

# Laryngology

## ANATOMY

### Laryngeal Neuromuscular Anatomy

- Extrinsic Depressors , Extrinsic Elevators

- Adductors

- Lateral Cricoarytenoid.
- Thyroarytenoid
- \*Interarytenoid.

- Abductors

- Posterior Cricoarytenoid

**MCQ**

*The only muscle that abducts the vocal cord  
" it pulls them way from each other"  
Thus Paralysis of this muscle will lead to  
asphyxia*

- Tensors

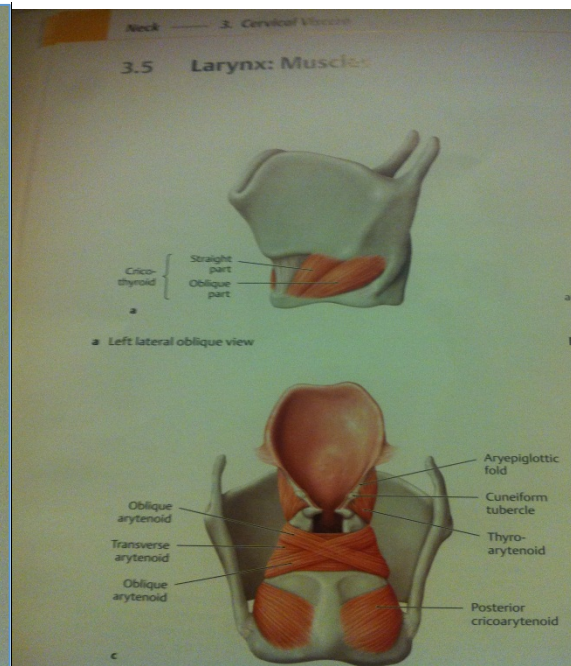
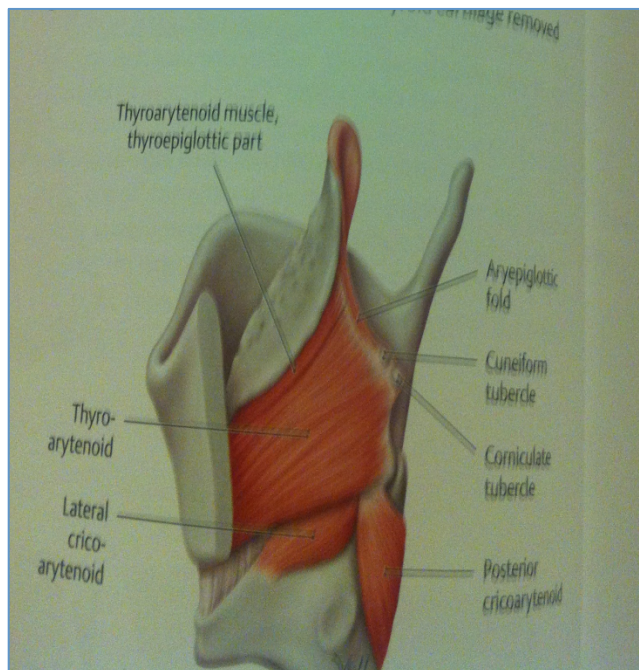
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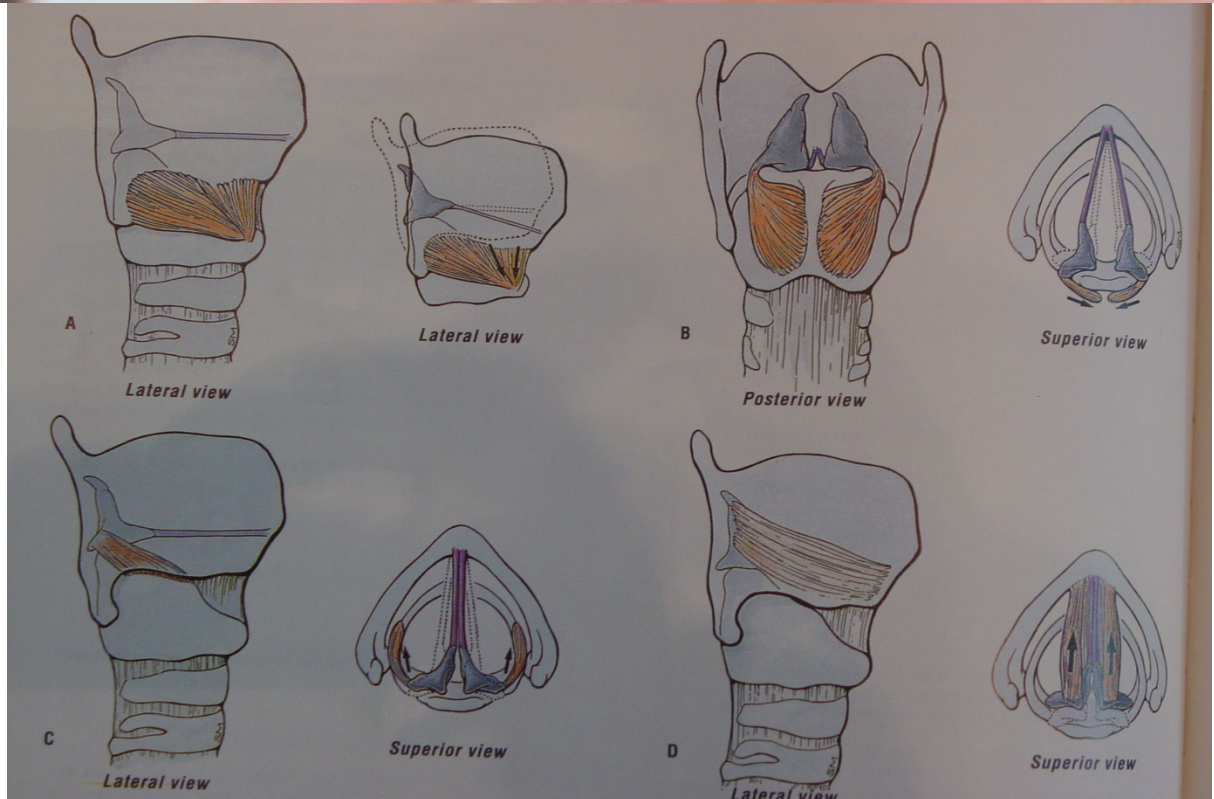
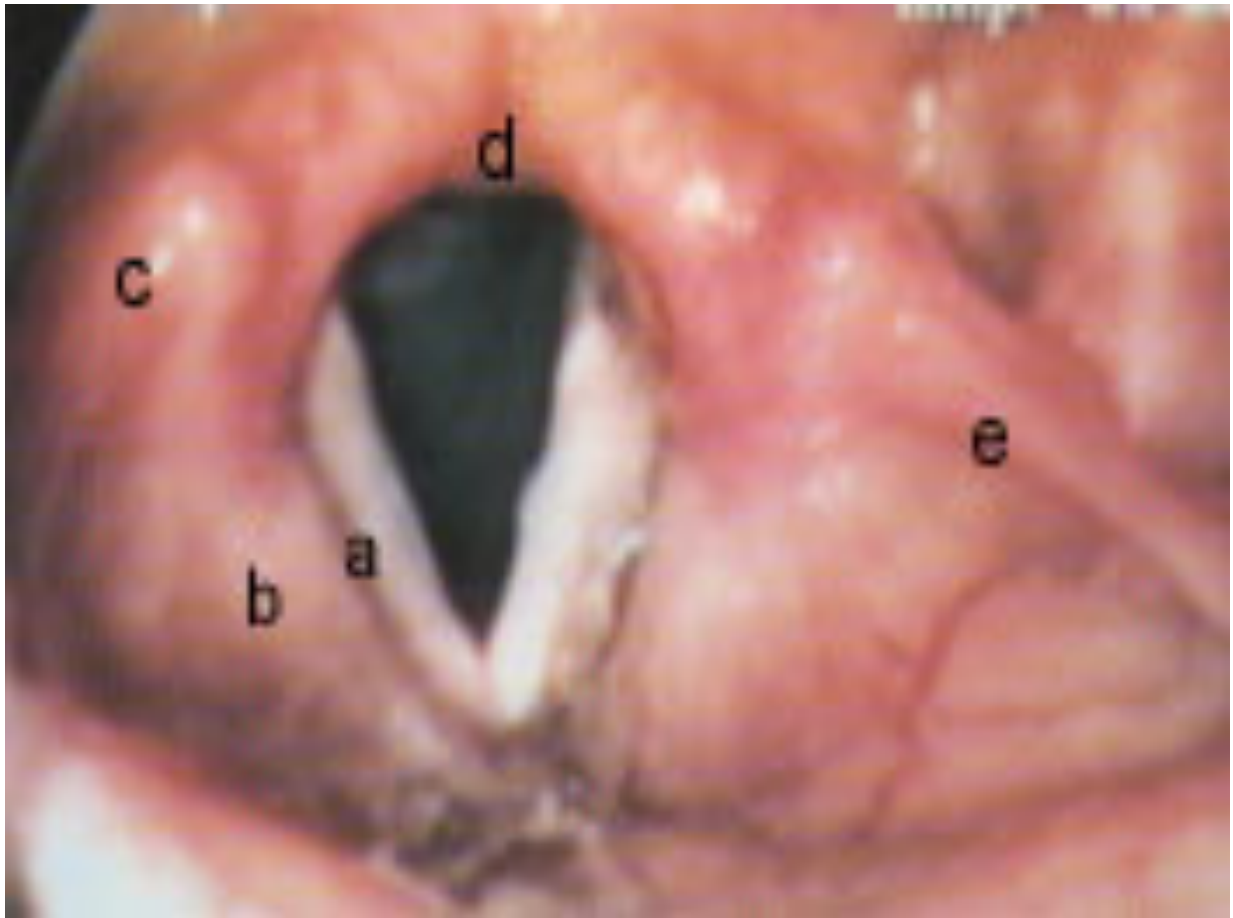
- Thyroarytenoid>>" medial fibers vocalis muscles'

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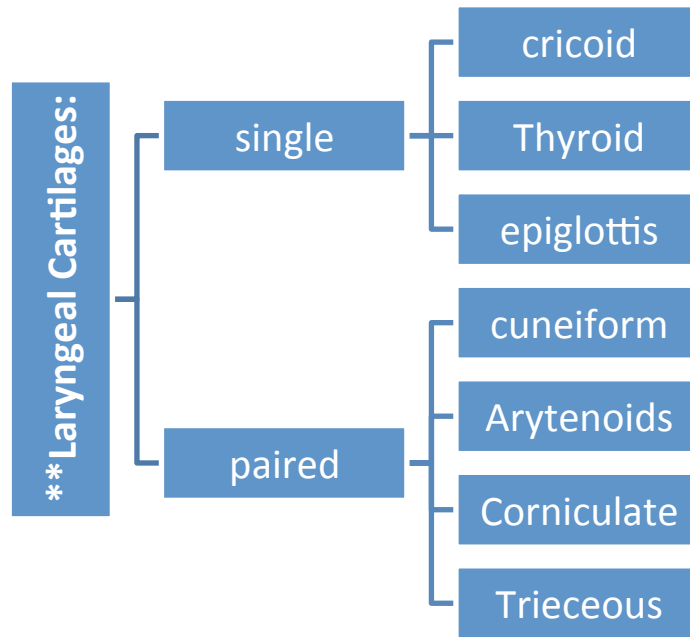
- Cricothyroid: >> supplied by the superior laryngeal nerve

\*interarytenoid is the only single muscle, while the others are paired



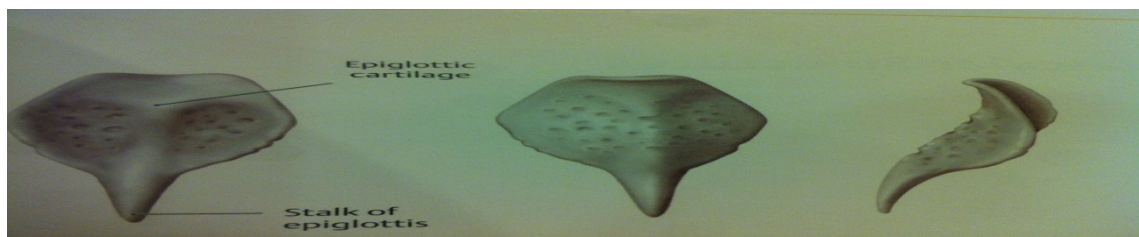
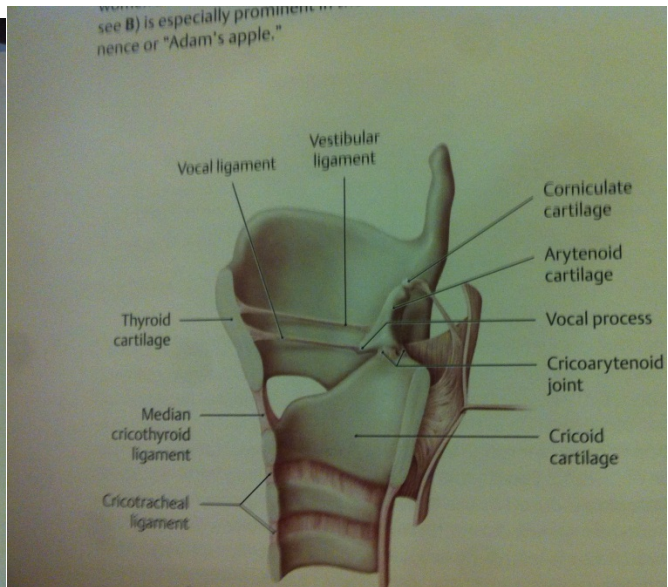
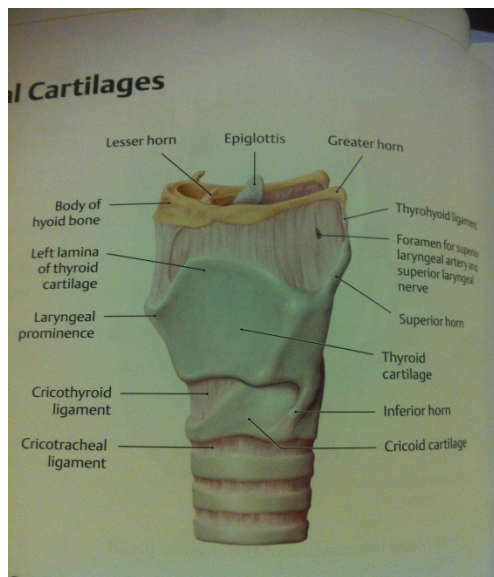






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All of these cartilages are **hyaline cartilages**, except the **epiglottis**, which is an **elastic cartilage**

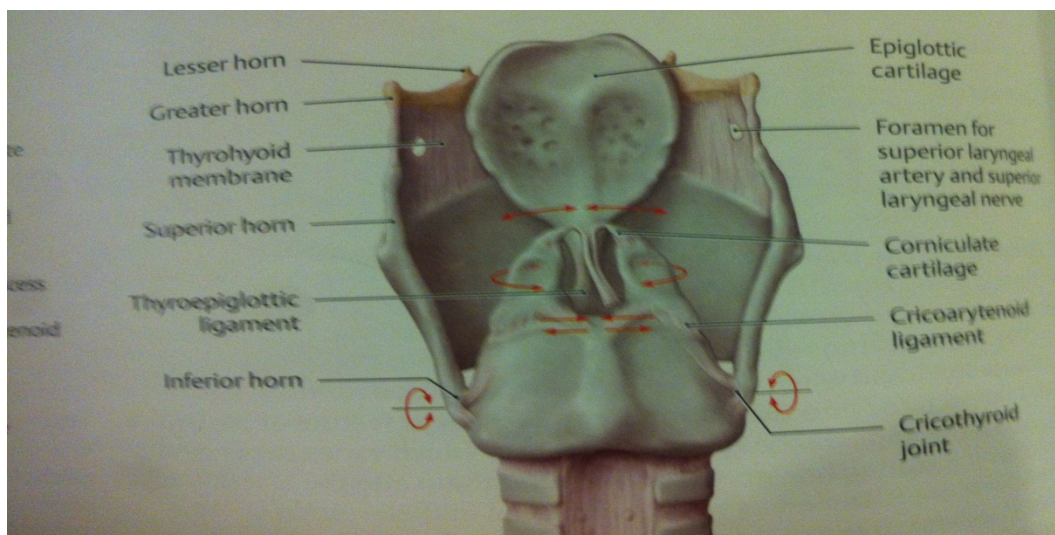
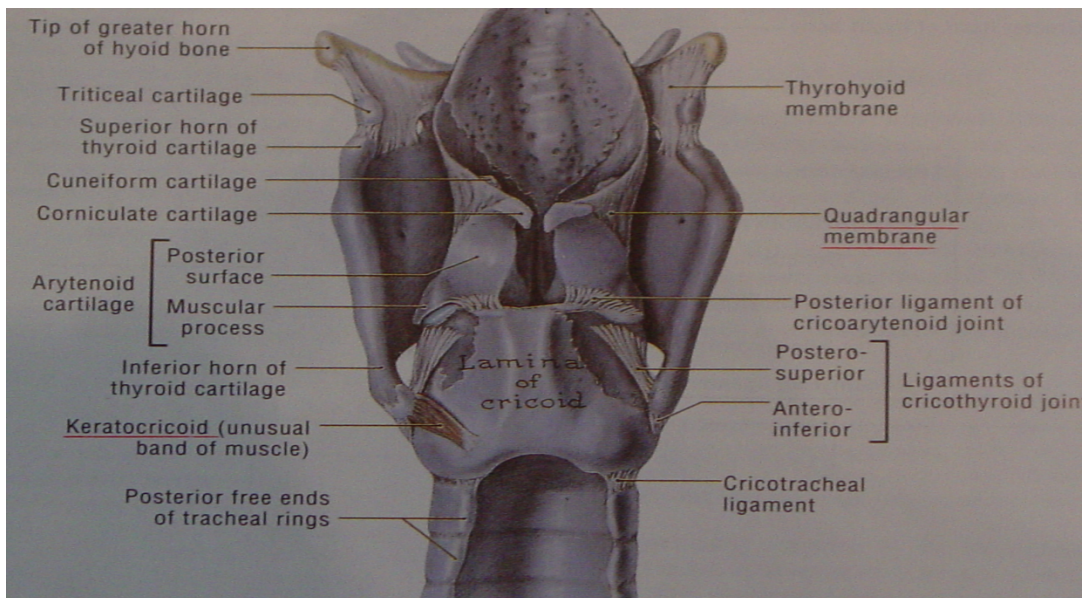


- **Laryngeal Joints**

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- Cricothyroid Joints: synovial rocks (hinge)
- Cricoarytenoid Joints: synovial rocking motion

✓ Anteromedially for vocal fold adduction. / Posterolaterally for vocal fold abduction.



## Vocal Fold Layers

**Superficial** —————→ **deep**

- 1) Squamous Epithelium.
  - 2) Superficial Lamina Propria (SLP. Reinke's Space).
  - 3) Intermediate Lamina Propria.
  - 4) Deep Lamina Propria: attached to;
  - 5) Thyroarytenoid Muscle Complex.
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## Pediatric Airway Anatomy

- ✓ > 90% of neonates are obligate nasal breathers until 2 months
  - ✓ 1mm of laryngeal edema in the neonate can reduce airway by 60%
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## Laryngeal Sensory Innervation:

- 1-Internal branch of the superior laryngeal nerve (SLN) : innervates the laryngeal mucosa above the epiglottis.
- 2-. Recurrent laryngeal nerve (RLN) : innervates the laryngeal mucosa below the epiglottis.

**Note:** Superior laryngeal nerve is divided to :

- ❖ External laryngeal nerve : motor supply to the cricothyroid muscle.
  - ❖ Internal laryngeal nerve : sensory supply of the larynx.
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## PHYSIOLOGY

### ● **Components of Speech:**

- ✓ **Phonation**
- ✓ **\*\*\*Resonation**
- ✓ **Articulation**
- ✓ **Respiration**

**Note:** the most common pathologies of speech are resonance problems, e.g. **hypernasality**.

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### **VOICE PARAMETERS :**

Pitch. (300-500 Hz) normal speech frequency.

Fundamental frequency.(men—>lower frq , women)

Loudness (decibels).

Quality (Timbre).

# EVALUATION OF THE DYSPHONIC PATIENT

## History:

- ❖ Character of Dysphonia.
- ❖ Contributing Factors.
- ❖ Associated Symptoms.
- ❖ Past history
- ❖ KITTNES for deferential diagnosis
  - (K:congenital , I:Inflammatory ,T:Trama , T:Tumor , N:Nerogenic , E: Endocrine)

## Physical Exam

- ❖ Quality of Voice
- ❖ Indirect and Direct Laryngoscopy
- ❖ (Mirror, Flexible Nasopharyngoscopy,
- ❖ Videostroboscopy):
- ❖ H &N Exam

To Examine Hypernasality ask the Patient to say S.

To Examine Hyponasality ask the Patient to say N (or) M , while the nose is closed.

Differential Diagnosis of Dysphonia : KITTENS Method						
<u>Congenital</u>	<u>Infectious &amp;</u>	<u>Trauma &amp;</u>	<u>Tumor</u>	<u>Endocrine</u>	<u>Neurologic</u>	<u>Systemic</u>
Congenital Larynx	Laryngitis (Viral, bacteria, & fungal)	Laryngeal cysts, nodules, polyps & ulcers	Recurrent laryngeal papillomatosis	Hypothyroidism (laryngeal myxedema)	Cerebral palsy	GERD
Under-Developed Larynx	vocal fold paralysis	voice abuse	laryngeal cancer	adrenal, pituitary, gonadic disorders	extra-pyramidal lesions (parkinson's)	connective tissue disorders (rheumatoid arthritis, SLE)
	Adductor Spasmodic Dysphonia	Reinker's edema	Benign laryngeal neoplasms (hemangiomas, cystichyromas)	Pubescence	stroke	Psychogenic
	muscle-tension disorders	arytenoid dislocation				Guillain Barre'
		vocal fold granulomas				Myasthenia gravis
		Caustic inhalation injuries				Other neurological disorders

## ANCILLARY TESTS

- Videostroboscopy
- Laryngeal EMG:



# **BENIGN LARYNGEAL PATHOLOGY**

## **• Congenital Laryngeal Defects**

- **Congenital Webs (bands between the vocal cord)**
  - Most commonly anteriorly based
  - **Pathophysiology** : incomplete recanalization
  - **Types**: supraglottic (2 %) glottic (75%), subglottic (7%)
  - **SSx**: aphonia, stridor ( usually in large web)
  - **Rx**: Surgical excision ( usually by endoscopy ,, except if the web is huge or recurrent then its done by an external approach)
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### **CONGENITAL SUBGLOTTIC STENOSIS \*\*\***

**< 4** mm in newborn.

**Pathophysiology**: incomplete recanalization

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#### **Types :**

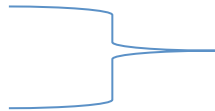
.Membranous  
.Cartilaginous  
Mixed



classified based on the stiffness

#### **Grades:**

I. <50% obstruction  
II 50-70%



endoscopic treatment

III- 70-90%  
IV.> 90-Complete obstruction



external surgery

SSx: stridor

#### **Management:**

Secure Airway  
Medical Management  
Grade I-II: Endoscopic management  
Grade Open Procedures.

#### **Open Procedures :**

- Anterior Cricoid Split.
- Posterior Cricoid Split.
- Laryngofissure.
- Segmental Resection with End to End Anastomosis.

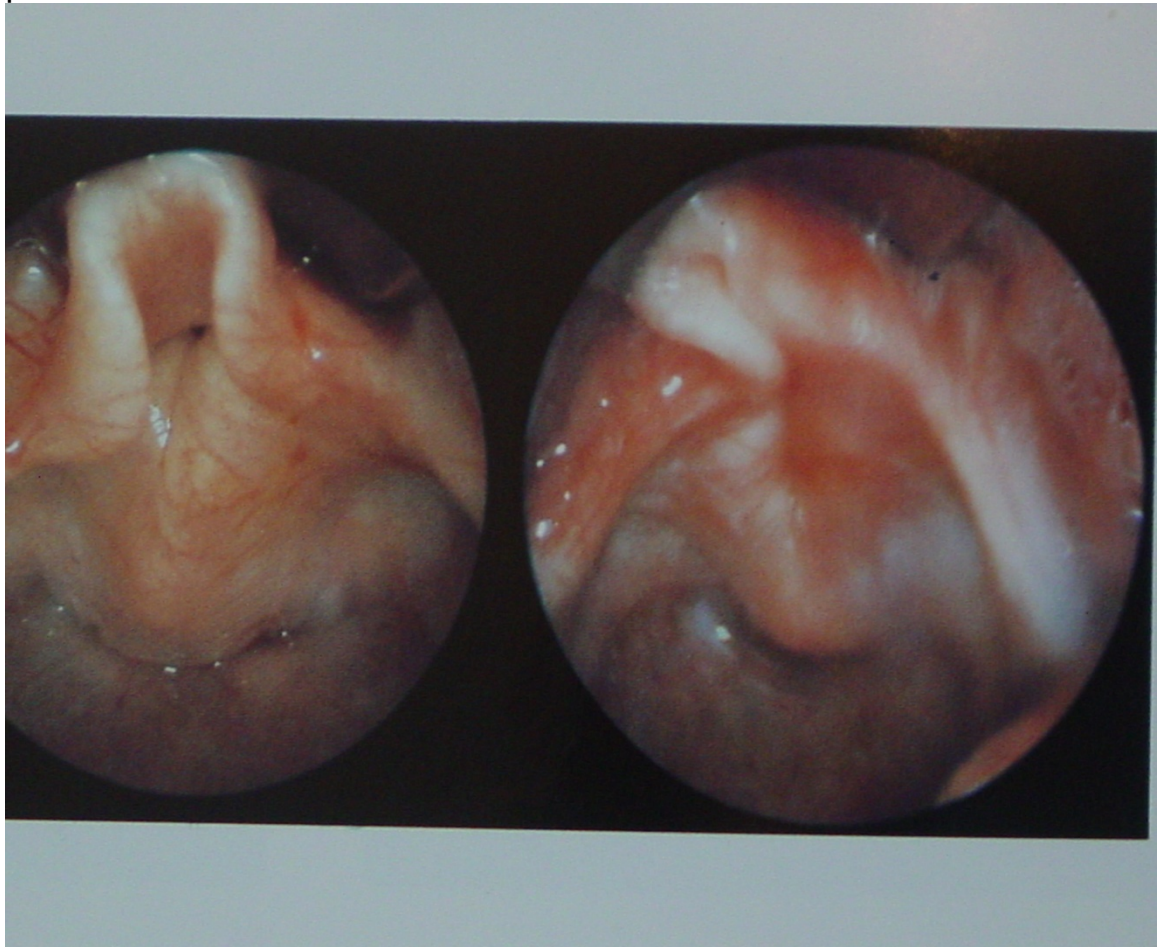
#### **Note:**

The Narrowest part of the air way in a child is the **subglottic area** while in an adult is the epiglottic area

\*\*\* most common disease

- **LARYNGOMALACIA**

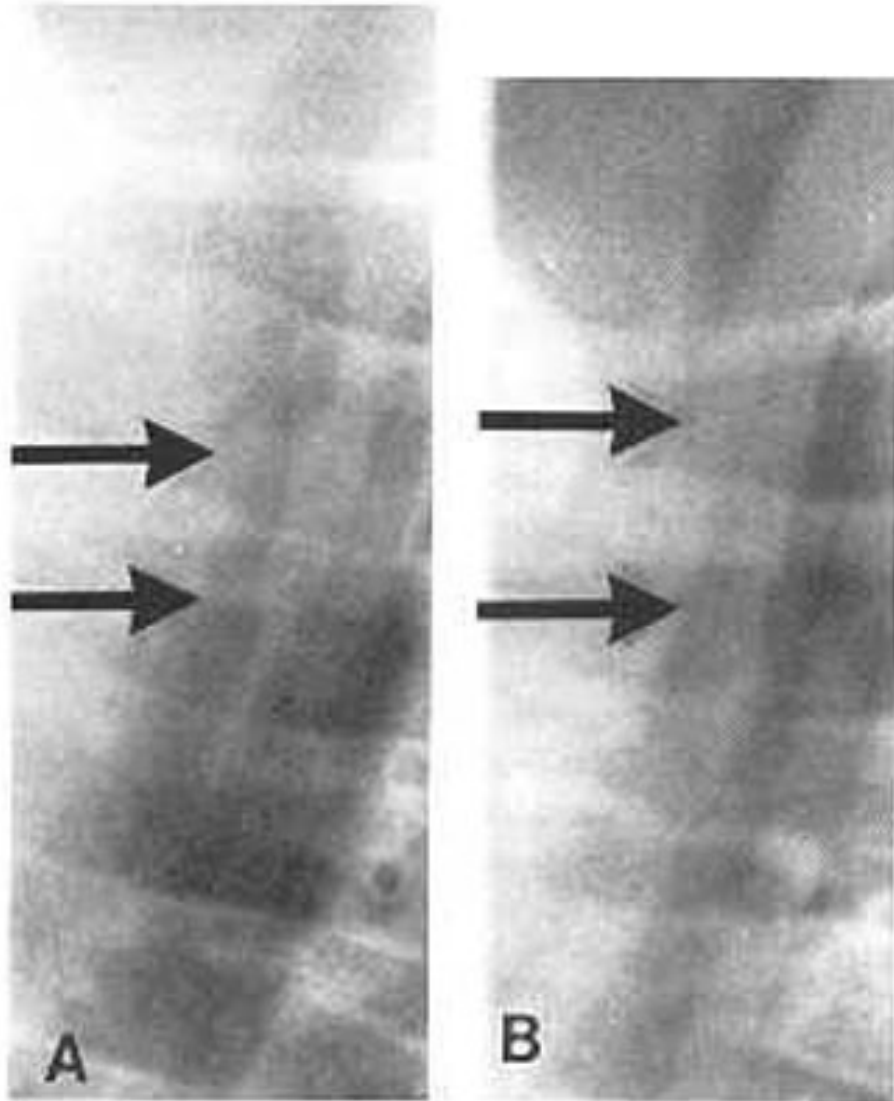
- Most common laryngeal anomaly
- **Most common cause of stridor in neonate and chronic pediatric stridor**
- Elongated Omega- shaped epiglottis, Short Aryepiglottic Fold, Pendulous Mucosa
- Caused by indrawing of supraglottis On inspiration
- **Pathophysiology** : immature cartilage
- **Symptom:** inspiratory stridor, feeding difficulties leading to failure to thrive.
- **Diagnosis:** Management: observation , epiglottoplasty , correct GERD if present





## **TRACHEOMALACIA**

- Less common
- Pathophysiology: Immature Laryngeal Cartilage
- Symptom: expiratory stridor
- Diagnosis: Bronchoscopy to see acolapced area ( abnormal )
- Management: observation.



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**Other Congenital Laryngeal Defects:**

- 1- Vascular Rings
  - 2- Cri du chat Syndrome
  - 3- Posterior Laryngeal Cleft
  - 4- Laryngotracheoesophageal Clefts
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Done !

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