

FAKULTNÍ
NEMOCNICE
U SV. ANNY
V BRNĚ

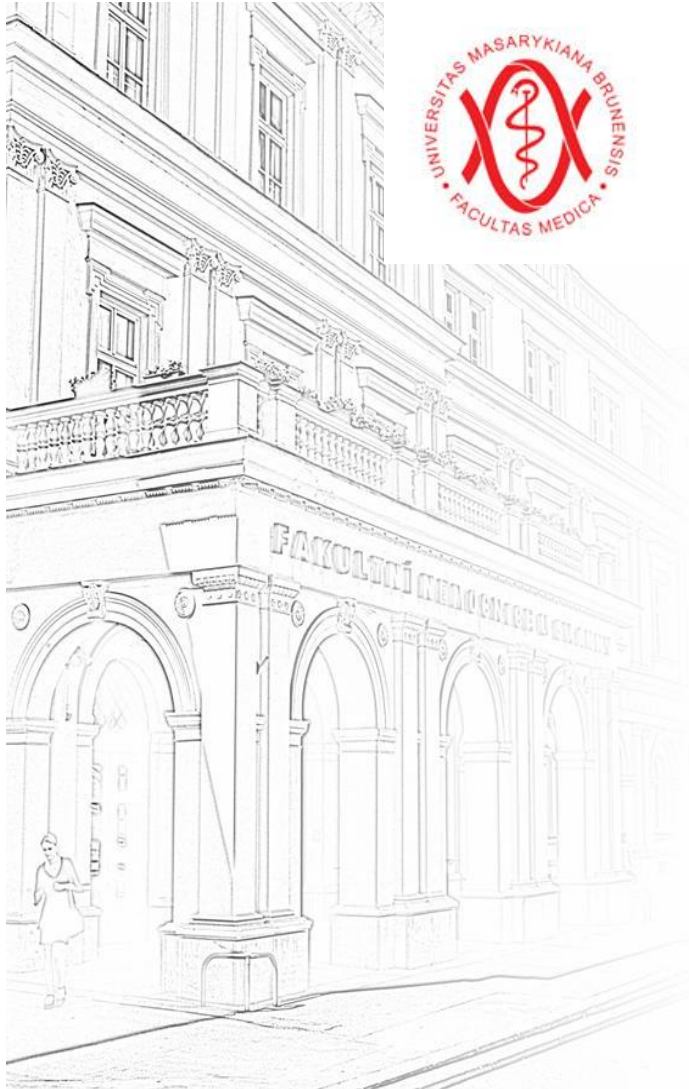


LARYNX and HYPOPHARYNX

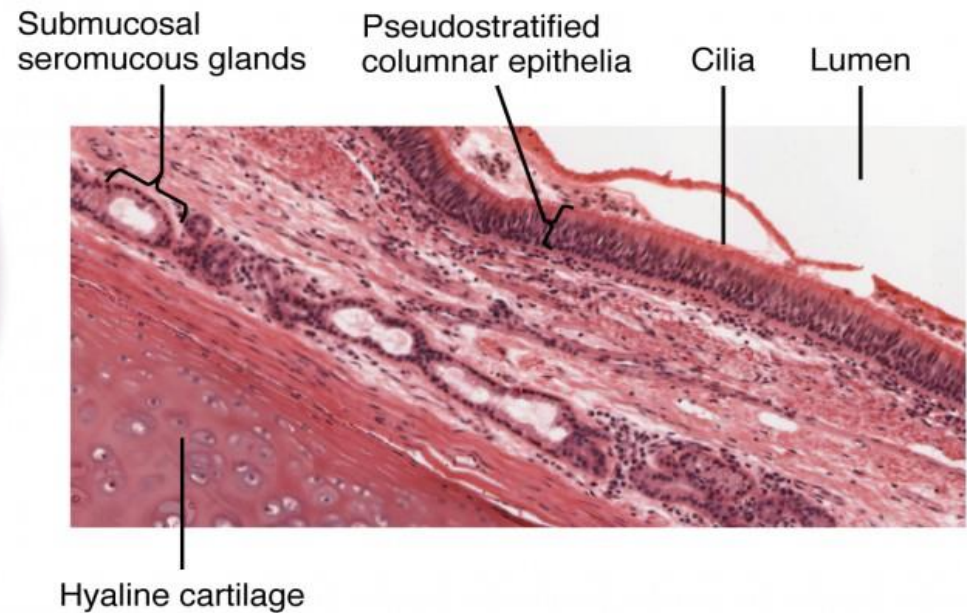
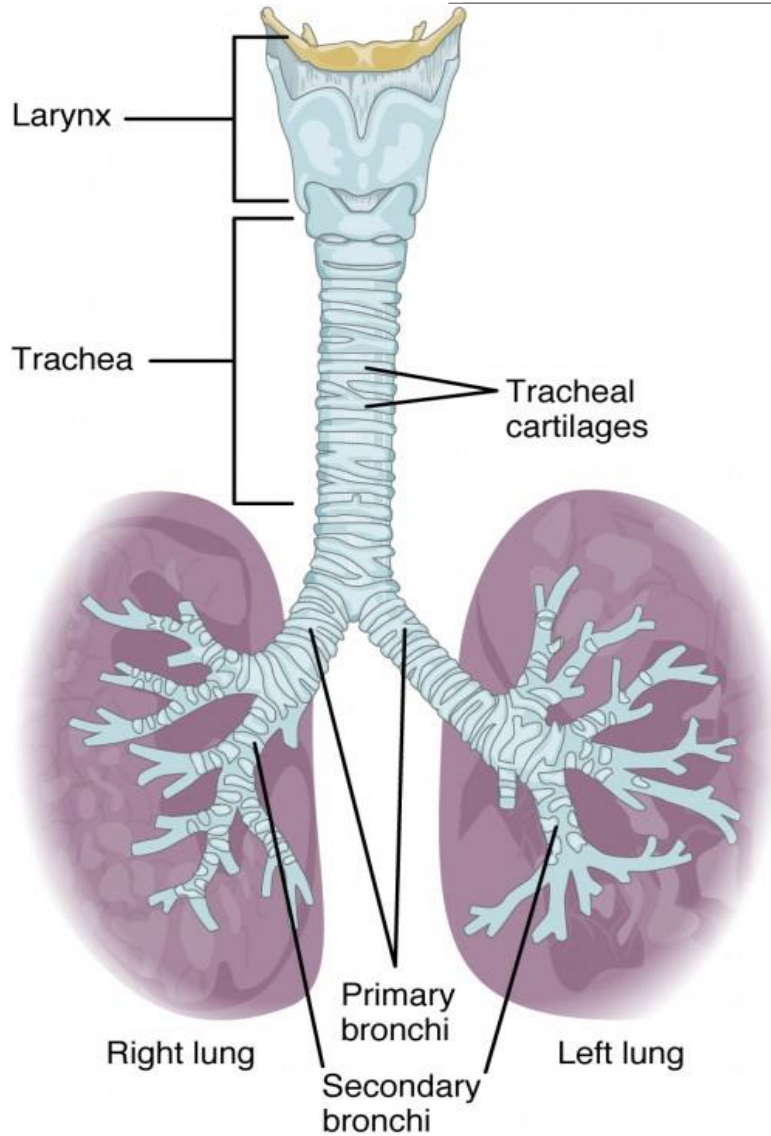
**ENT Clinic of Masaryk university, Brno
Faculty St. Ann Hospital**

Head: Ass.prof. Gál Břetislav, MD, Ph.D.

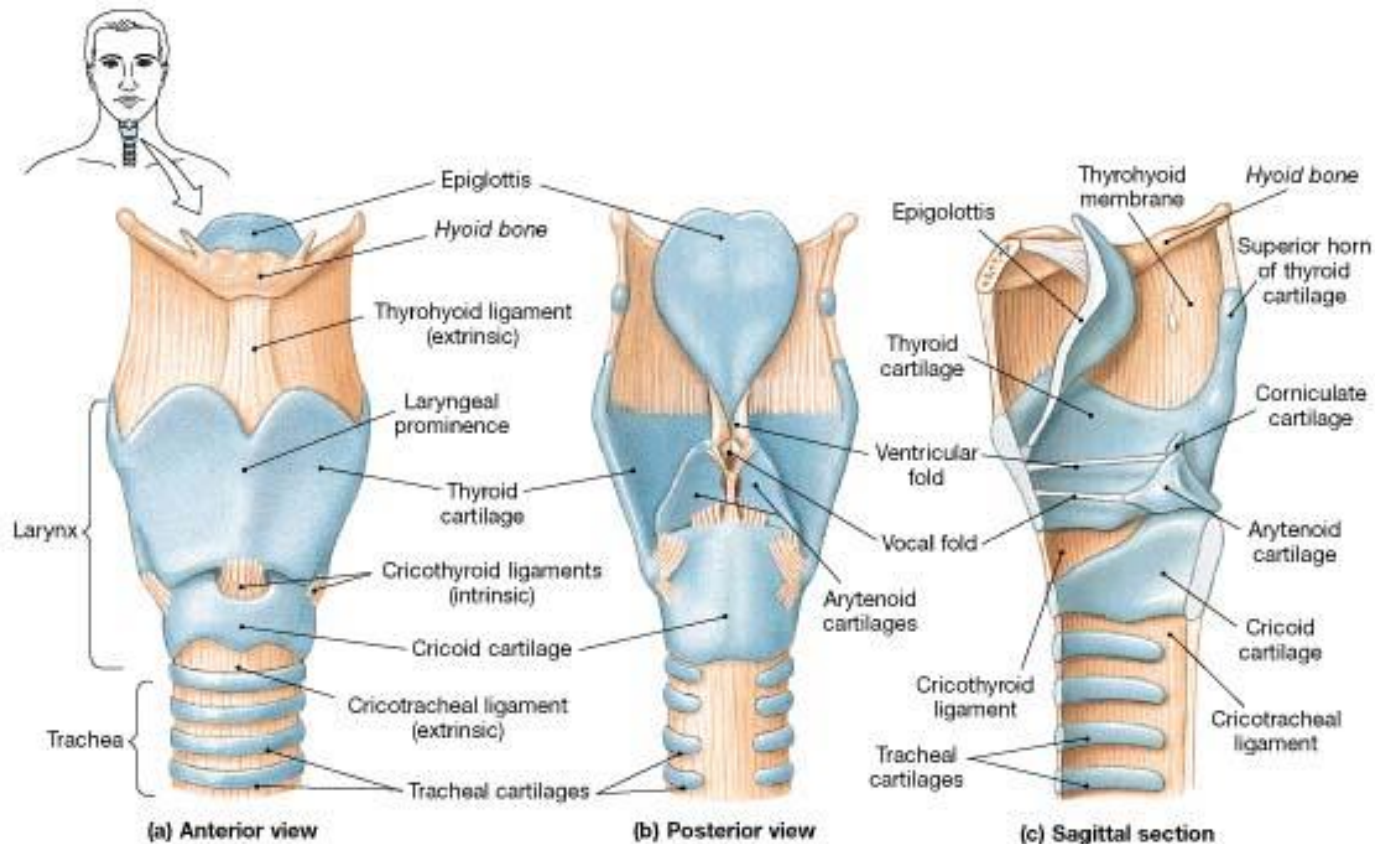
Pekařská 53, Brno , 656 91



Air passages



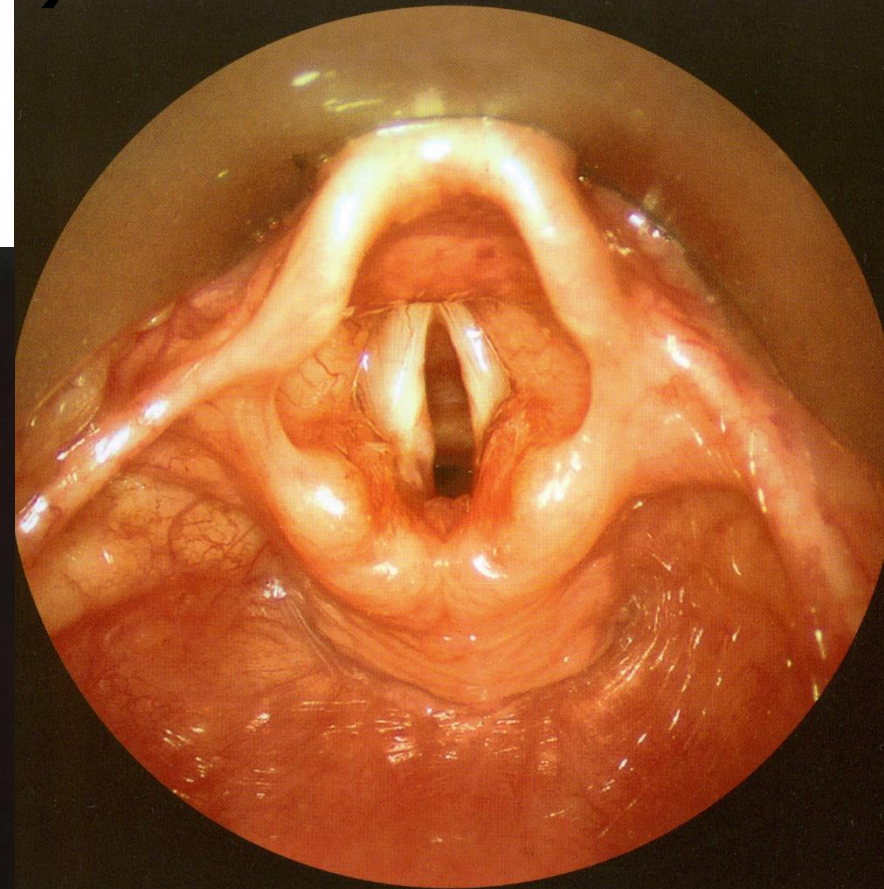
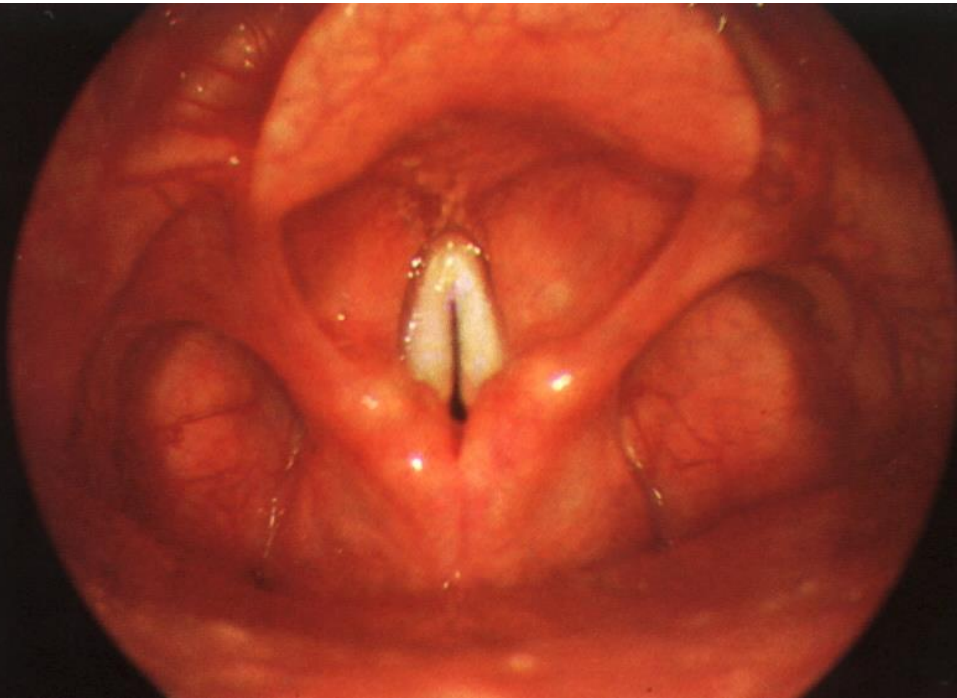
ANATOMY of the larynx



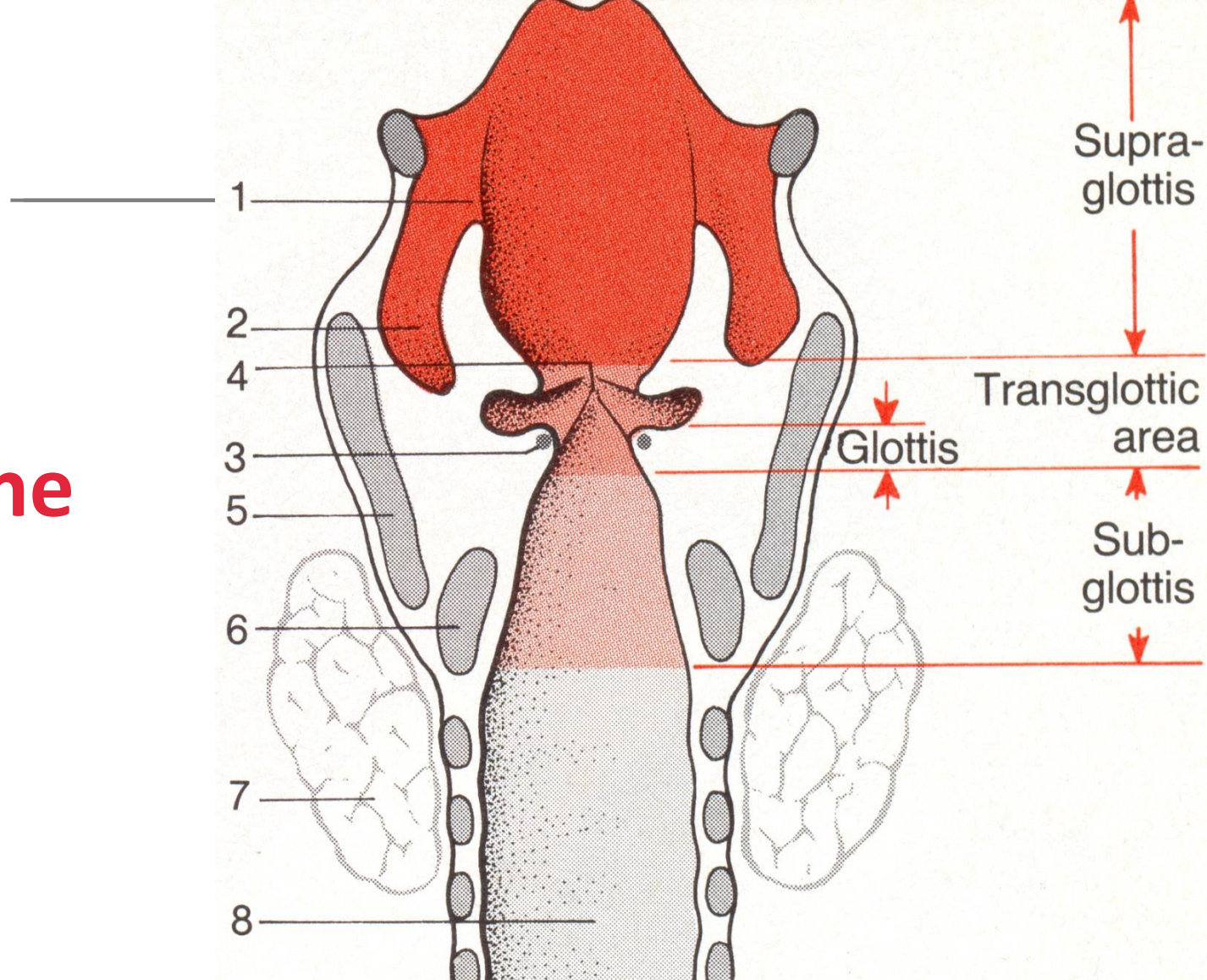
• **FIGURE 23-4 Anatomy of the Larynx.** (a) Anterior view of the intact larynx. (b) Posterior view of the intact larynx. (c) Sagittal section through the larynx.

LARYNX - function

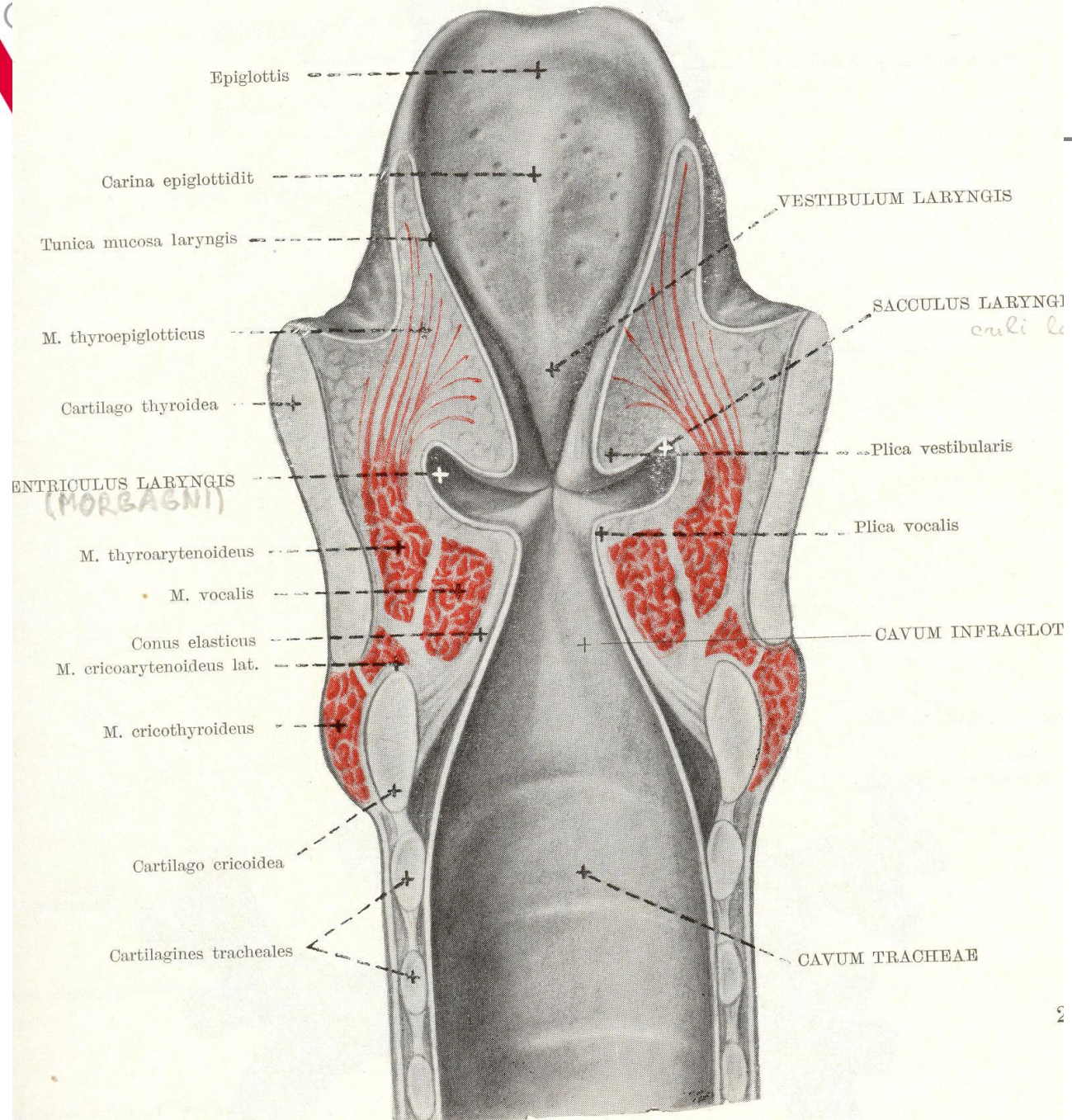
Function: vital (respiration), **social** (phonation), **protective of lower airways** (reflexes: closure of aditus, glottis, cough reflex etc.)



Frontal section through the larynx



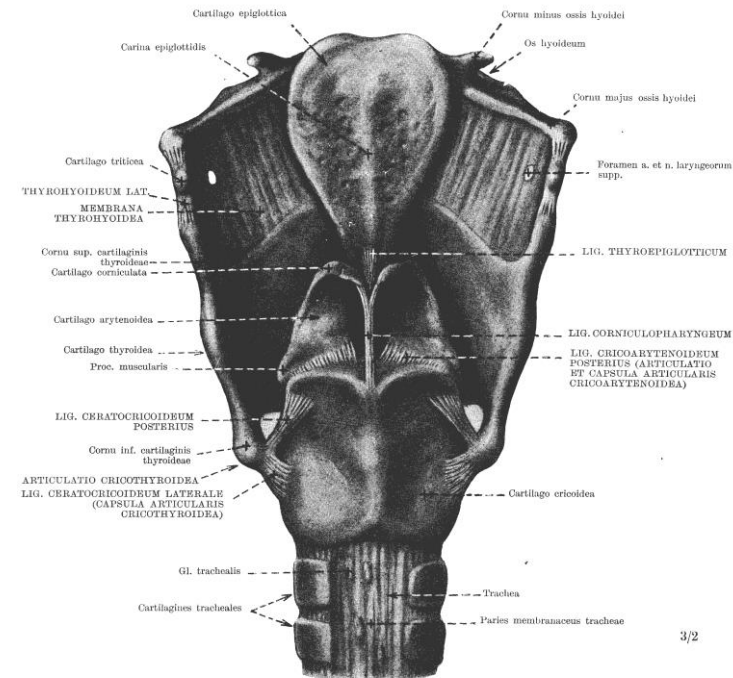
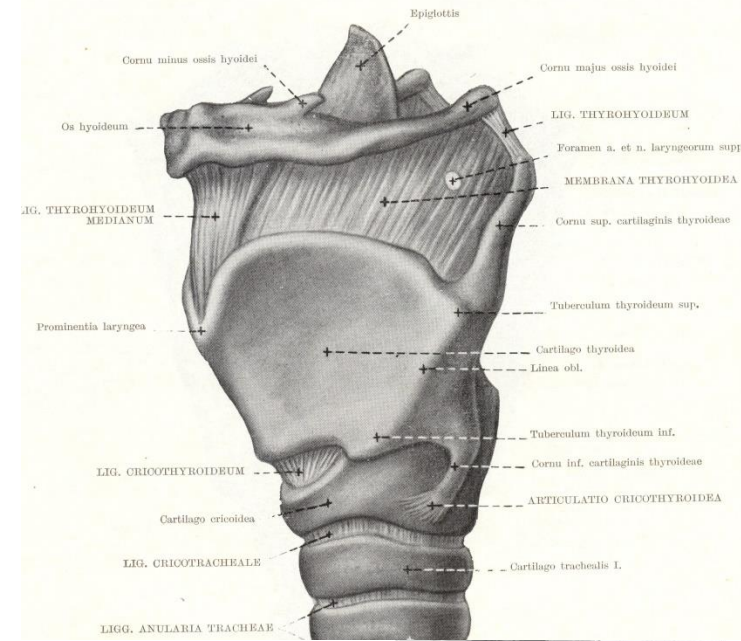
1. Aryepiglottic fold, 2. recessus piriformis, 3. vocal cord, 4. anterior commissure, 5. thyroid cartilage, 6. cricoid cartilage, 7. thyroid gland, 8. trachea. (Taken from Becker, Neumann, Pfaltz. Ear, Nose and Throat Diseases 1989)



Larynx

3 non-pair cartilages
(thyroid, cricoid and epiglottis)

3 pair cartilages –
arytenoidea,
corniculatae
(Santorini),
cuneiformes
(Wrisbergi)





Laryngeal muscles

Muscle moving larynx:

infrahyoid (sternohyoideus, -thyreoideus, thyreoihyoideus, omohyoideus), suprahyoid

Ones' own laryngeal muscles:

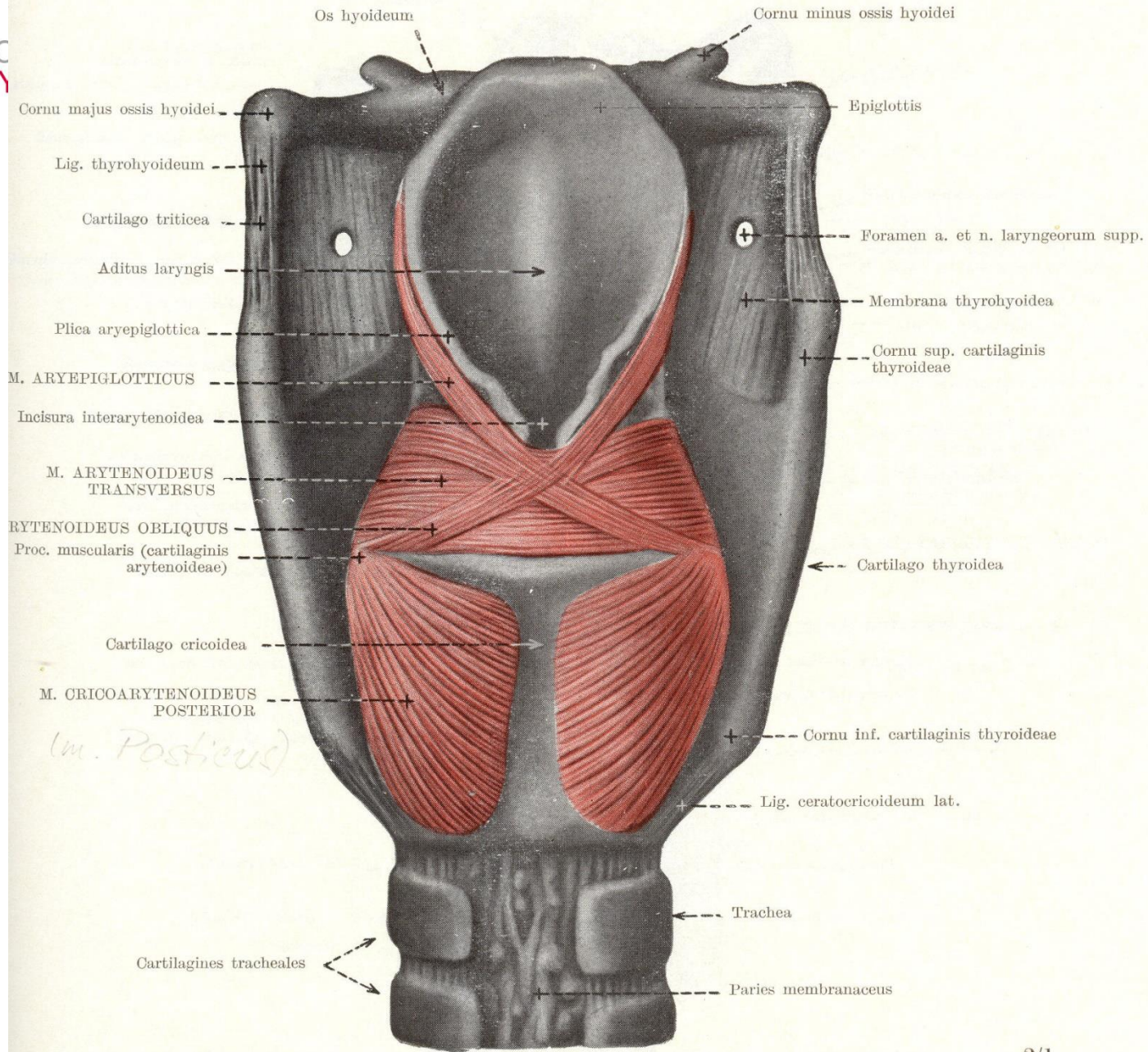
Abductores (open) – m. cricoarytenoideus post. (POSTICUS)

Adductores (close) – cricoaryteoideus lat., arytenoideus transversus

Tensores (stretch) – m. cricothyreoideus (r. ext. N. laryngici sup.), m. vocalis

Muscles moving aditus laryngis

m. aryepiglotticus, thyreoepiglotticus

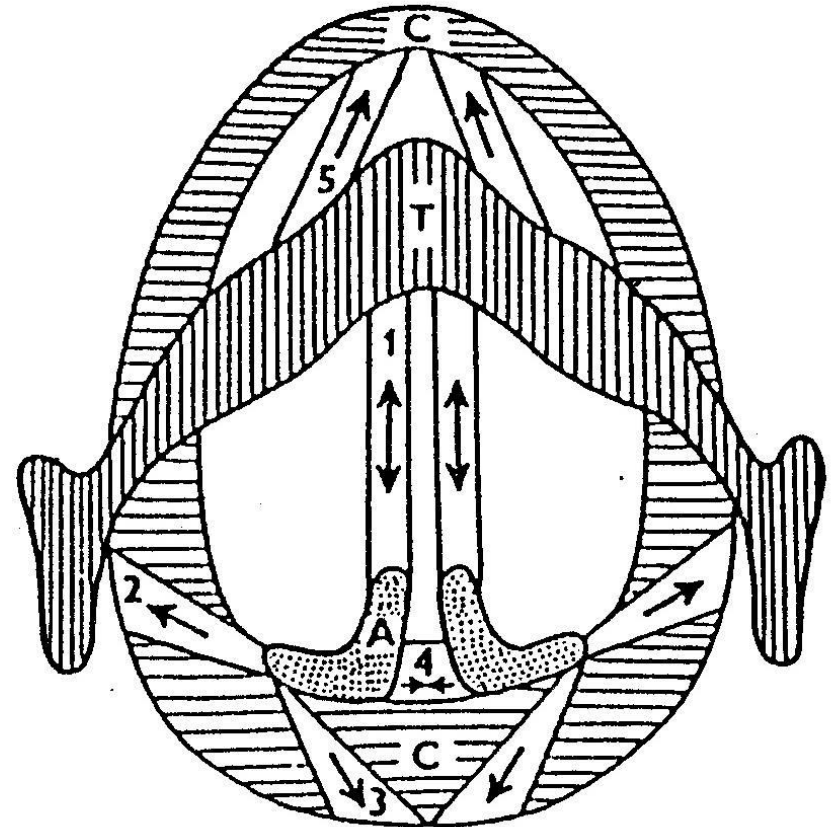


Schema of function of laryngeal muscles

A-cartilago arytenoidea

C-cartilago cricoidea

T-cartilago thyroidea



1.-m. thyroarytenoideus /vocalis/ "internus"

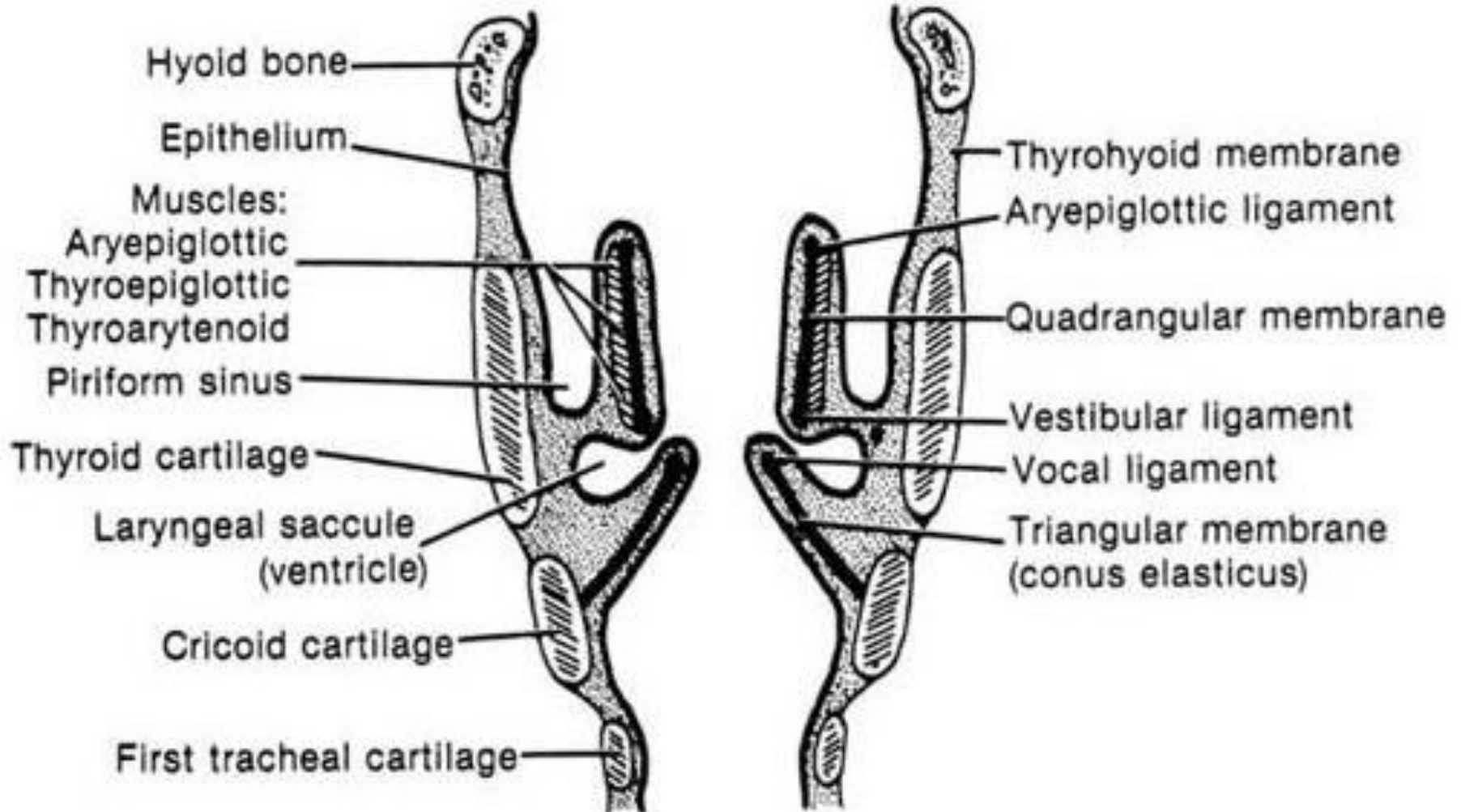
2.-m. cricoarytenoideus lateralis

3.-m. crycoarytenoideus posterior "posticus"

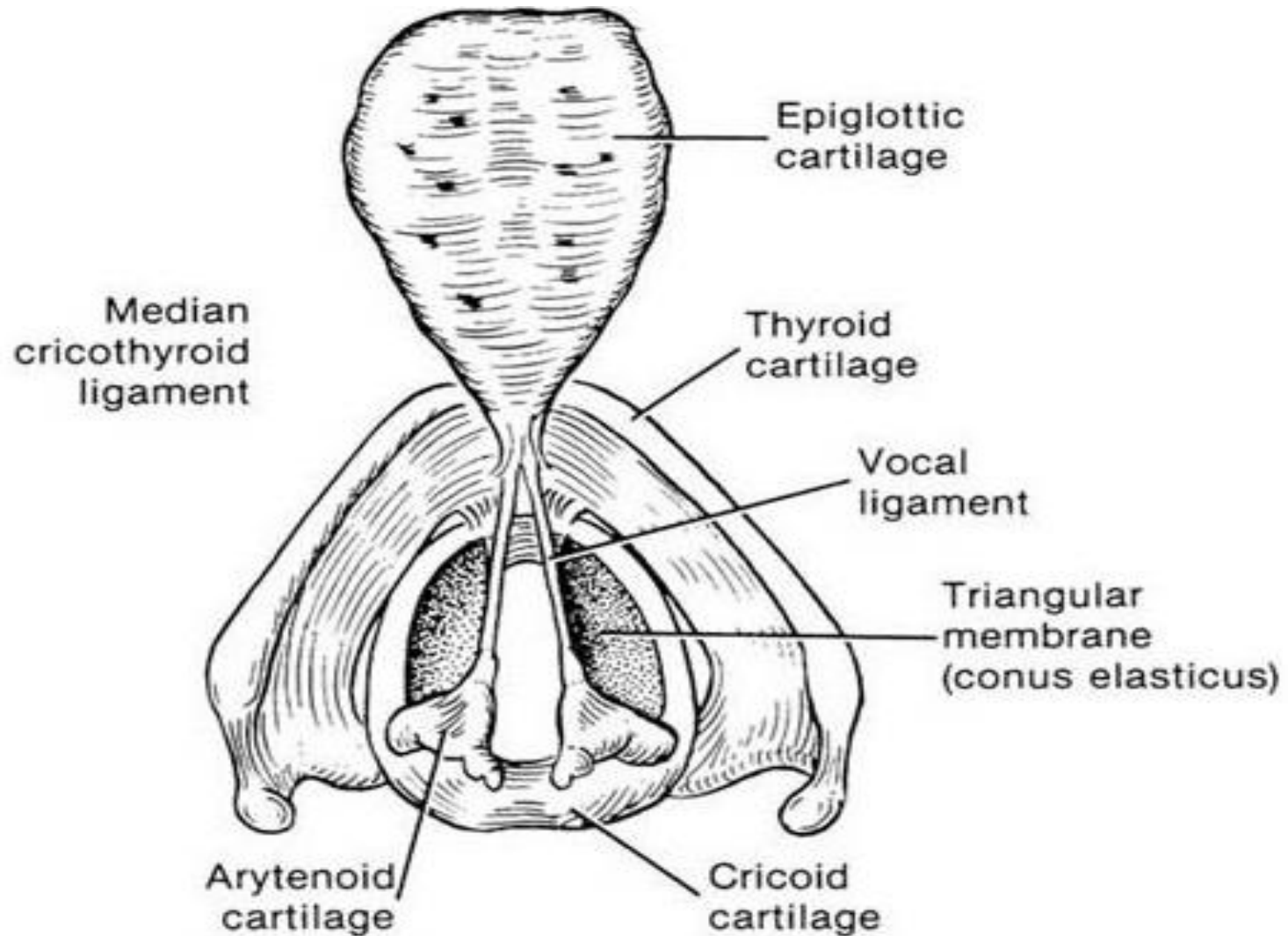
4.-m. arytenoideus transversus "transversus"

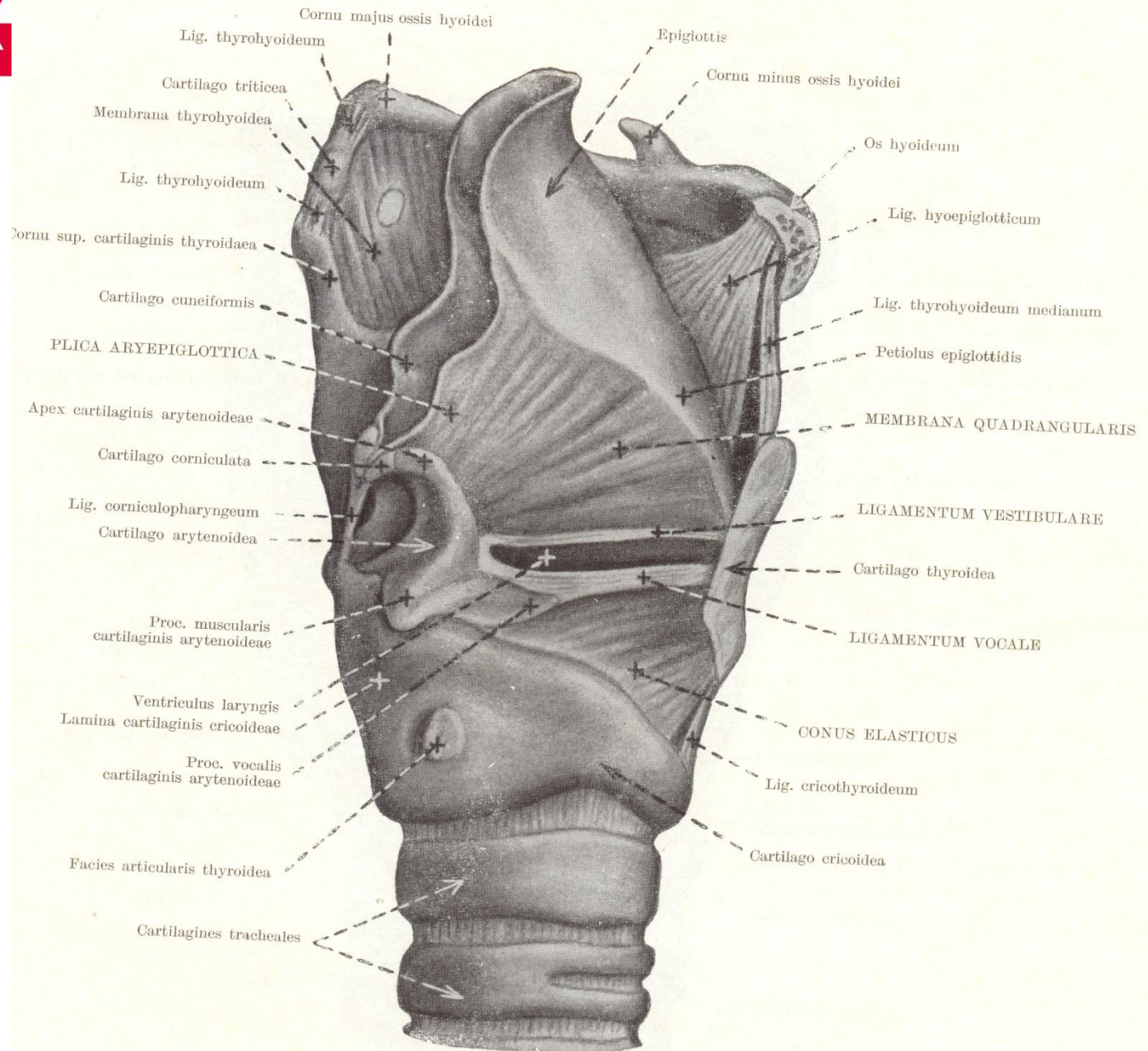
5.-m. cricothyreoideus

Internal ligaments and connective tissue membranes (membrana fibroelastica laryngis=quadrangularis + conus elasticus)



Conus elasticus







History of laryngeal disorder

Breathing disorder

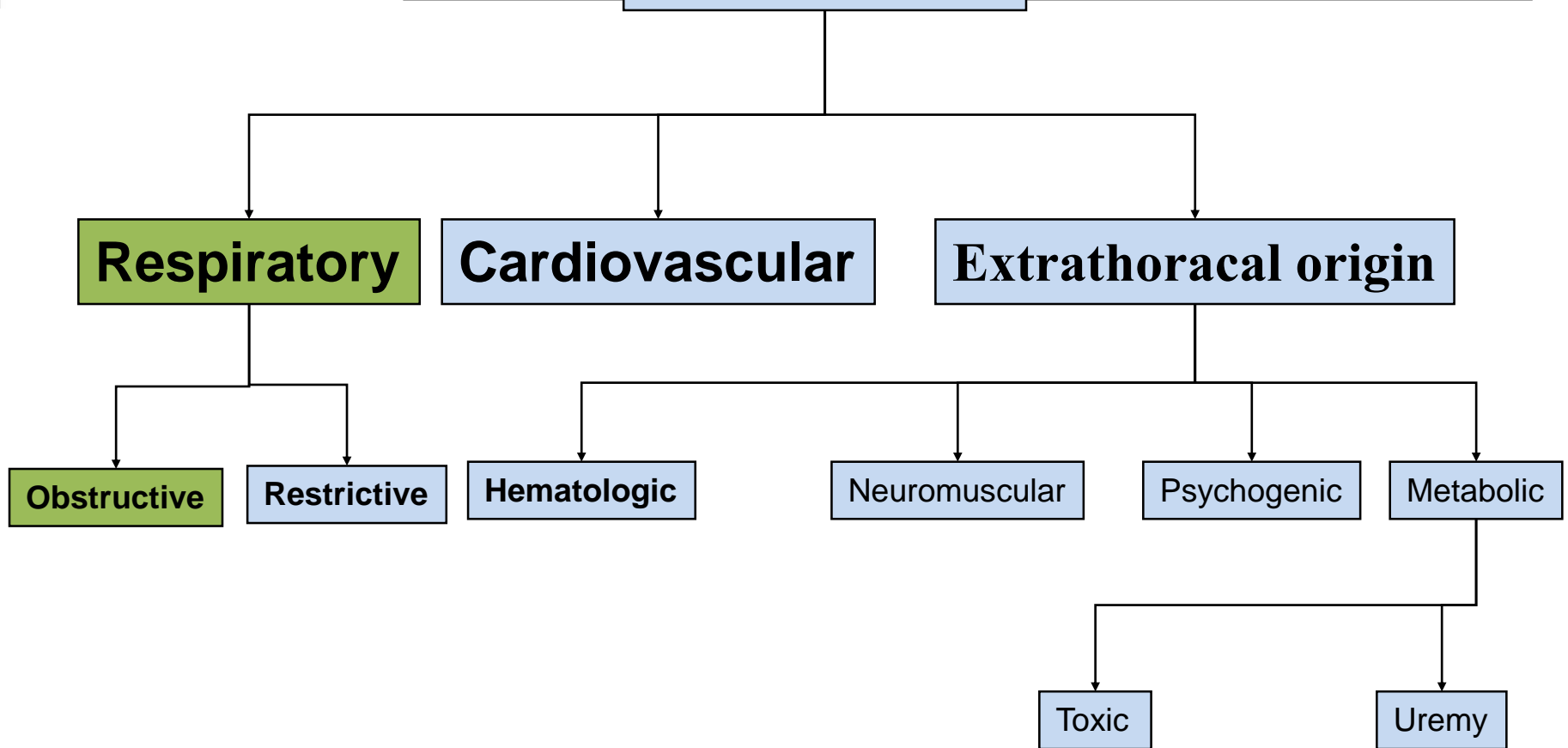
inspiratory stridor - stenosis localized upwards from bifurcation.

Symptoms of usage of auxiliary breathing muscles (retraction of jugulum). There is longer inspirium as expirium. General symptoms - agitation with anxiety, loss of orientation, loss of conscience, tachycardia, usually bradypnoe. Auscultation the most noisy stridor above stenosis. Skin colour pale, then cyanotic. Growing exhaustion, alarm face.

Voice disorder

hoarseness – lasting longer than 14th days in male of risk group (smoker older 40 y) should be evaluated by otolaryngology.

Dyspnoe





Evaluation of dyspnoe

■ Subjective scales



■ (quasi) objective scales

- no dyspnoe (0)
- dyspnoe after greater physical labour than usually (1)
- dyspnoe after usual physical labour (2)
- dyspnoe at any physical action (3)
- dyspnoe in no action (4)



Pathophysiology of obstructive respiratory insufficiency

- inspiratory dyspnea
- stridor - 400-800 Hz, the most proximal stenosis, the lower frequency is
- Involvement of auxiliary breathing muscles
- dysphony
- cough, sometimes odynophagia.

Stage of compensation – prolongation of regular inspiration, good blood supply, possible causal therapy

Stage of decompensation – mild tachypnoea, motoric agitation, hypercapnia, anoxemia, respiratory acidosis, larynx in anteflex position, anxiety, exhaustion. Hypercapnia leads gradually to inhibition of breathing center

Stage of suffocation – air flow with turbulence, decreased breath volume, reanimation is necessary



Obstructive respiratory insufficiency

1. Larynx and superior part of trachea - „laryngeal“ dyspnea

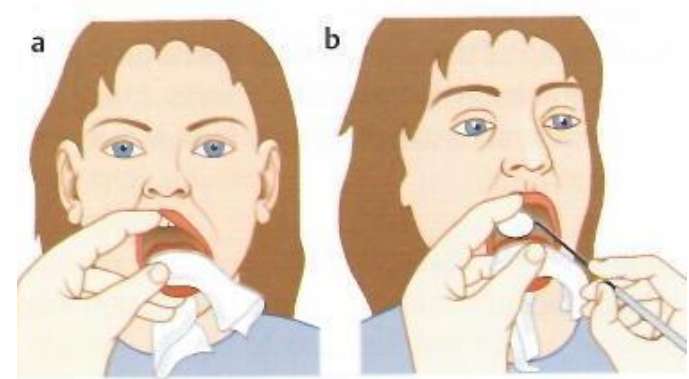
inspiratory stridor - stenosis localized upwards from bifurcation. Symptoms of usage of auxiliary breathing muscles (retraction of jugulum). There is longer inspiration as expiration. General symptoms - agitation with anxiety, loss of orientation, loss of conscience, tachycardia, usually bradypnea. Auscultation the most noisy stridor above stenosis. Skin color pale, then cyanotic. Growing exhaustion, alarm face.

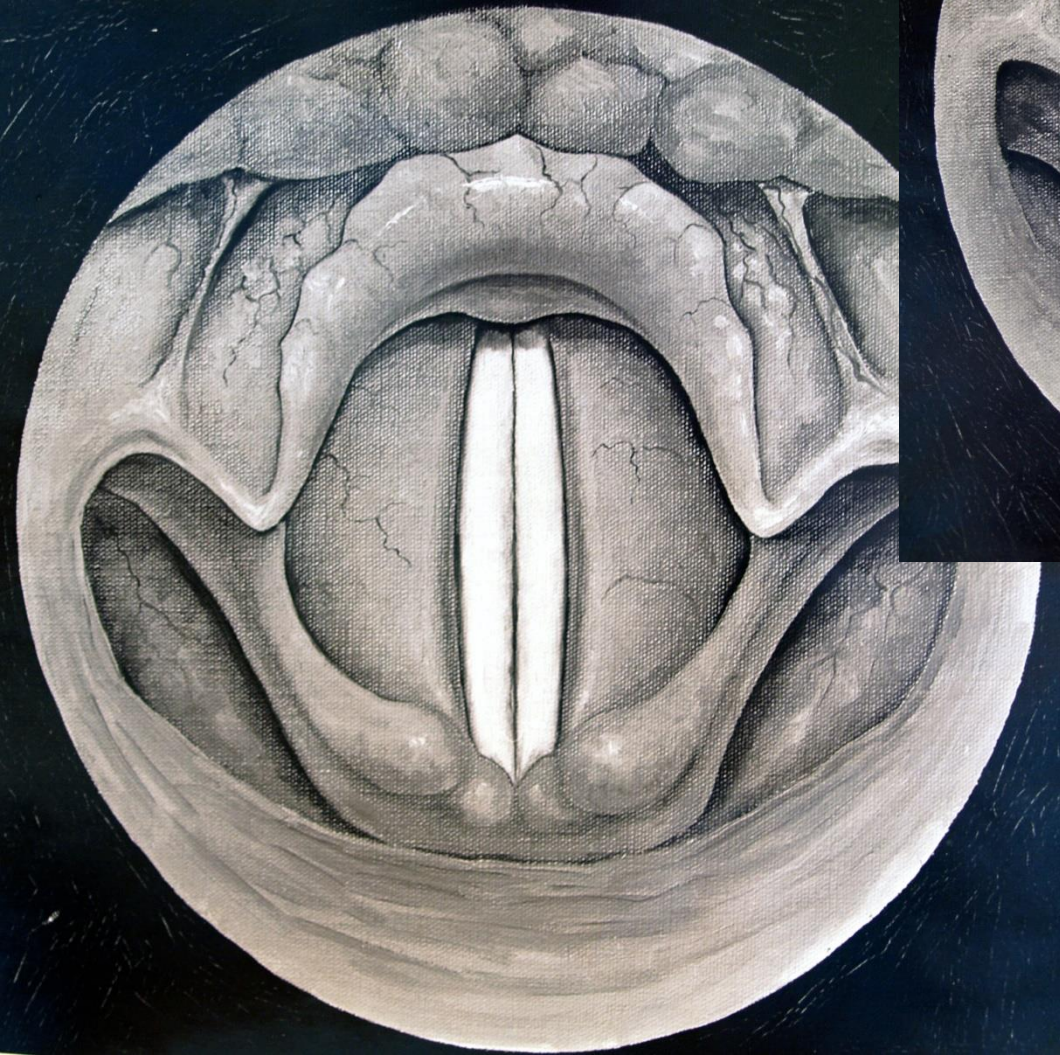
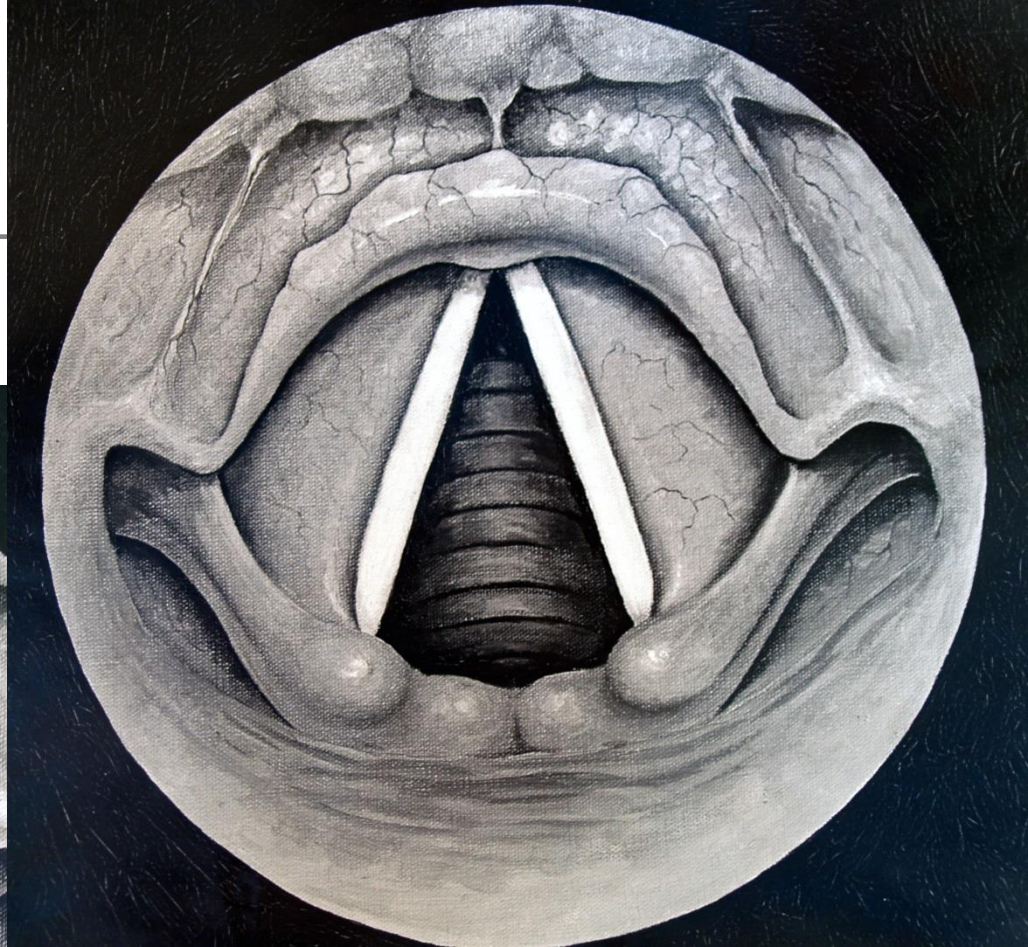
2. Distal part of airways.

Expiratory stridor - longer expiration

Methods of investigation of larynx

- Inspection
- Palpation (crepitation, emphysema)
- Indirect laryngoscopy
- Direct laryngoscopy
 - Flexible
 - Rigid
 - Microlaryngoscopy sec Kleinsasser
- Stroboscope (high frequency movies, allowing scientific analysis of the laryngeal function, especially of the vocal cords)
- Tomography
- CT





Laryngoscopy

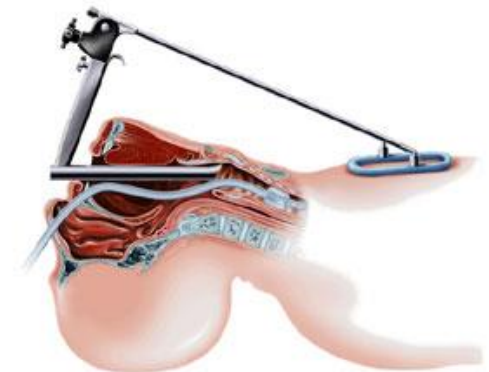
direct - flexible nose-endoscopy (laryngoskopy)



Rigid endoscopy of the Larynx

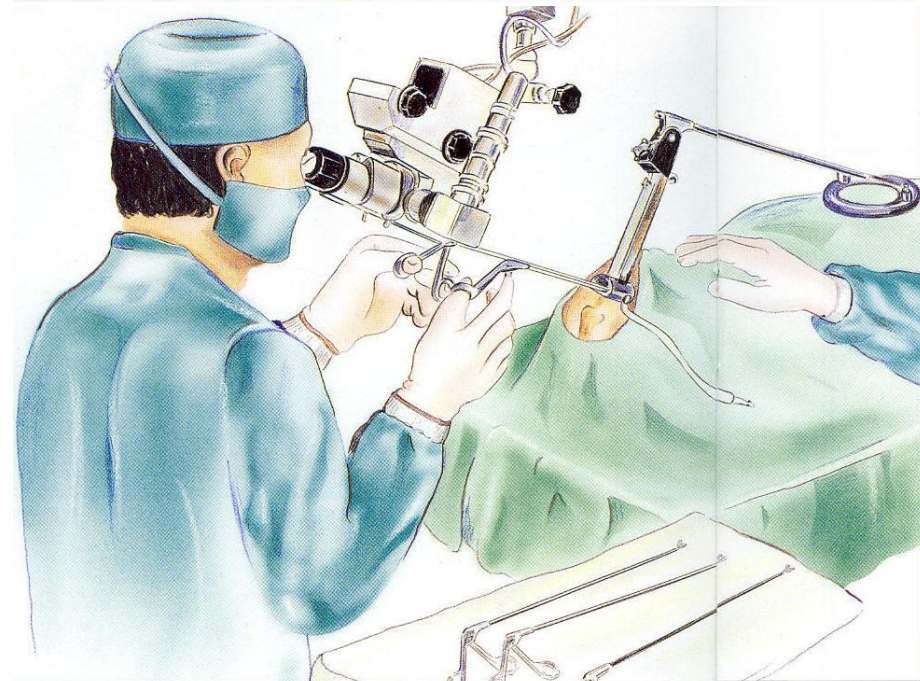
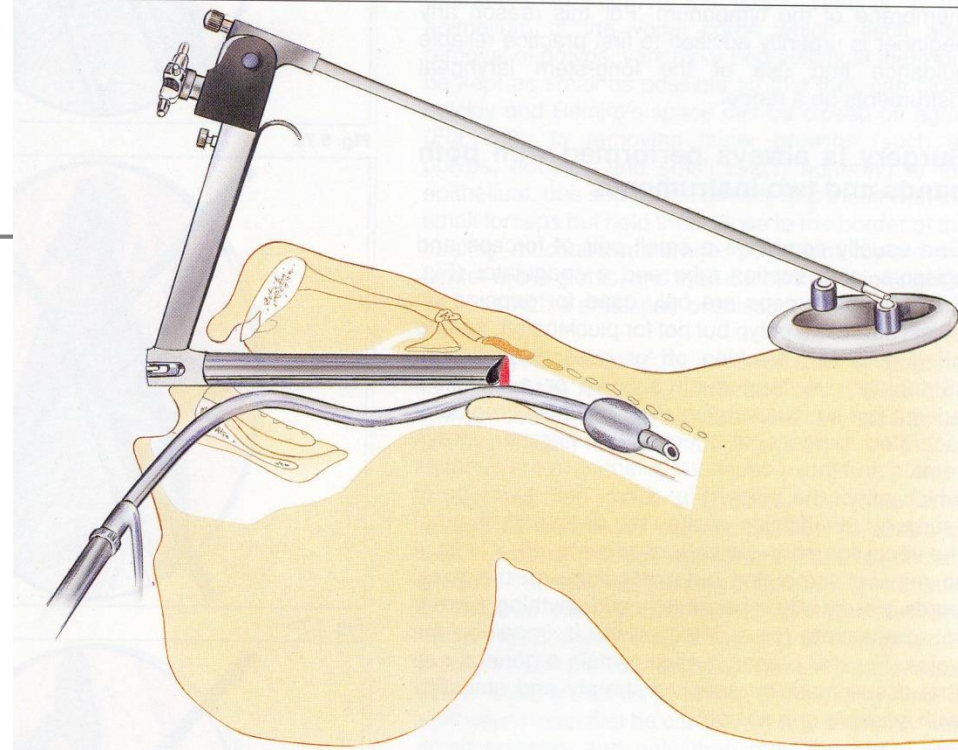
Rigid laryngoscopy

(according to Stuckrad and Kleinsasser)



Microlaryngoscopy sec. Kleinsasser

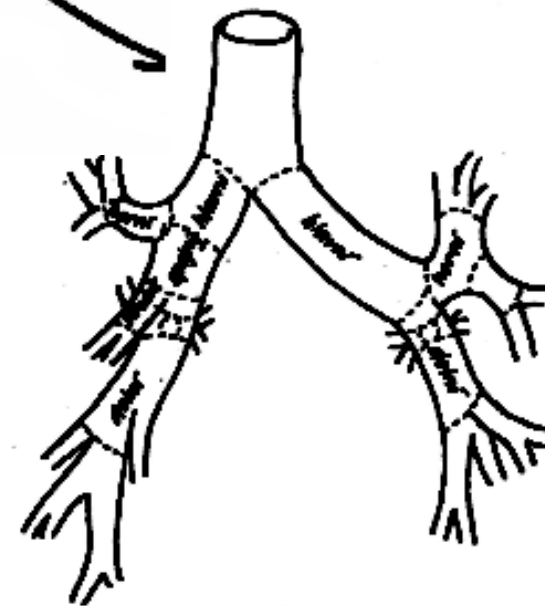
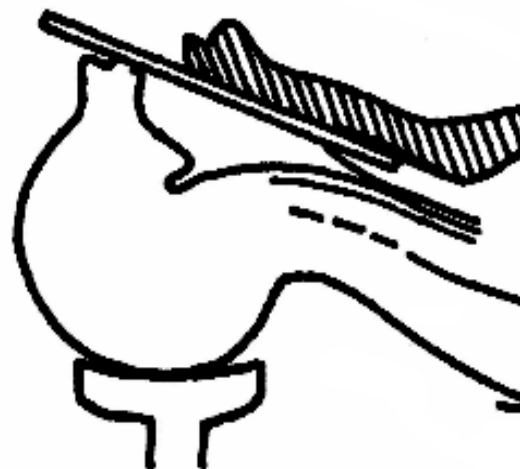
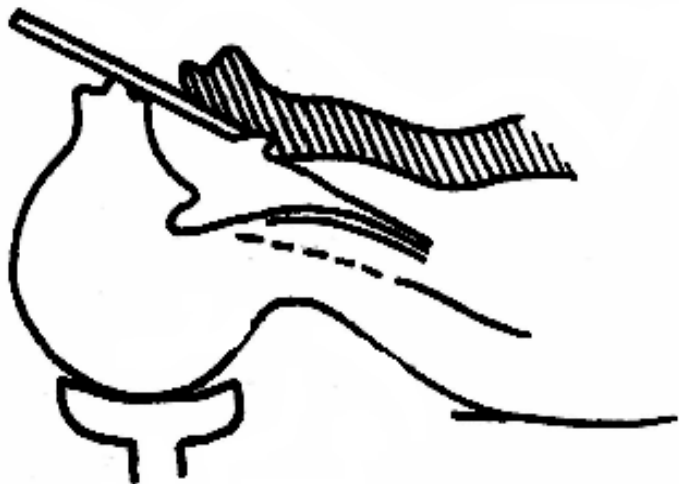
- general anesthesia
- chest holder
- microscope



Stroboscopy



Tracheo-bronchoscopy rigid vs. flexible



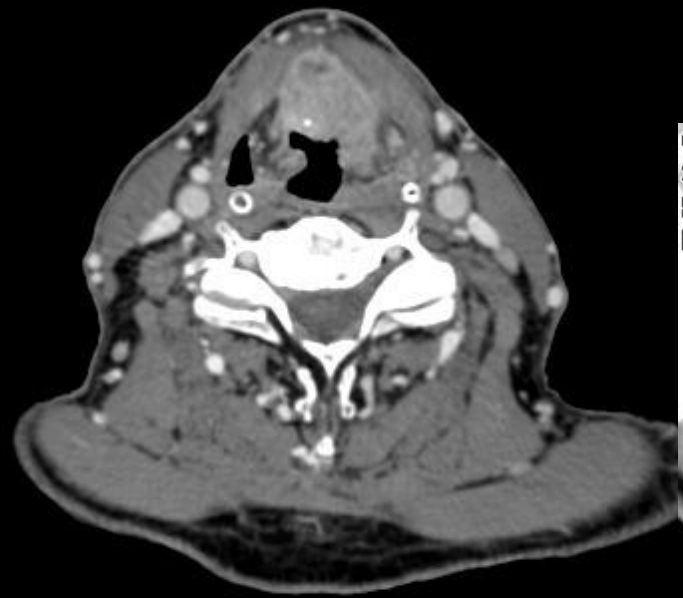
Zjednodušené schéma
bronchiálního stromu

CT/4/187
Axial F->H
Recon 2: K.L.
IOMERON 300

A FN U sv. Anny v Brme

65Y M
4284-4117/08
2088/5/26
10:49:11

Transglottic cancer spreading
into preepiglot. space,
subglottic spread



120.0 kV
650.0 mA
Pixel size: 0.494 mm
Position: 78.0 mm
W: 359 L: 82
P DFOV: 25.3

CT/451/28
Sagittal L->R
krk-sag
IOMERON 300

FN U sv. Anny v Brme

65Y M
4117/08
2088/5/26
10:49:11



120.0 kV
788.0 mA
Pixel size: 0.313 mm
Position: -6.4 mm
W: 273 L: 45
F DFOV: 16.00 x 16.00 cm

CT/452/16
Axial F->H
hrtan
IOMERON 300

A

FN U sv. Anny v Brne



65Y M
4117/08
2008/5/26
10:49:11

120.0 kV
788.0 mA
Pixel size: 0.234 mm
Position: 91.9 mm
W: 239 L: 64

DFOV: 1

CT/450/12
Coronal A->P
krk
IOMERON 300

H

FN U sv. Anny v Brne



65Y M
4117/08
2008/5/26
10:49:11

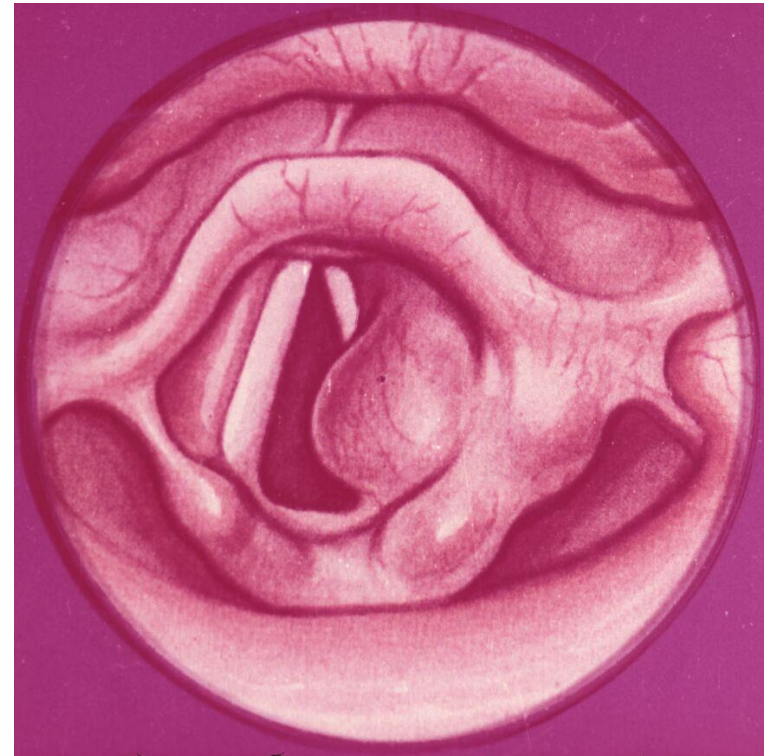
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788.0 mA
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DFOV: 16.00 x 16.00cm

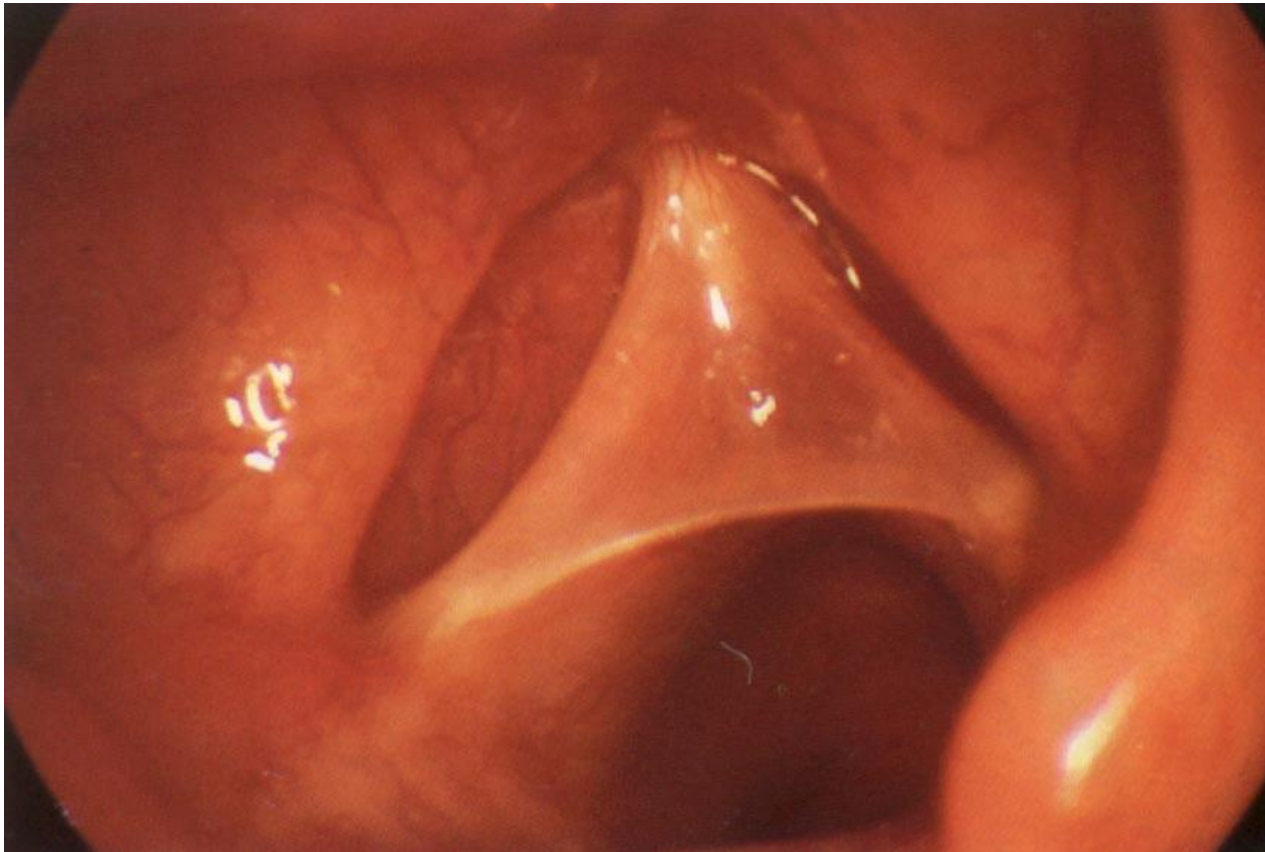
Congenital laryngeal anomalies

Laryngomalacia – dyspnea, dysphonia, dysphagia. Unusual weakness of the supraglottic laryngeal skeleton

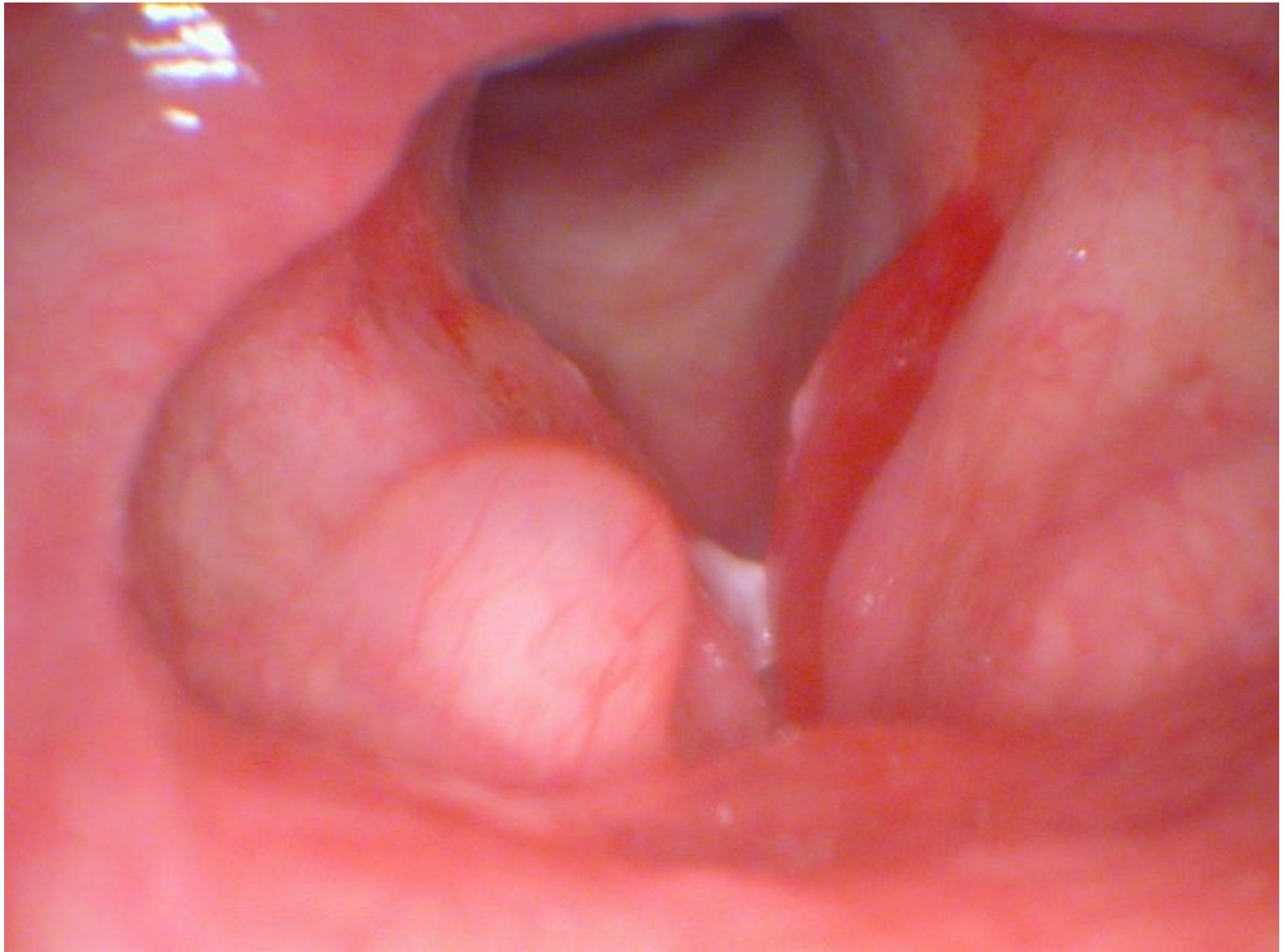
Laryngoceles – lie within the larynx in the vestibular fold – dyspnoea, dysphonia



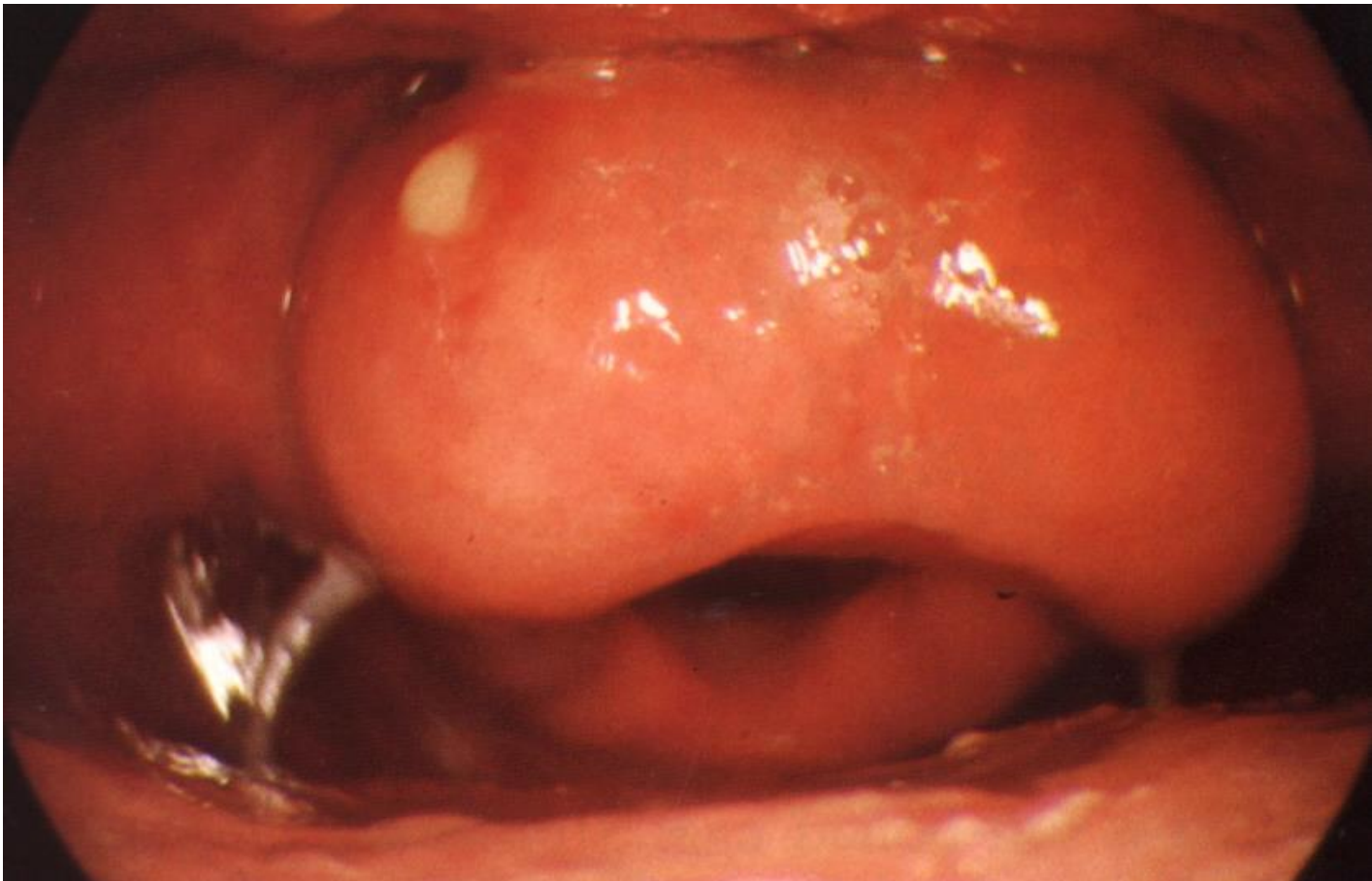
Atresia and membranes



Laryngitis acuta (restricted x diffused)

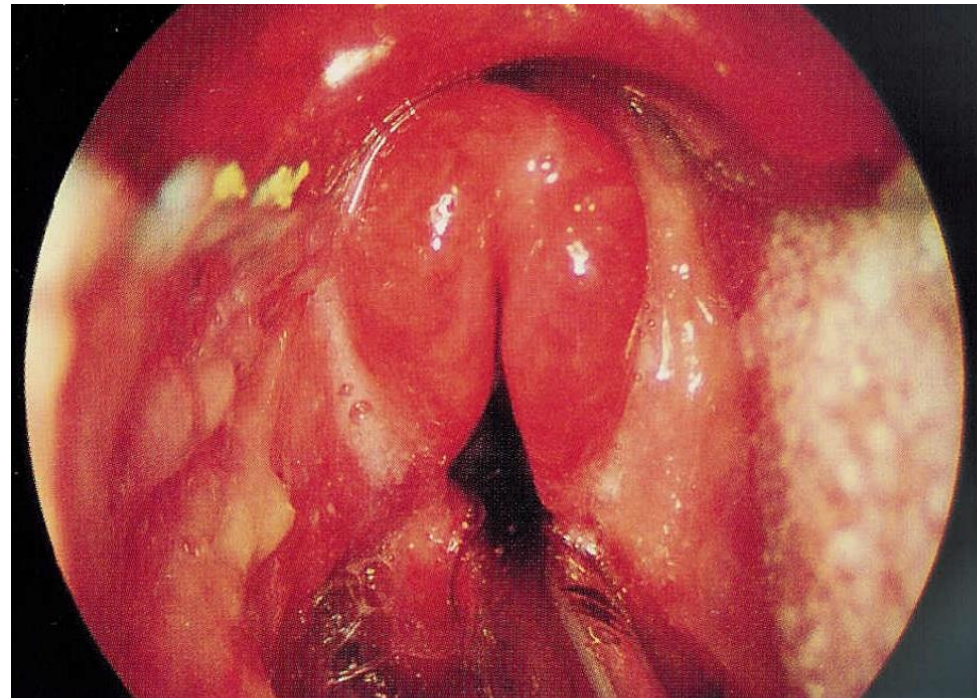


Abscesus epiglottidis



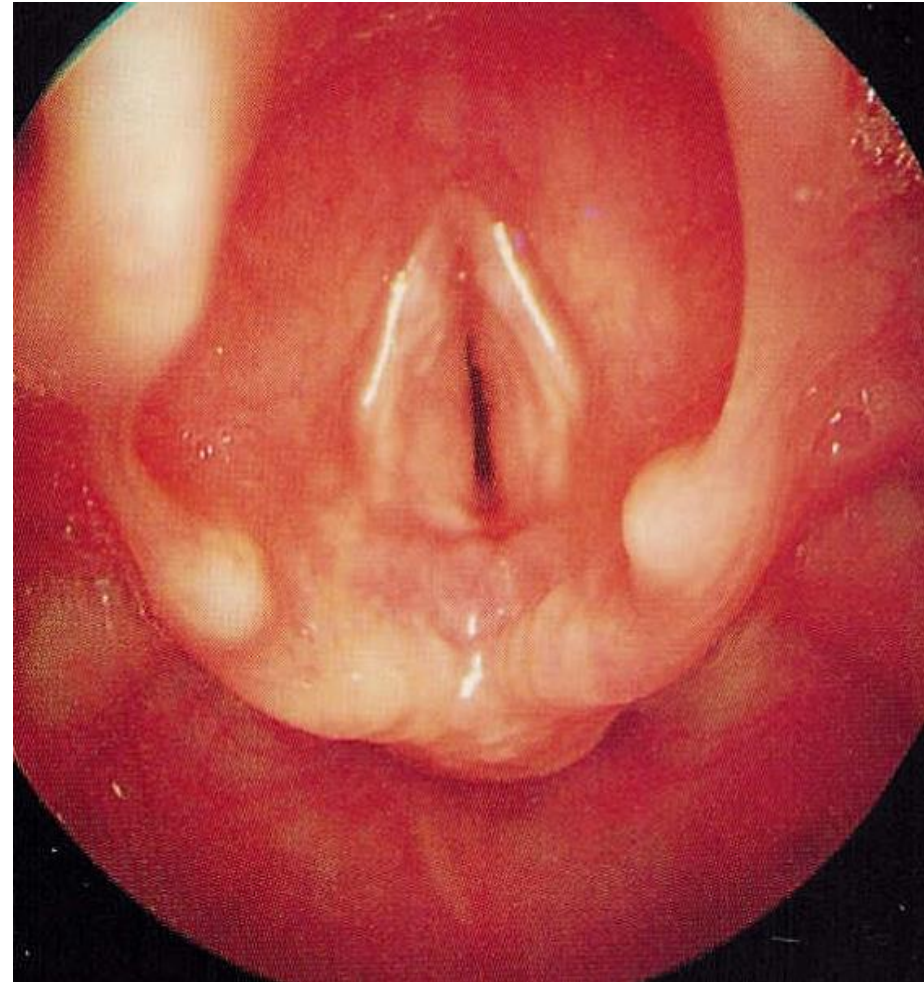
Acute supraglottic laryngitis - epiglottitis

- Hemophilus influenzae
- inspiratory stridor
- dysphagia
- Antibiotic treatment
- steroids
- tracheal intubation
- tracheostomy

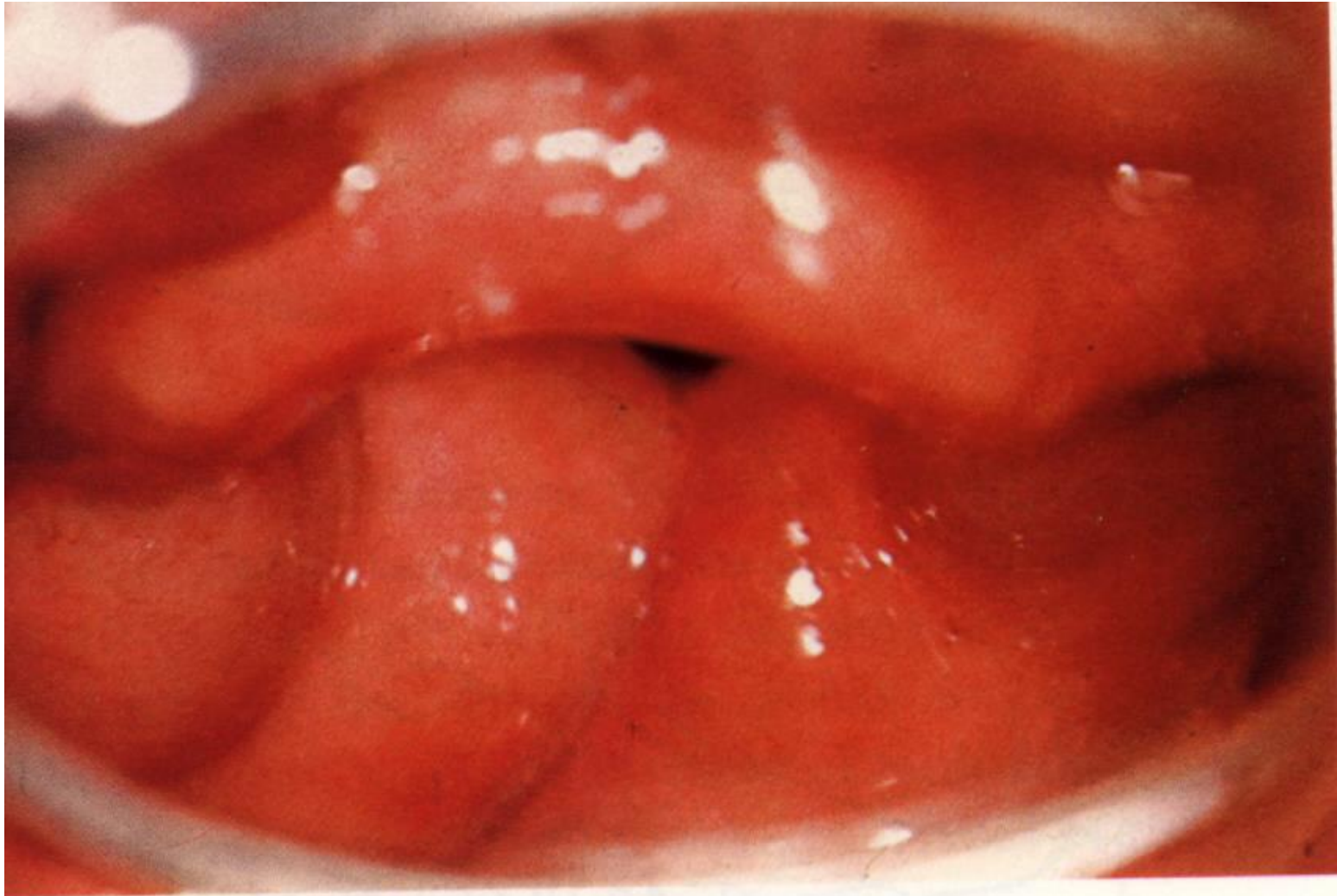


Acute subglottic laryngitis

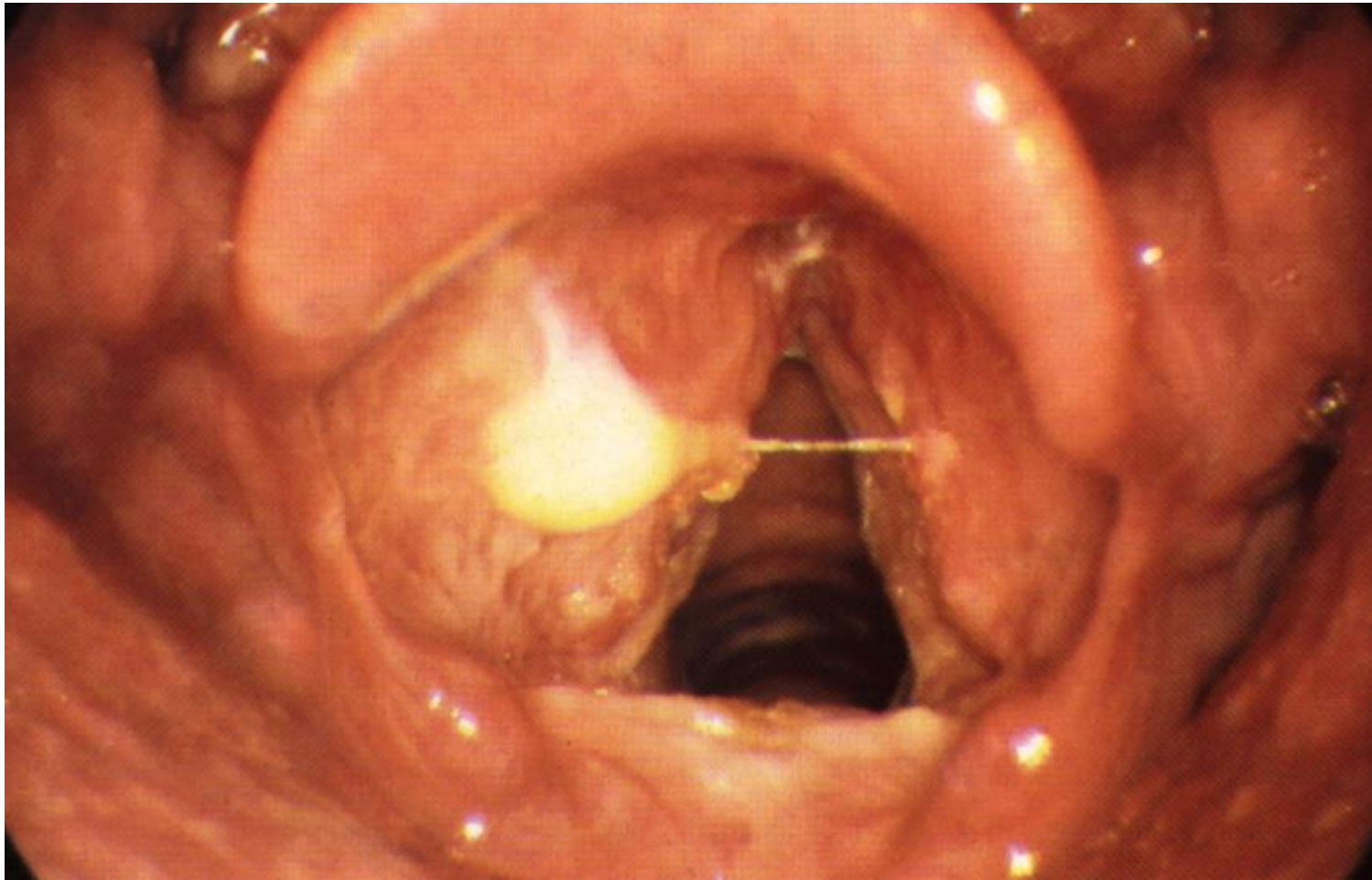
- viral infection
- rapid growth at night
- cough
- inspiratory stridor, inspiratory dyspnea
- steroids, sedation, ATB,
- Microclimate (steam inhalation)



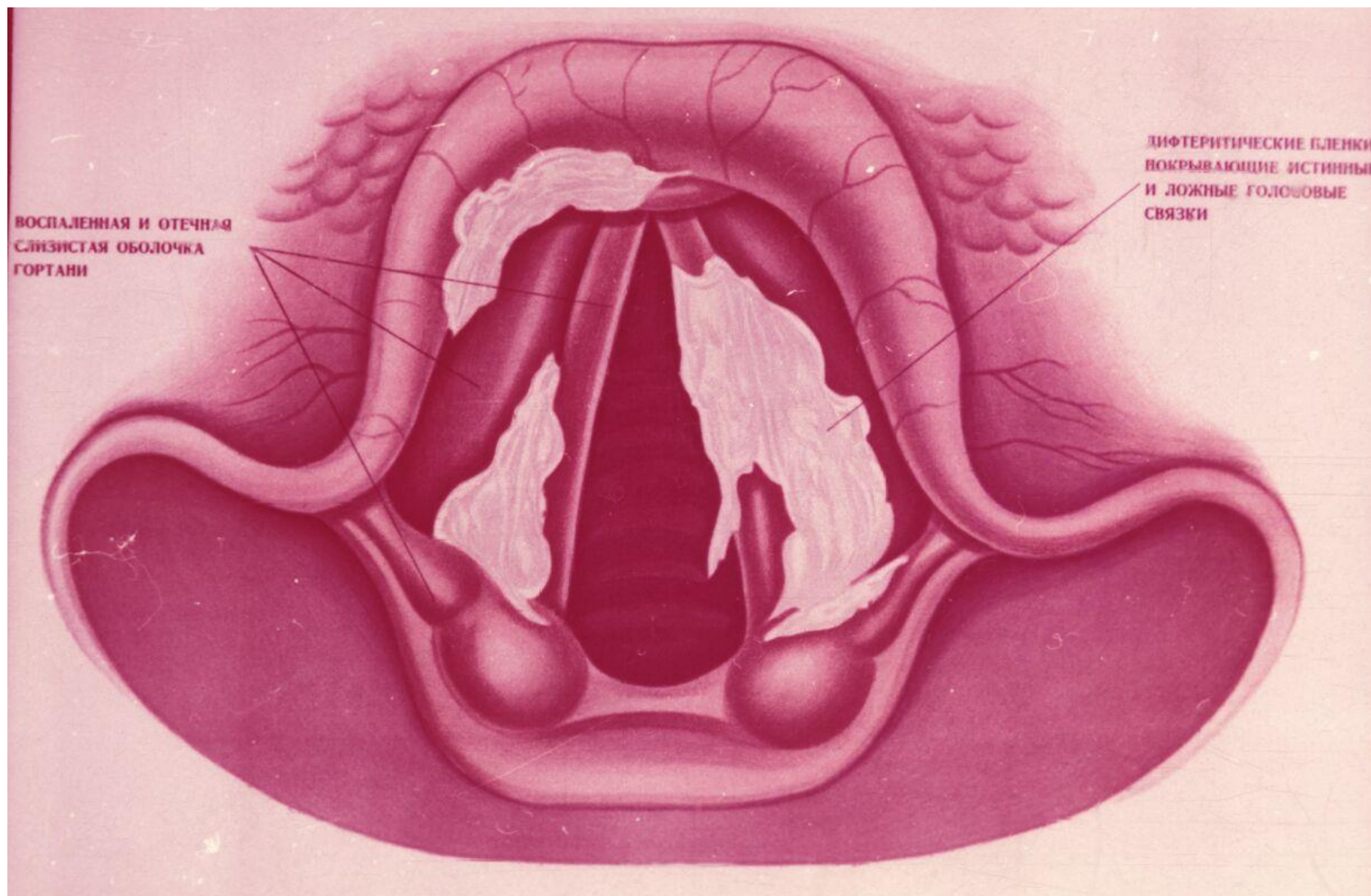
Angioneurotic swelling of larynx



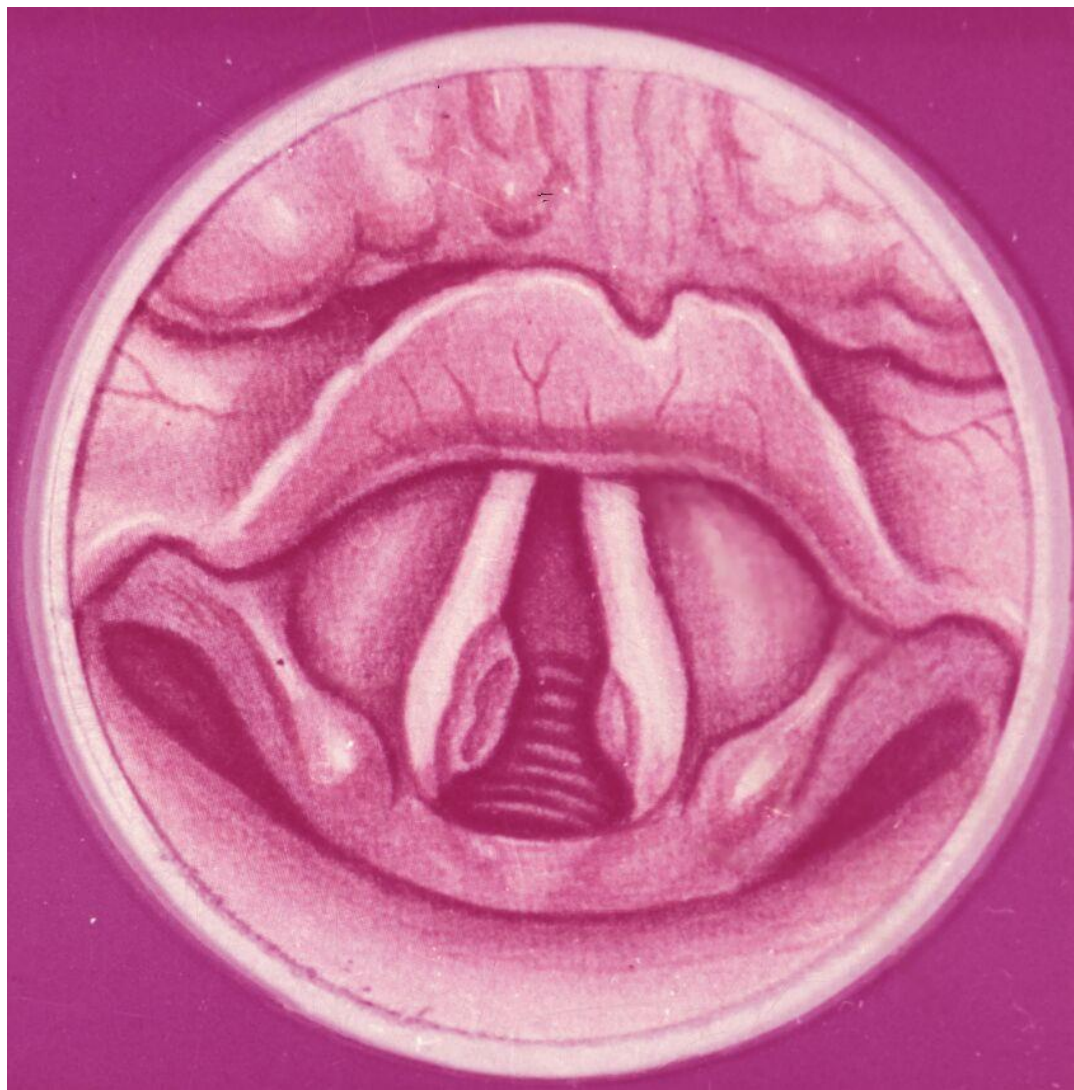
Laryngitis chronica



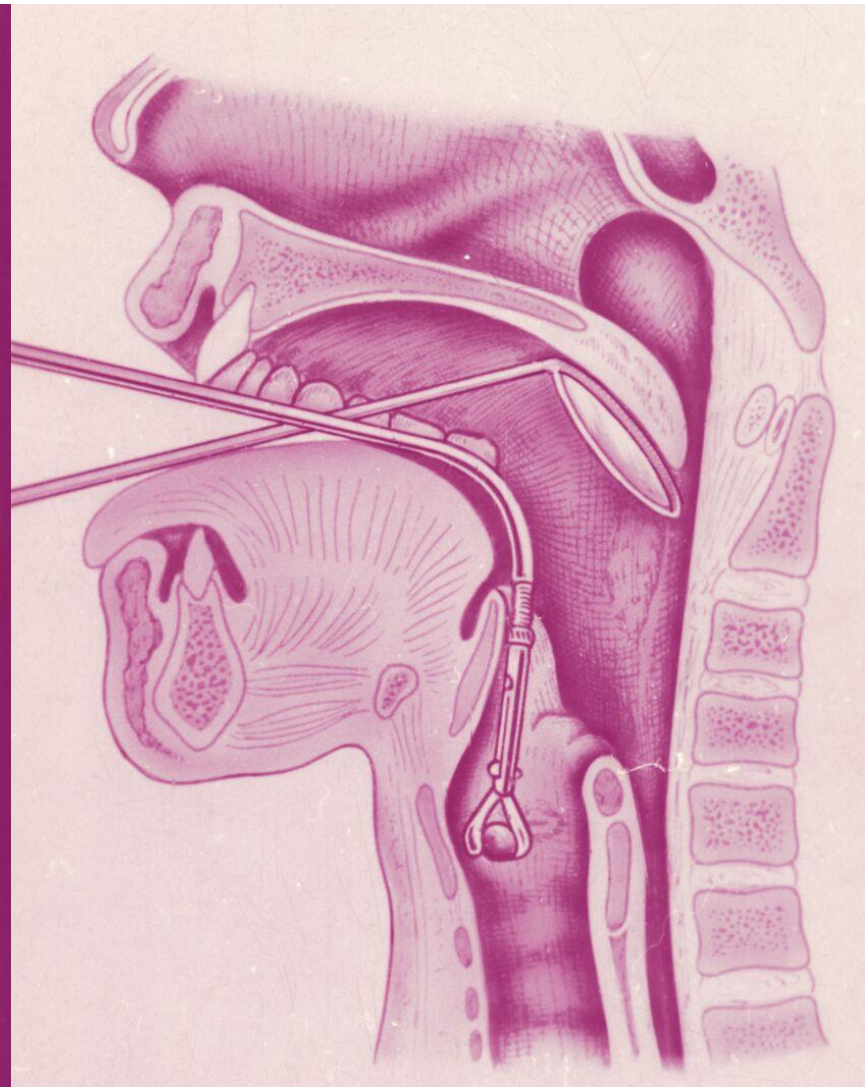
Diphtheria



Laryngitis chronica hyperplastica



Laryngeal polypus



ID:

Name:

Sex: Age:

D.O.B.:

30/11/2016

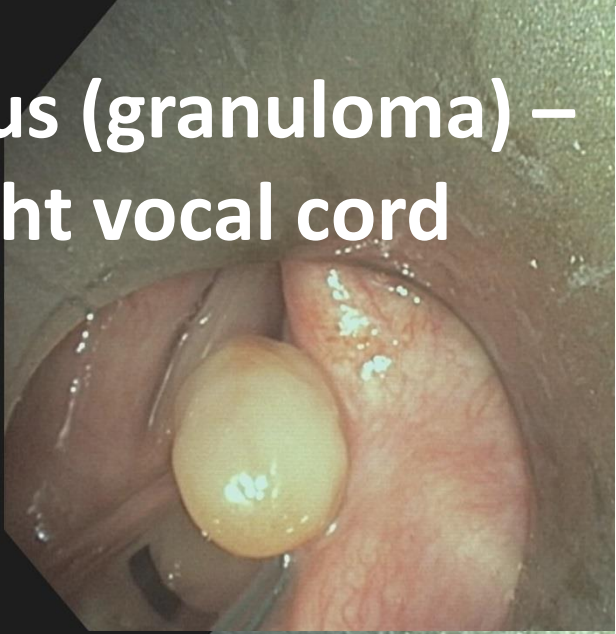
11:56:46

Polypus (granuloma) – right vocal cord

■■■/---(0/1)

Eh:A3 Cm:1

Comment:



ID:

Name:

Sex: Age:

D.O.B.:

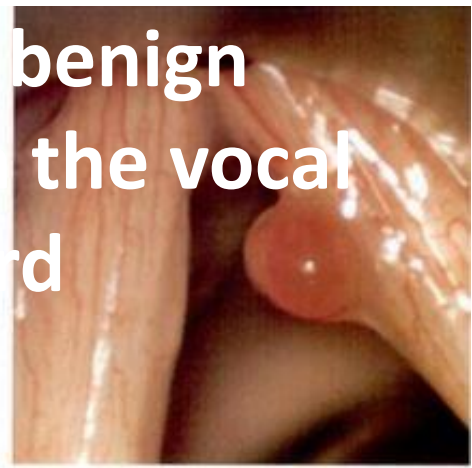
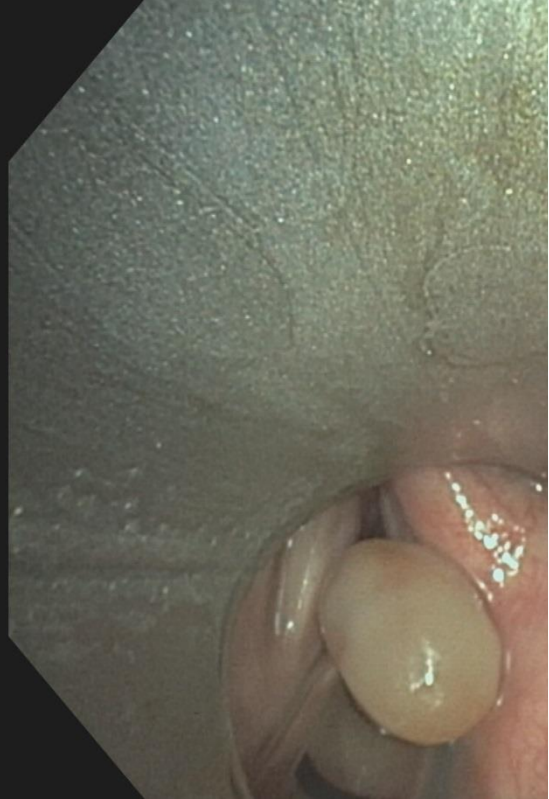
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11:57:21

■■■/---(0/1)

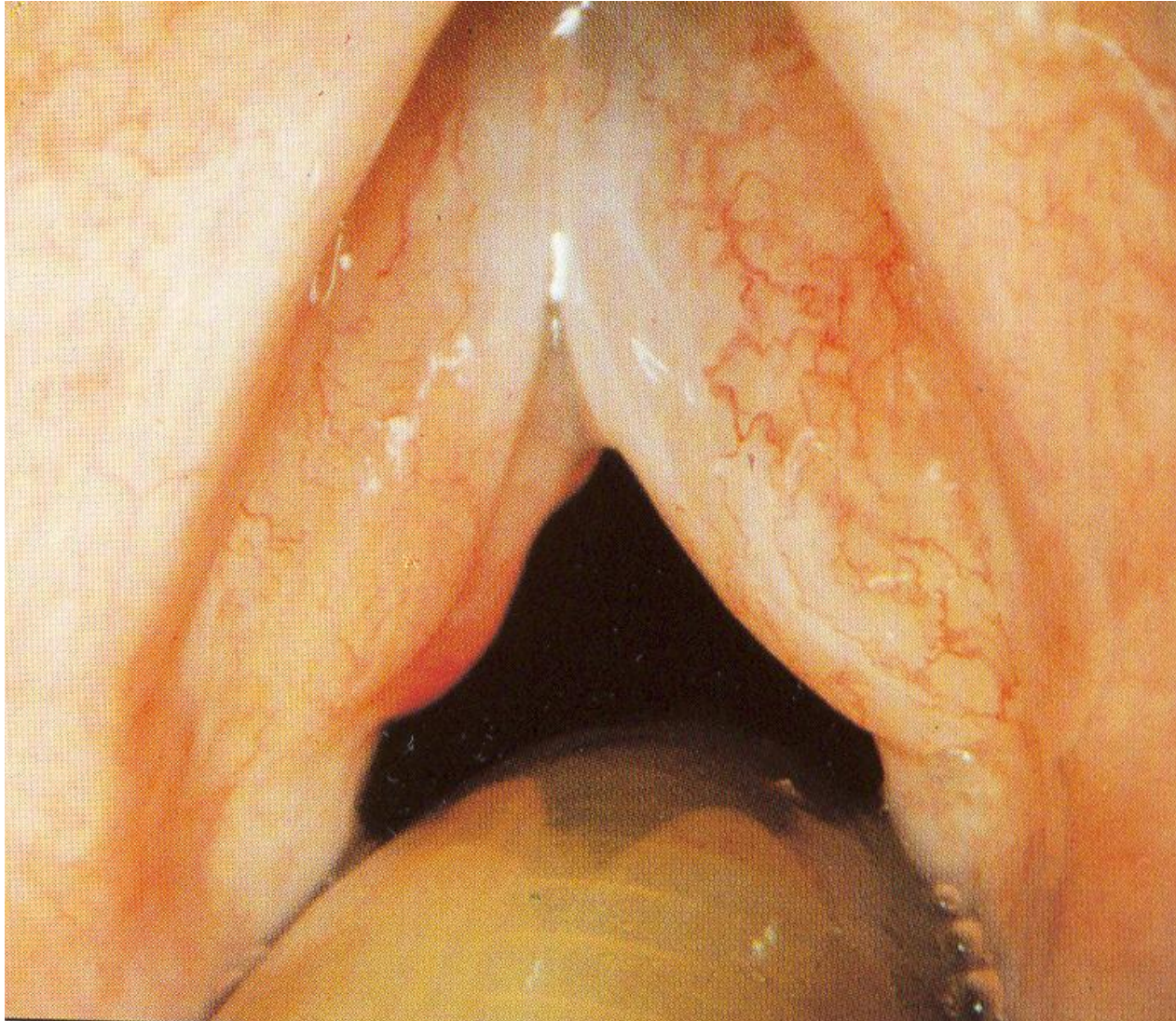
Eh:A3 Cm:1

Comment:



Various benign findings on the vocal cord

LARYNGITIS CHRONICA-OEDEMA REINCKE

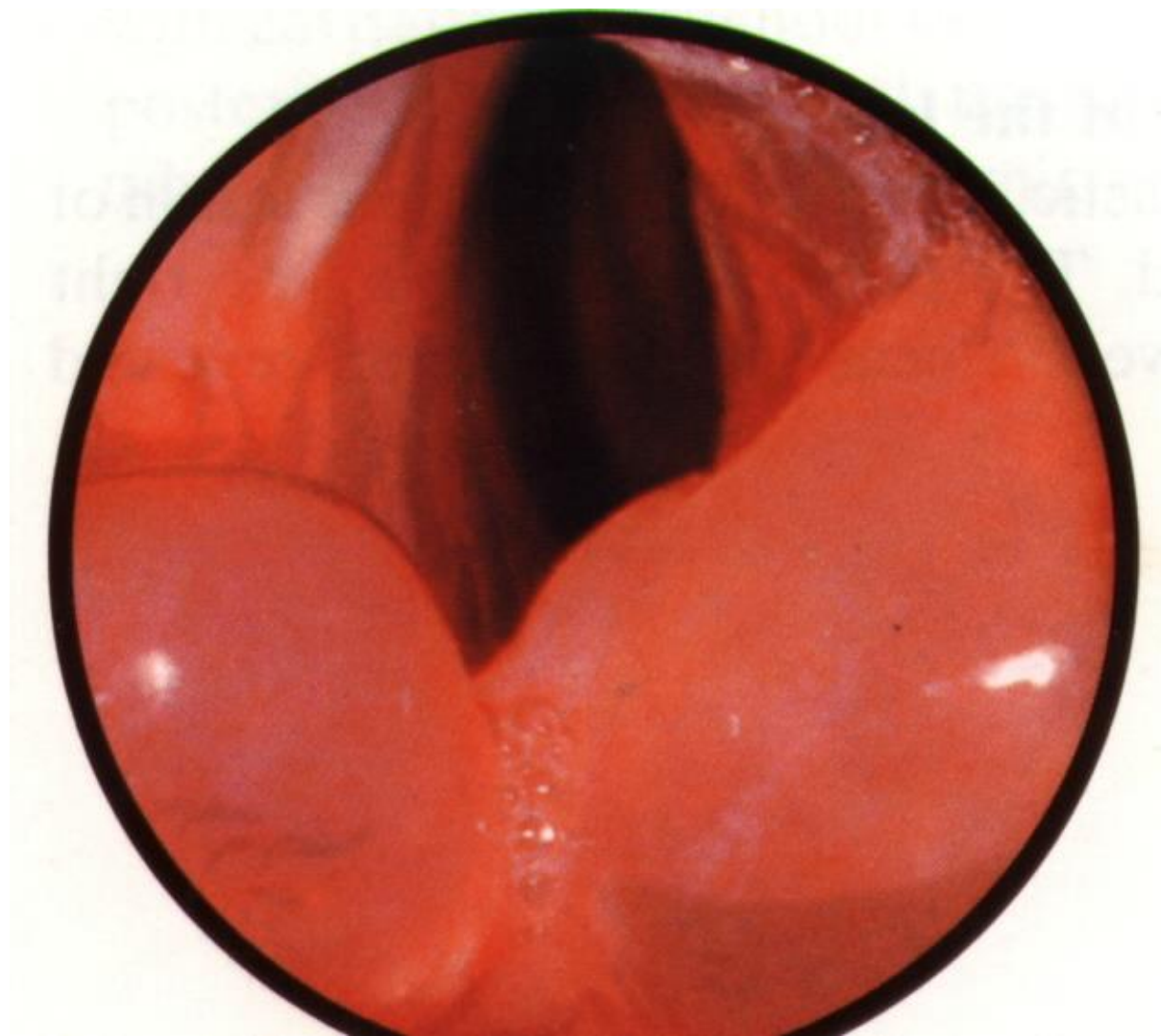




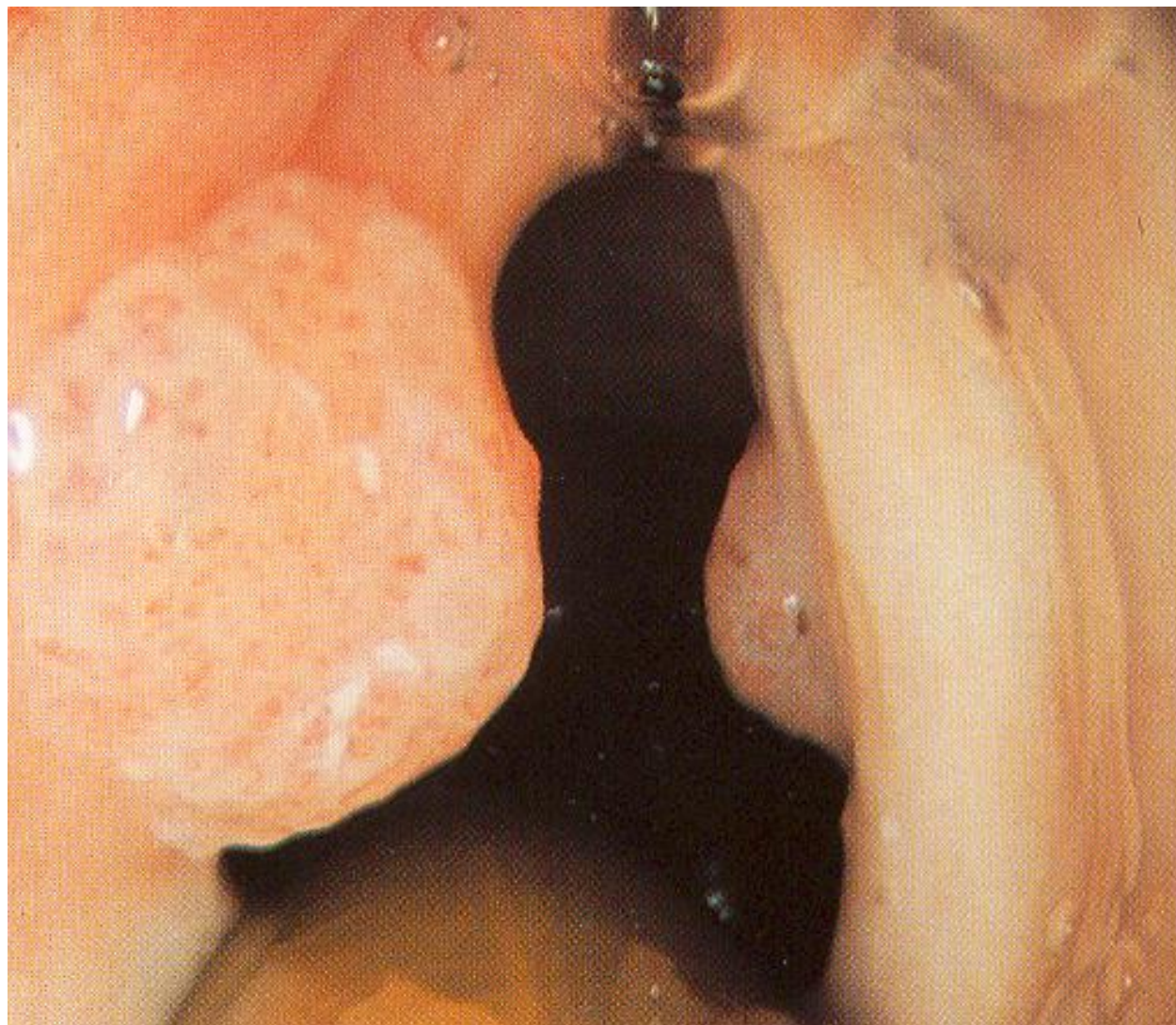
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*24.07.1945
01.11.2007
17:35:56
1 Sn 11

W 256
C 128

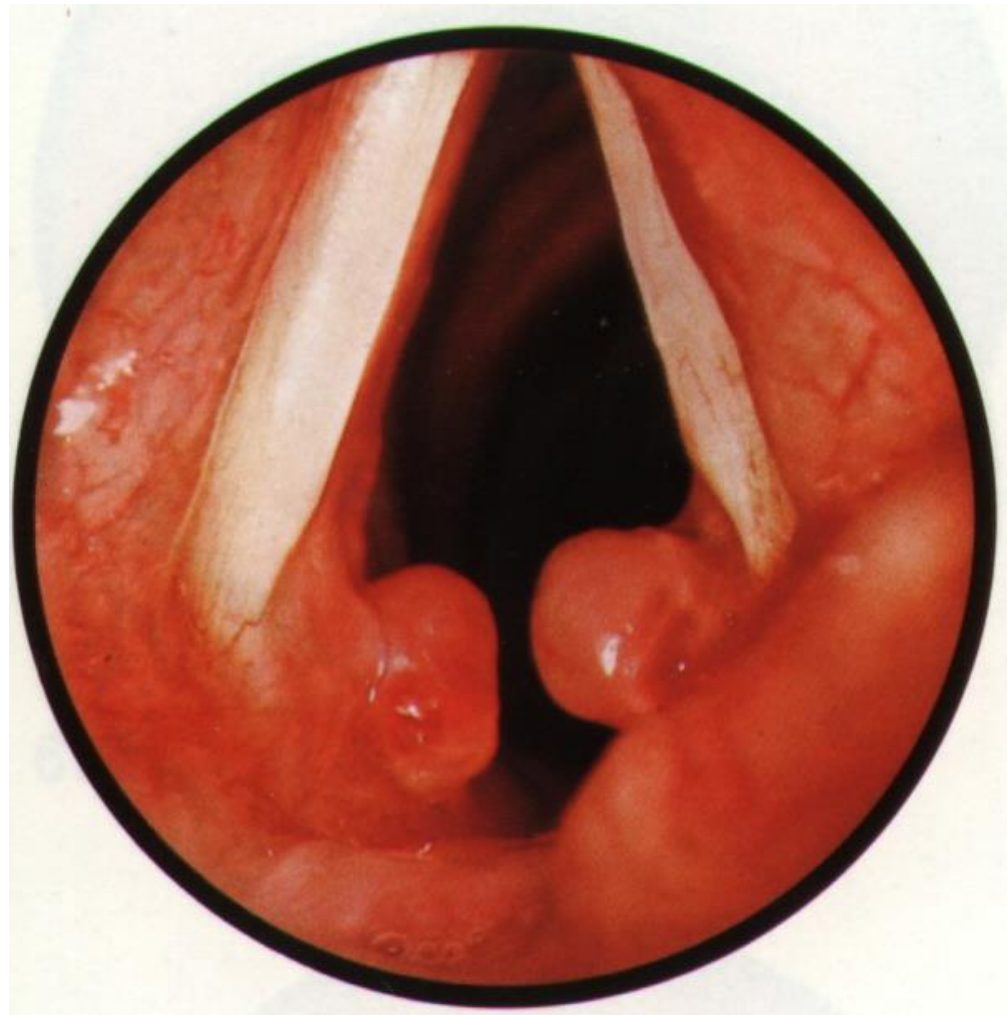
Oedema laryngis



Papilomatosis laryngis, HPV virosis

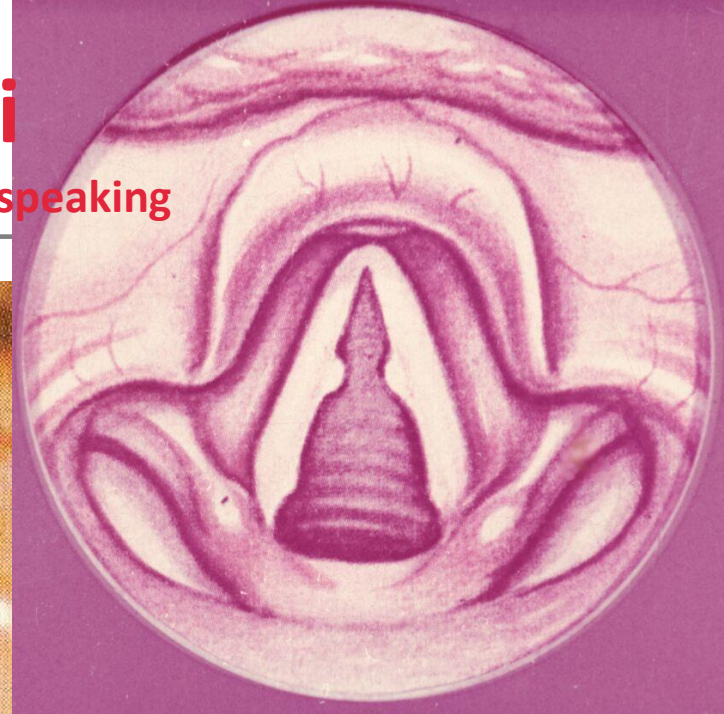


Intubation injury, granulomas



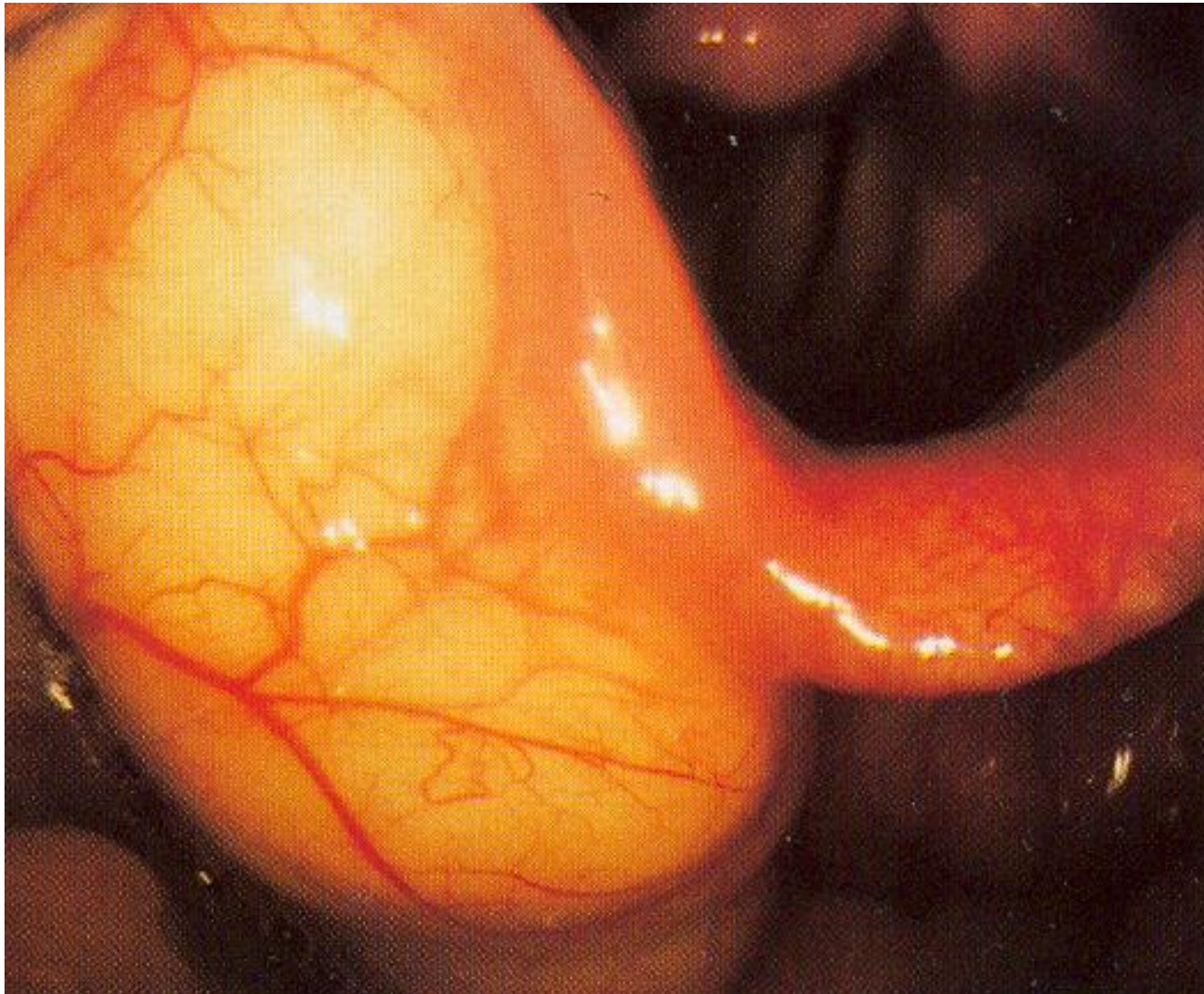
Noduli cantatorii

vocal abuse, dysphonia, pain on speaking

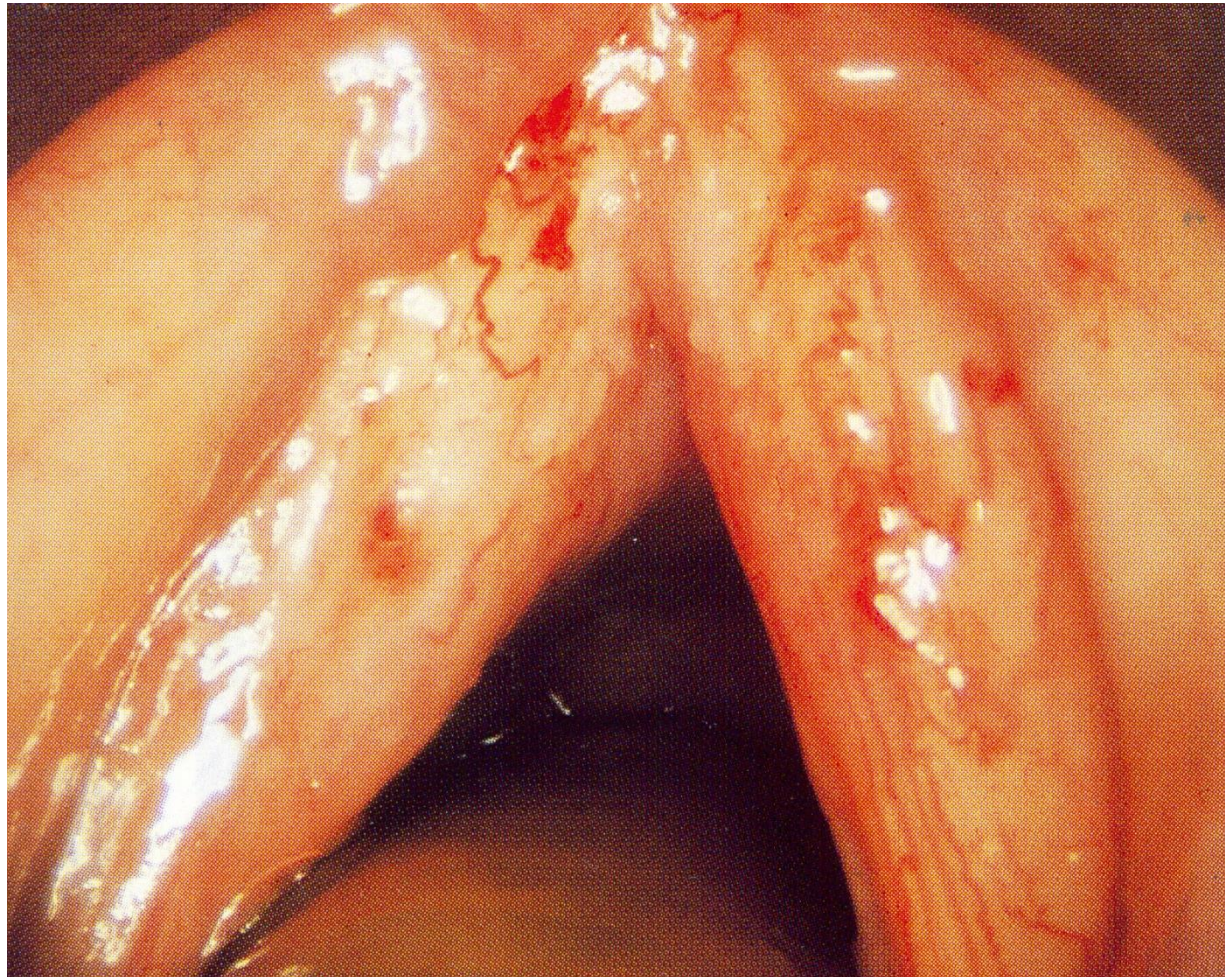


- in voice professionals
- microlaryngoscopy
- strict voice rest

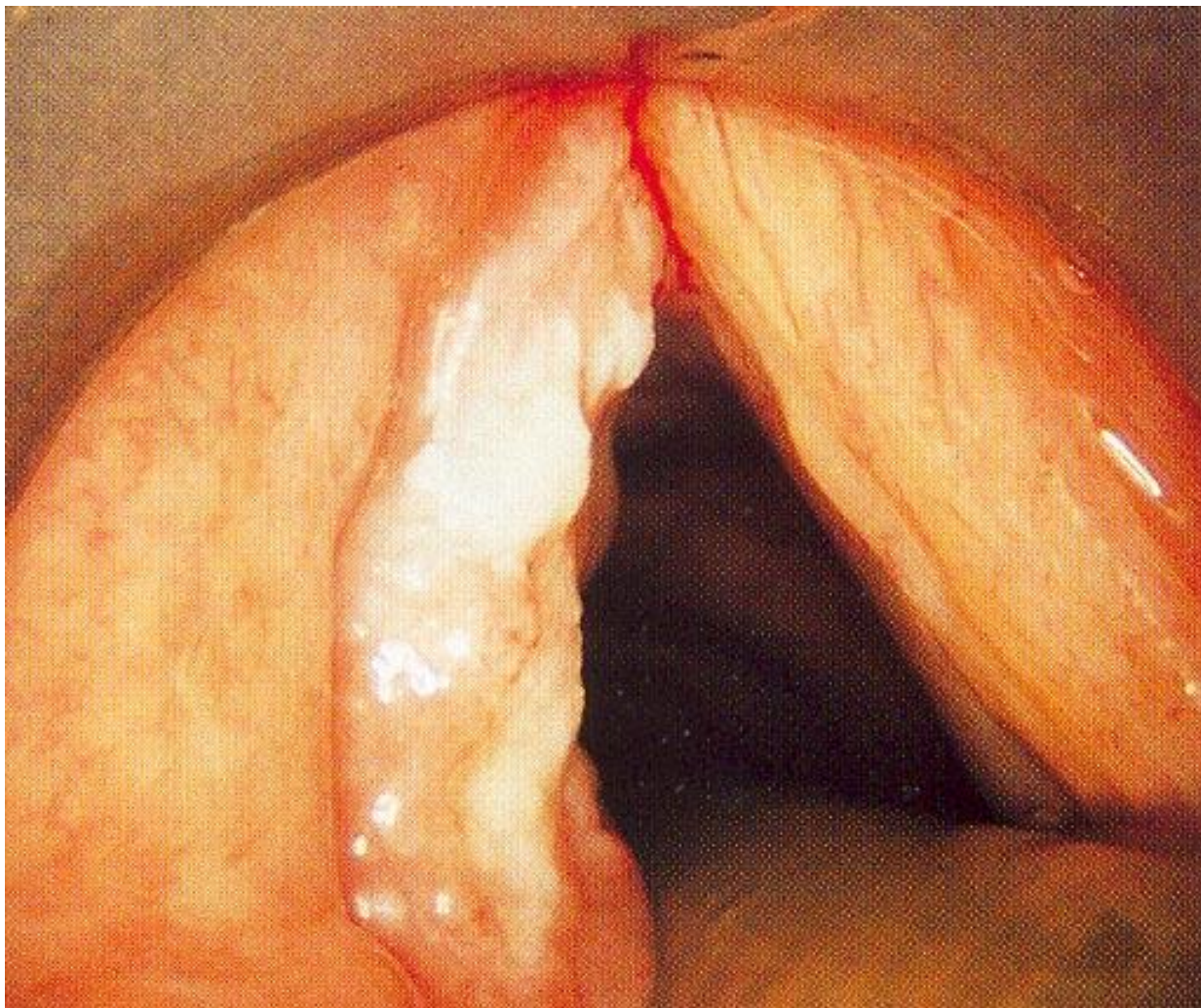
Cystis epiglottidis



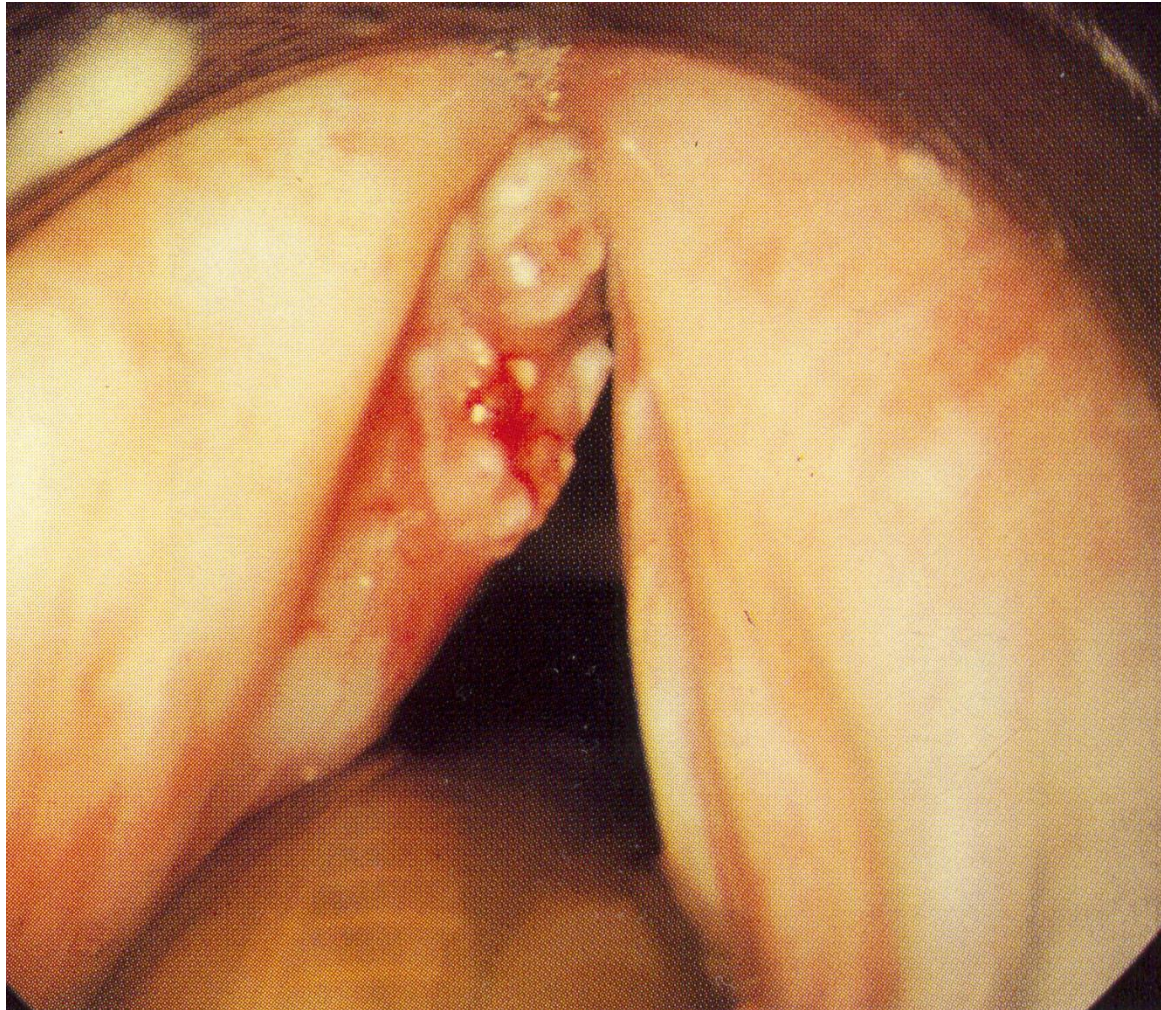
Ca in situ bilat



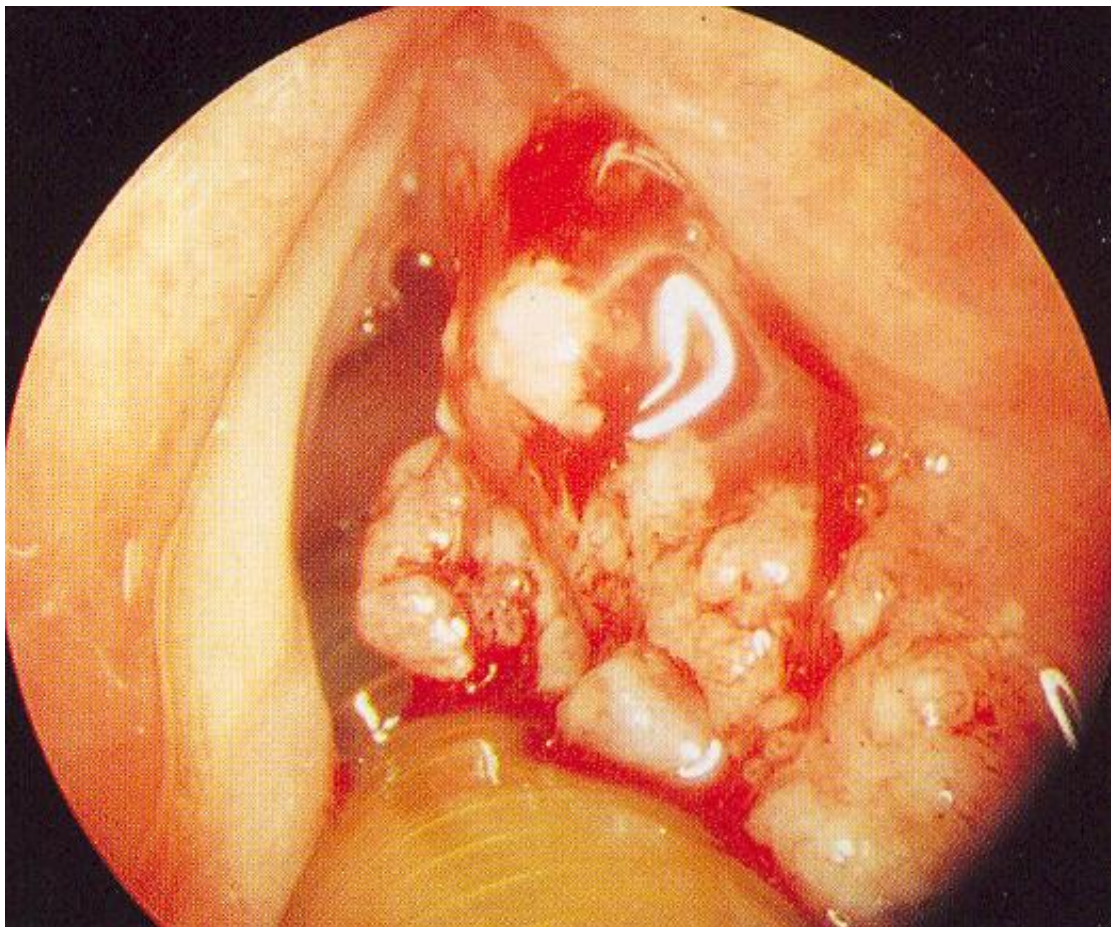
Ca spino plicae voc. I.sin. T1



Ca spino plicae voc. l.sin. T2

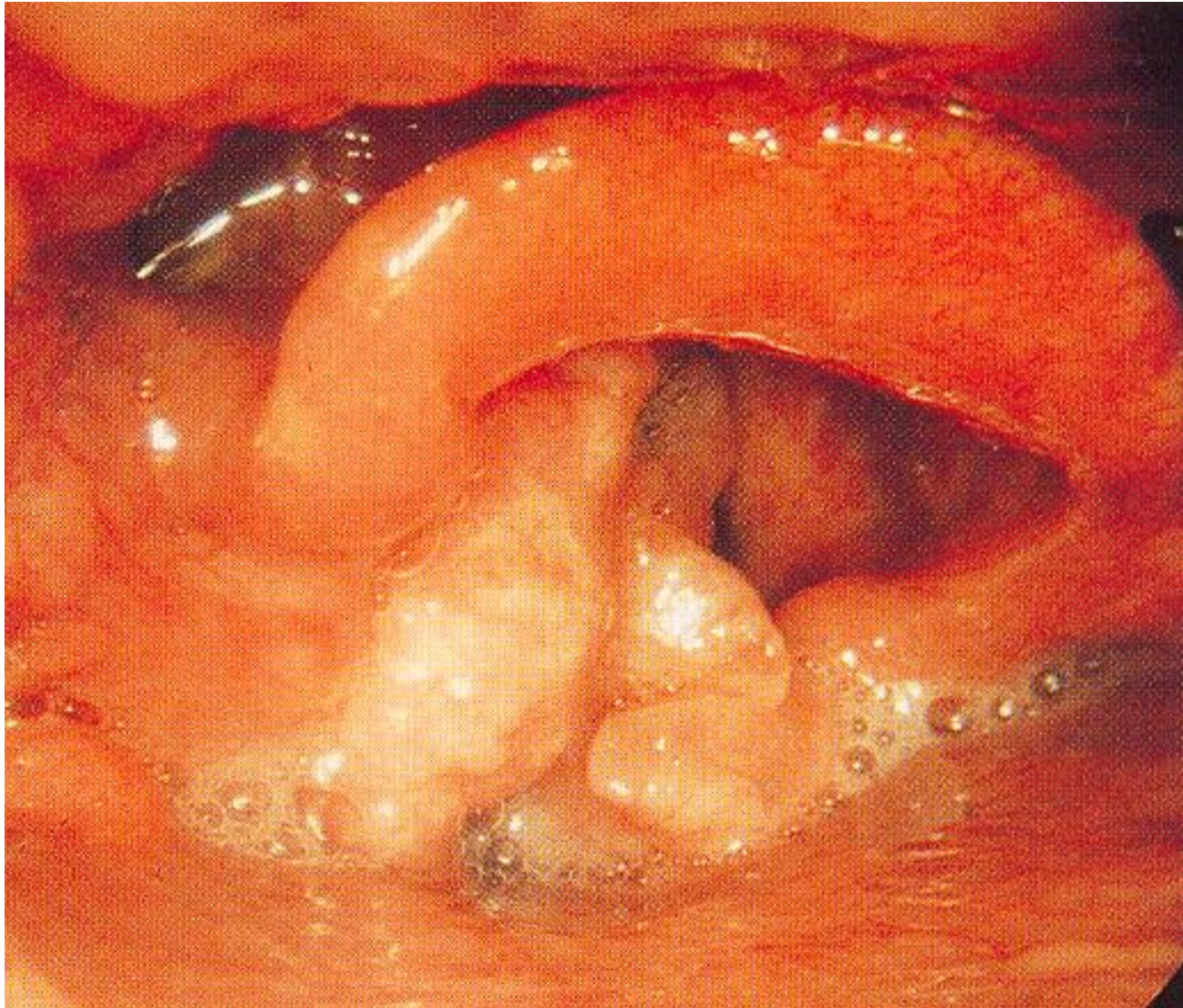


Ca spino plicae voc. l.sin. T3

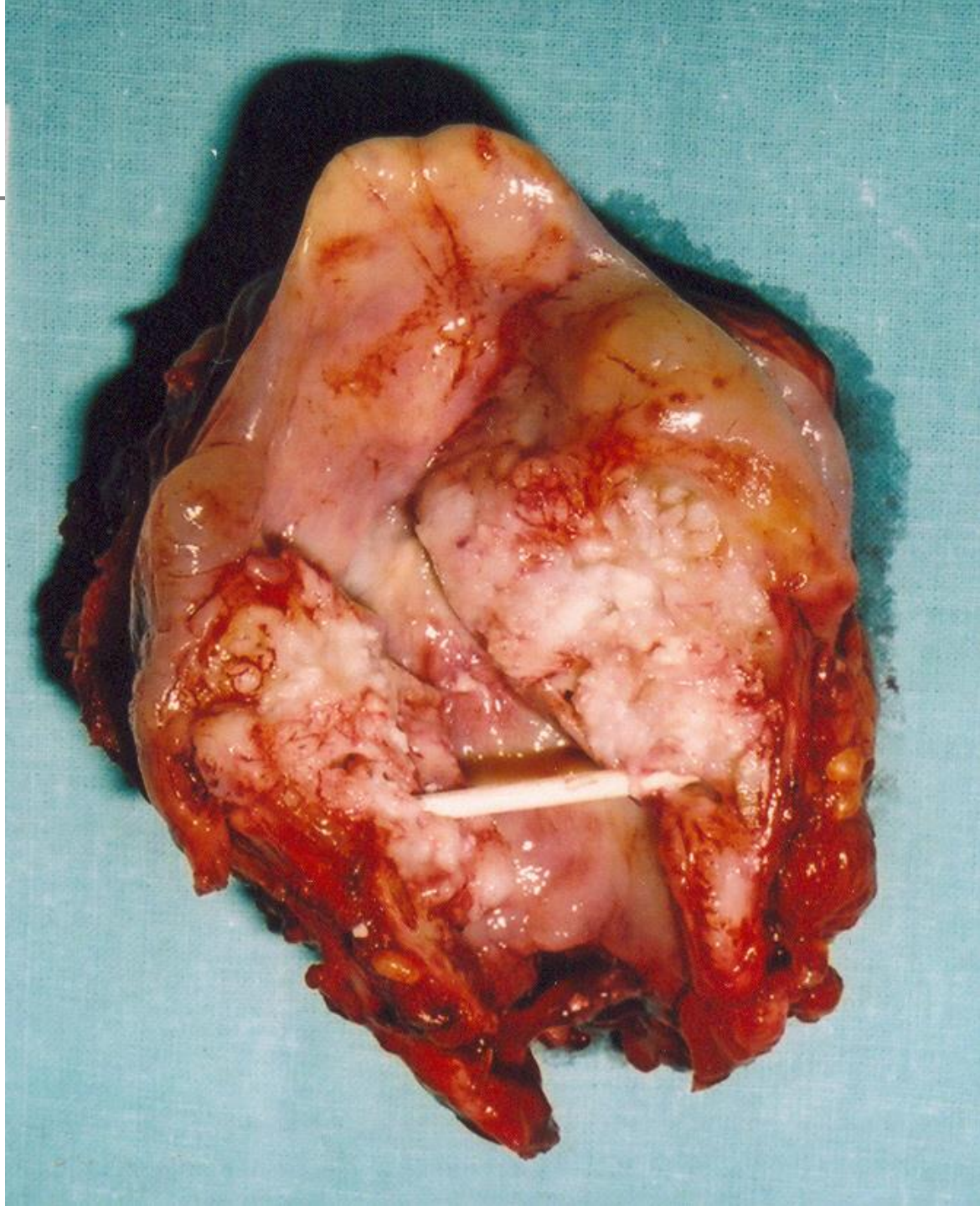




Ca spino sinus piriformis

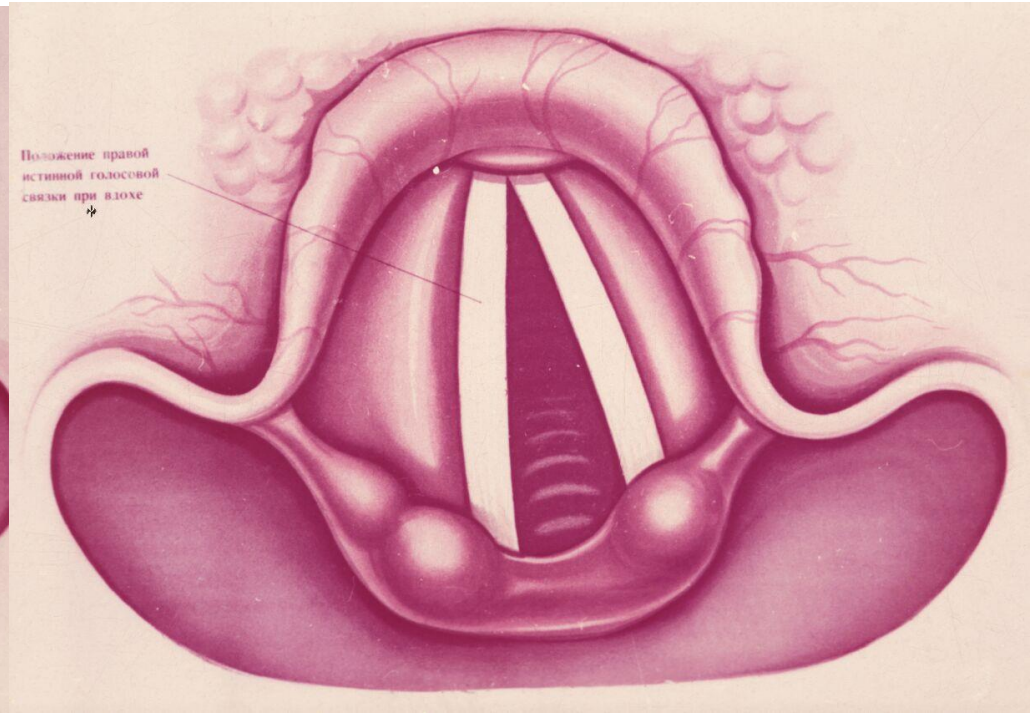
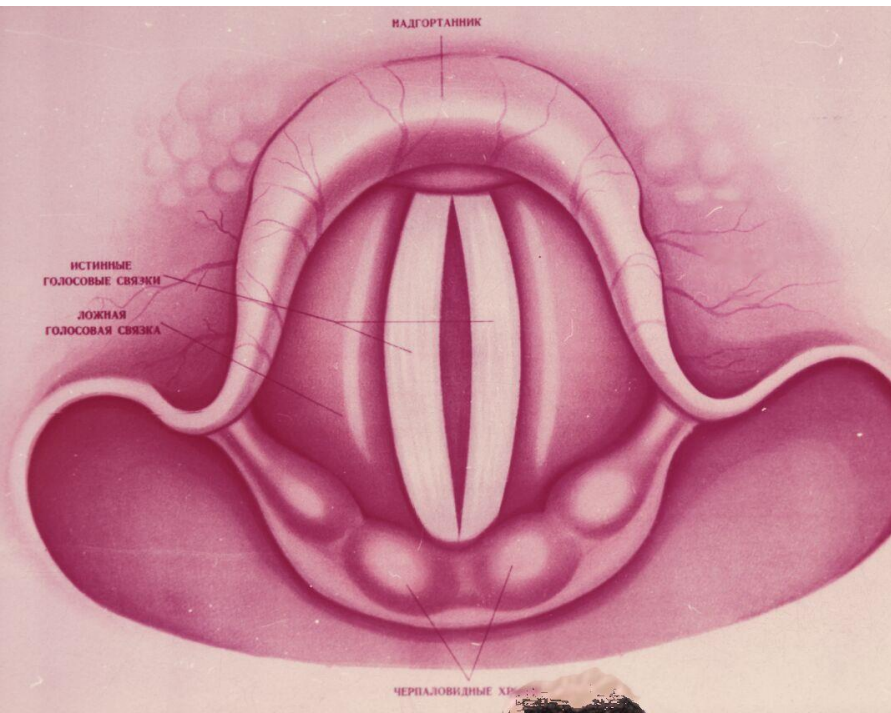


Ca glottis



Disorder of laryngeal motivity

Seeman-Rosenbach rule – in insidious toxic influence on recurrent nerve - first damaged fibers phylogenetically younger (for m. posticus)





Laryngeal injury

Laryngeal injury – external vs internal

Comotio

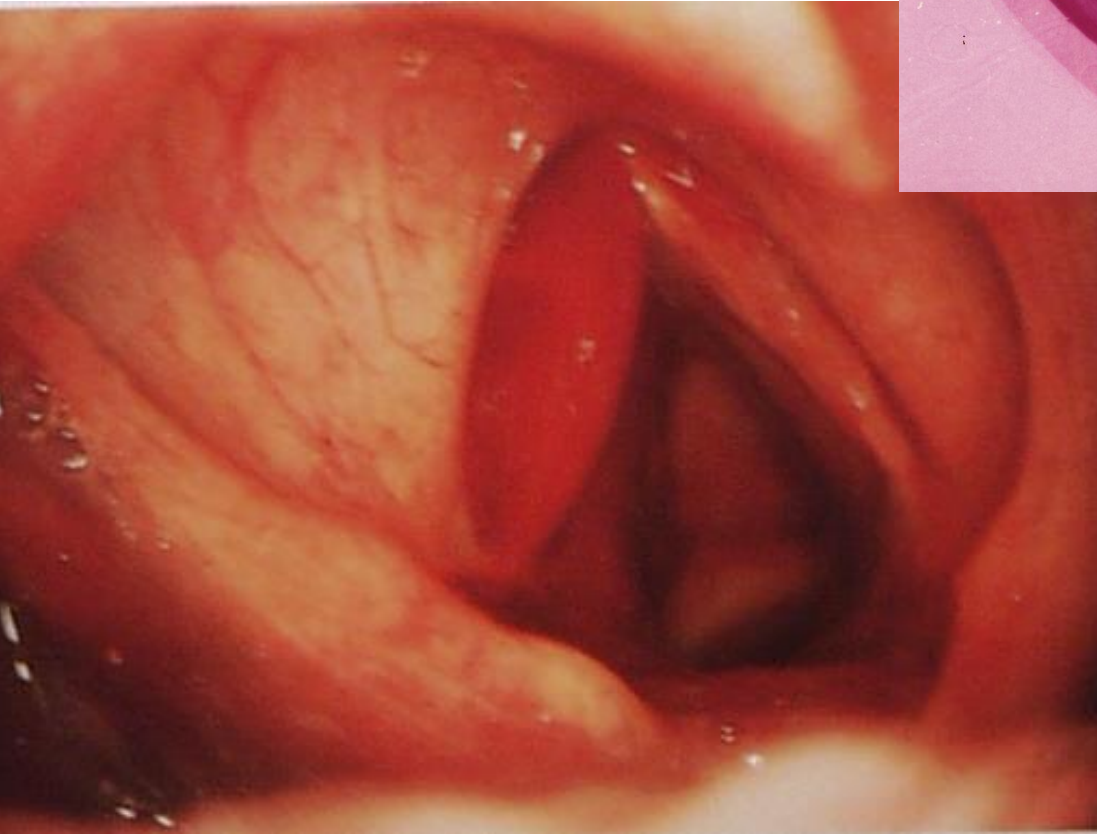
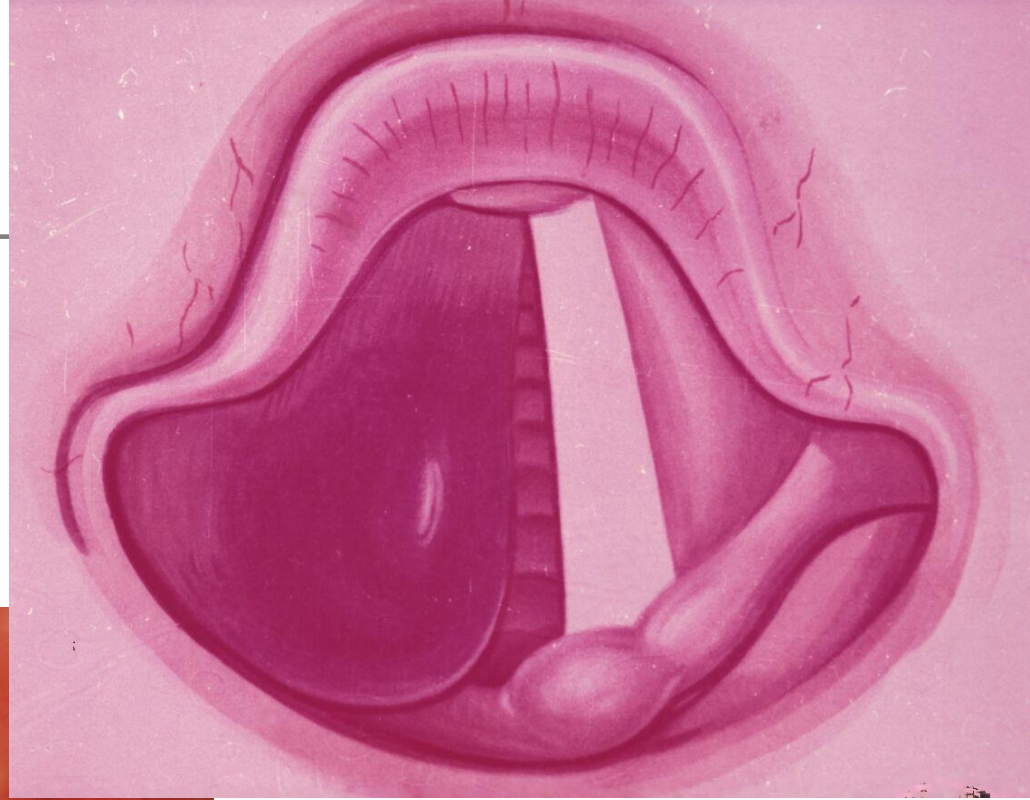
Contusion

Fractures of laryngeal cartilages

Symptoms – according to degree of laryngeal injury

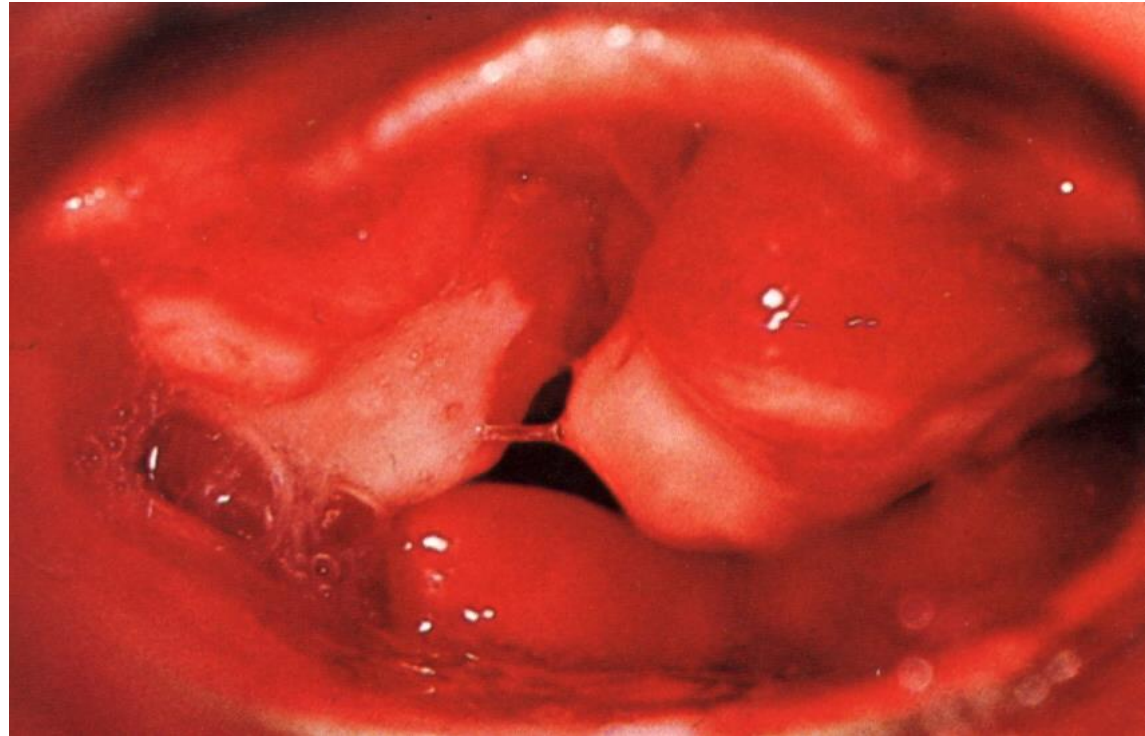
- Dyspnea
- Dysphonia
- Bleeding – not very extensive
- Dysphagia – in connection to injury of pharyngeal and esophageal muscles

Hematoma of the right vocal cord

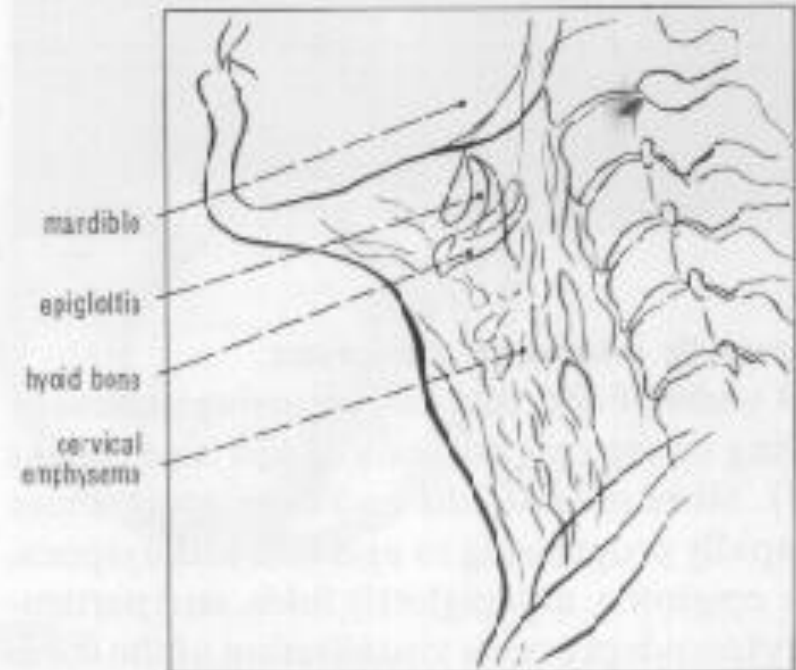
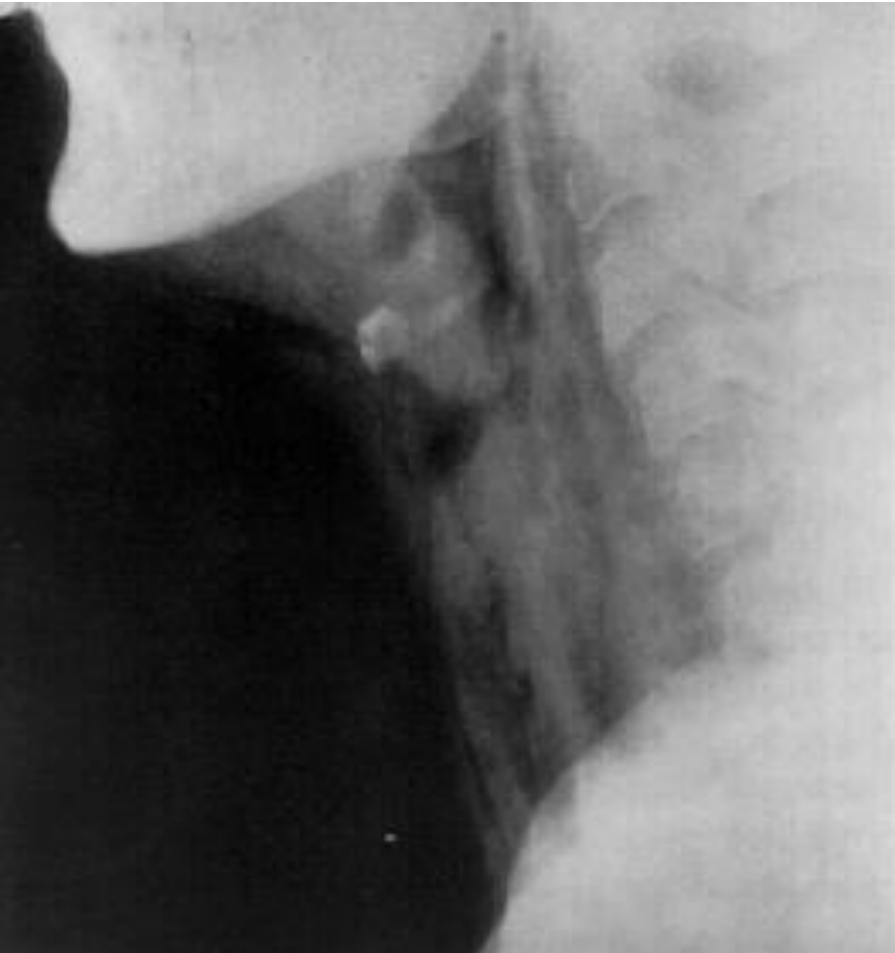


Fracture of laryngeal skeleton

Laryngeal fracture
with a mucosal
hematoma and
dislocation of the
arytenoid



Laryngeal fracture, neck emphysema





External laryngeal injury, first physician aid

- Anti- shock treatment
- care for airway
- Management of bleeding

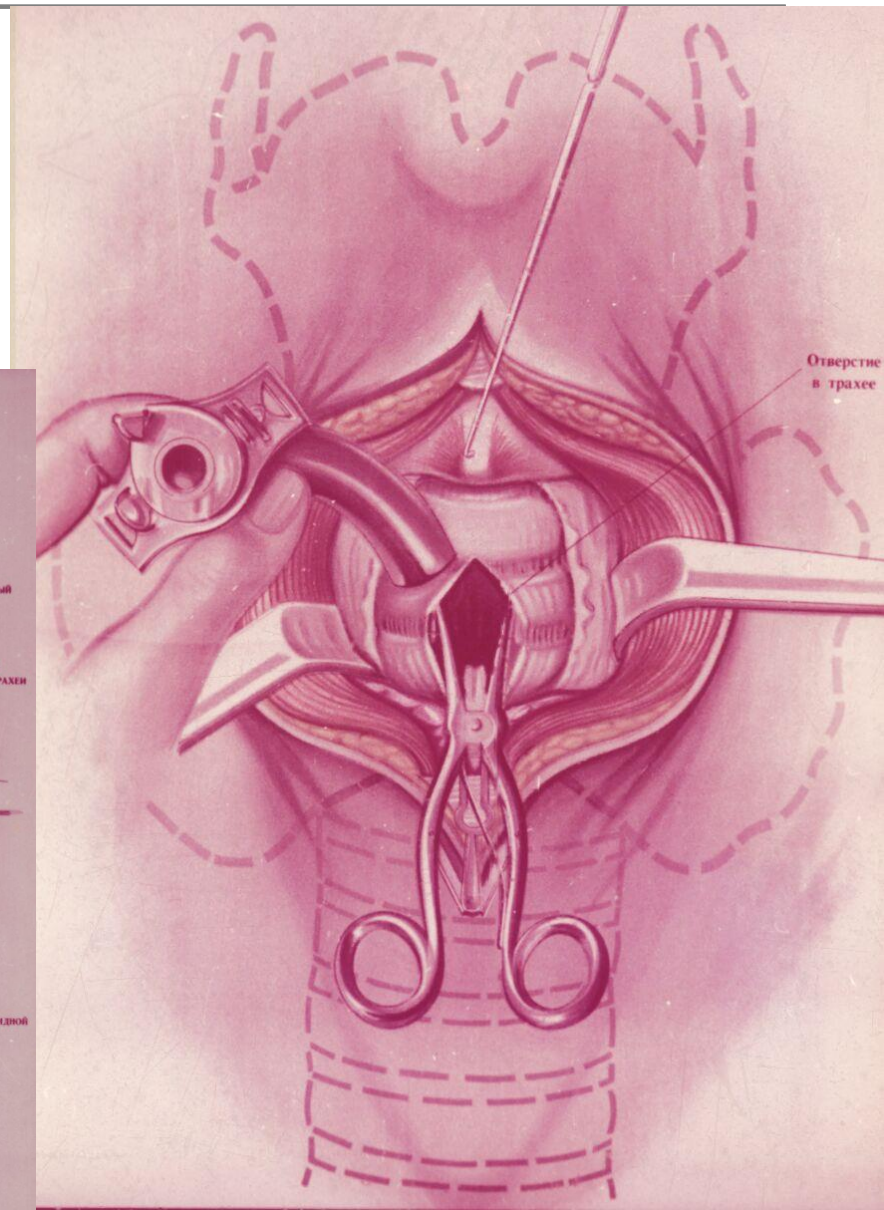
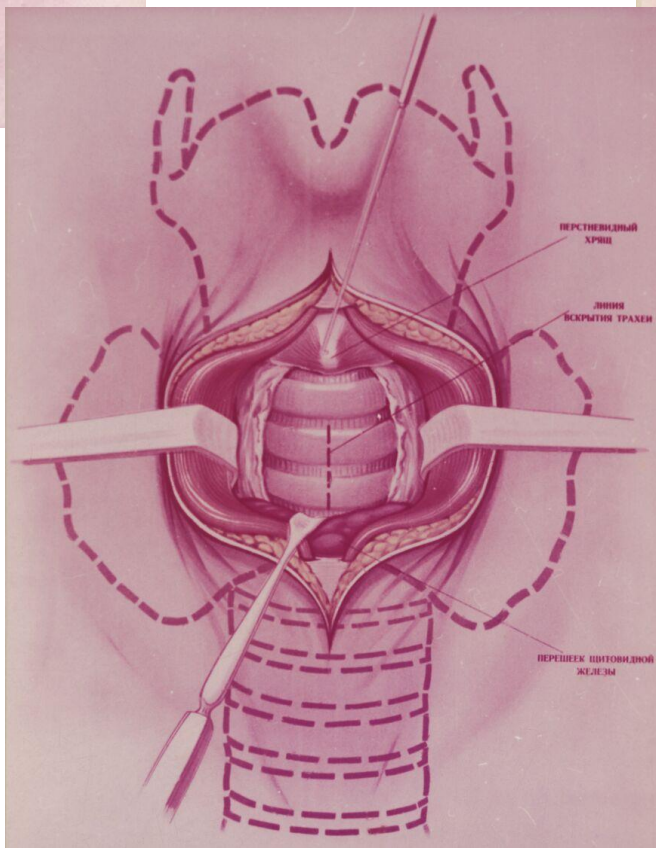
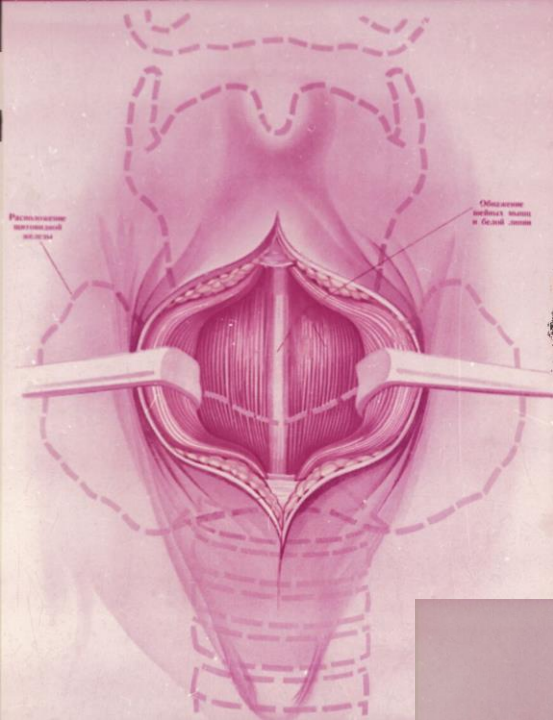
Light injury (blunt trauma) conservative treatment-

1) antihistaminic, corticosteroids, antibiotics, analgesics', oxygen

2) cold compress on neck

3) in dyspnea – coniotomy, intubation, tracheotomy

Tracheotomy



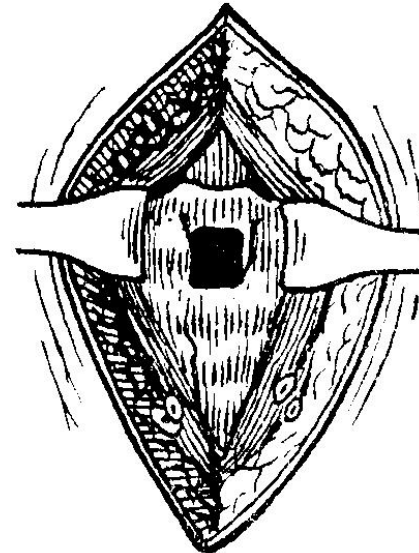
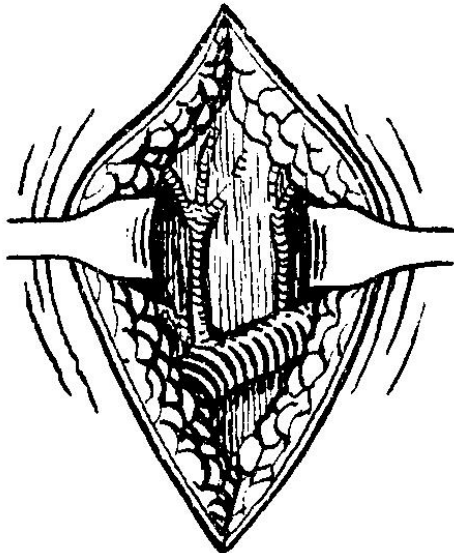
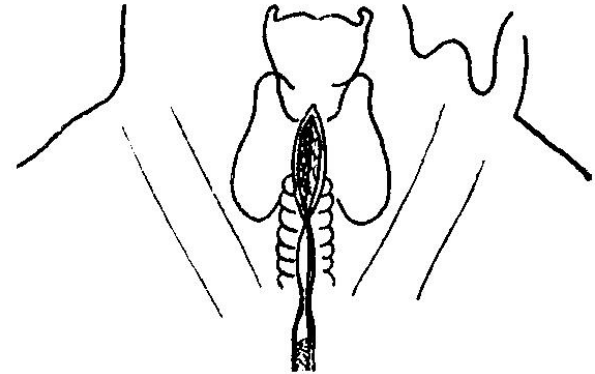
Indication for tracheotomy

„Classic“ – to bridge stenosis caused by inflammation, tumor, foreign body, injury, palsy

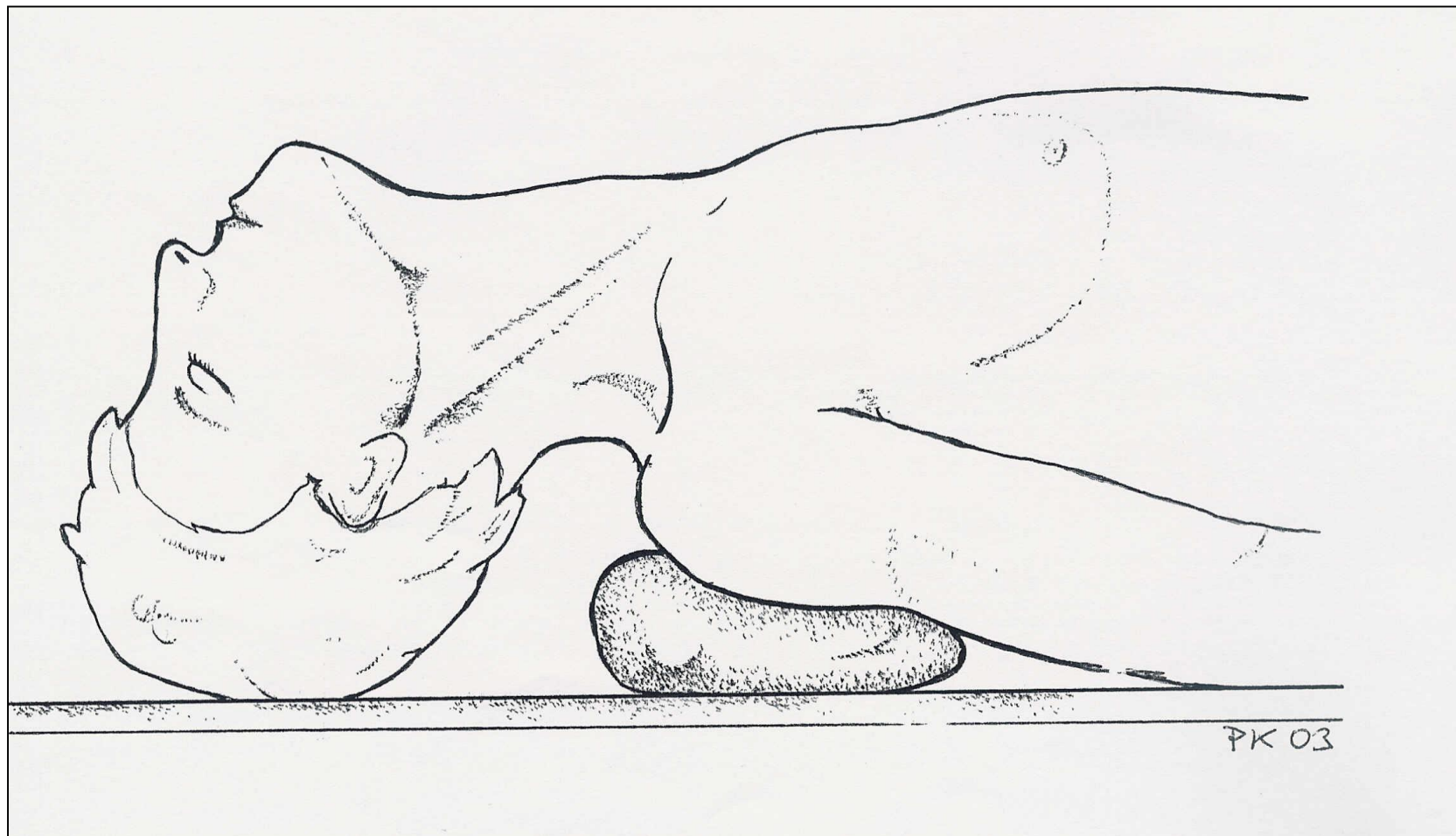
„Prophylactic“ – if we suppose possible stenosis (big surgery, swelling, bleeding, irradiation...)

„Anesthesiologic“ long term intubation of patient (prophylaxis of intubation injury, aspiration; reduction of dead space in airway, suction...etc.)

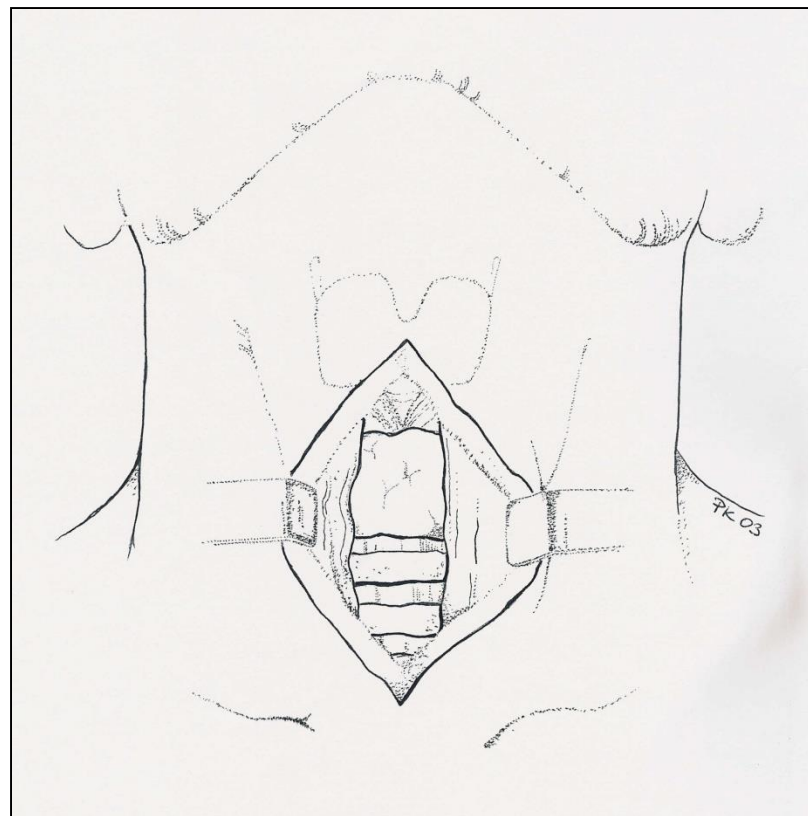
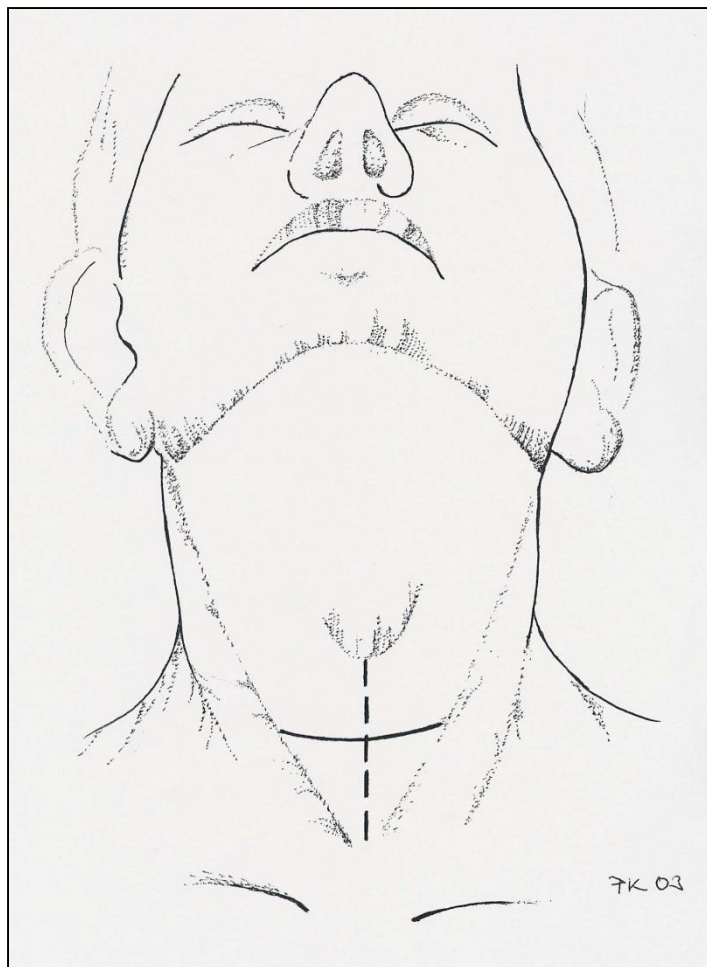
Tracheotomy



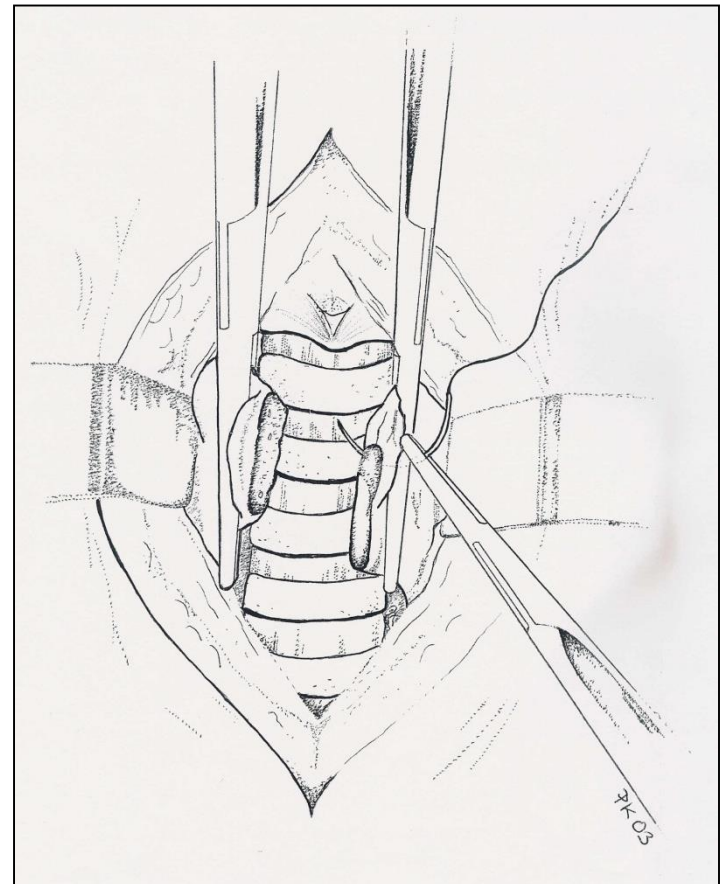
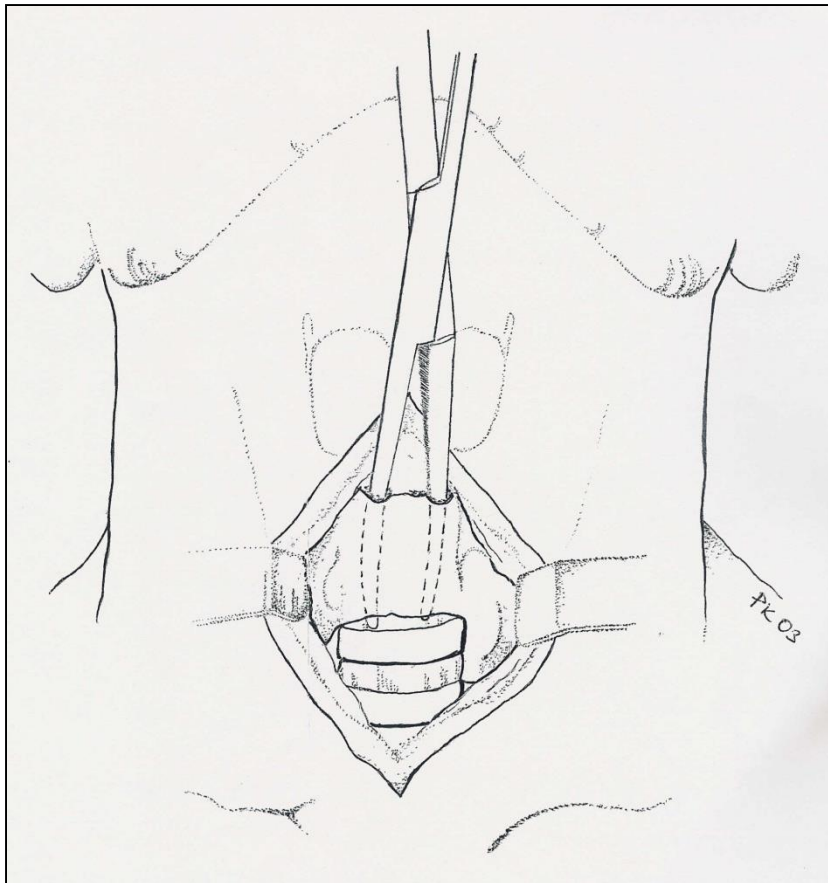
Position in tracheotomy



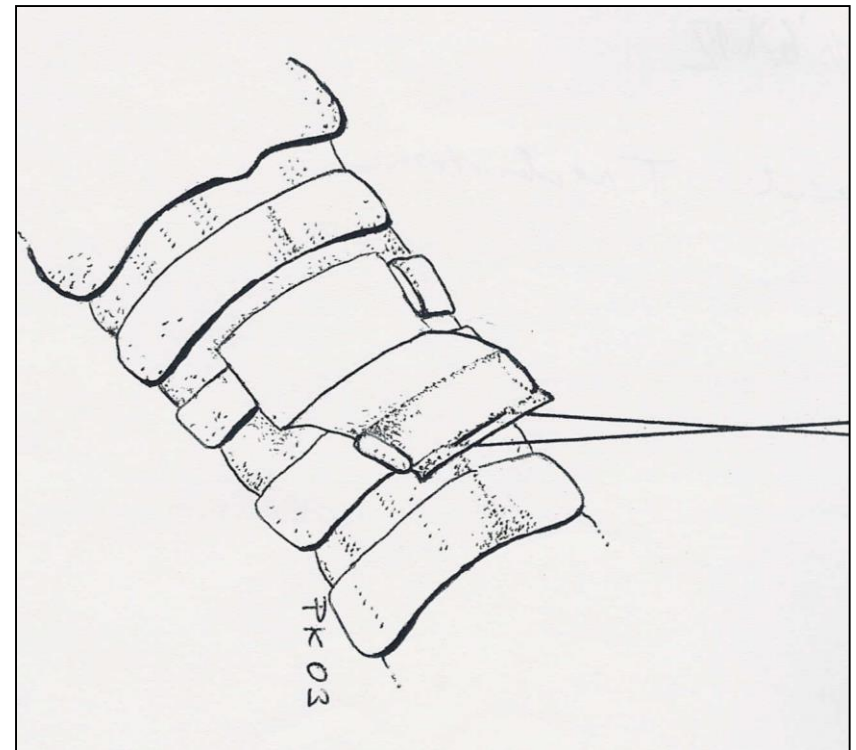
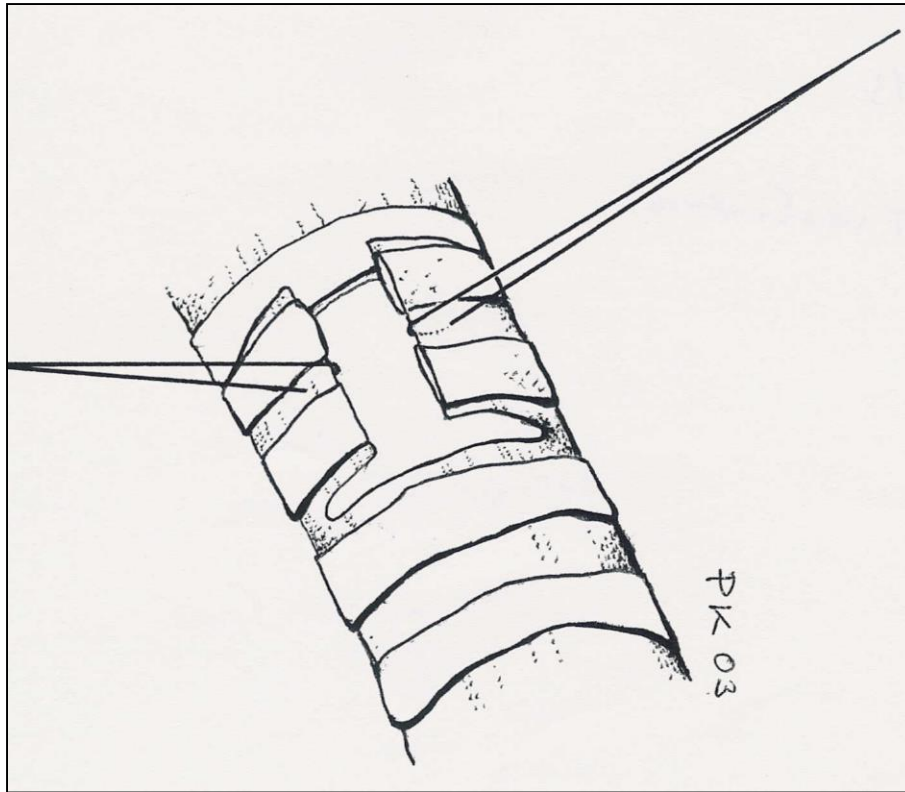
Skin section – horizontal or vertical



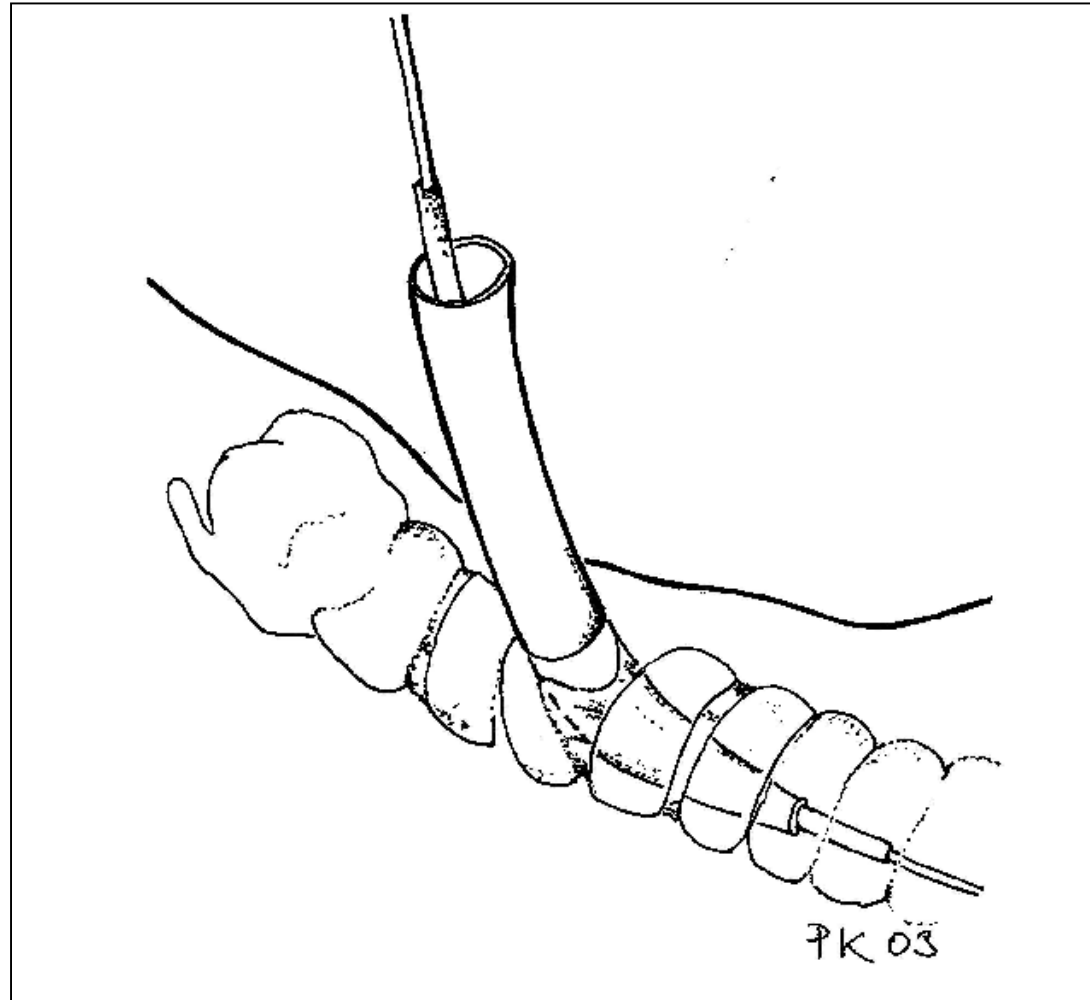
Thyroid gland isthm resection



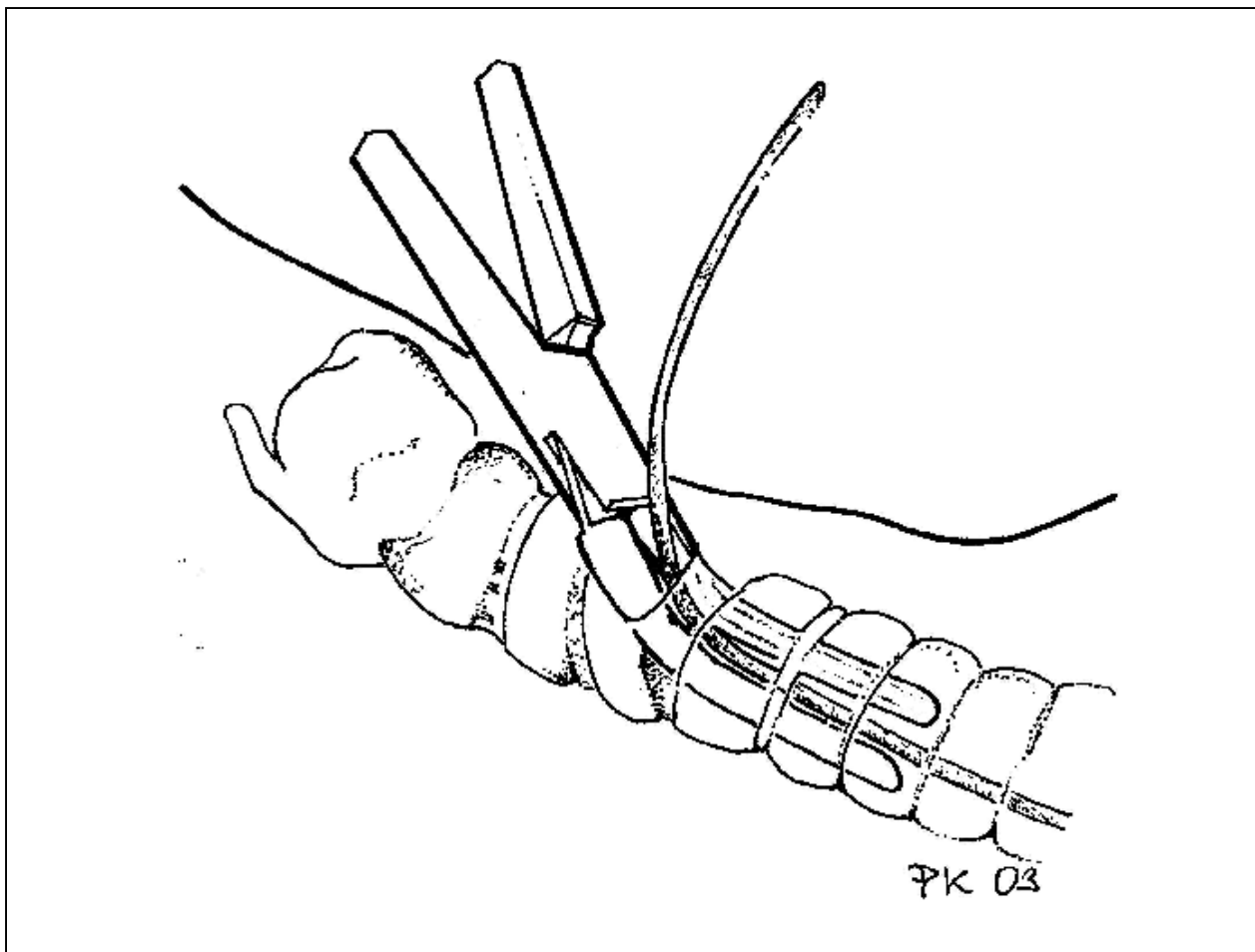
Trachea opening



Puncture, dilatation tracheotomy - Ciaglia (1985)



PDT – Griggs (1990)



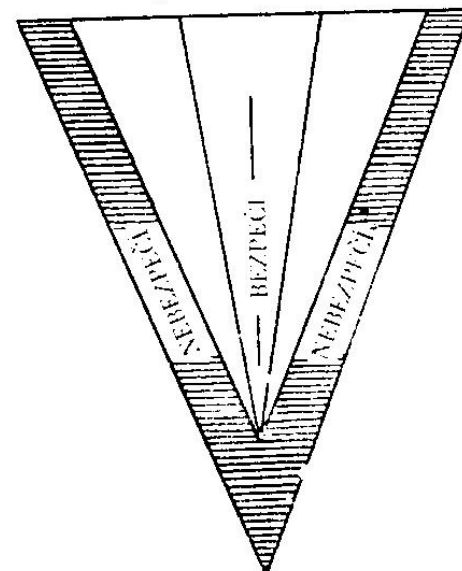
Complication in tracheotomy

During surgery bleeding, dyspnea, lost of orientation,

Early post surgery emphysema,
embolism, mediastinal emphysema,
pneumothorax, inflammation bleeding,
no corresponding opening in trachea
and on the skin – problems with
exchange o tracheal cannula

Late post surgery stenosis

(C. CRICOID)



Orientační trojúhelník při tracheotomii
(podle Ch. Jacksona):

Černá ramena trojúhelníku značí nebezpečnou oblast svazku velkých krčních cév. Střední čára značí bezpečí jak před krvácením, tak před funkčními poruchami hrtanu. Směrem kaudálním od chrupavky prstencové, která tvoří základnu trojúhelníku, bezpečí ubývá, poněvadž se obě nebezpečné zóny sblíží