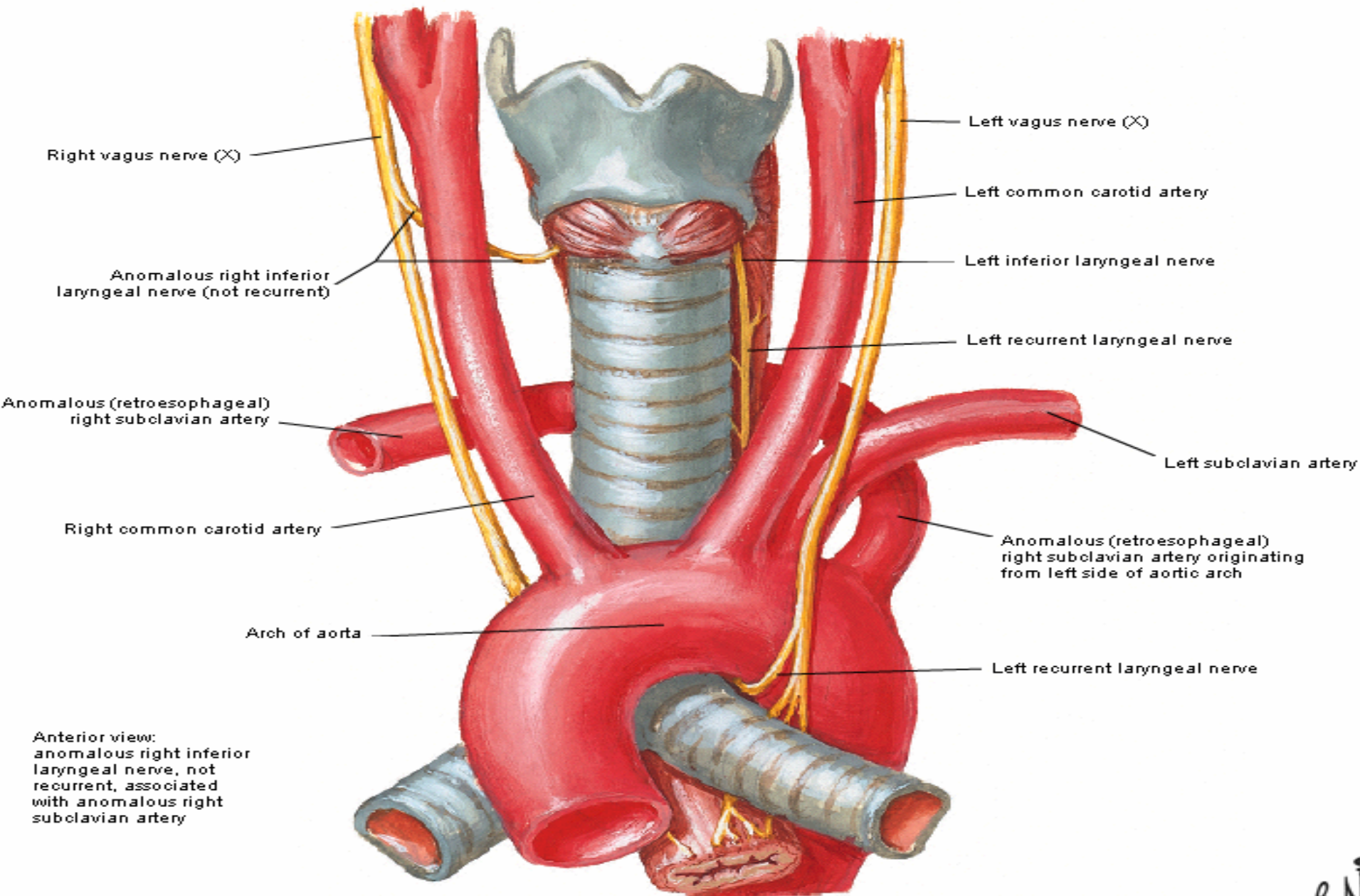
Action of transverse arytenoid muscle
Adduction of vocal ligaments

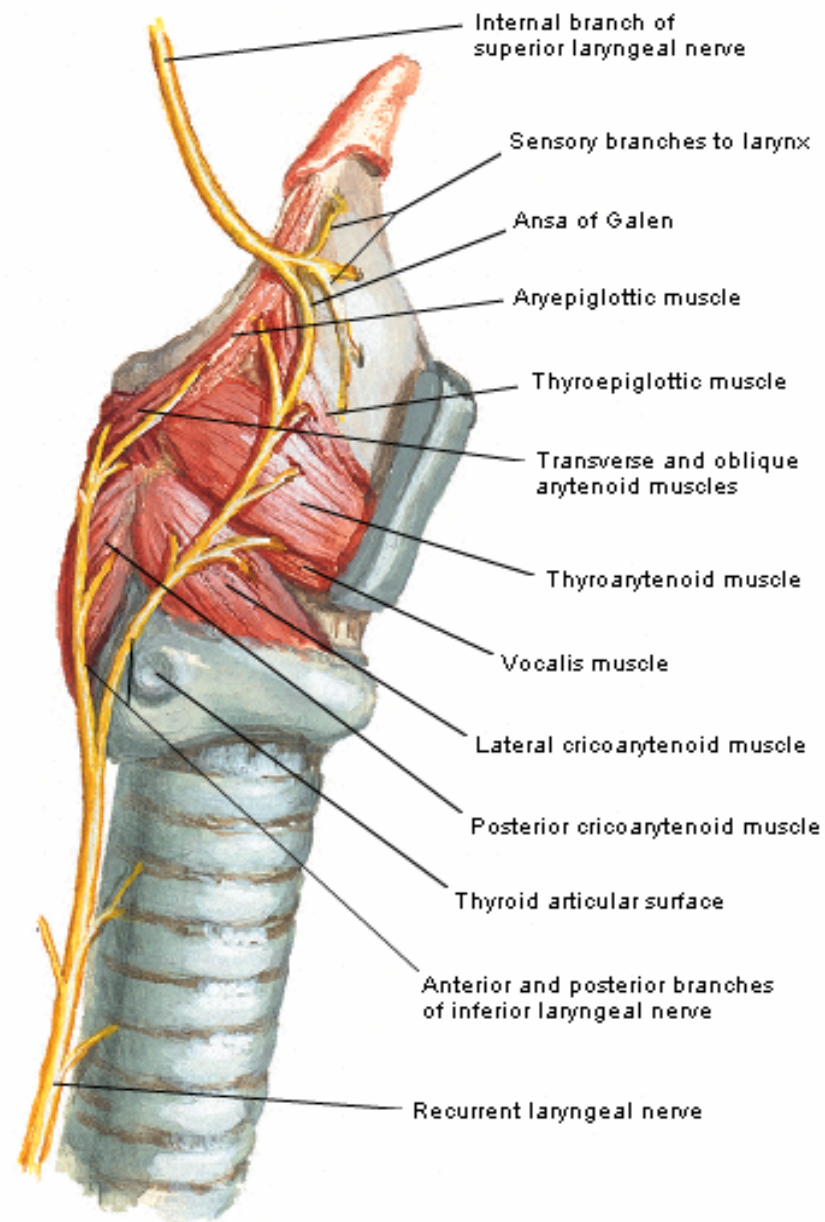
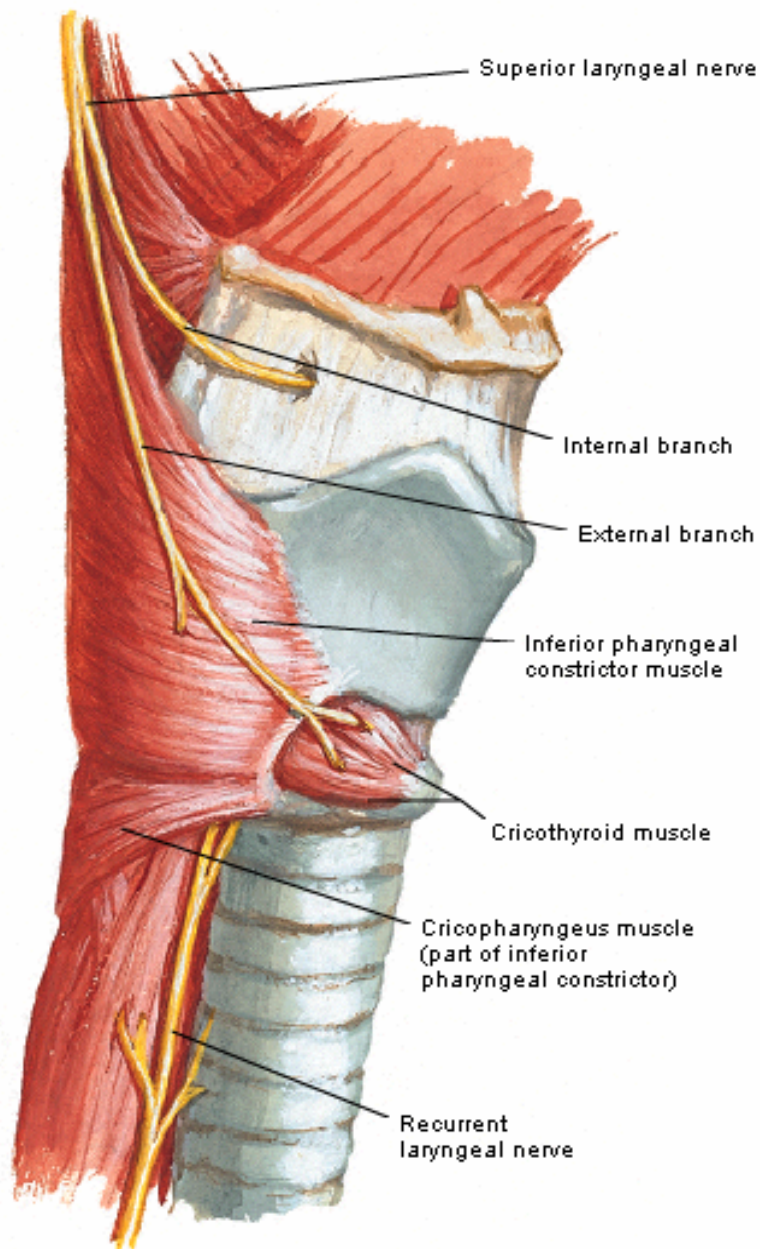


Action of vocalis and thyroarytenoid muscles
Shortening (relaxation) of vocal ligaments

Nerves of Larynx

Anterior View





Thyroid cartilage lamina removed

Vocal Cord Paralysis

Vocal cord paralysis

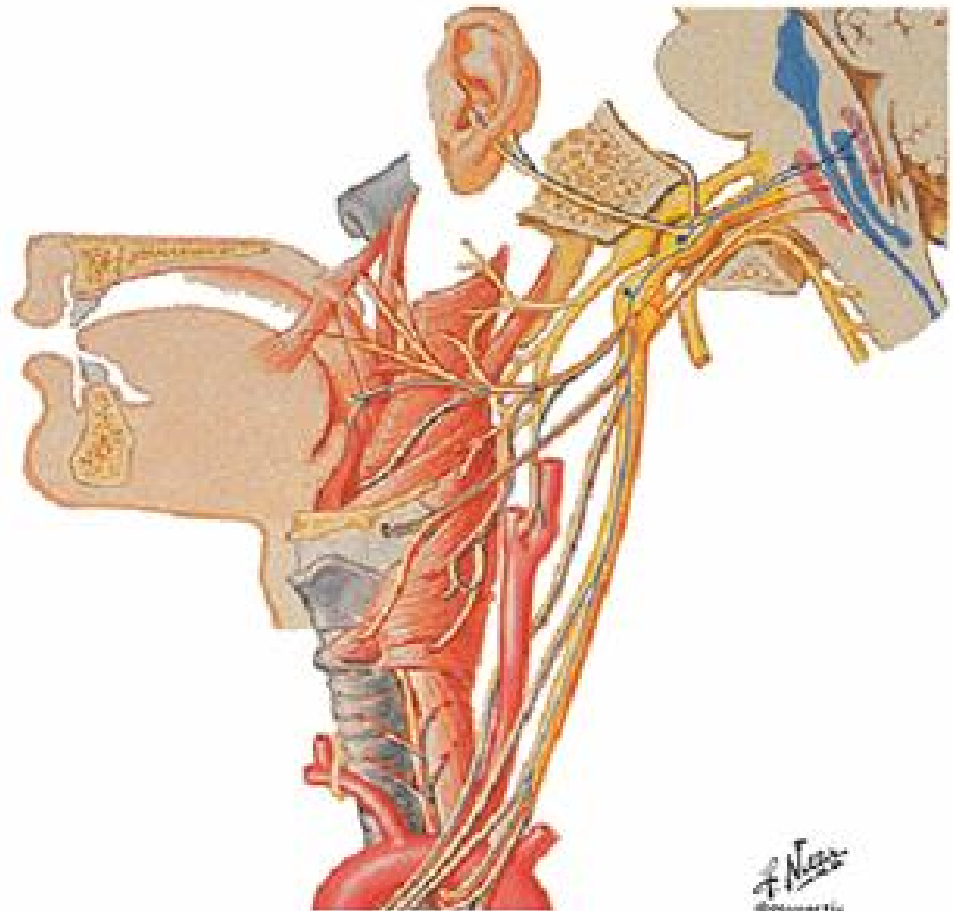
- 2nd common cause of congenital upper a/w obstruction.
- Unilateral VC paralysis > bilateral

Introduction

- Affects quality of life
- Potential morbidity and mortality
- A sign of a disease process with multiple etiologies, necessitating thorough evaluation
- Multiple therapeutic options that must be tailored to the patient

Etiology

- Dysfunction at
 - Brain and brainstem nuclei
 - Vagus nerve
 - Recurrent laryngeal nerve

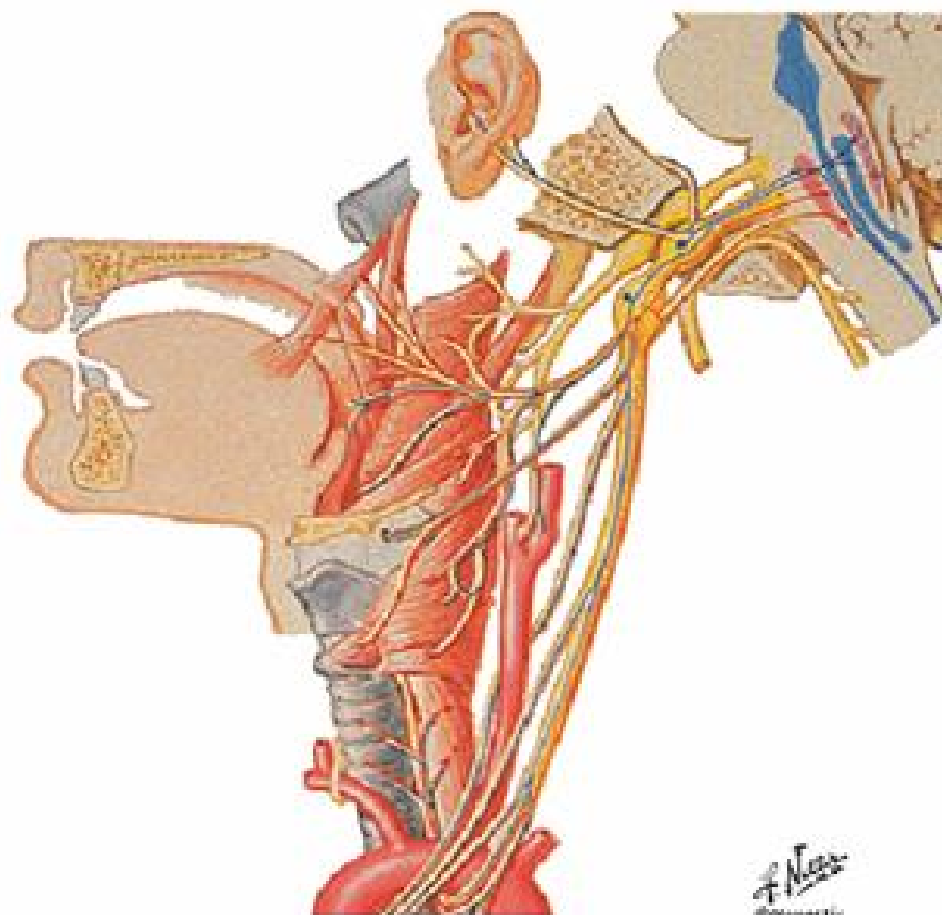


Etiology: Neurologic

- Stroke
- CNS tumor
- Diabetic neuropathy
- Amyotrophic lateral sclerosis (ALS)
- Parkinson disease
- Myasthenia gravis
- Guillain-Barre syndrome

Etiology: Tumor infiltration or mass compression

- Skull base
- Thyroid
- Esophagus
- Lung



Etiology: Systemic disease

- Systemic lupus erythematosus
- Sarcoidosis
- Amyloidosis
- Tuberculosis
- Mitochondrial disorders
- Polyarteritis nodosa

Etiology: Traumatic

- Iatrogenic: Surgical
 - Thyroidectomy
 - Anterior cervical spine procedures
 - Esophagectomy
 - Thymectomy
 - Carotid endarterectomy
 - Cardiothoracic surgery
 - Aortic surgery
 - Coronary artery bypass grafting
 - Pulmonary lobar resection
 - Mediastinoscopy
- Iatrogenic: Non-surgical
 - Endotracheal intubation
 - Arytenoid dislocation, subluxation
 - Tapia's syndrome
 - Nasogastric tube placement¹
- Non-iatrogenic
 - Blunt or penetrating trauma to the neck

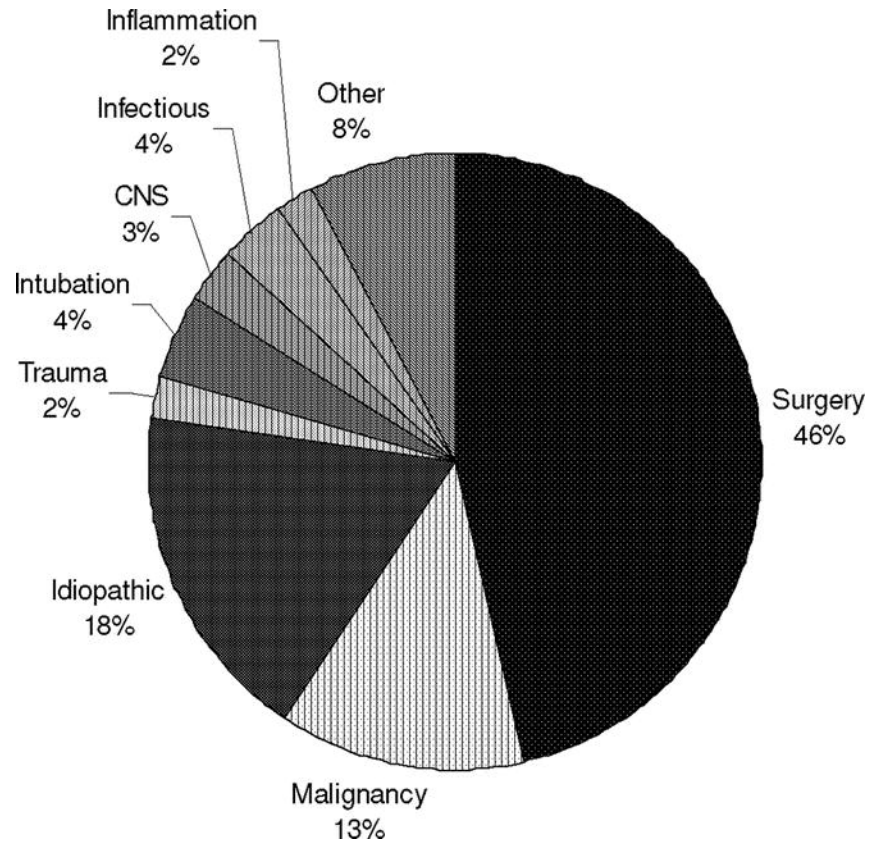
Etiology: Idiopathic

- Not well understood
- Possible infectious cause
 - Lyme disease
 - Tertiary syphilis
 - Epstein-Barr virus
 - Herpes simplex virus Type I
- Diagnosis of exclusion

Etiology

1. Surgery (46%)
2. Idiopathic (18%)
3. Malignancy (13%)

- Lung was most common

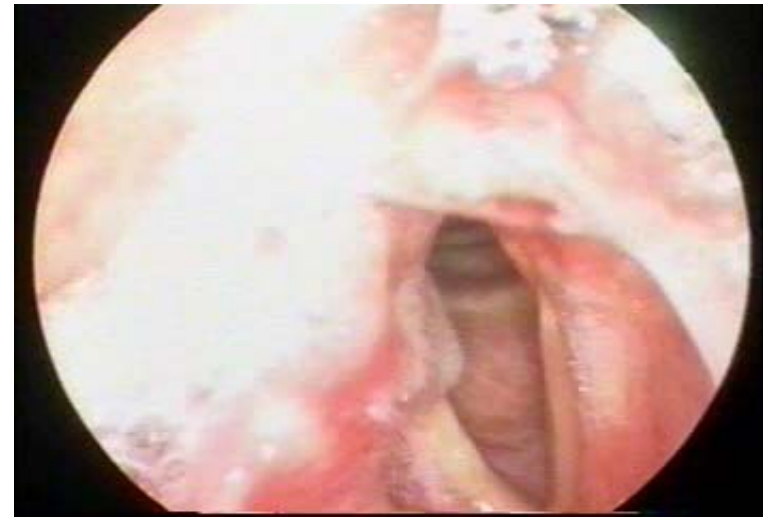


Evaluation – History

- Symptoms
 - Voice changes
 - Hoarseness to aphonia
 - Vocal fatigue, neck pain
 - Aspiration
 - Weak, ineffective cough
- Past medical and surgical history
- Social history

Evaluation – Physical Exam

- Cranial nerve exam
- Nasopharyngolaryngoscopy
 - Vocal cord asymmetry
 - Horizontal and vertical position
 - Glottic gap
 - Pooled secretions
 - Aspiration
 - Maximal phonation time (MPT)
 - Supraglottic hyperfunction



Evaluation

- Assess swallow function and aspiration
 - Modified barium swallow
 - Functional endoscopic evaluation of swallowing (FEES)
- Imaging
 - CXR
 - CT with contrast: May evaluate the entire course of the RLN.
 - MRI
- Laryngeal electromyography





Modified barium
swallow



FEEES

Treatment

- Goal: prevent aspiration and Improve voice.
- Patient factors affect treatment strategies.
 - Presence of aspiration
 - Nature of nerve injury
 - Vocal demands
 - Medical comorbidities
 - L-EMG findings

Treatment

- Strategies:
 - Observation for 6-12 months
 - Speech and swallow therapy
 - Surgical intervention
 - Temporary: Vocal fold injection
 - Permanent: Vocal fold injection with durable material, medialization thyroplasty +/- arytenoid adduction or laryngeal reinnervation

Thanks