laryngology

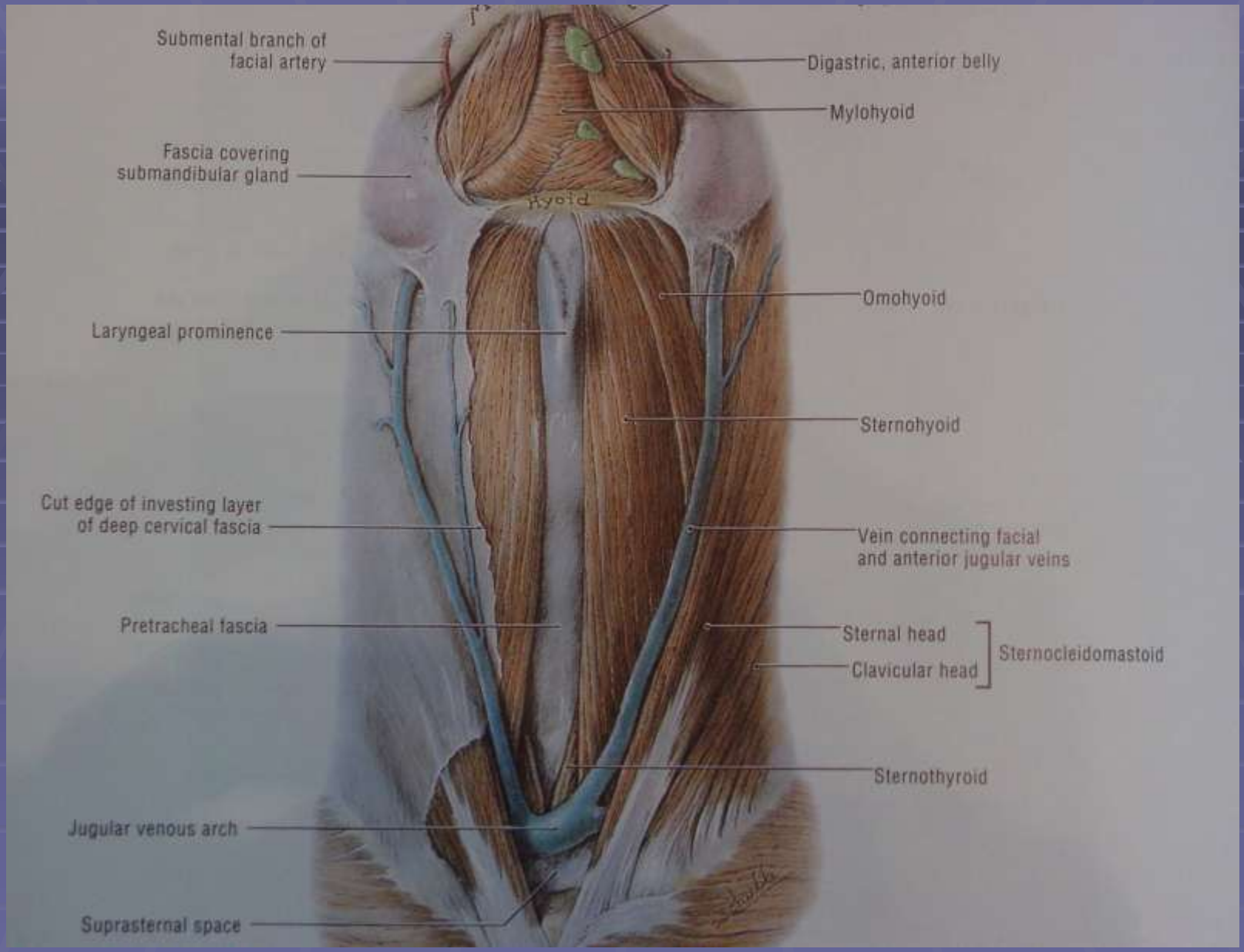
AHMED ALARFAJ

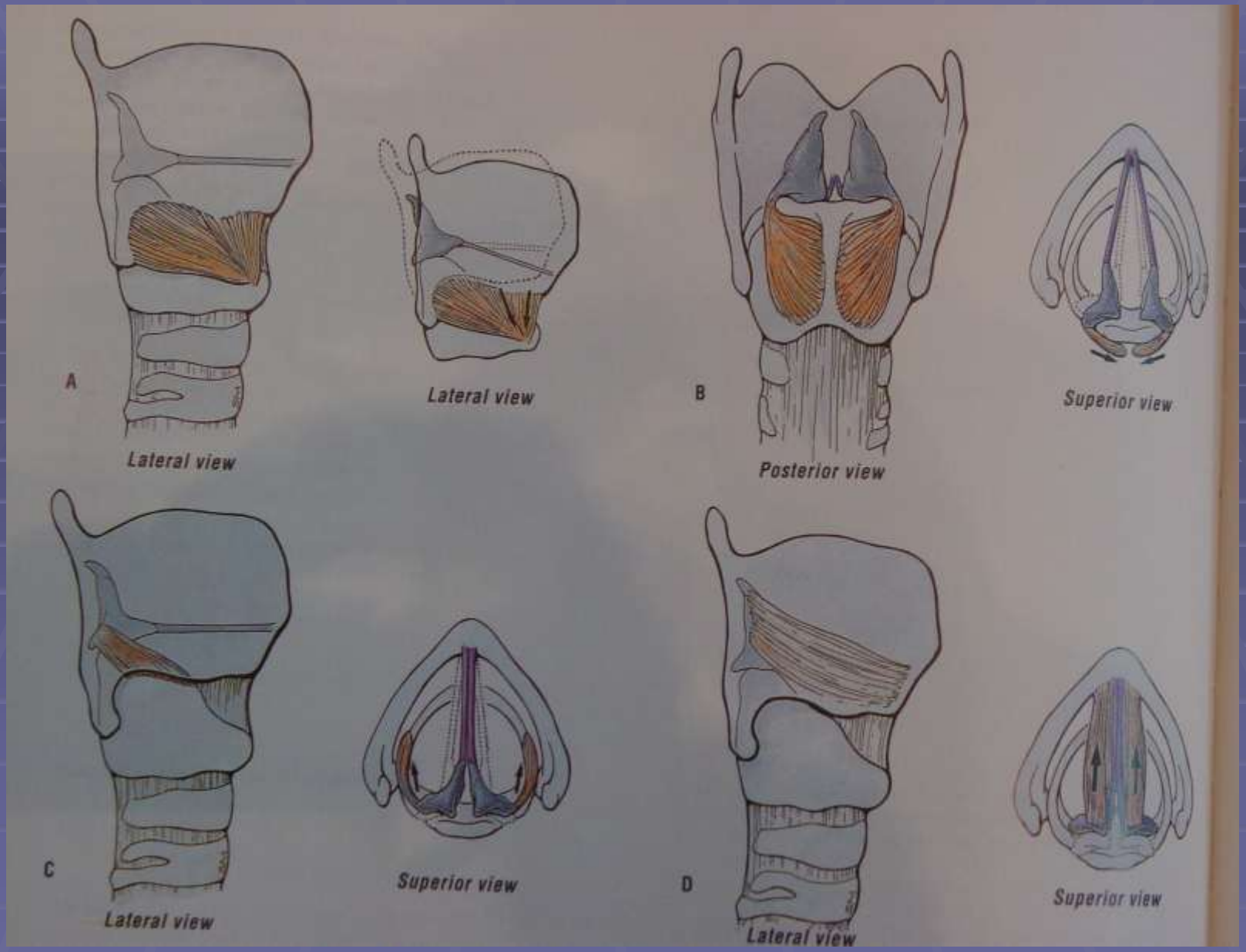
ANATOMY

Laryngeal Neuromuscular Anatomy

- Extrinsic Depressors:
- Extrinsic Elevators:
- Posterior Cricoarytenoid
- Lateral Cricoarytenoid:
- Thyroarytenoid:
- Cricothyroid:
- Interarytenoid


d
c
e
a
b

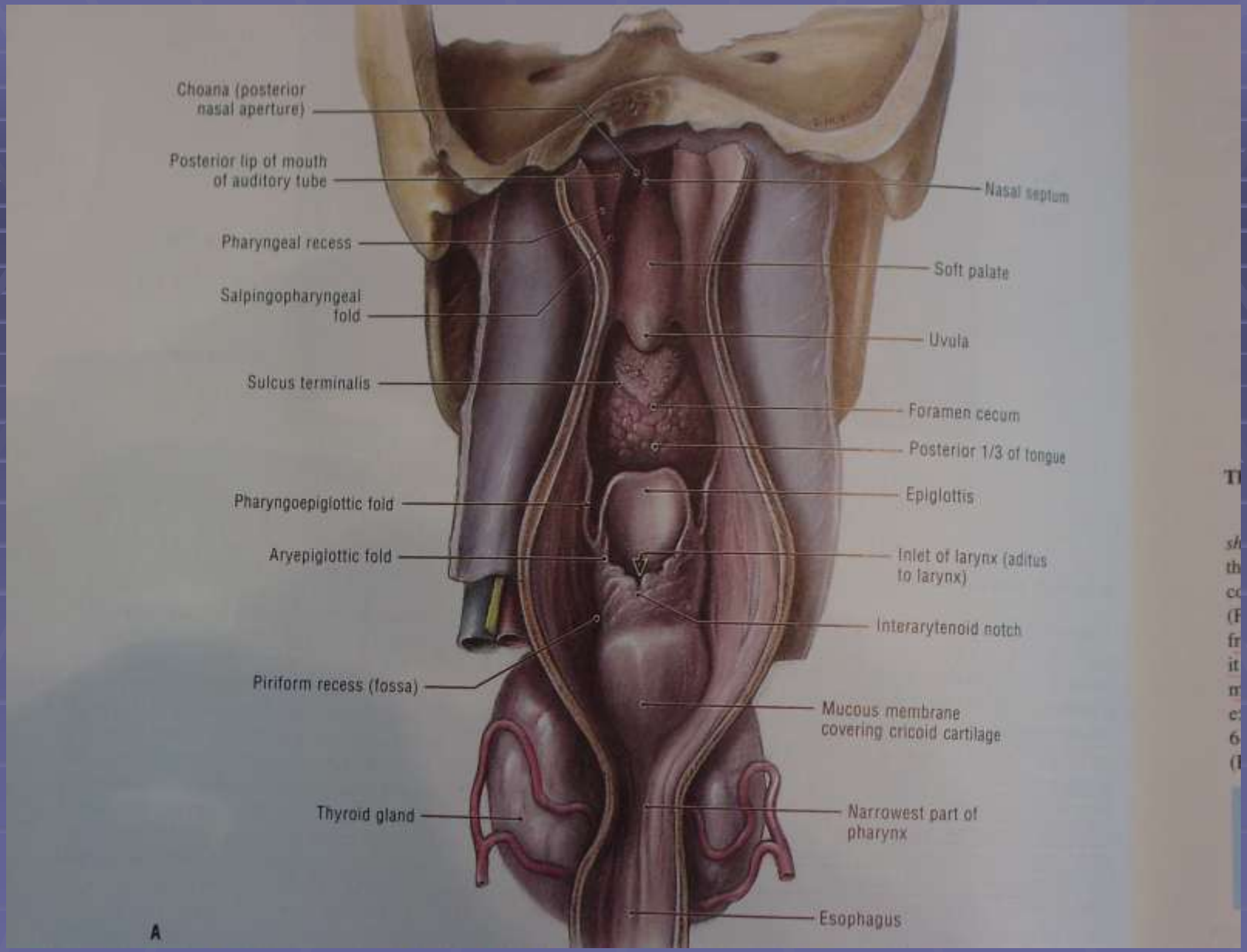

Submental branch of facial artery
Digastric, anterior belly
Mylohyoid
Fascia covering submandibular gland
Hyoid
Omohyoid
Laryngeal prominence
Sternohyoid
Cut edge of investing layer of deep cervical fascia
Vein connecting facial and anterior jugular veins
Pretracheal fascia
Sternal head
Clavicular head
Sternocleidomastoid
Sternothyroid
Jugular venous arch
Suprasternal space


A
Lateral view
Lateral view
B
Posterior view
Superior view
C
Lateral view
Superior view
D
Lateral view
Superior view

ANATOMY

Laryngeal Cartilage

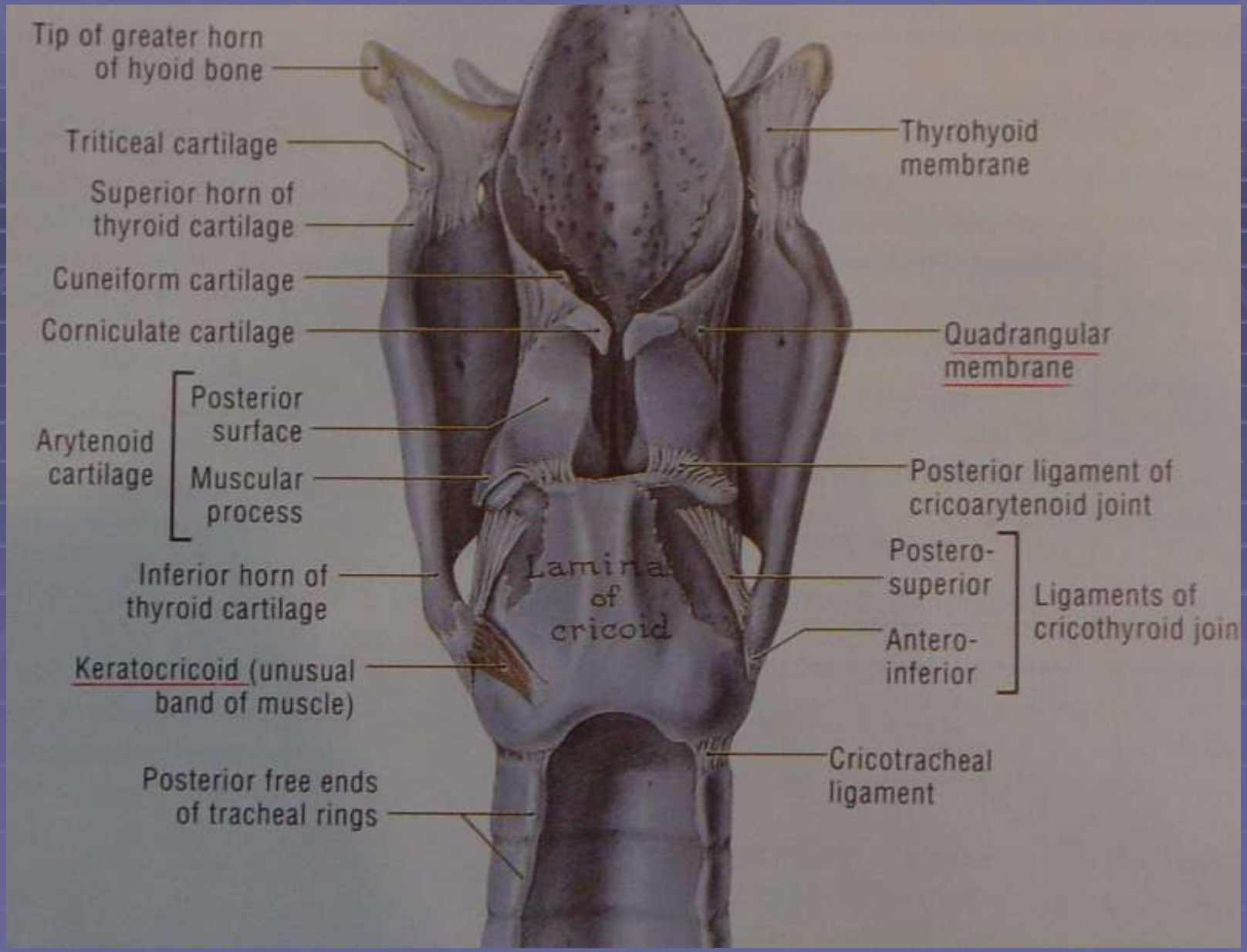
- Thyroid, Cricoid and Arytenoids
- Epiglottis
- Corniculate Cartilage
- Trieceous Cartilage


Choana (posterior nasal aperture)
Posterior lip of mouth of auditory tube
Pharyngeal recess
Salpingopharyngeal fold
Sulcus terminalis
Pharyngoepiglottic fold
Aryepiglottic fold
Piriform recess (fossa)
Thyroid gland
Nasal septum
Soft palate
Uvula
Foramen cecum
Posterior 1/3 of tongue
Epiglottis
Inlet of larynx (aditus to larynx)
Interarytenoid notch
Mucous membrane covering cricoid cartilage
Narrowest part of pharynx
Esophagus
A

ANATOMY

Laryngeal Joints

- Cricothyroid Joints
- Cricoarytenoid Joints


Tip of greater horn of hyoid bone
Triticeal cartilage
Superior horn of thyroid cartilage
Cuneiform cartilage
Corniculate cartilage
Arytenoid cartilage
Posterior surface
Muscular process
Inferior horn of thyroid cartilage
Keratocricoid (unusual band of muscle)
Posterior free ends of tracheal rings
Thyrohyoid membrane
Quadrangular membrane
Posterior ligament of cricoarytenoid joint
Postero-superior
Antero-inferior
Ligaments of cricothyroid join
Cricotracheal ligament
Lamina of cricoid

ANATOMY

Vocal Fold Layers (from superficial to deep)

1. Squamous Epithelium
2. Superficial Lamina Propria (SLP. Reinke's Space)
3. Intermediate Lamina Propria
4. Deep Lamina Propria
5. Thyroarytenoid Muscle Complex

ANATOMY
SPECIAL CONSIDERATION

Pediatric Airway Anatomy

- > 90% of neonates are obligate nasal breathers until 2 months

- 1mm of laryngeal edema in the neonate can be reduce airway by 60%

ANATOMY

Laryngeal Sensory Innervation

- Internal Branch of the SLN
- RLN

PHYSIOLOGY

Components of Speech

- Phonation
- Resonation
- Articulation
- Respiration

PHYSIOLOGY

Voice Parameters

- Pitch (Hz)
- Fundamental Frequency
- Loudness (decibels)
- Quality

EVALUATION OF THE DYSPHONIC PATIENT

History and Physical Exam

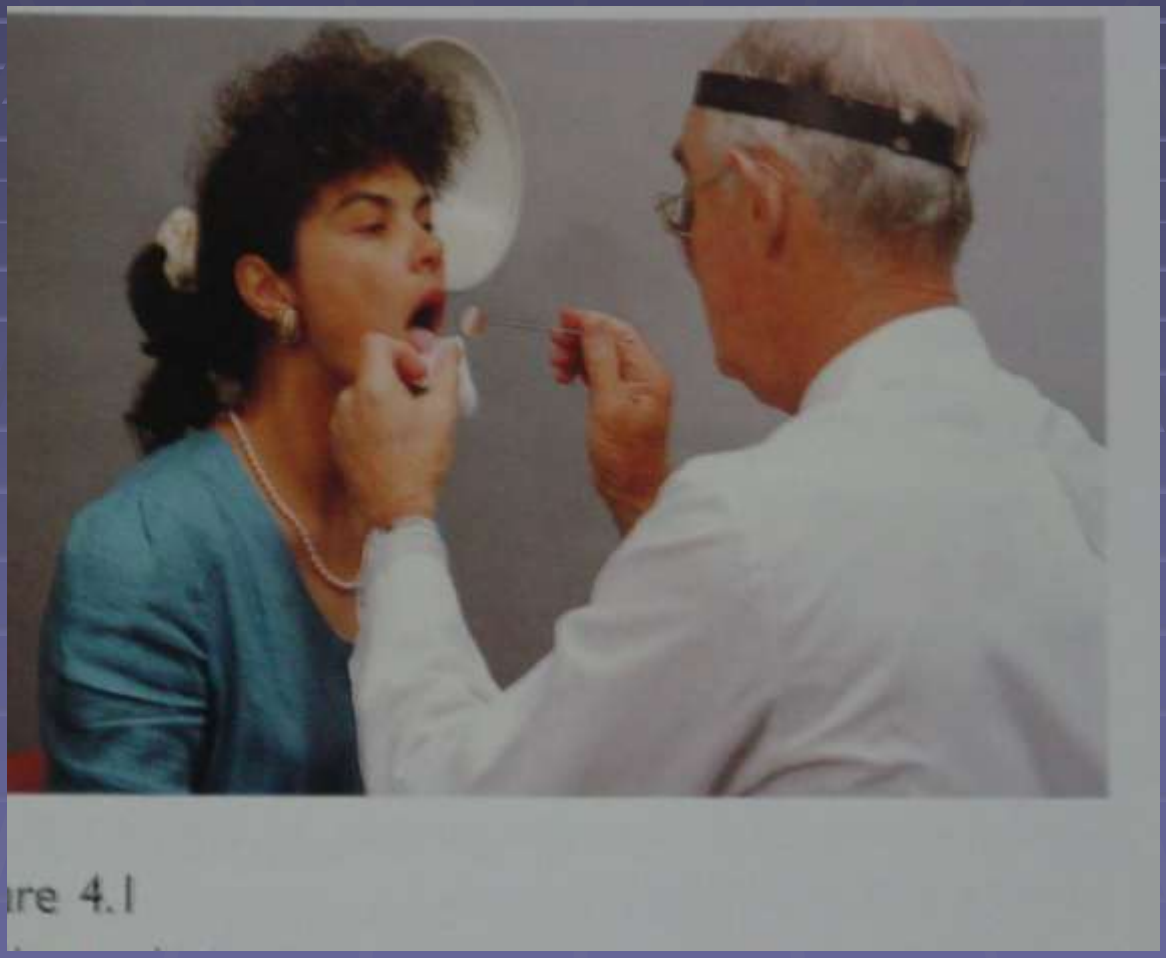
History

- Character of Dysphonia
- Associated Symptoms
- “KITTNES” for differential diagnosis

EVALUATION OF THE DYSPHONIC PATIENT

Physical Exam

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



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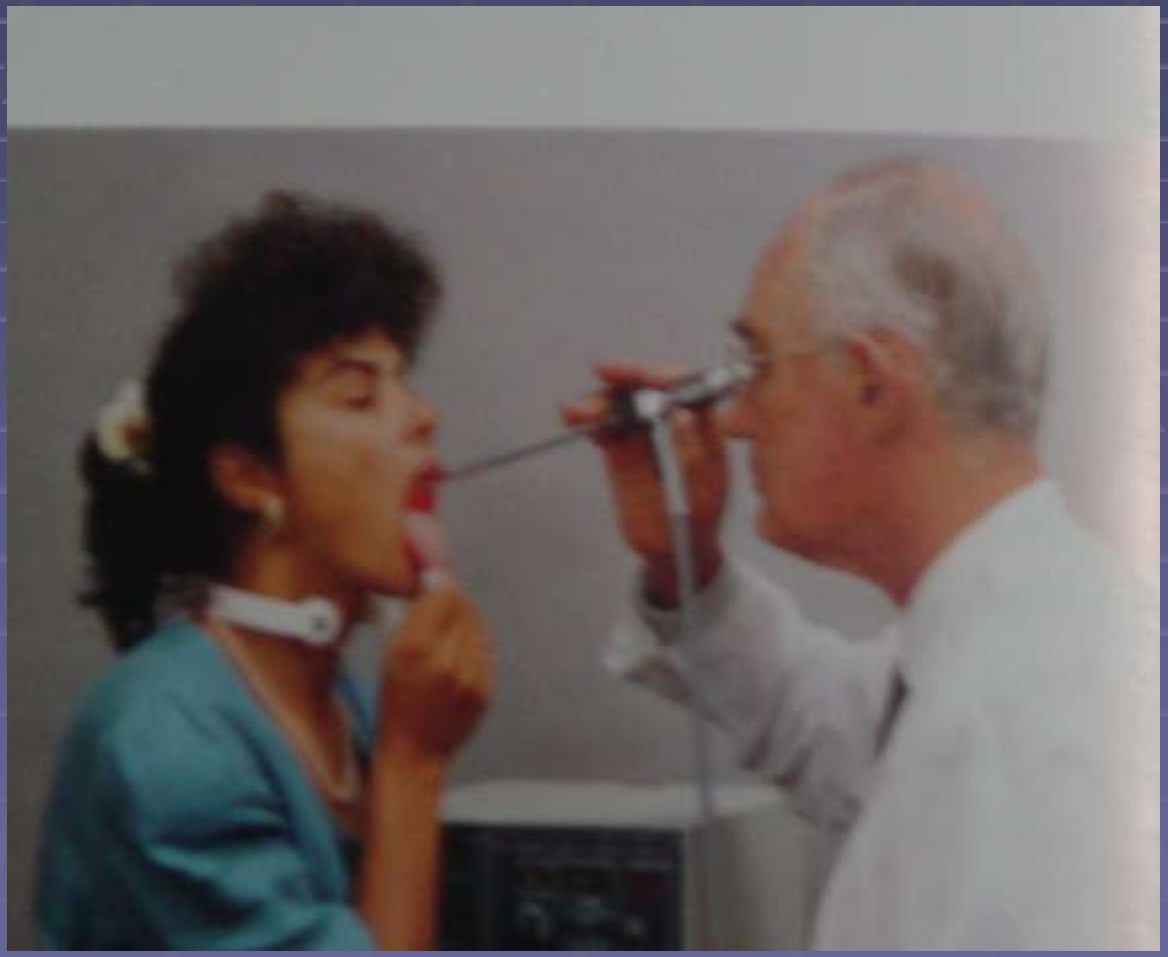
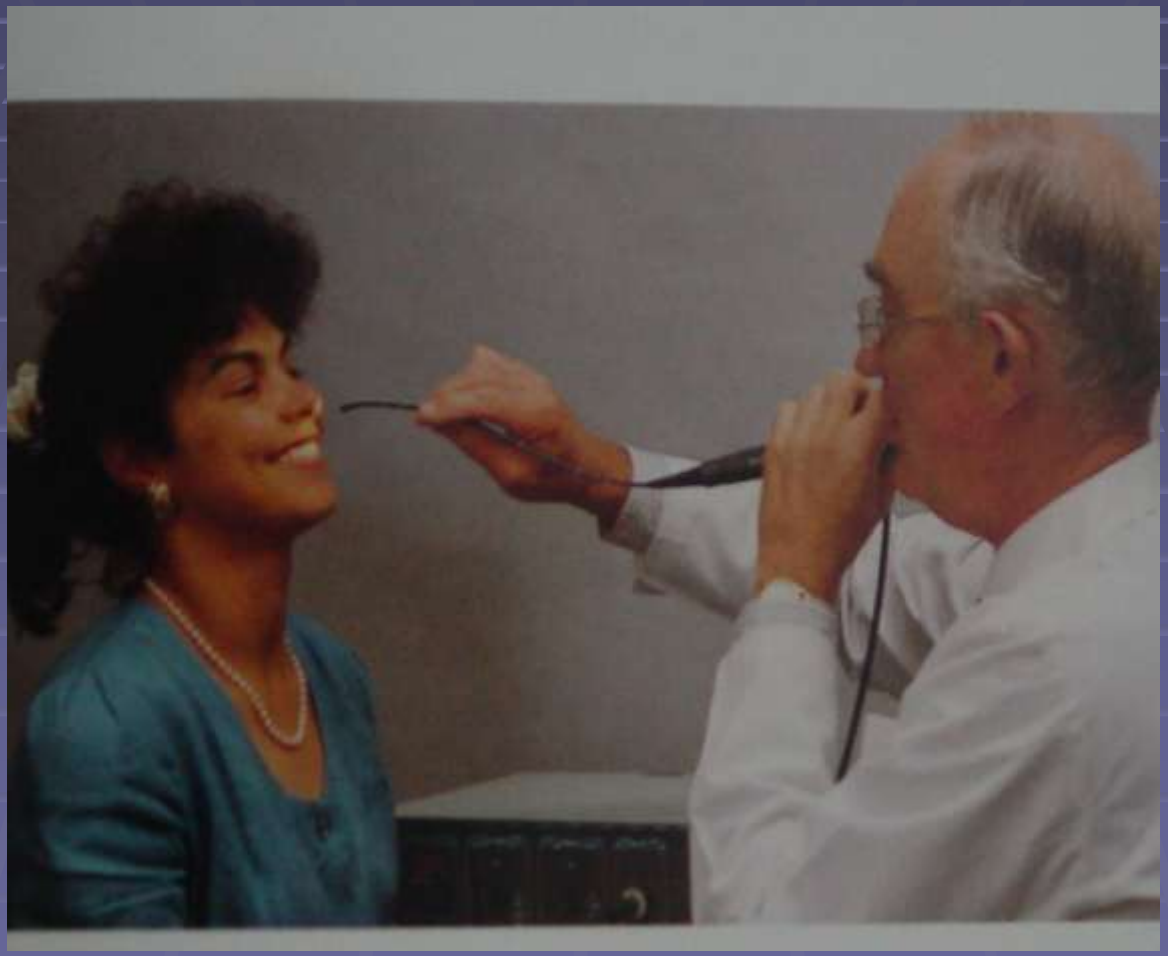




Differential Diagnosis of Dysphonia : KITTENS Method

Congenital	Infectious & Inflammatory	Trauma & Vascular	Tumor	Endocrine	Neurologic	Systemic
Congenital	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, cystic hygromas	Pubescence	stroke	Psychogenic
	muscle-tension disorders	arytenoid dislocation				Guillain Barre'
		vocal fold granulomas				Myasthenia gravis
		Caustic inhalation injuries				Other neurological disorders

ANCILLARY TESTS

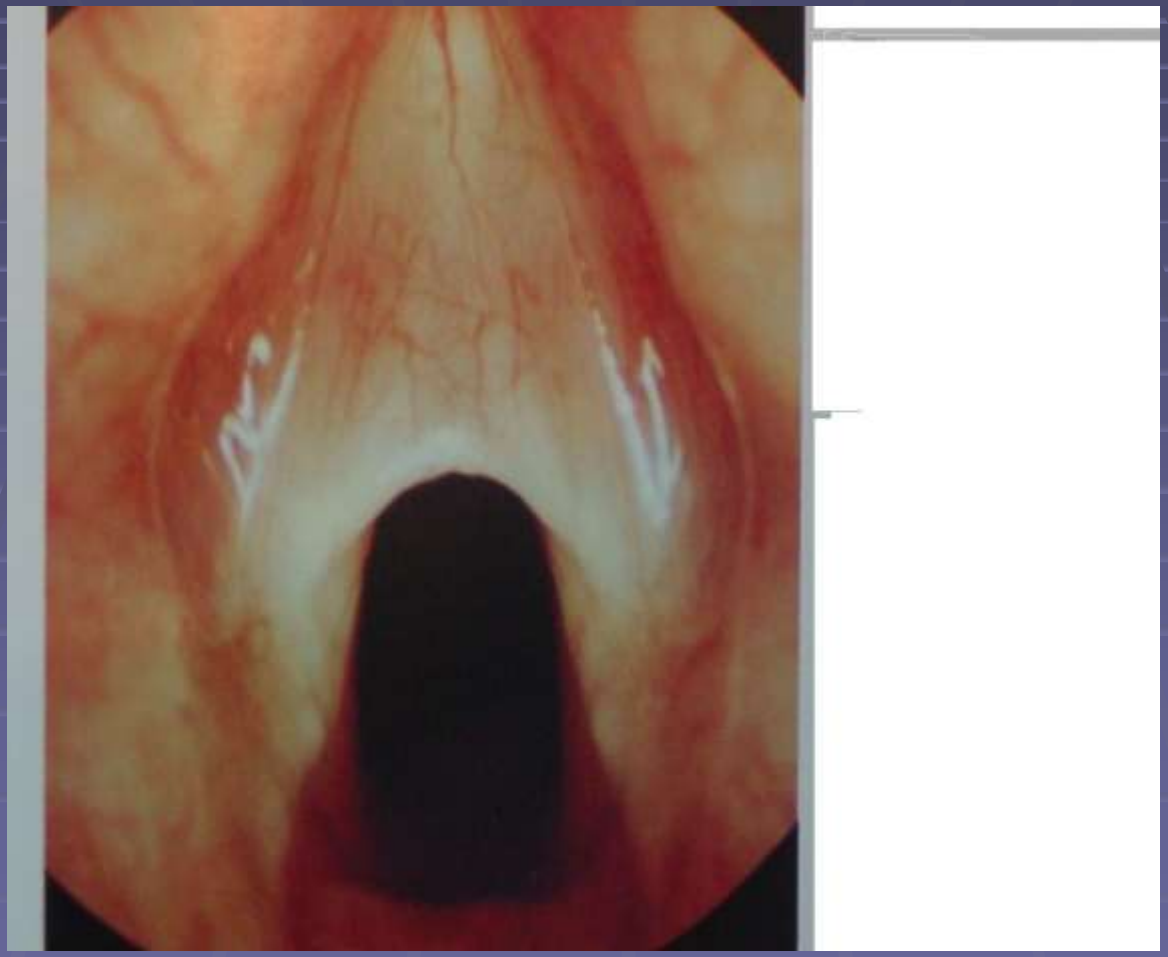
- Videostroboscopy:
- Laryngeal EMG:

BENIGN LARYNGEAL PATHOLOGY

Congenital Laryngeal Defects

Congenital Webs

- Most commonly anteriorly based
- Pathophysiology : incomplete recanalization
- Types: supraglottic (2%) glottic (75%), subglottic (7%)
- Symptom: aphonia, stridor
- Management:



CONGENITAL SUBGLOTTIC STENOSIS

- < 4 mm in newborn
- Pathophysiology: incomplete recanalization
- Types
    1. Membranous
    2. Cartilaginous
    3. Mixed
- Grades: I. <50% obstruction, II 50-70%, III-70-90% IV.> 90-Complete obstruction
- Symptom: stridor

CONGENITAL SUBGLOTTIC STENOSIS

Management

- Secure Airway
- Medical Management

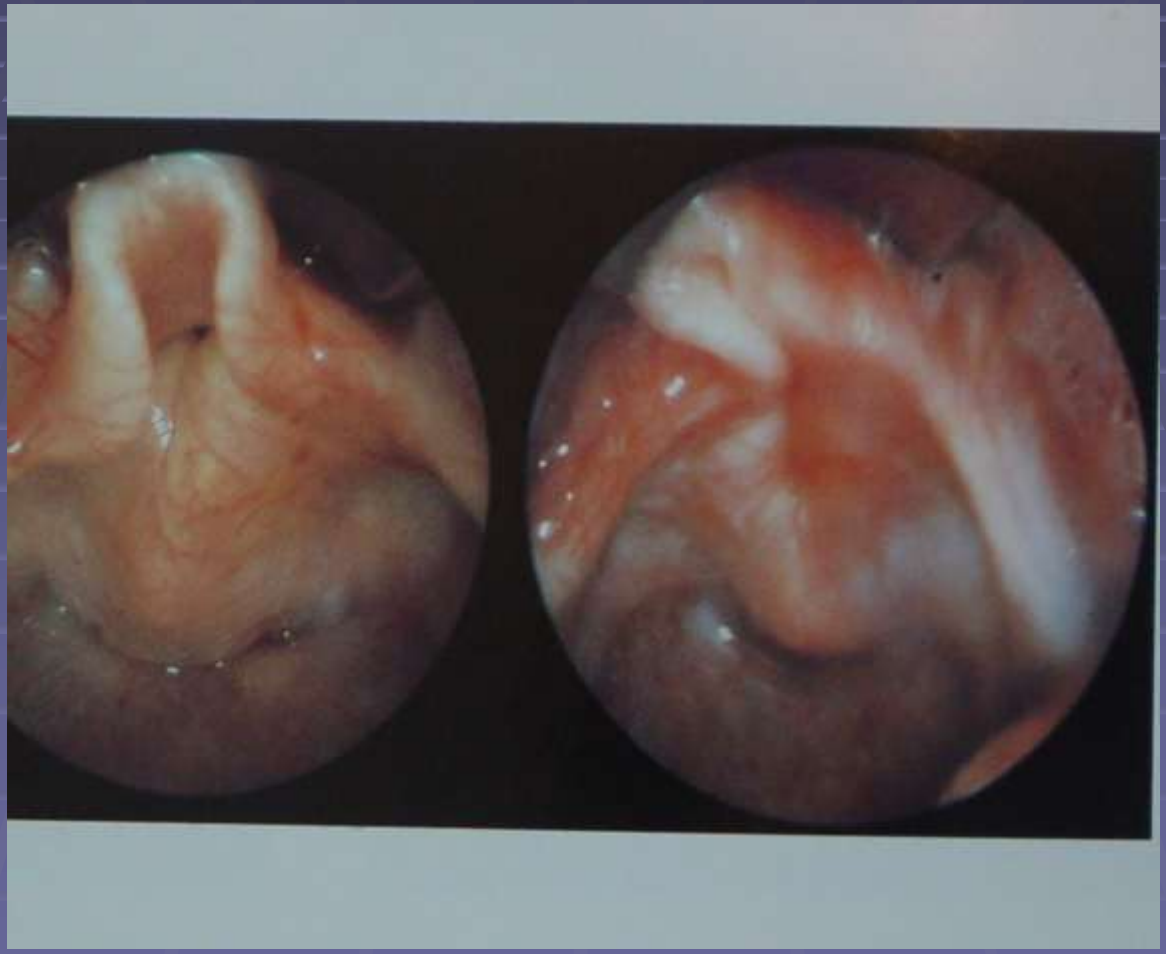
Grade I-II: Endoscopic management

Grade III-IV: Open Procedures:

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

LARYNGOMALACIA

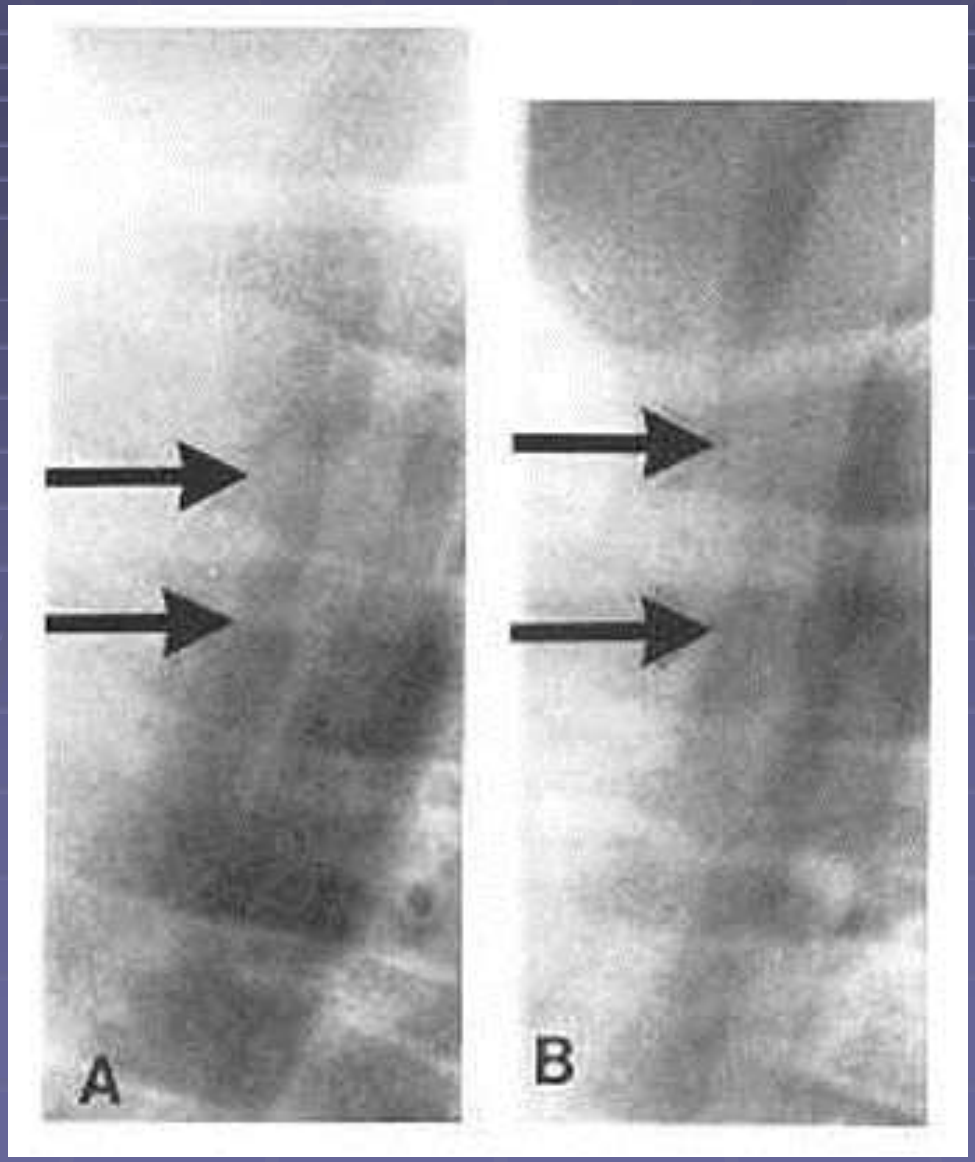
- Most common laryngeal anomally
- Most common cause of stridor in neonate and chronic pediatric stridor
- Pathophysiology : immature cartilage
- Symptom: inspiratory stridor
- Diagnosis:
- Management: observation , epiglottoplasty , correct GERD if present.



TRACHEOMALACIA

- Less common
- Pathophysiology
- Symptom: expiratory stridor
- Diagnosis:
- Management: observation.

TRACHEOMALACIA



LARYNGITIS

Acute Viral Laryngitis

- Pathogens: rhinovirus (most common)
- Symptom:
- Management : conservative

ADULT SUPRAGLOTTITIS

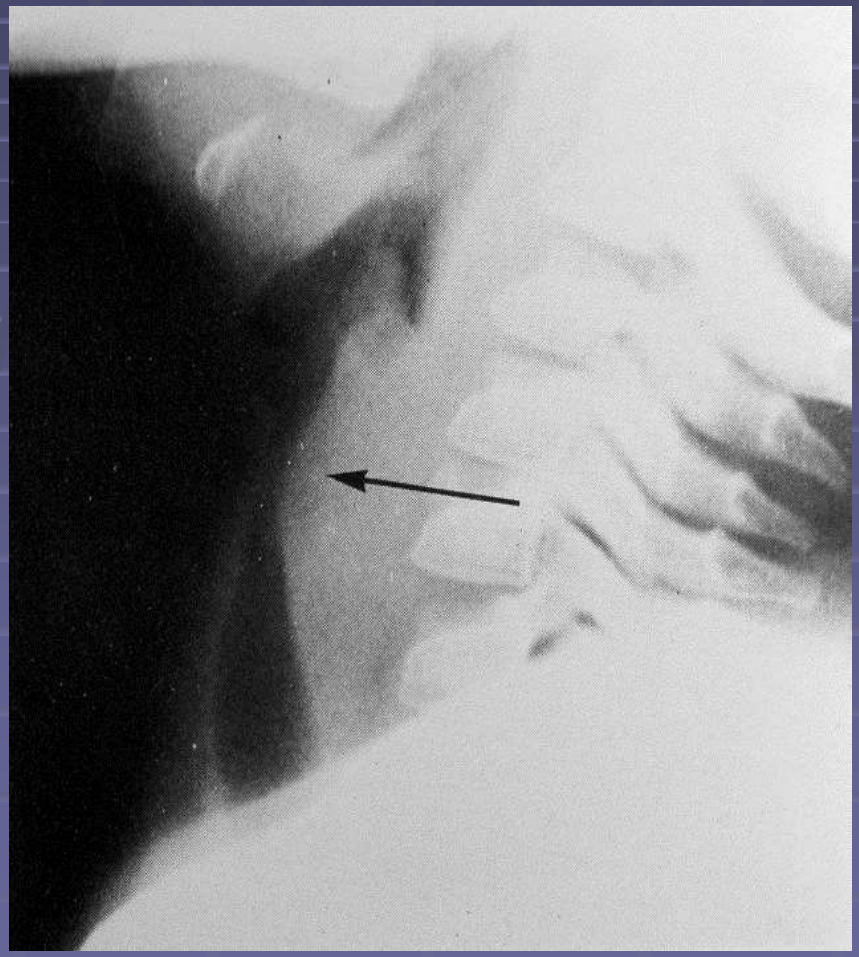
- Common Pathogens: H. influenza (most common) S. pneumoniae. S.aureus, β hemolytic Streptococcus
- Symptom:
- Management:
    1. Evaluate airway
    2. Humidification
    3. Parenteral antibiotics

REFLUX-INDUCED LARYNGITIS

- Pathophysiology
- Clinical feature
- Laryngeal Findings
- Management

CROUP (Acute Laryngotracheobronchitis, LTB)

- Most common cause of stridor in children
- Subglottic region
- Pathogen: parainfluenza 1 (most common cause)
- Risks: 1-5 years old during fall and winter seasons
- Sign&symptom:
- Diagnosis: plain neck films (“Steeple”)



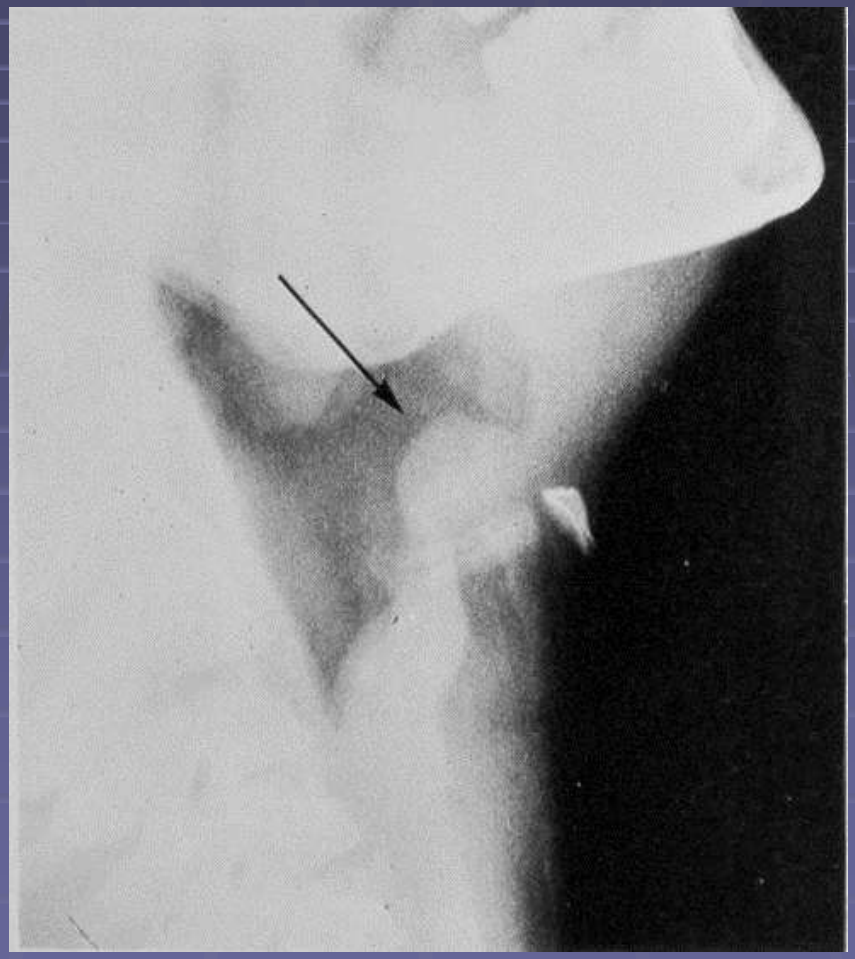
CROUP (Acute Laryngotracheobronchitis, LTB)

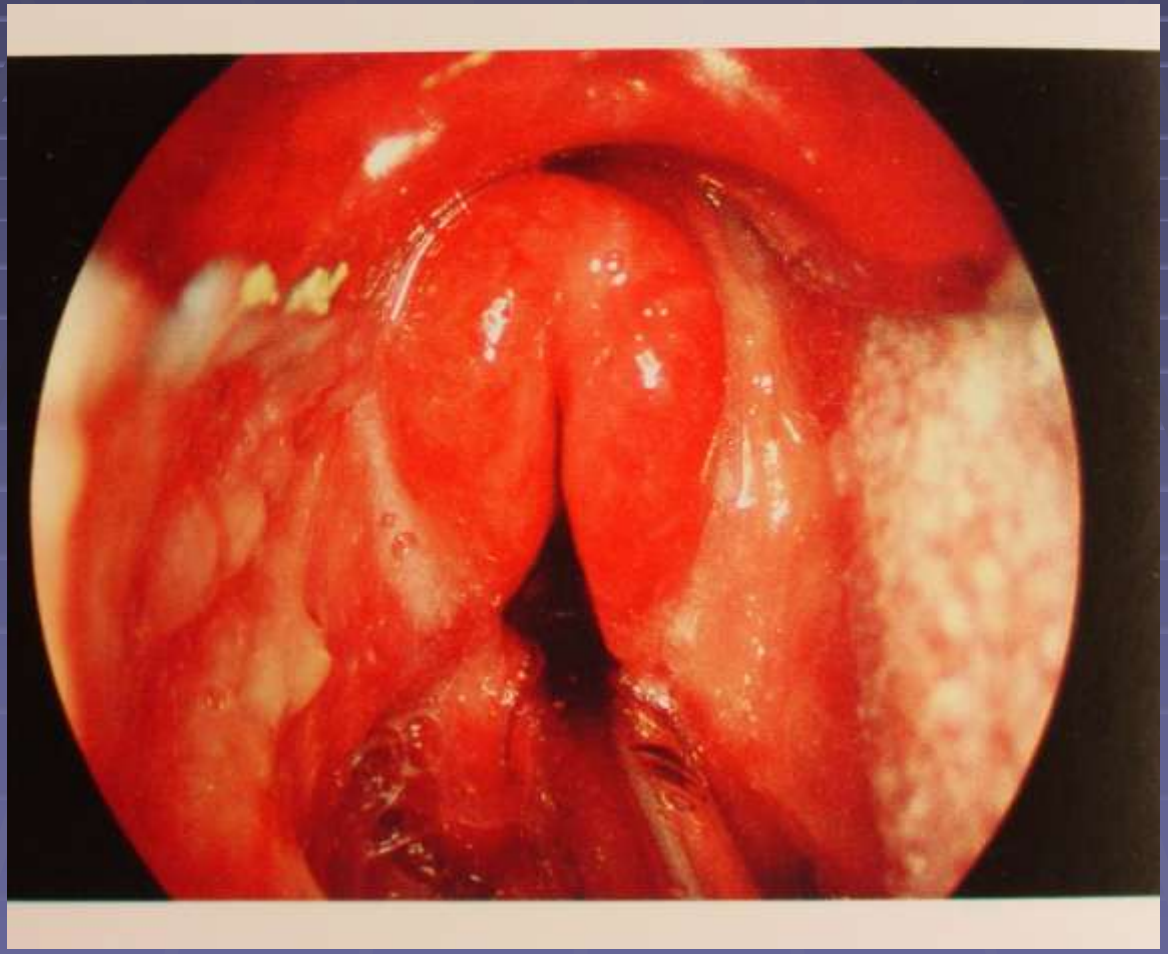
Management

- Assess Airway
- Medical Management
- Endoscopy

EPIGLOTTITIS

- Pathogen
- Risks
- Clinical feature
- Diagnosis: plain neck films ("thumbprint sign')
- Complications





EPIGLOTTITIS

Management

- Establish Emergent Airway
- Endoscopy
- Postoperative Care parenteral antibiotics and corticosteroids

Contrasting Acute Laryngotracheobronchitis (Croup) and Epiglottitis

	Acute Laryngotracheobronchitis	Acute Epiglottitis
Pathogen	Parainfluenza virus 1	Haemophilis influenze B
Age	<5 years old	2-6 years old
Location	subglottic	supraglottic
Onset	gradual (days)	sudden onset (hours)
Cough	barky	normal
Posture	supine	upright
Drooling	no	yes
Fever	low grade	high fevers
Radiographs	steeple sign	thumb printing
Treatment	supportive	airway management

EXAMPLES OF SPECIFIC CHRONIC LARYNGITIS

- TB Laryngitis
- Syphilitic Laryngitis
- Scleroma of the Larynx/ Rhinoscleroma
- Leprosy (Hansen's Disease)
- Perichondritis of the Larynx/Polychondritis
- Fungal Laryngitis

COMMON BENIGN LARYNGEAL NEOPLASMS

Recurrent Respiratory Papillomatosis

- Pathophysiology
- Lesion: wart-like, irregular exophytic
- Types:
    1. Juvenile
    2. Senile
- Clinical feature
- Complications

COMMON BENIGN LARYNGEAL NEOPLASMS

Recurrent Respiratory Papillomatosis

Management

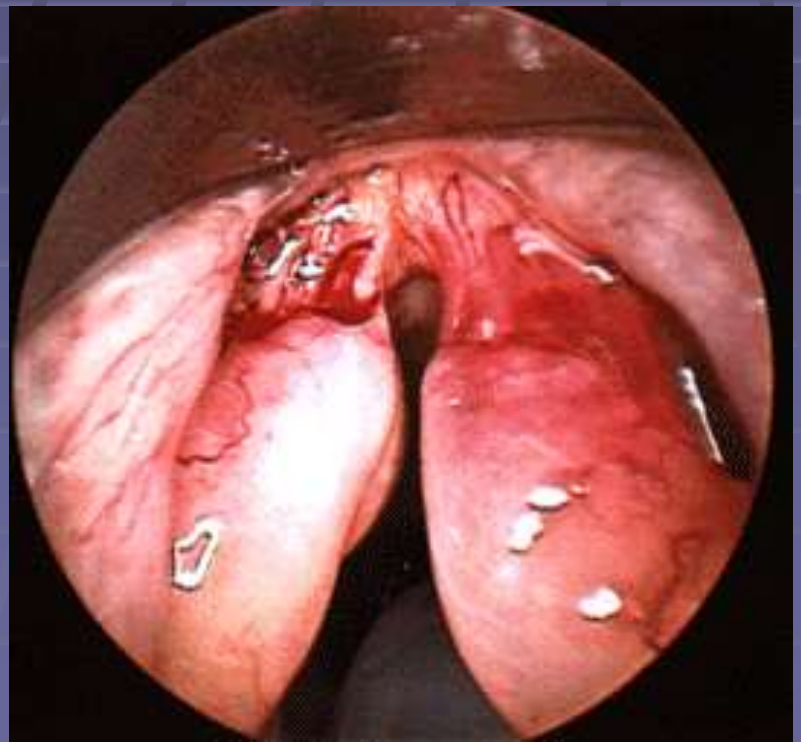
- Microlaryngoscopy with Laser Excision:
- Avoid tracheotomy
- Adjunctive Therapy: αINF

SYSTEMIC DISEASES AFFECTING THE LARYNX

- Sarcoidosis
- Wegener's Granulomatosis
- Amyloidosis
- Arthritis of Cricoarytenoid Joint

OTHER COMMON LARYNGEAL LESION

- Acquired Stenosis - Subglottic
- Edema - Reink's edema
- Cysts -laryngeal cyst
- laryngocele



Hemangioma

- Most common head and neck neoplasm in children
- Typically presents by 6 months old then involutes by 2 years of age
- Most common laryngeal site subglottis
- 50% of subglottic hemangiomas associated with cutaneous involvement
- **Pathophysiology**: abnormal blood vessel growth
- **Types**: .

  Compact or Capillary (more common in infantile type, typically resolves), *cavernous* (may enlarge rapidly, less chance of regression)
- **Symptom**: polypoid or sessile lesions, biphasic stridor, worse with crying (hemangiomas become engorged with blood), dysphonia, dysphagia, seldom causes bleeding in the larynx
- **Diagnosis**: endoscopy (avoid biopsy)

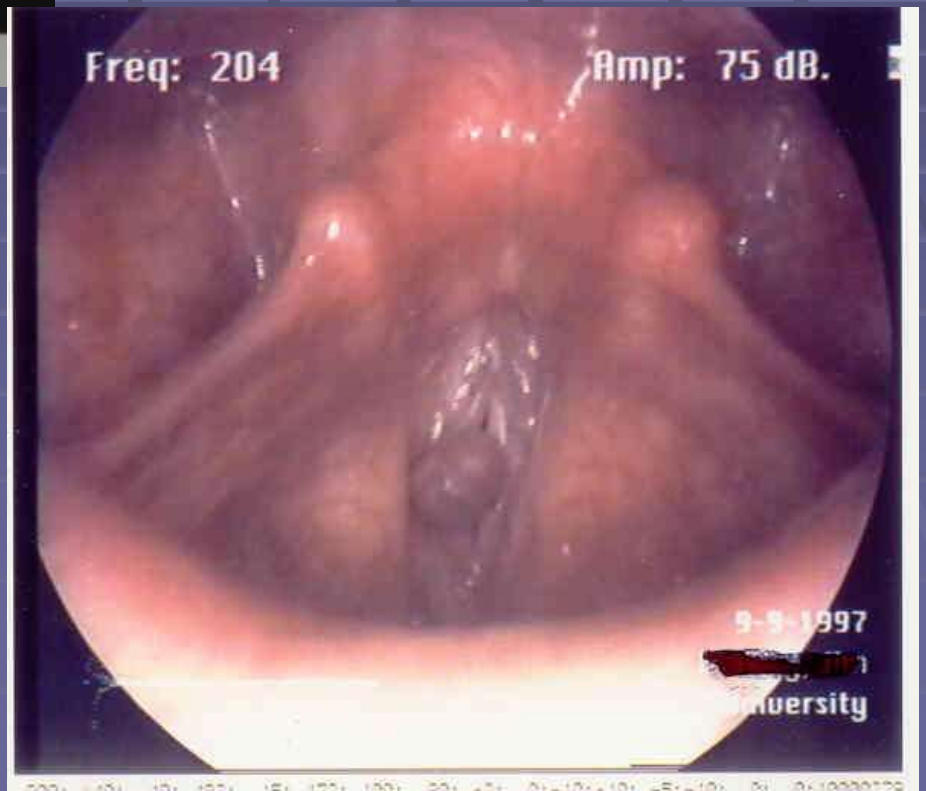
Hemangioma

Management

- May observe if asymptomatic and non progressive
- Embolization
- Corticosteroids or interferon.
- Endoscopic CO2 or argon laser excision (YAG lasers).
- Radiation therapy may be considered although increases risk of malignant degeneration.

OTHER COMMON LARYNGEAL LESION

- Granuloma - Intubation granuloma
- Nodule -Singer's
- Polyps -Mucoid
  -Angiomatoma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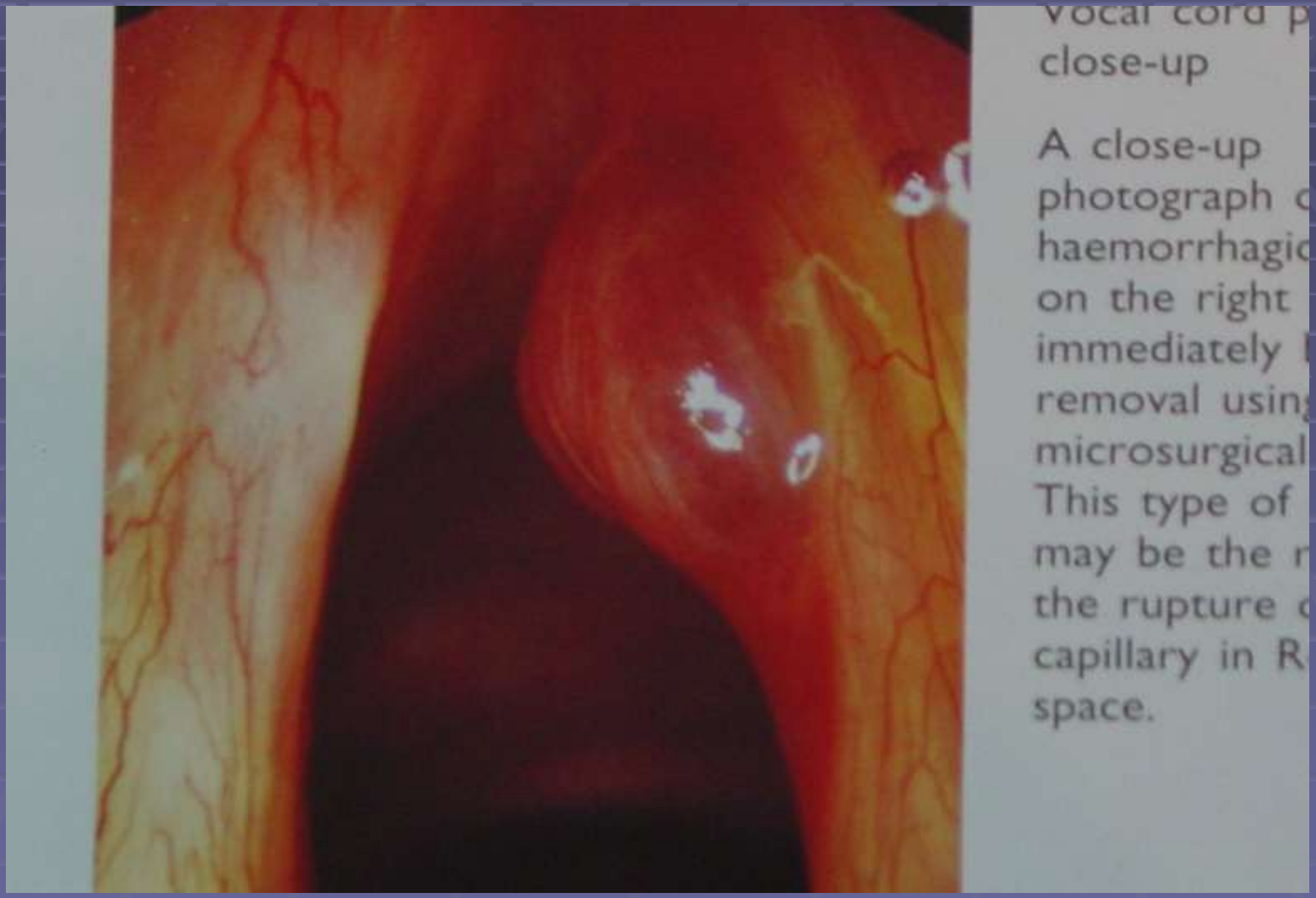

Vocal cord p
close-up

A close-up
photograph
haemorrhagi
on the right
immediately
removal usin
microsurgical
This type of
may be the
the rupture
capillary in R
space.

NEUROGENIC VOCAL PATHOLOGIES

VOCAL FOLD PARALYSIS
Evaluation of Vocal Fold Paralysis

- History and Physical
- Vocal Fold Positioning

VOCAL FOLD PARALYSIS

Evaluation of Vocal Fold Paralysis

Causes of Vocal Fold Paralysis in Adults

- Neoplastic
- Iatrogenic Injury
- Idiopathic
- Trauma
- Neurological
- Infectious
- Systemic Diseases
- Toxins

VOCAL FOLD PARALYSIS
Evaluation of Vocal Fold Paralysis

Causes of Vocal Fold Paralysis in Pediatrics

- Idiopathic
- BirthTrauma
- Iatrogenic Injury
- Infection
- Vascular Abnormalities

VOCAL FOLD PARALYSIS
Evaluation of Vocal Fold Paralysis

Unilateral Vocal Paralysis Management

- Must determine if self limiting or permanent paralysis
- May not require surgical management
- Goal of unilateral surgical procedures is to medialize vocal fold

VOCAL FOLD PARALYSIS
Evaluation of Vocal Fold Paralysis

Surgical Management of Unilateral Vocal Fold Paralysis

- Vocal Fold Injections
- Thyroplasty

VOCAL FOLD PARALYSIS
Evaluation of Vocal Fold Paralysis

Bilateral Vocal Fold Paralysis Management

- Goal is lateralize vocal fold
- Tracheotomy: gold standard treatment
- Cordotomy (Laser)
- Arytenoidectomy

THANKS