



PÉCSI TUDOMÁNYEGYETEM
ÁLTALÁNOS ORVOSTUDOMÁNYI KAR

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Nose – from ENT surgeon's point of view

László Lujber

ENT, Head and Neck Surgery Department
University Pécs, Medical School

Nose

- ◆ Aesthetics
- ◆ Function

- breathing
- smelling
- phonation
- heating, moisturising, cleaning of inhaled air
- absorption takes place on mucosal surfaces
- etc...

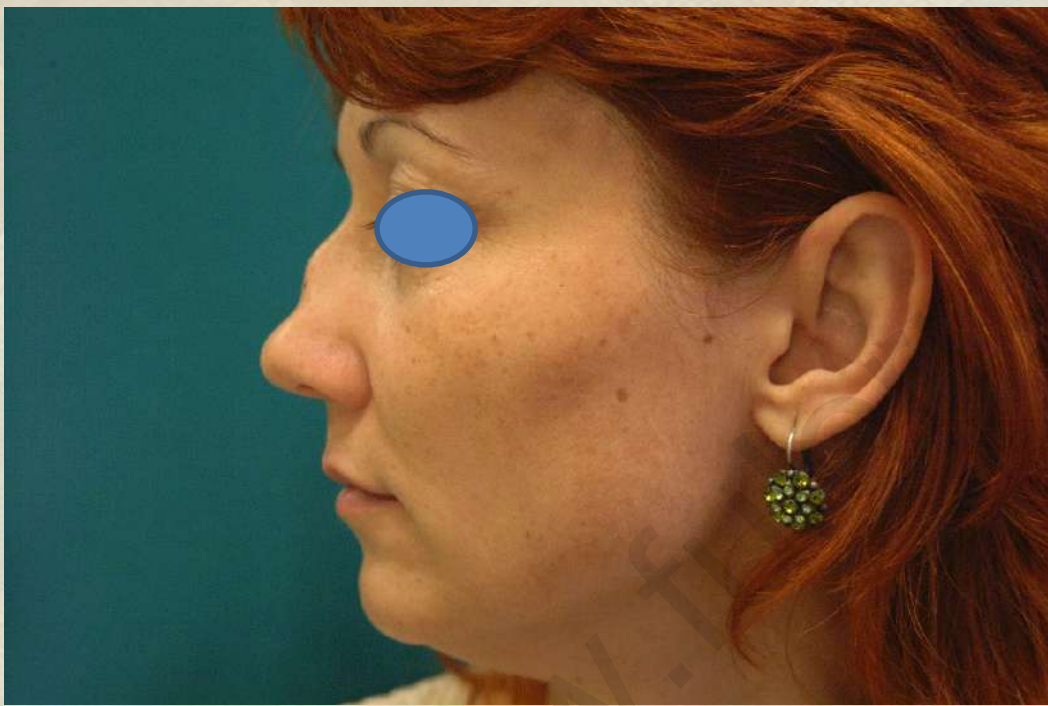


External nose

Underdeveloped or missing nasal bone – sign of different congenital disorder
e.g. **DOWN SY.**

- Important feature in the diagnostics of Down`s sy during intrauterine 4D US examination.
- Characteristic facial appearance in diff. genetic disorders.





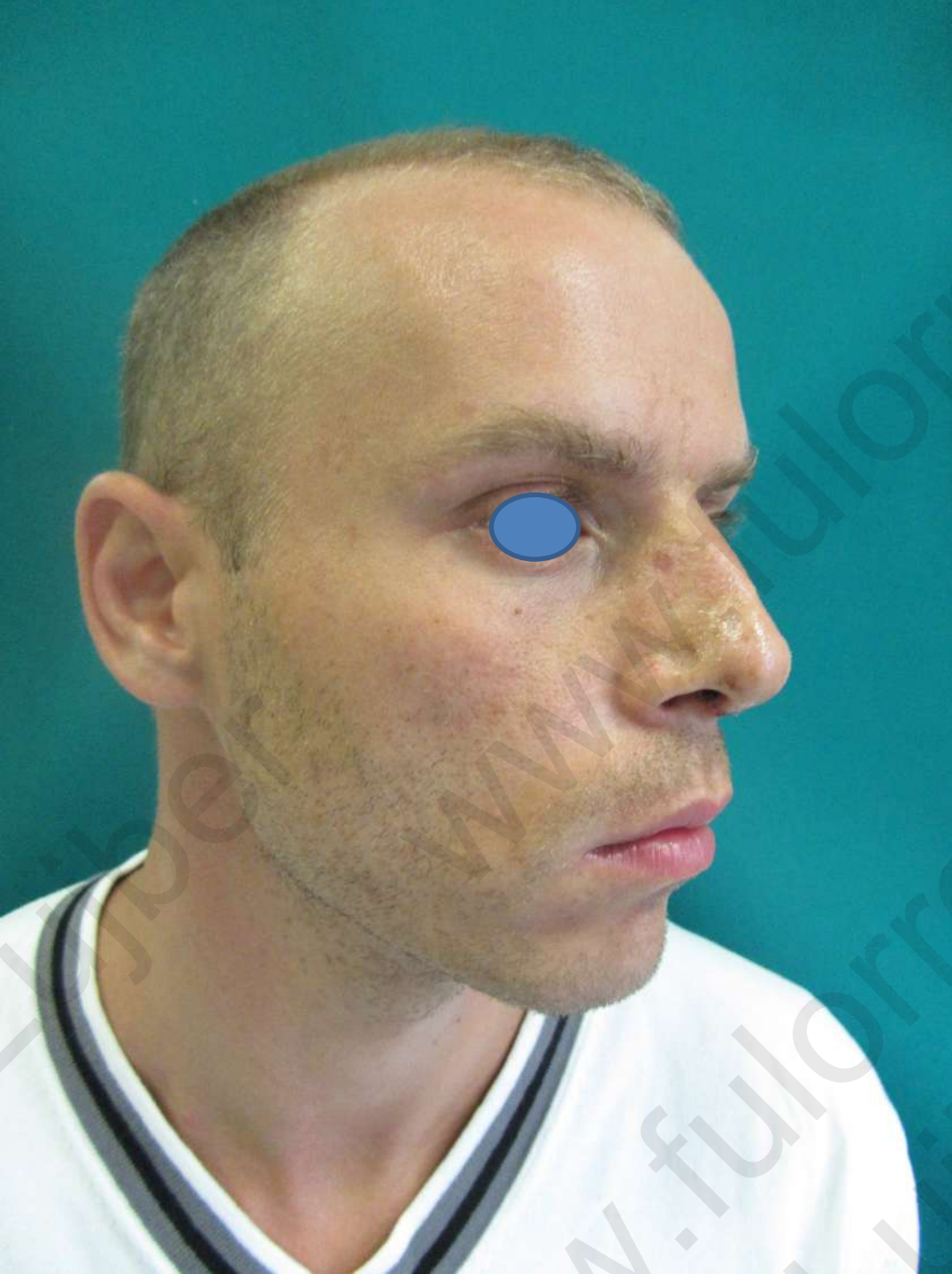
MUA of fractured nasal bone

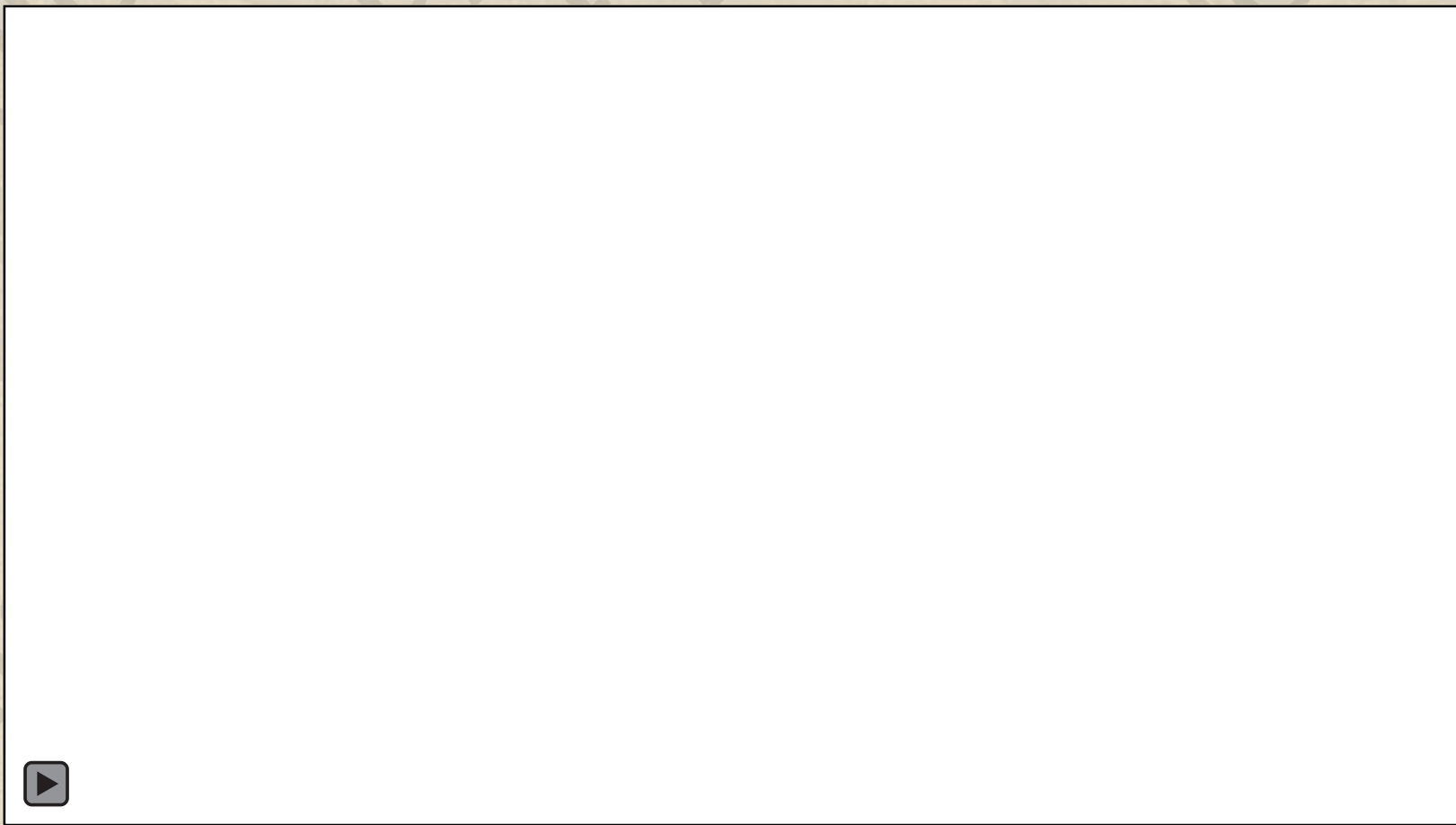
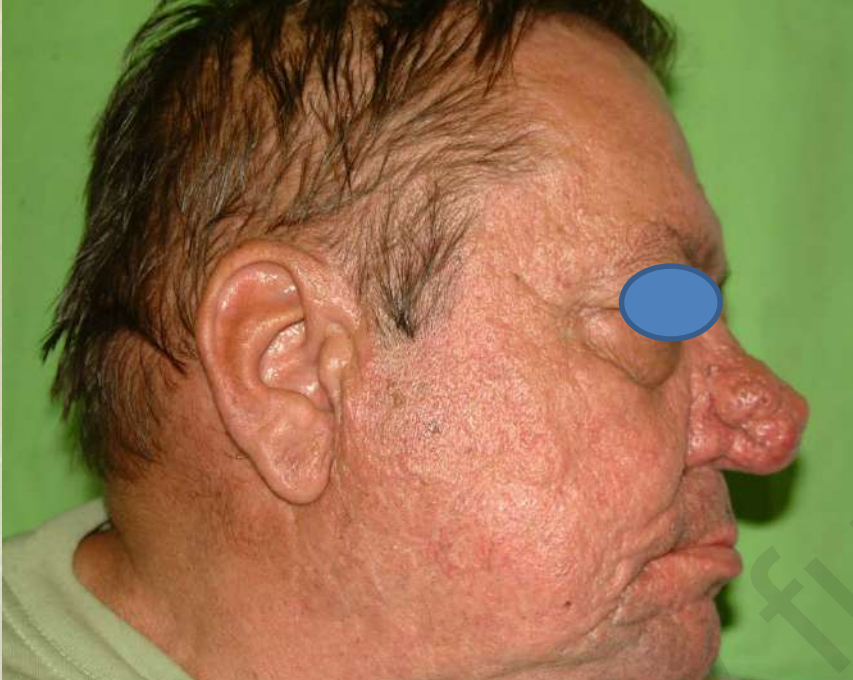
- acutely ASAP or within 3 weeks of the injury
- later only by rhinoplasty



Rule out **septal haematoma** → septal abscess → intracranial complication













Examination of the nose

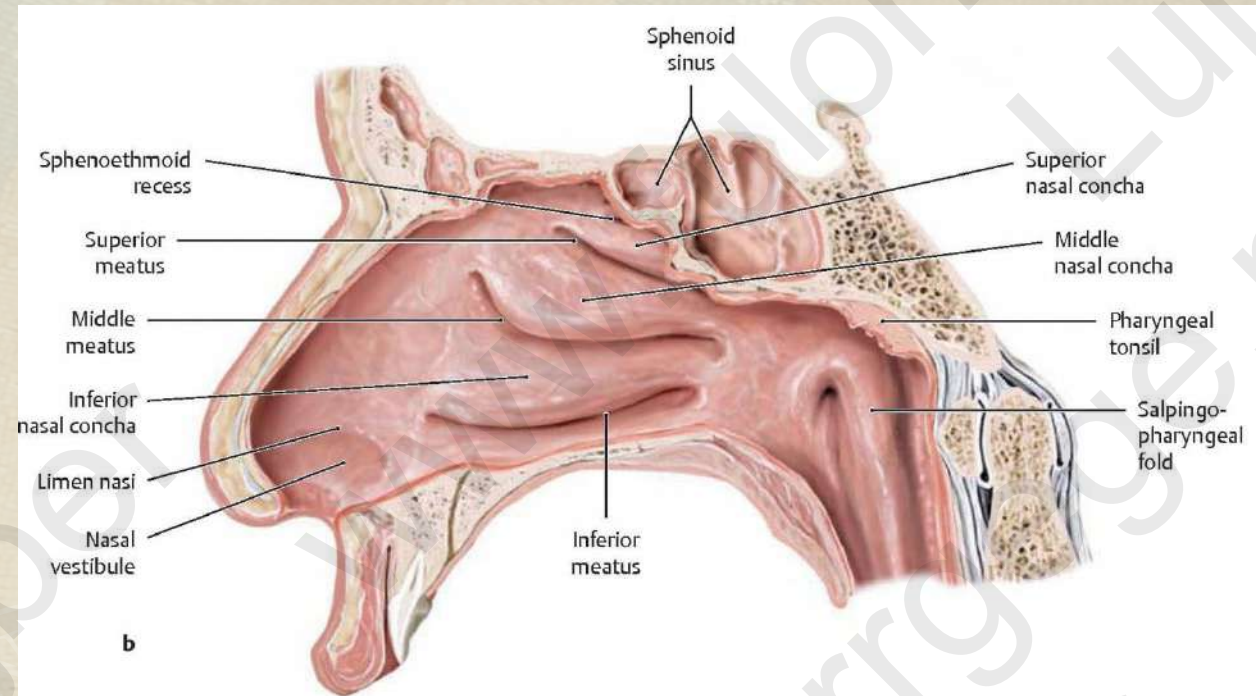


Looking into the depth of the nasal cavity → endoscopes!!!



NASAL CAVITY – anatomy is complex!

- Lamina cribrosa** - thin fragile bone → easily breaks during surg. or at skull base fracture → CSF leak
- drugs / meds. can penetrate intracranially → gyógyszerek, drogok felszívódása;
 - anosmia, hyposmia, kakosmia (Alzheimer`s)
 - anterior skull base surgery via this route



B Mucosa of the nasal cavity

b Mucosa of the right lateral nasal wall, viewed from the left side.

Illustrator: Karl Wesker

pp. 114-115

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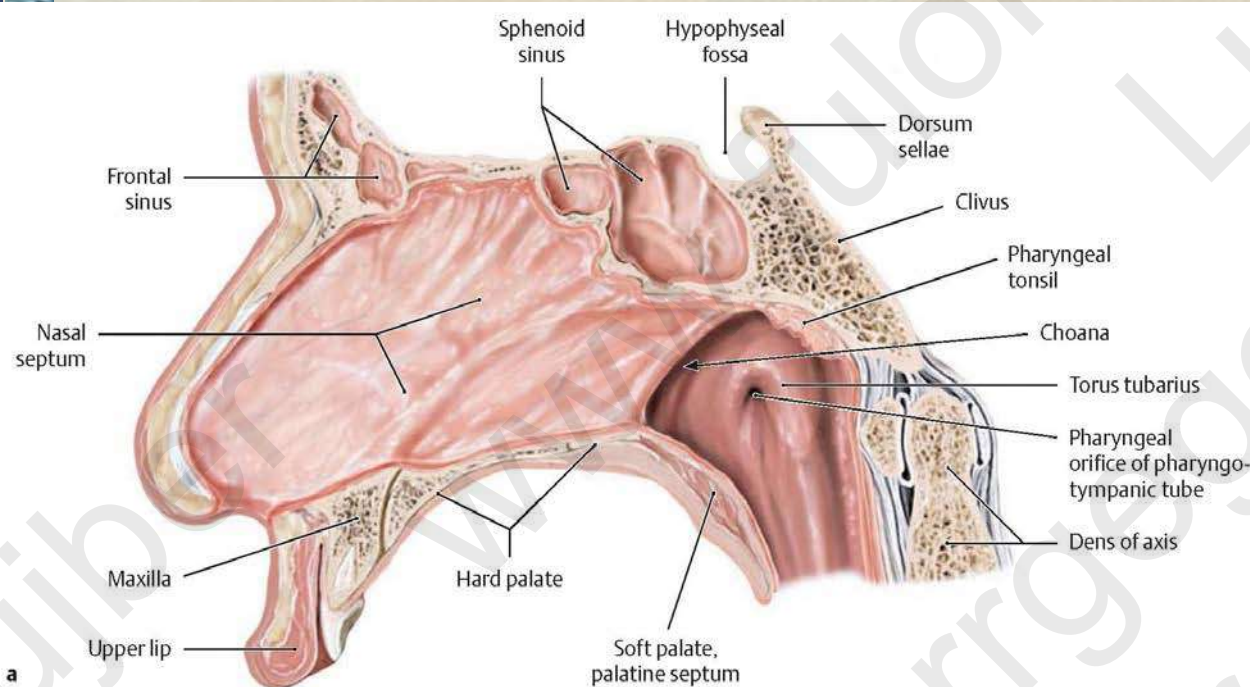
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Choana – atresia, leads to the nasopharynx and to GI tract + airways

Floor of nose – hard and soft palate
- cleft palate!

Nasal septum- cartilage & bone



B Mucosa of the nasal cavity

a Mucosa of the nasal septum, parasagittal section viewed from the left side.

Illustrator: Karl Wesker

pp. 114-115

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SM - posterior ethoids (cellulae ethmoidales

- sinus sphenoidalis

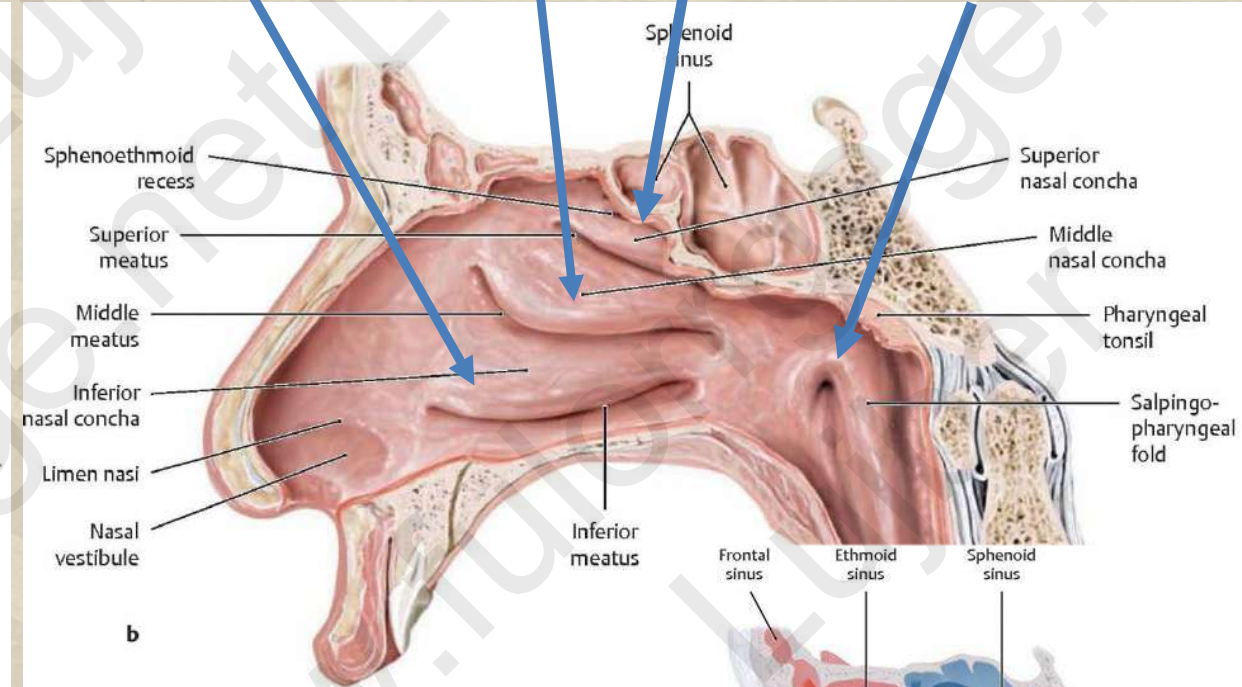
MM - anterior ethmoids

- sinus frontalis

- sinus maxillaris

IM - nasolacrimal duct

ET Eustachian tube



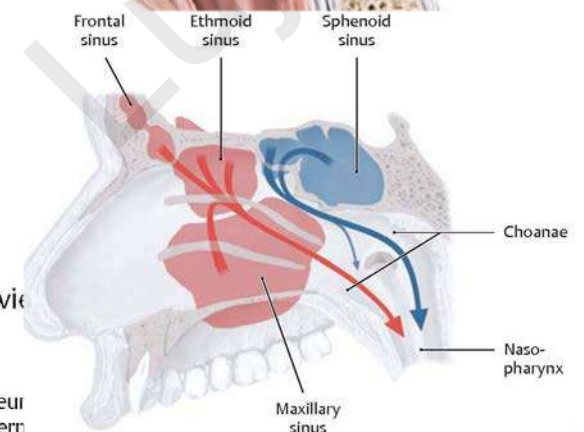
B Mucosa of the nasal cavity

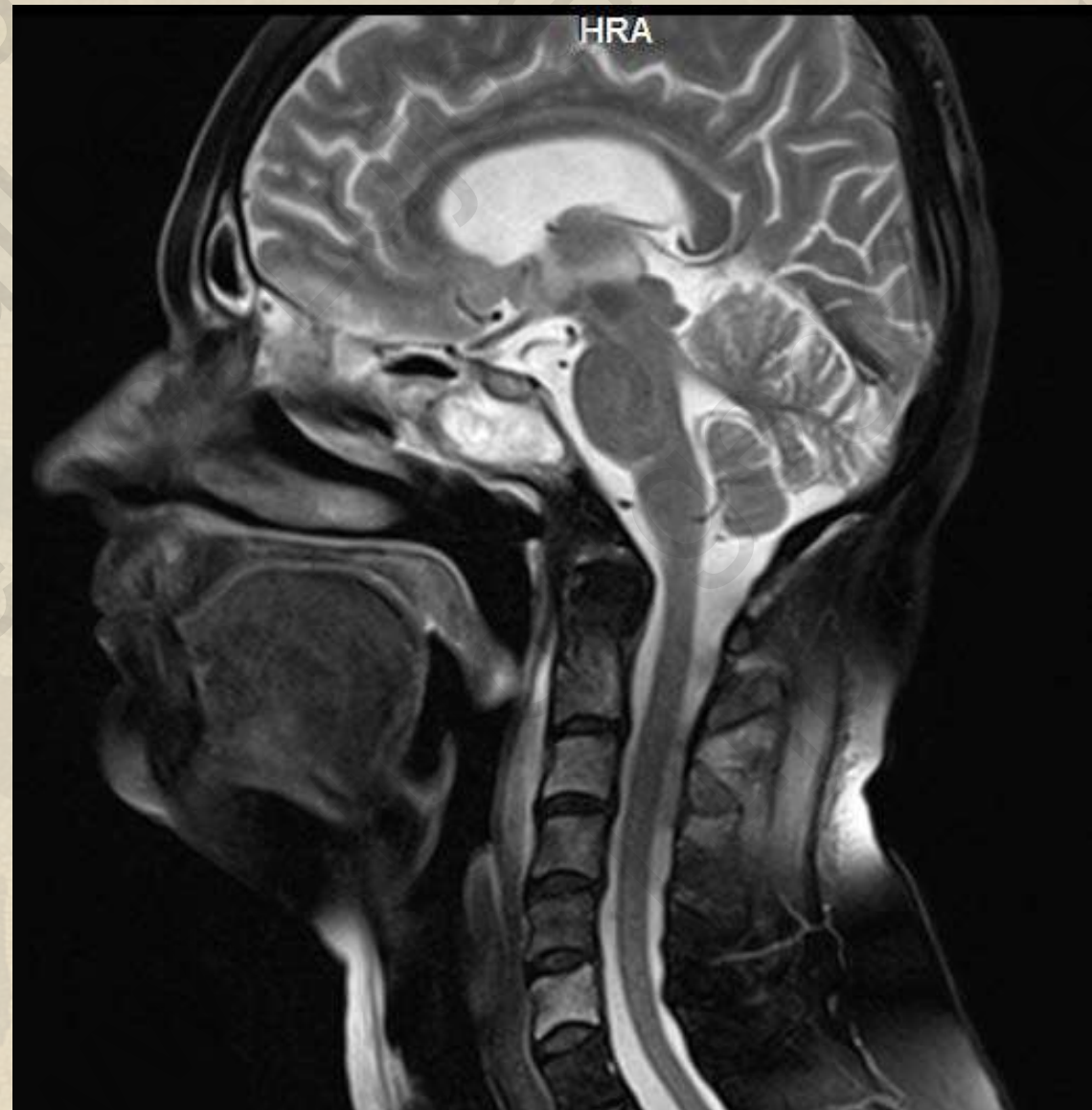
b Mucosa of the right lateral nasal wall, view from the right side.

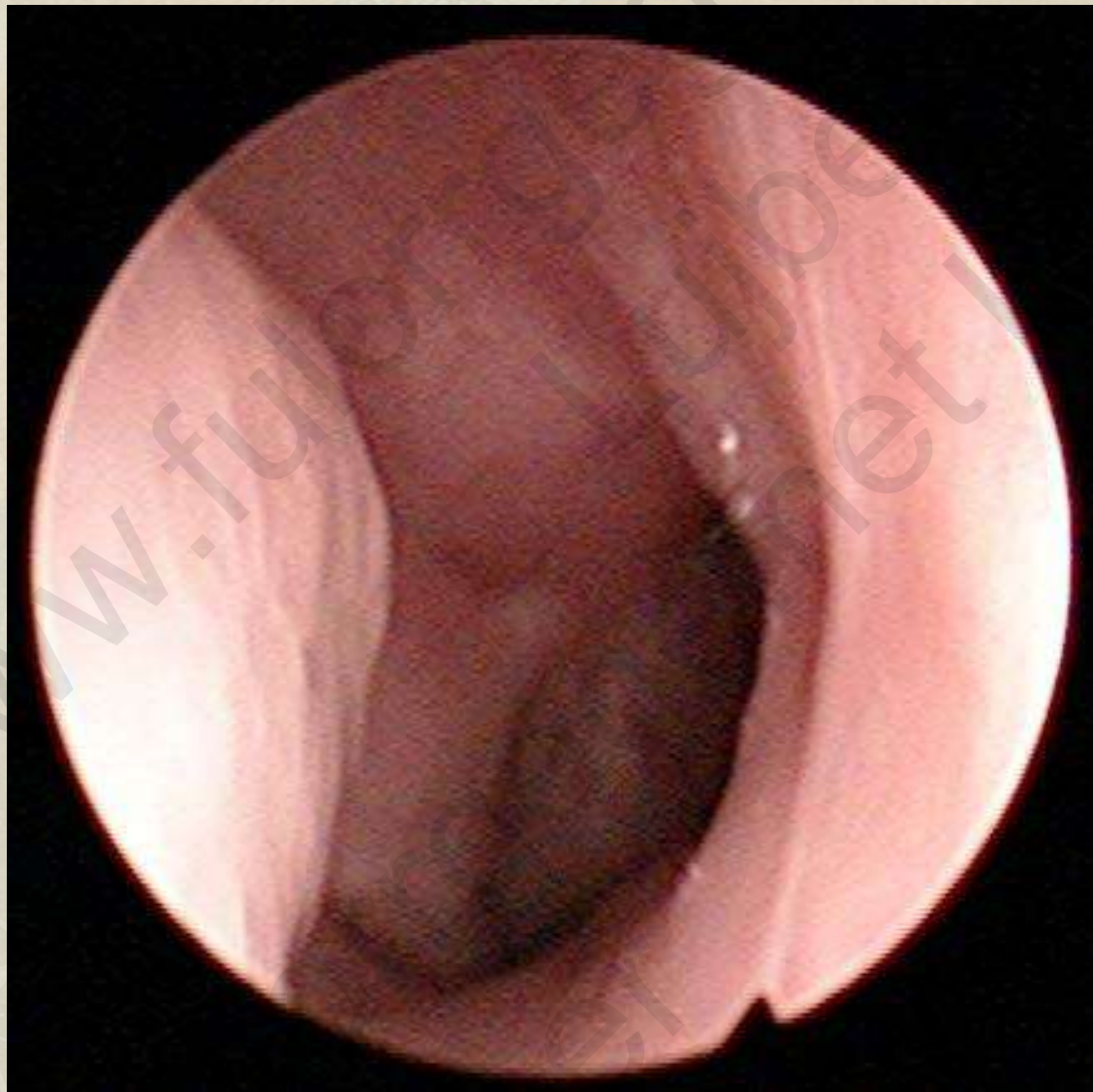
Illustrator: Karl Wesker

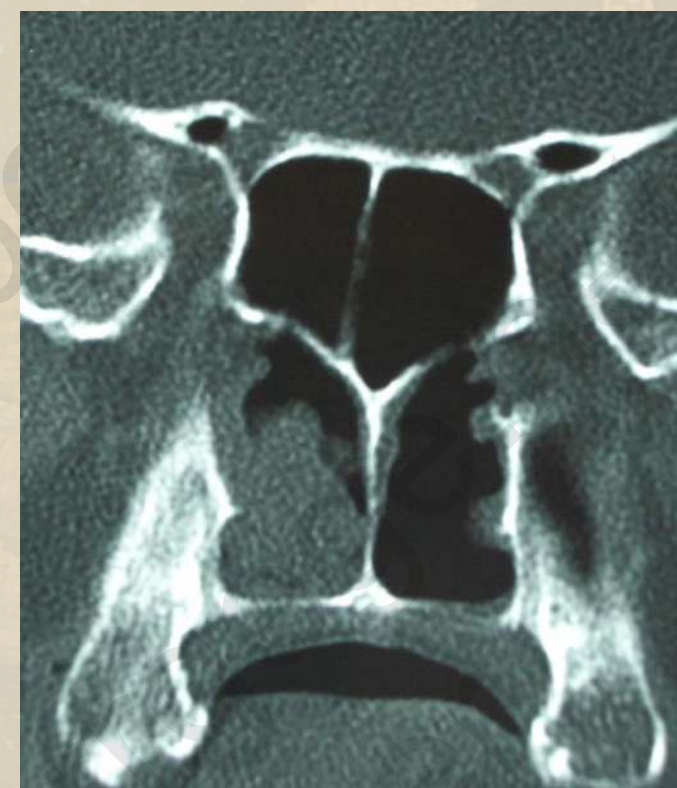
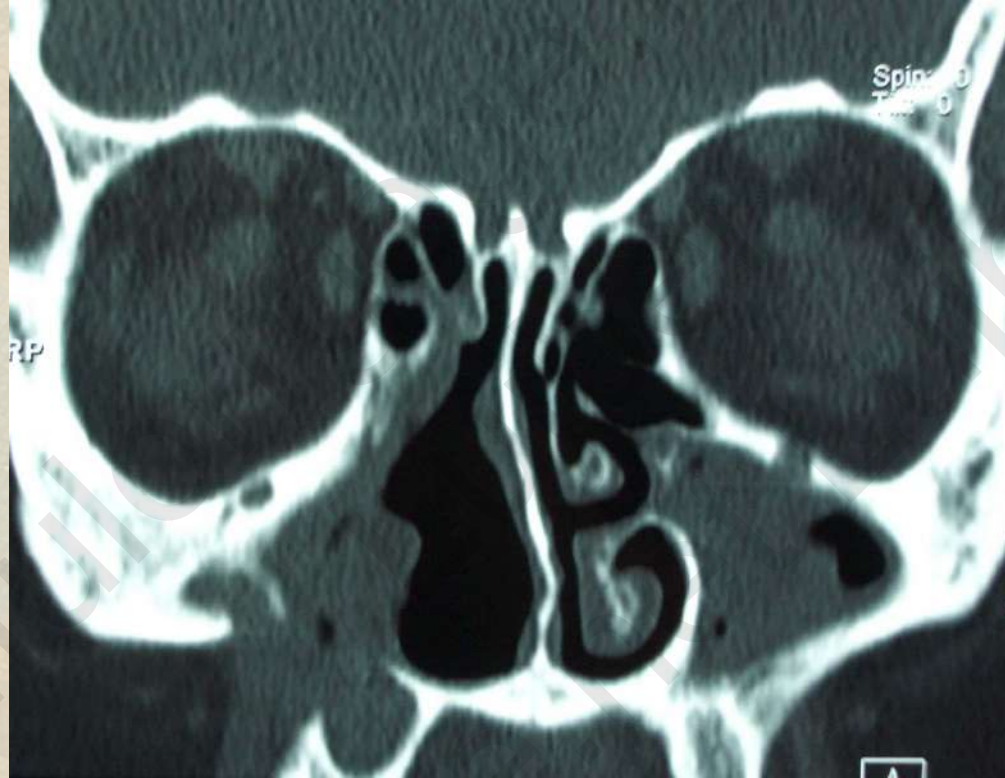
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Brain - infection/tumor spread from sinuses to CNS

- trauma = CSF leak or loss of sense of smell
- absorption of meds., drugs
- anterior skull base surgery via the nose

Eye - infection/tumor spread from sinuses to orbits

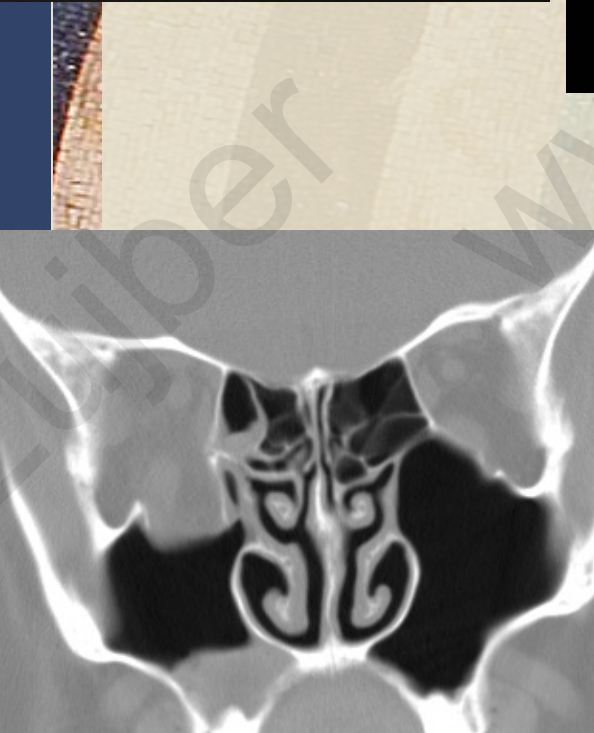
- trauma “blow-out” fracture
- dacryo-cysto-rhinitis (nasolacrimal duct obstruction)



Nasal floor - cleft palate

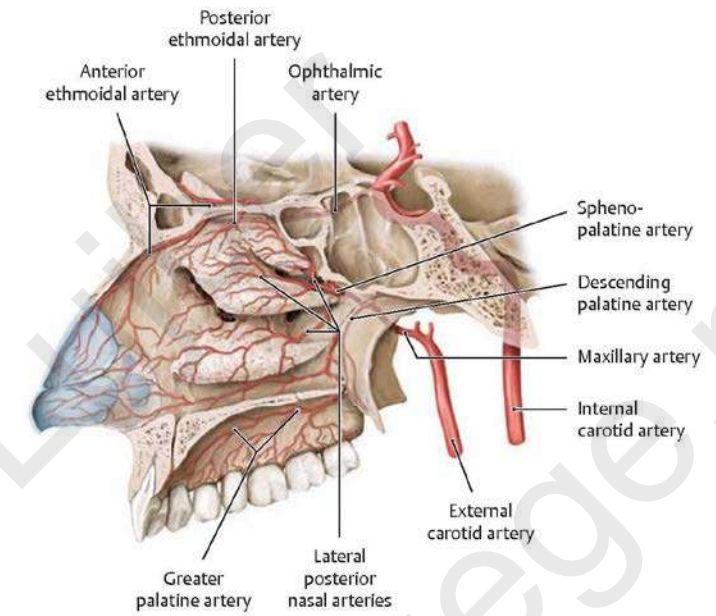
Teeth - dental sinusitis

- oroantral fistula
- sinus lift- implant
- tu. – hard palate!
- trauma- Le Fort #



Epistaxis

- ◆ 60% of population encounters nosebleed once in the lifetime
- ◆ 6% will go to the doctor
- ◆ 23% the ENT emergency work is related to nosebleed (Corbridge, Clin. Otol., 1995)
- ◆ Epistaxis can be life threatening and its mortality is 1%
- ◆ 16/100.000 patients need hospital admission



E Arteries of the right lateral nasal wall
Left lateral view.

Illustrator: Karl Wesker

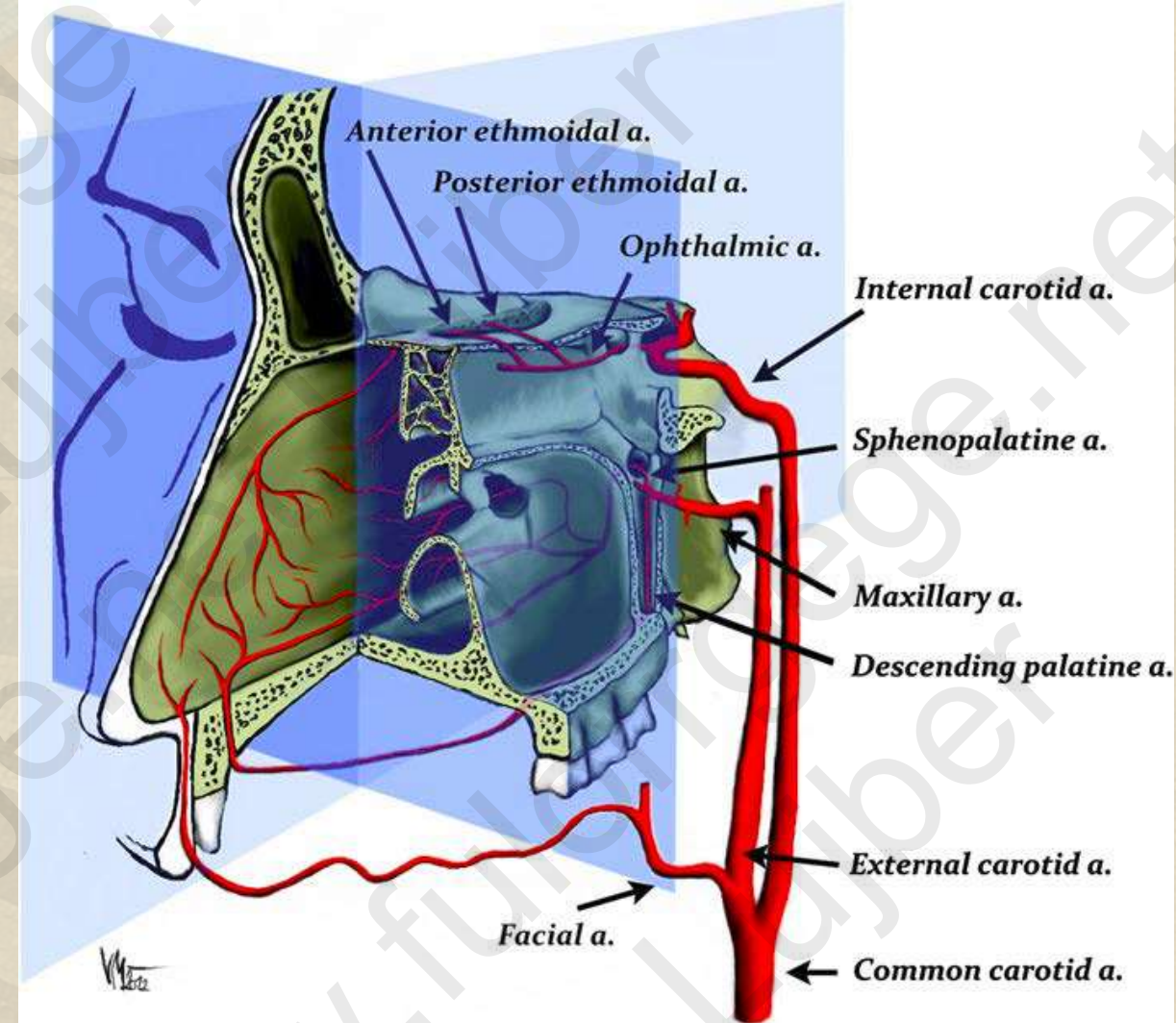
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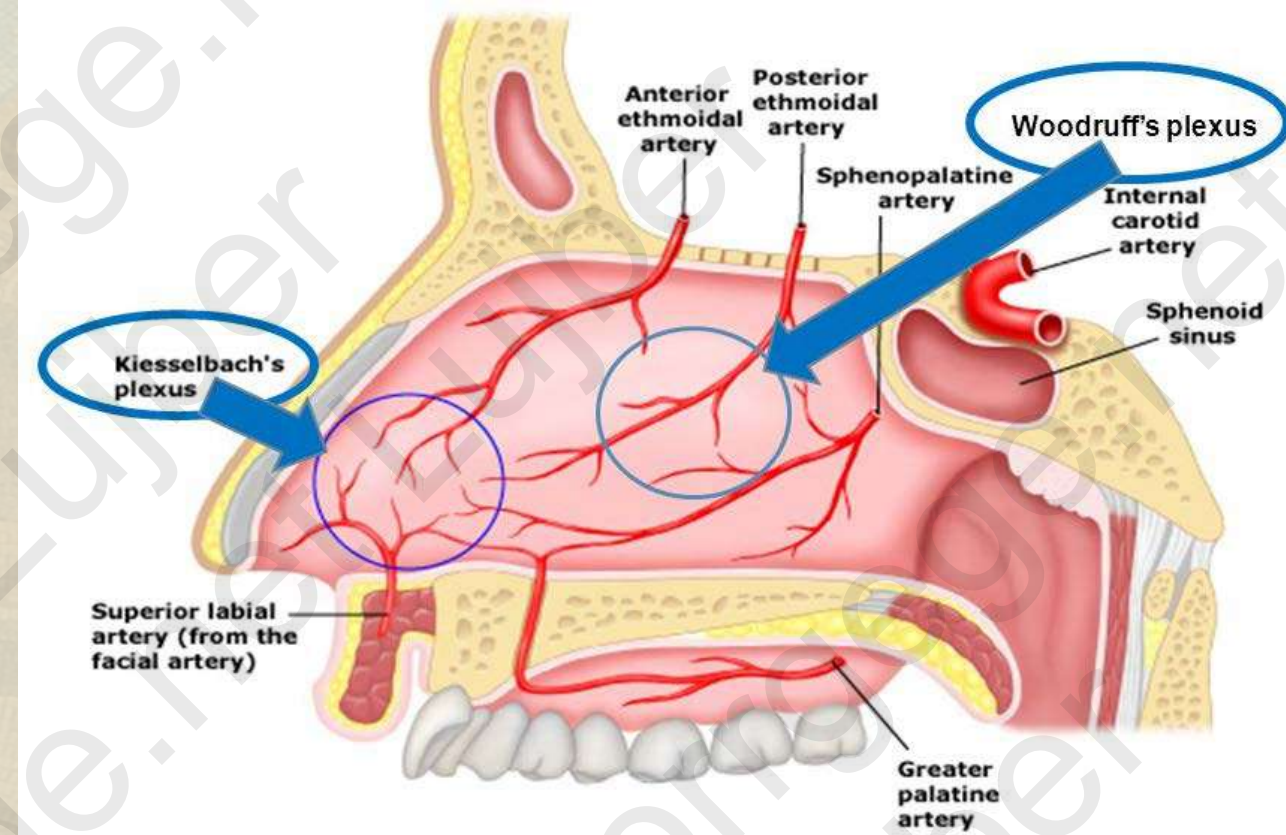
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Anatomy

- ♦ a. carotis interna
 - ▶ a. ophtalmica
 - ▶ a. ethmoidalis anterior
 - ▶ a. ethmoidalis posterior
- ♦ a. carotis externa
 - ▶ a. maxillaris
 - ▶ a. palatina descendens
 - ▶ a. sphenopalatina
 - ▶ a. nasalis posterior
 - ▶ a. facialis
 - ▶ a. labialis superior
- ♦ Majority of nosebleeds are ANTERIOR most often from the **Kisselbach plexus**, which is made up from the anastomosis of 3 arteries:
 - ▶ a. ethmoidalis anterior /septal branch/
 - ▶ a. sphenopalatina /septal branch/
 - ▶ a. facialis (a.labialis superior)

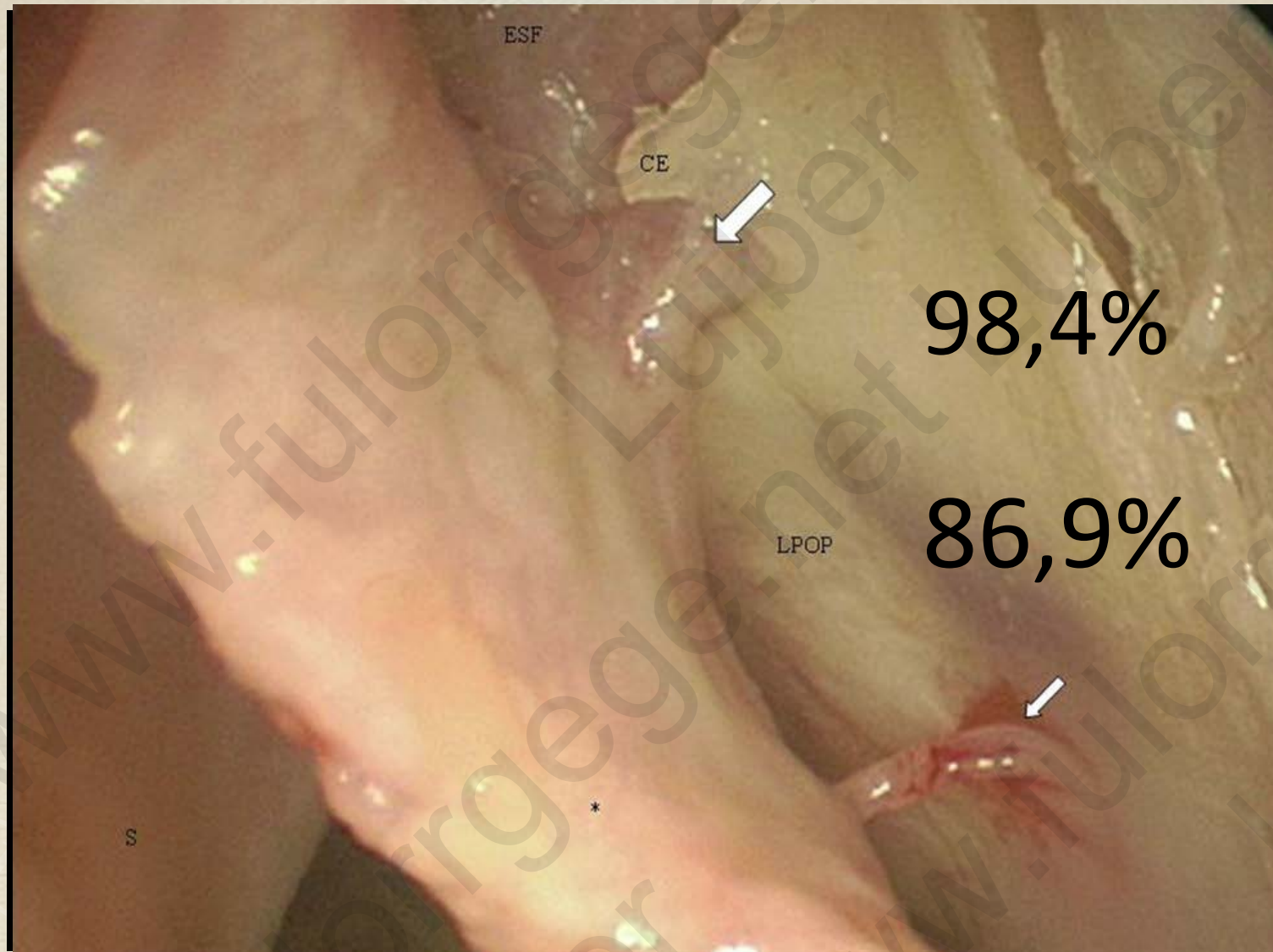




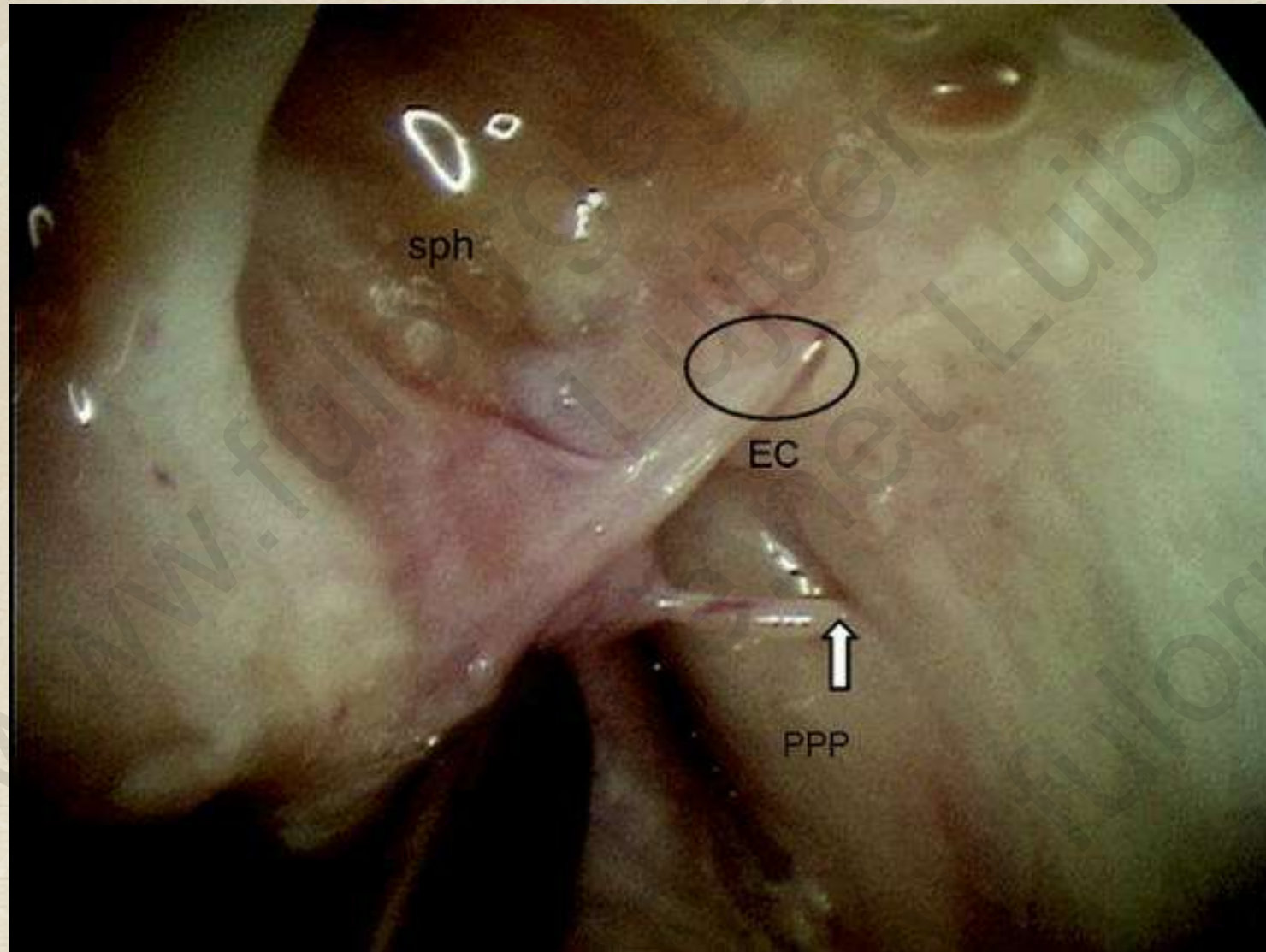
- ◆ Kiesselbach Plexus /Little's area/
- ◆ **Woodruff's plexus** (nasopharyngealis plexus)– venous plexus, in the posterior part of the nasal cavity.
- ◆ **Shaheen** - arterial plexus (a. pharyngea, a. nasalis posterior and a. sphenopalatina (posterior septal branch)
- ◆ Arteria ophtalmica and a. sphenopalatina also communicating via the a. ethmoidalis anterior and posterior.

Symptomatic treatment of nosebleeds

- ◆ Silver nitrate cautery
- ◆ Electrocautery
- ◆ Anterior nasal packing
- ◆ Posterior nasal packing (Belloccq tamponade)
- ◆ Ligation of sphenopalatine artery in the nose
- ◆ Ligation of maxillary artery in the neck
- ◆ Selective embolization of bleeding vessel



. Endoscopy of the left nasal fossae. The ethmoidal crest (EC) is anterior to the sphenopalatine foramen. The larger arrow points to the sphenopalatine foramen, which presents a single arterial branch and is located on the transition of the middle and superior meatus. The small arrow points to the accessory foramen located in the middle meatus. Also shown: nasal septum (S); *mucoperiosteal flap; perpendicular plate of the palatine bone (PPP); and the anterior wall of the sphenoid bone (sph).



Endoscopy of the left nasal fossae. The ethmoidal crest (EC) is posterior to the sphenopalatine foramen (circle). The arrow points to the accessory foramen in the middle meatus. Also shown: *mucoperiosteal flap; perpendicular plate of the palatine bone (PPP); anterior wall of the sphenoid bone (sph).

Blocked nose

- ◆ Septal deviation
- ◆ Inferior turbinate hypertrophy
- ◆ Space occupying mass lesion
 - polyps, adenoids, papilloma, malignancies....
- ◆ Functionally blocked "laminar" airflow instead of "turbulent"
- ◆ etc...



Poor nasal airflow → poor sinus ventilation

- ◆ Sinus ventilation ↓, sinus drainage ↓ ⇒ infection

- ◆ Symptoms:

blocked nose

rhinorrhoe

postnasal drip

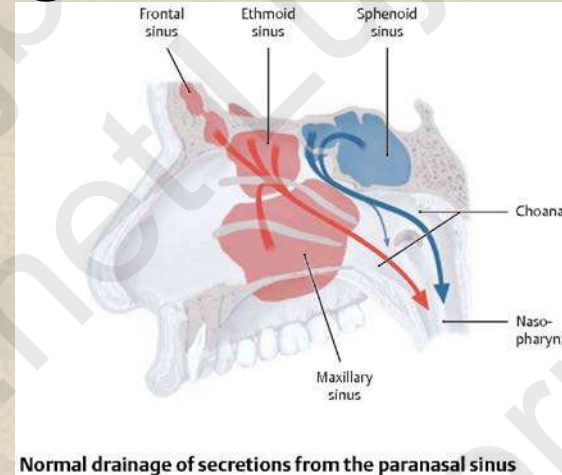
hyposmia/anosmia

midfacial pain, headache

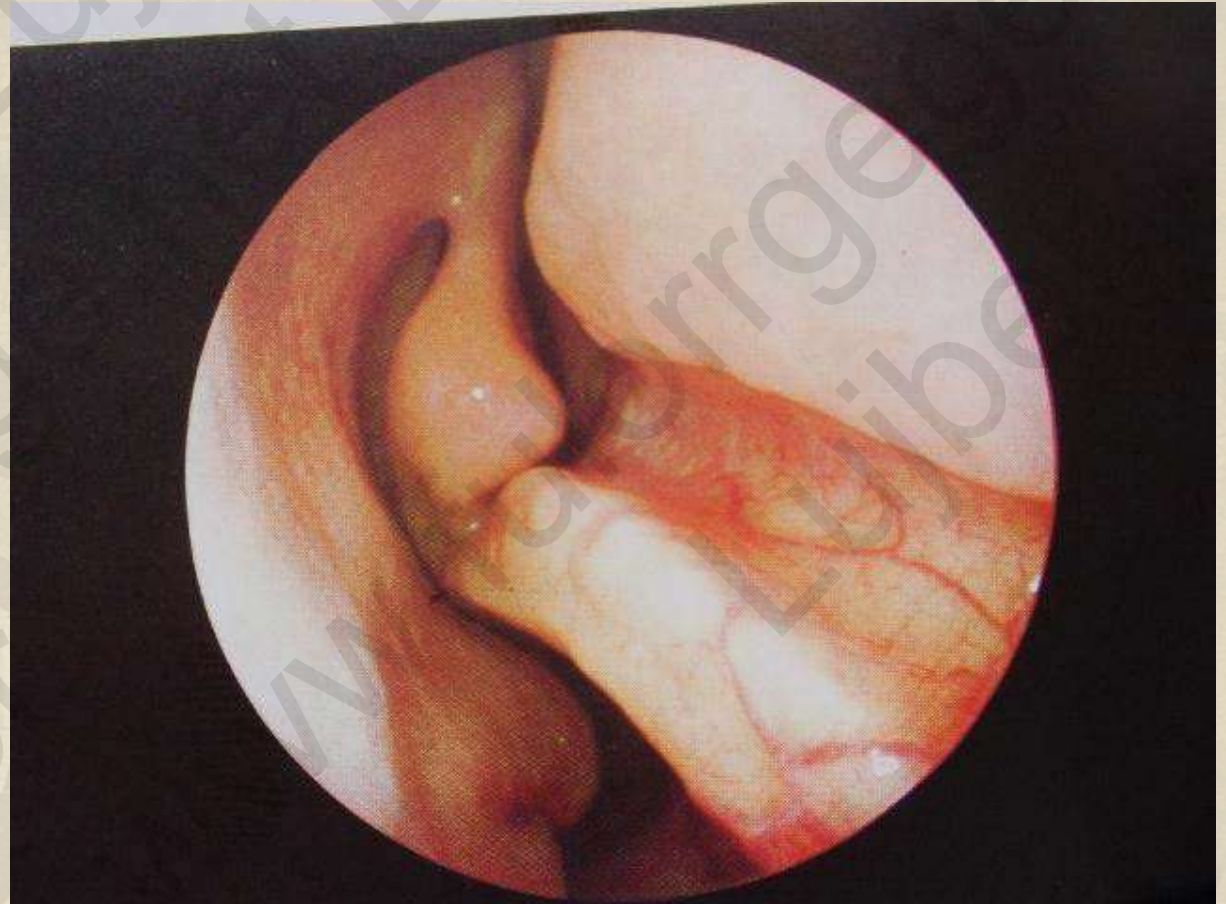
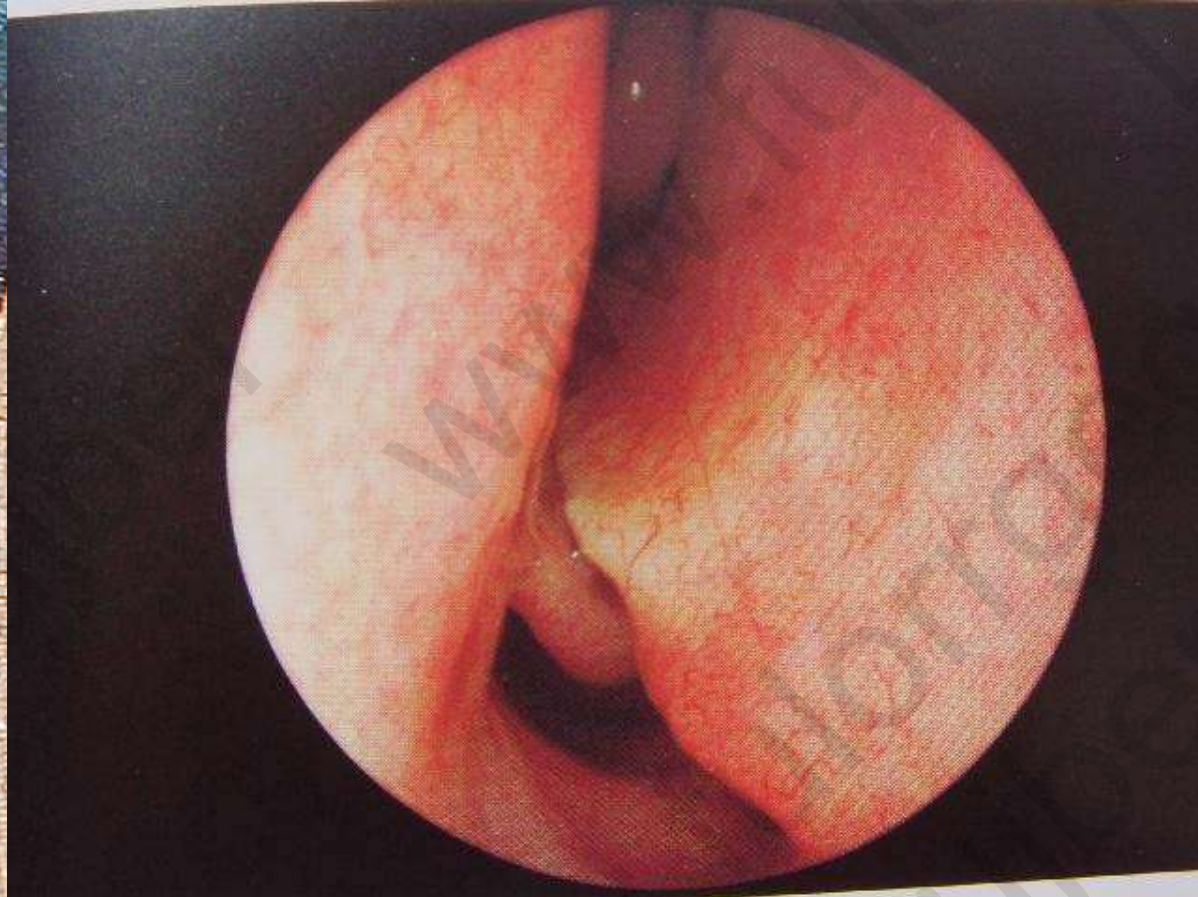
specific sinus pain

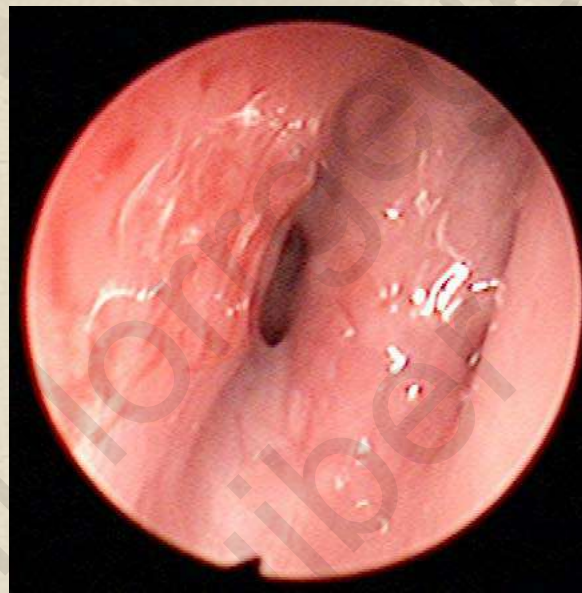
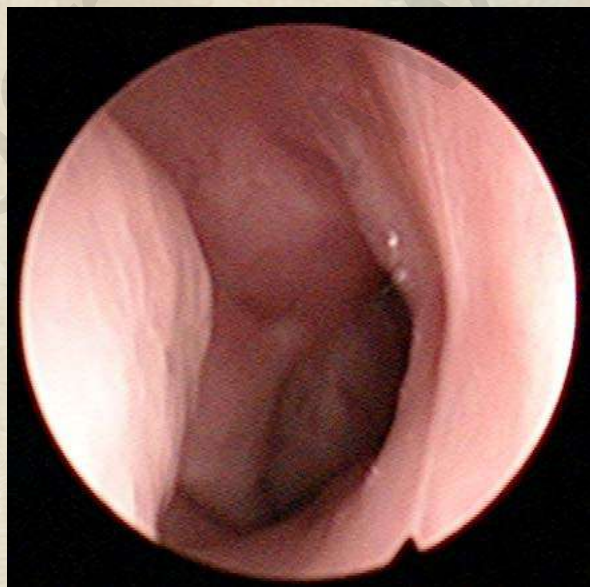
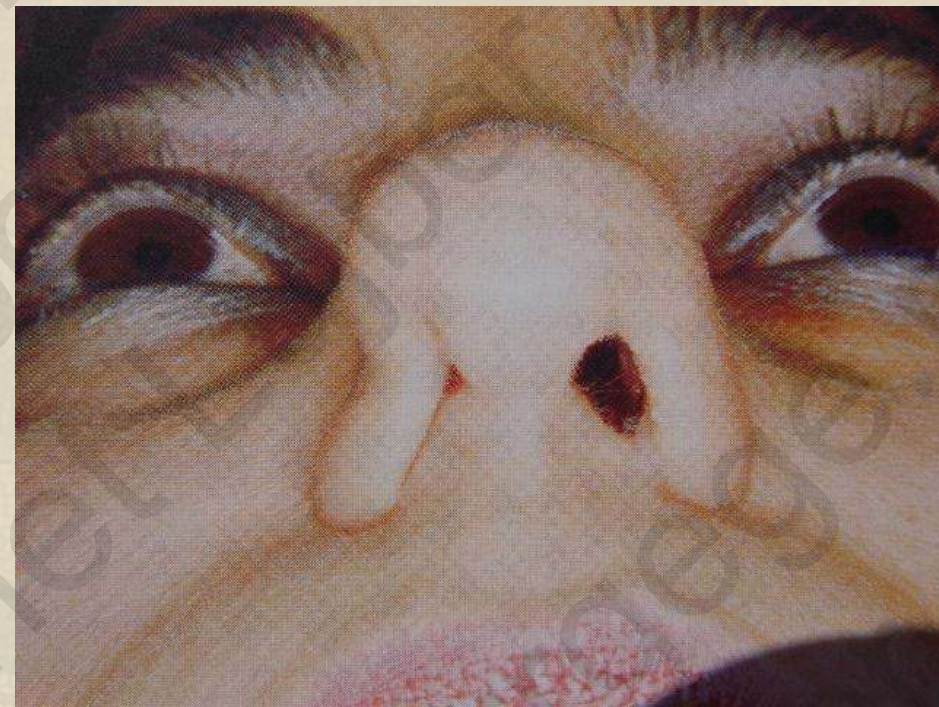
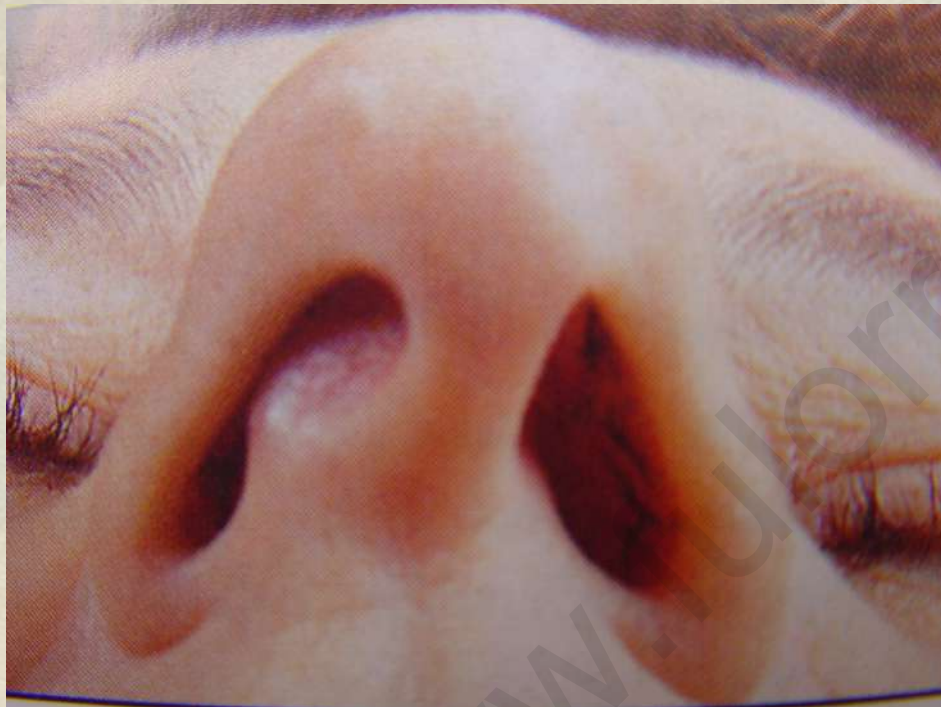
(bending forward or pressure over sinuses increases the pain)

- ◆ Sinusitis – dental origin! Direct spread

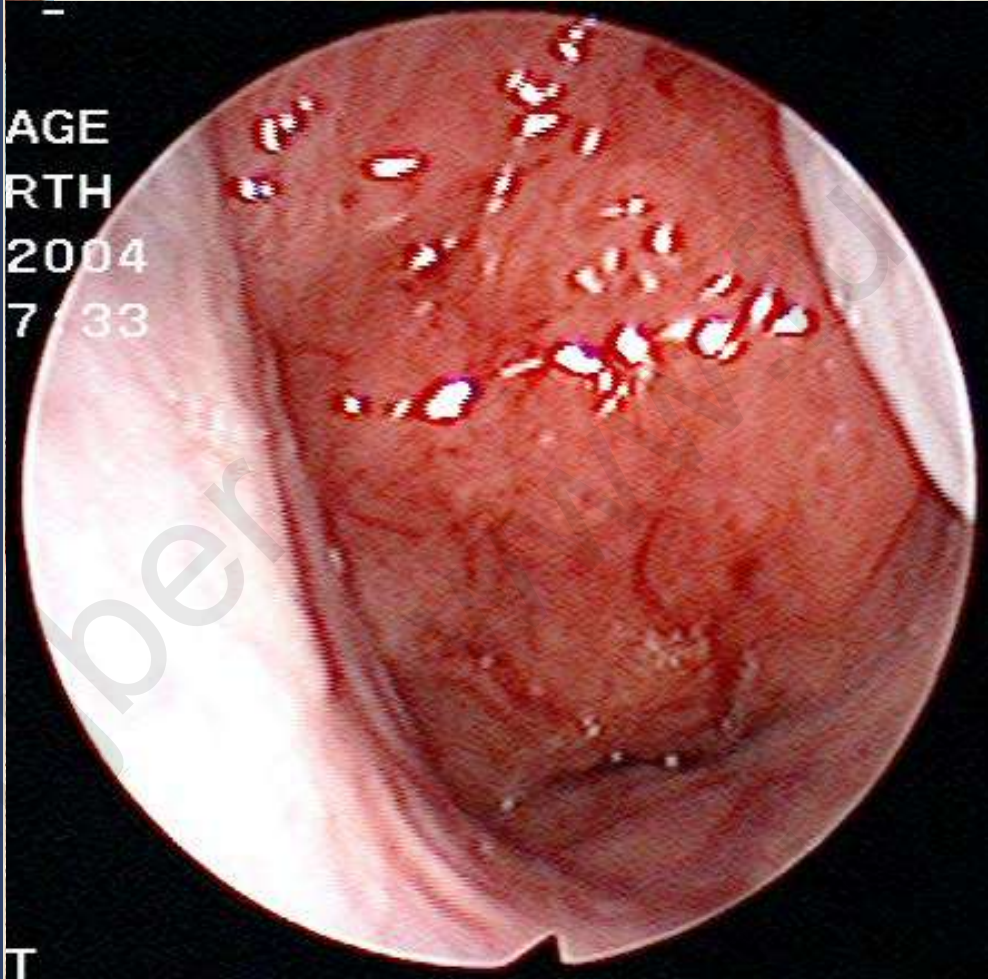


DNS - deviated nasal septum





Hypertrophic adenoid



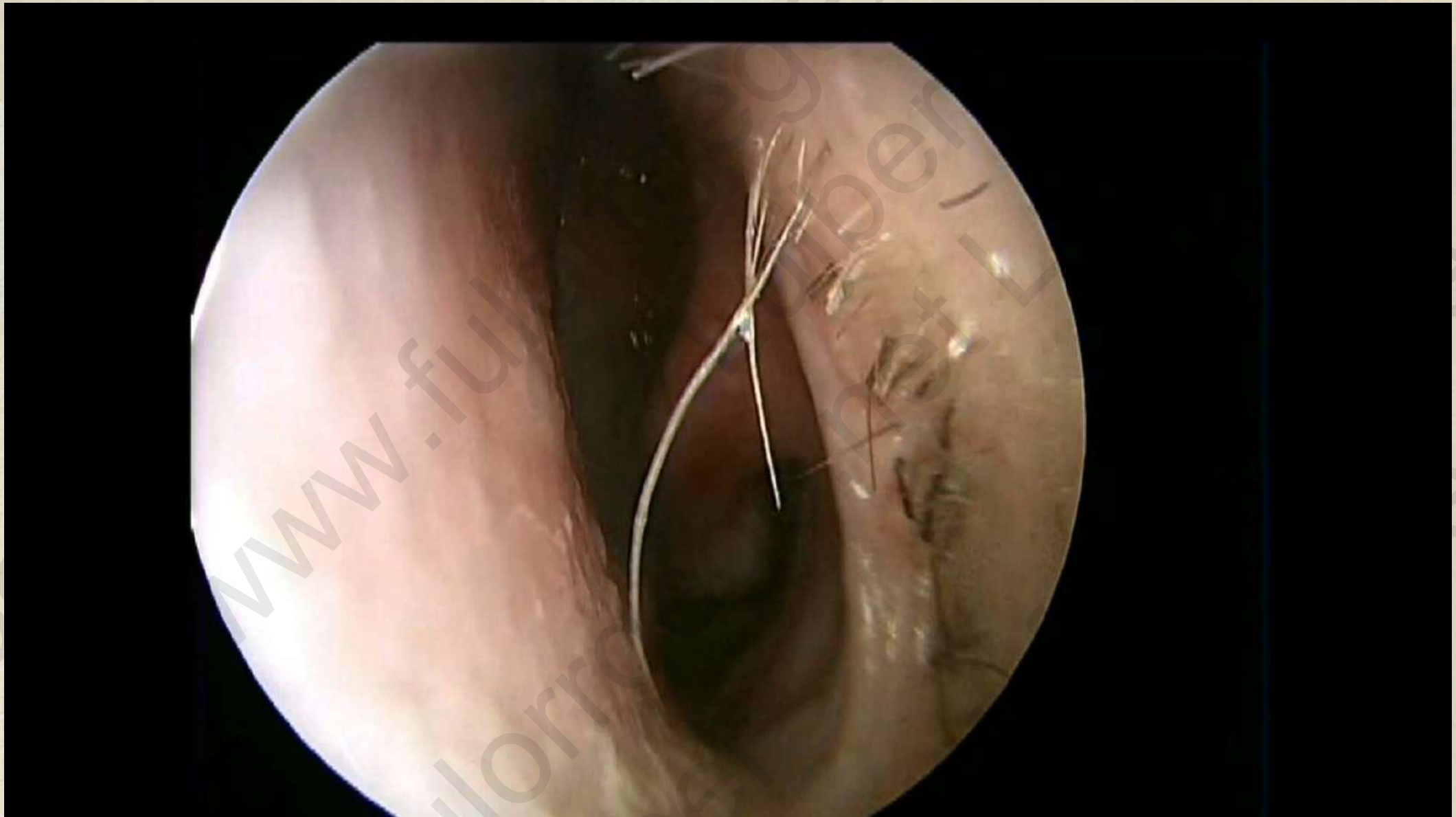
Polyps

- Chronic rhinosinusitis with nasal polyps
- Antro-choanal polyps
- Inverted papilloma
- Malignant tumors



ARS - Acut rhino-sinusitis







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Nasopharyngealis Juvenilis Angiofibroma

Lujber László

Fül-, Orr-, Gégészeti és Fej-, Nyaksebészeti Klinika
Pécsi Tudományegyetem Klinikai Központ

Tornóczki Tamás, Vida Livia

Pécsi Tudományegyetem Kórbonctani Intézet

Hudák István

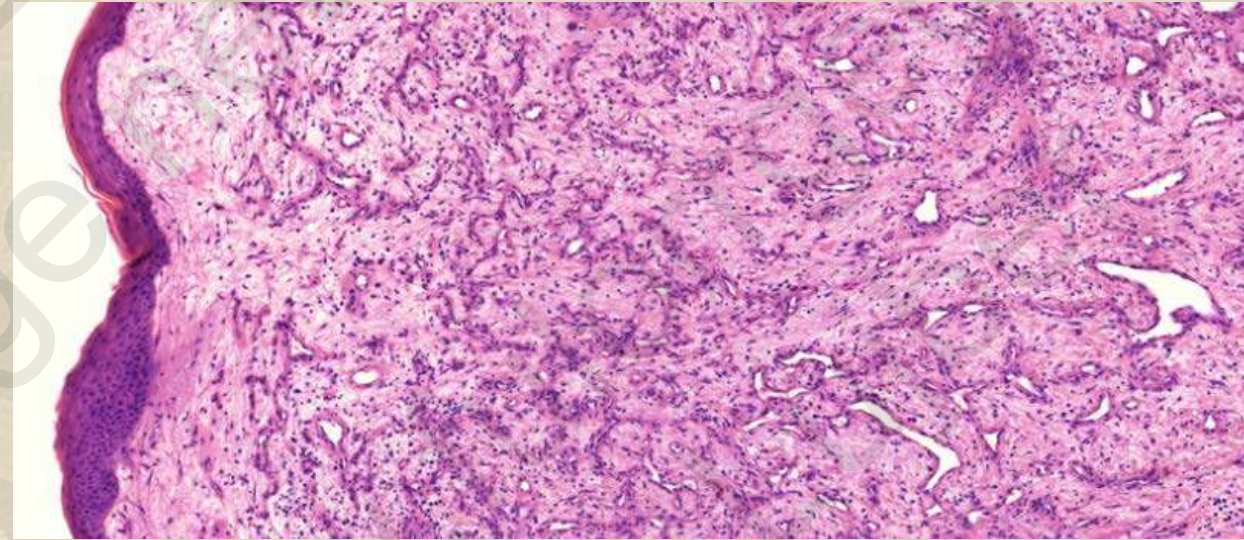
Idegsebészeti Klinika
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Epidemiológia

- ◆ Young males 9-19 y
- ◆ 0.05% JA, among all H&N cancers in USA
- ◆ 1 case / 2.5 million in Denmark
- ◆ High incidence in India and Middle East

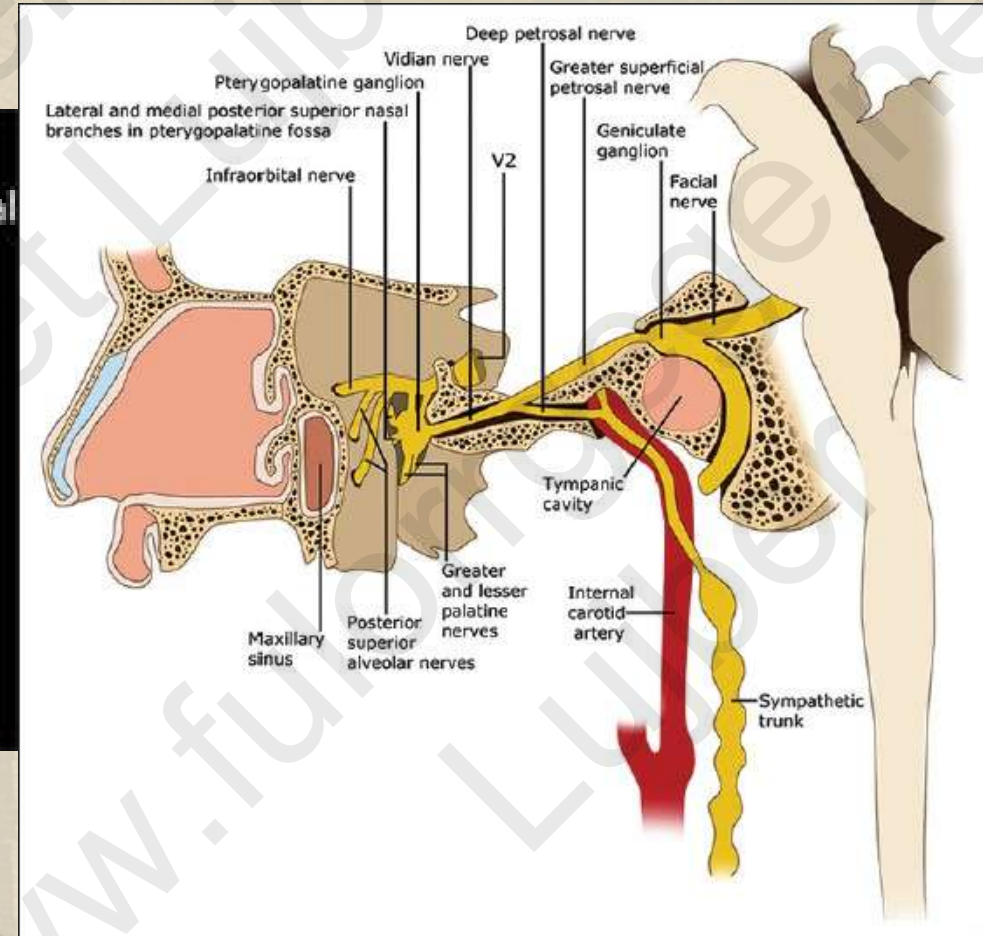
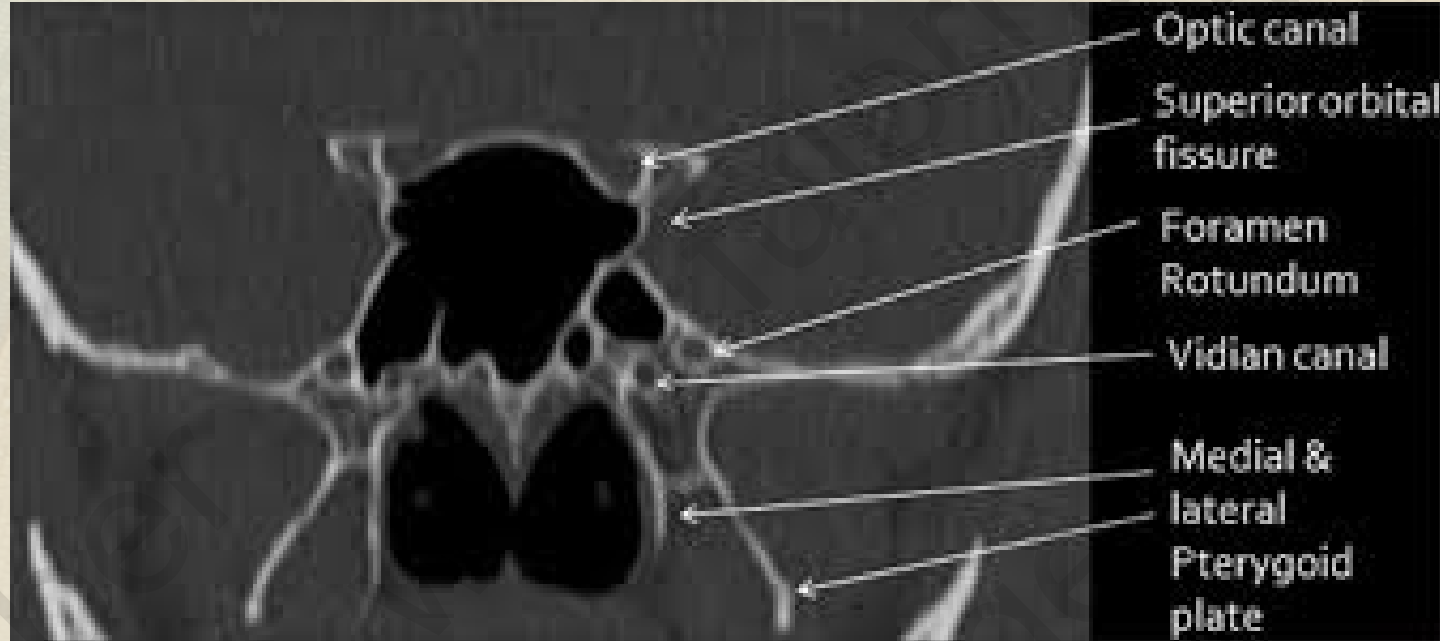
Szövettan

- Benign tumor
- Pseudo-capsulated
rich in blood vessels
fibrotic stroma, collagenous fibers
muscle layer of vessel walls are often missing
- Haemangioma? Vascular malformation?
Artery of the first brancial arch persisited?
- Hormonal changes influence its growth?



Localization

- ◆ Originates from the Vidian Canal in the pterygopalatine fossa and enters the nose via the sphenopalatine foramen



- ◆ Submucosus spread
- ◆ Expands toward the least resistant areas

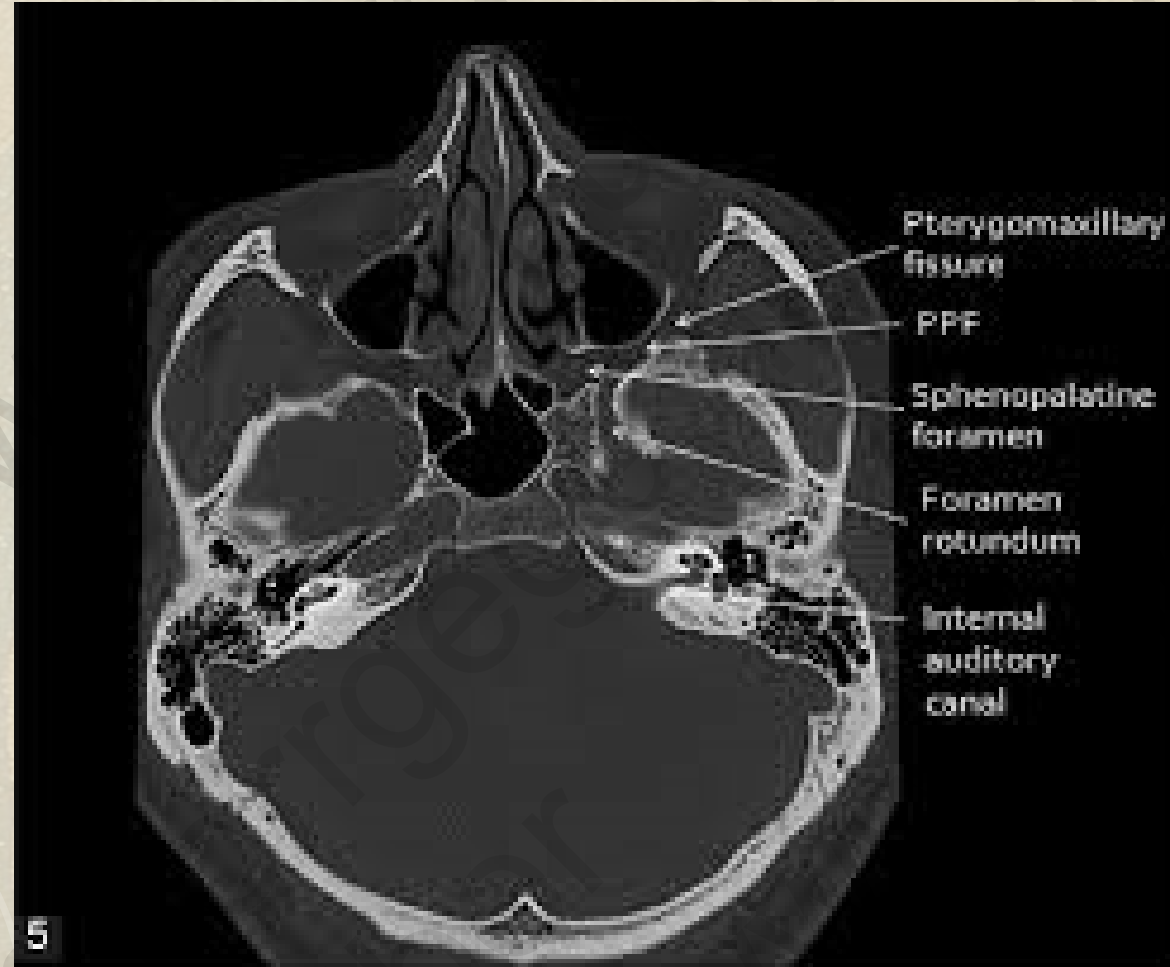
Fossa pterygopalatina

- Anterior** - Post wall of maxillary sinus (can be remodeled by the tumor)
- Inf. orbital fissure → orbital apex

Medial

(sphenopalatine foramen)

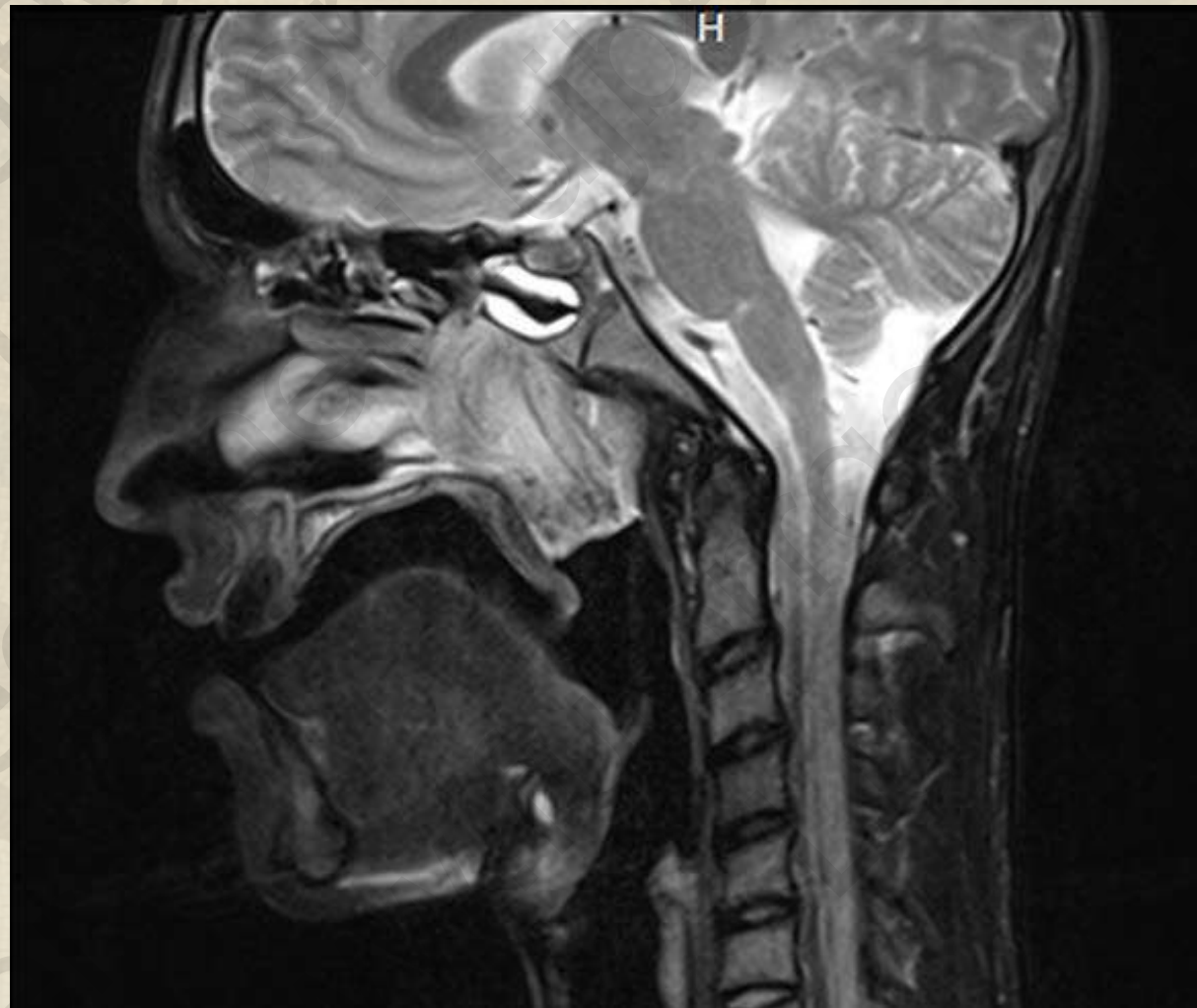
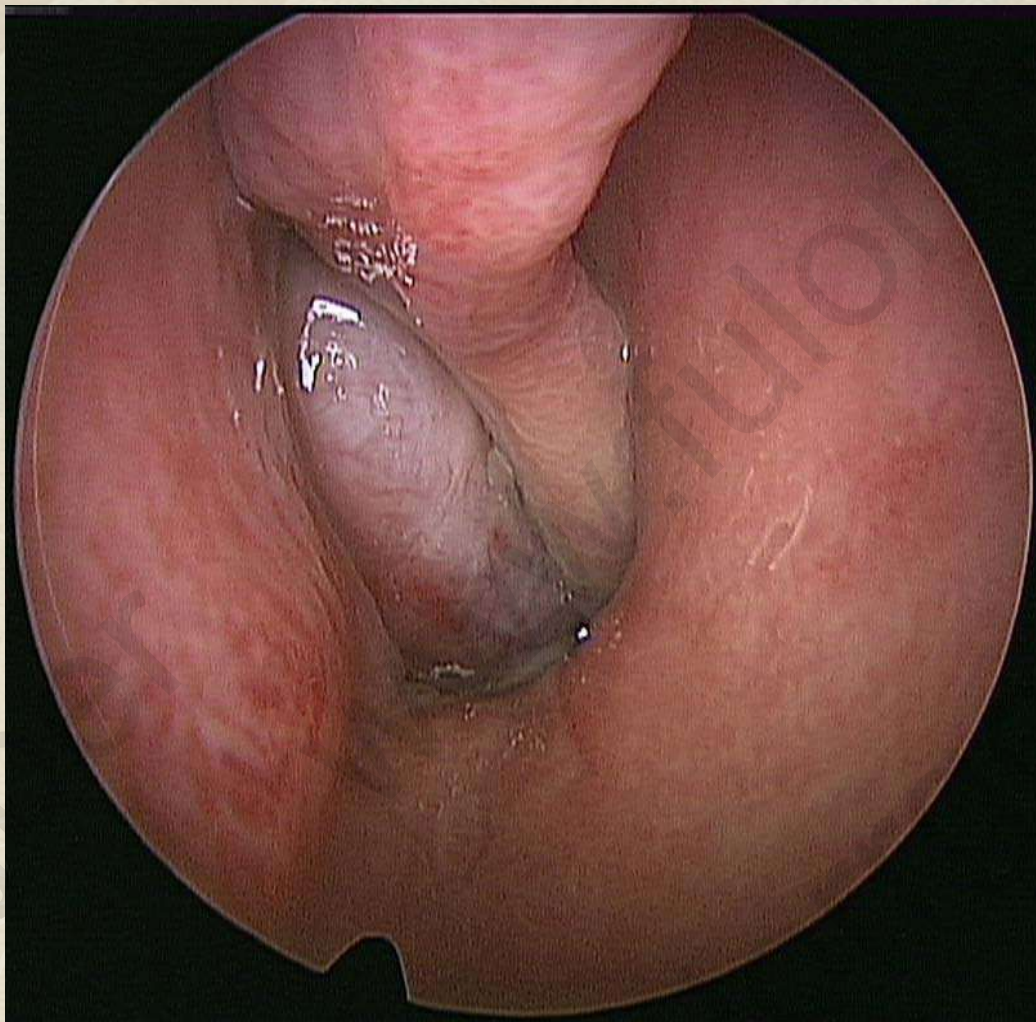
- Nasopharynx
- Nasal cavity



Lateral

- Fissura pterygo-maxillaris
- Fossa infra-temporalis

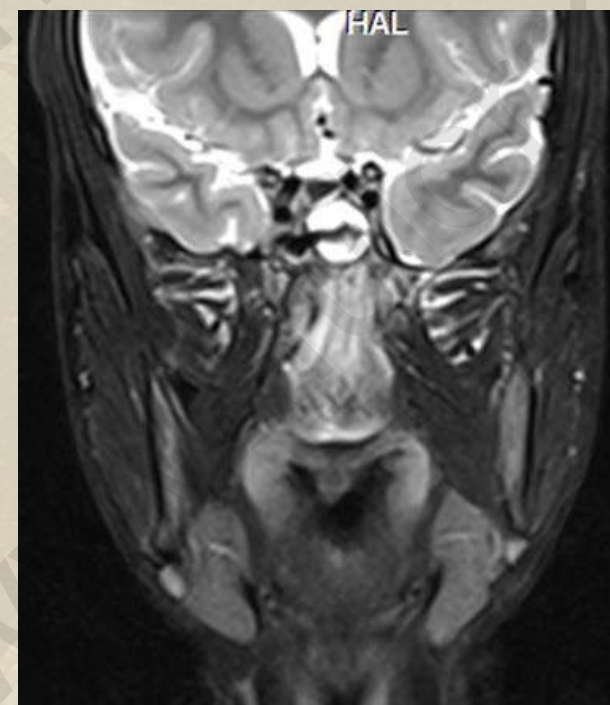
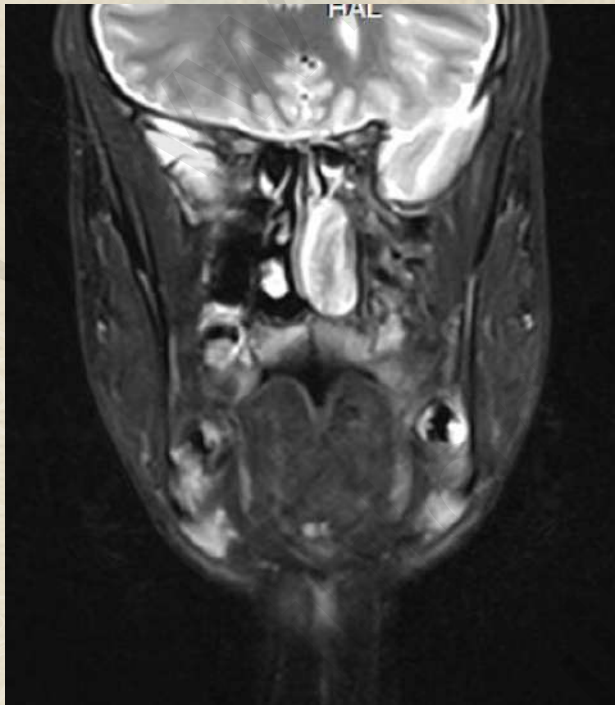
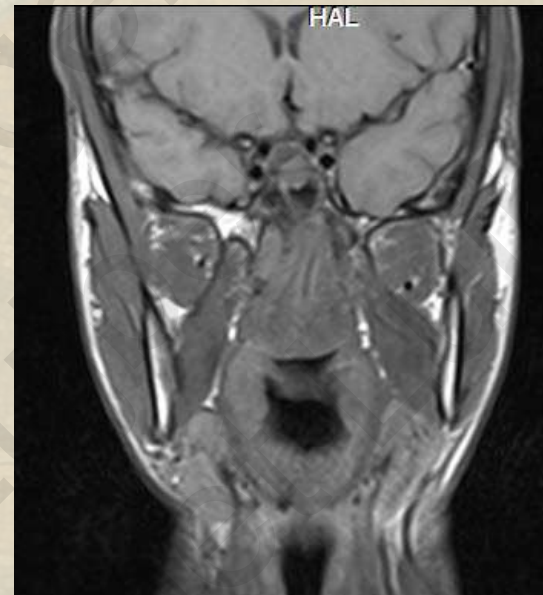
- Posterior** - Vidian canal → ICA
- Foramen rotundum → sin. cavernosus



CT

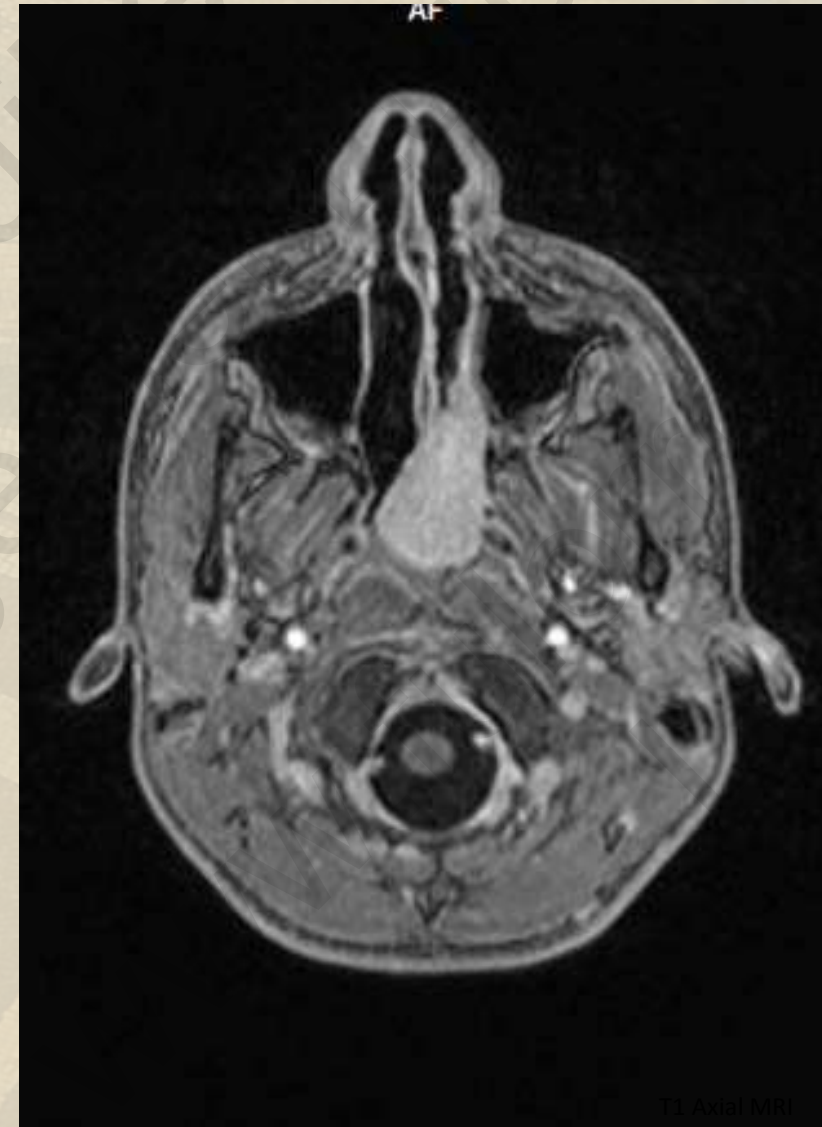
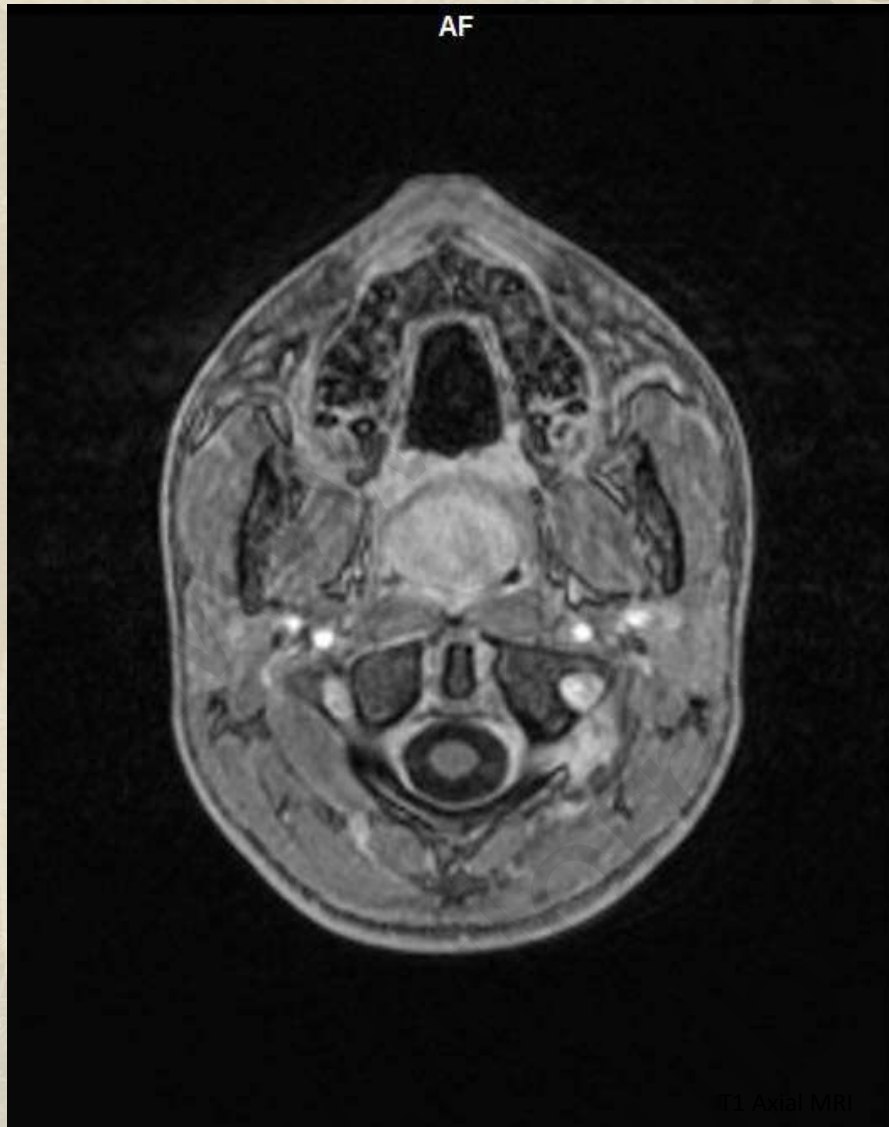


MRI





MRI



Embolization

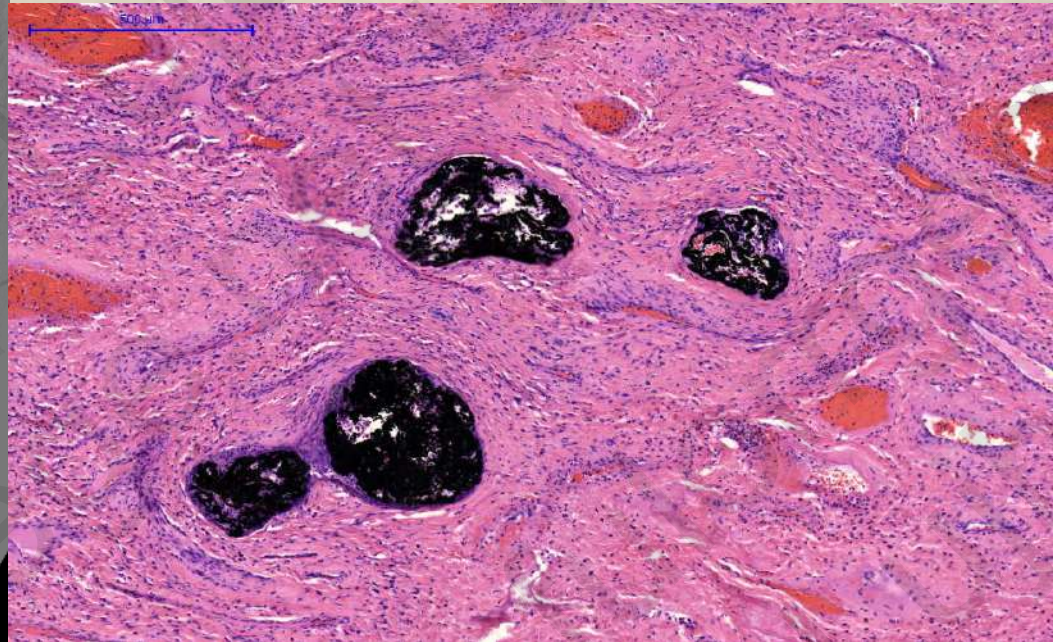


Post embolization



DSA and embolization

Dr. Hudák István
PTE Neurosurgery



Histology

Dr. Tornóczy Tamás
Dr. Vida Livia
PTE Pathology



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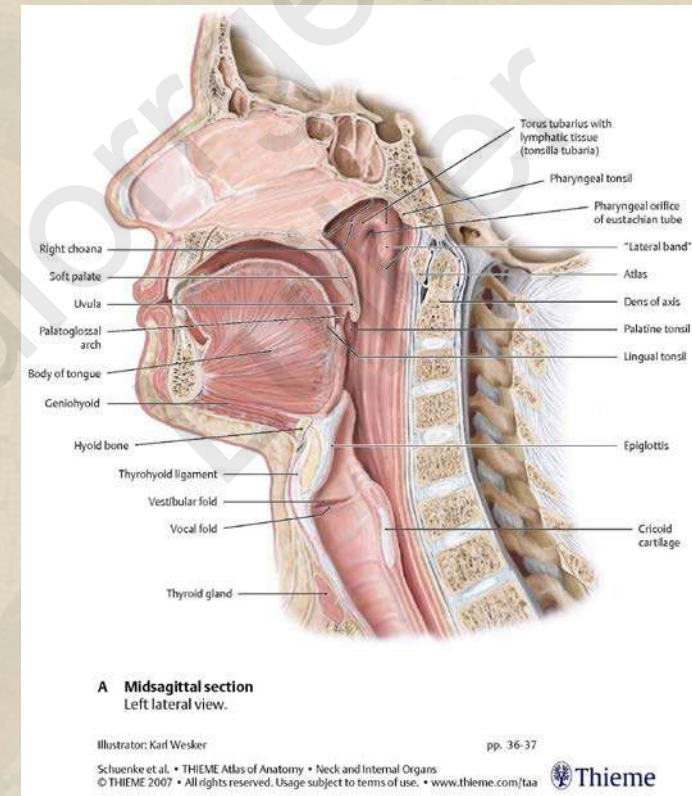
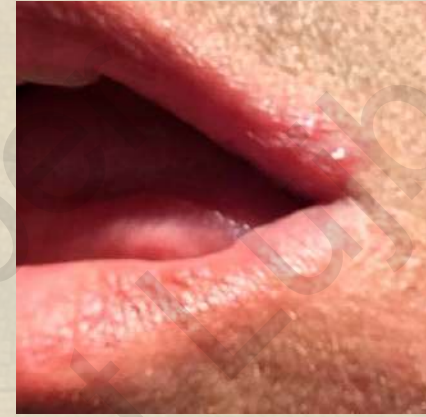
Oral cavity– from ENT surgeon`s point of view

Lujber László

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Lips

- ◆ Infection – cheilitis
 - viral – labial herpes
 - fungal – infection at the angle of the mouth
- ◆ Rich in blood supply – O_2 saturation drops → lips become cyanotic
- ◆ Facial nerve palsy (innervation) – sagging of lips
- ◆ Tumours



Oral vestibulum & Floor of the mouth



Stenon's duct (Stensen's) – opening of parotid gland opposite to 2nd upper polar tooth

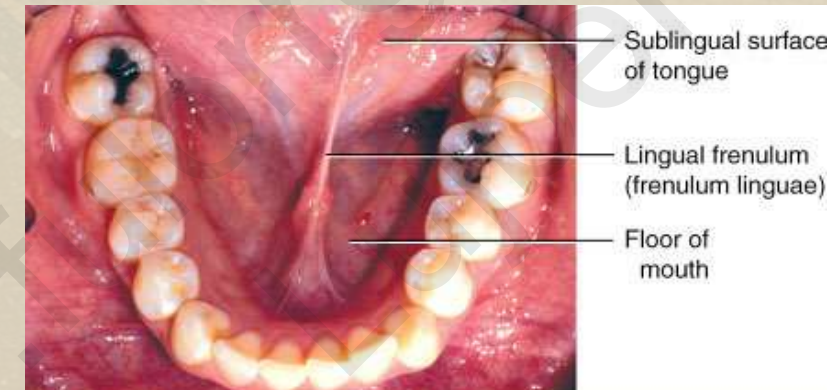
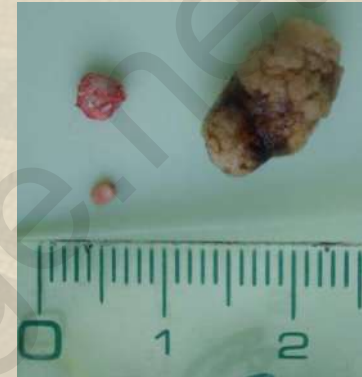
Wharton's duct – opening of submandibular gland on sublingual caruncula

Bartholinus duct- opening of sublingual gland on caruncula sublingualis

Stone – palpable, visible, pus compressable, gland swells up during eating, pain... Dg.: US + physical examin.

Parasympathetic innervation of salivary glands

- N. petrosus major --- ggl. pterygopalatinum --- n. lacrimalis (V/1) et
Lacrimal gland, nasal and oral mucosa n. zygomaticus(V/2)
- Chorda tympani --- ggl. submandibulare --- n. lingualis (V/3)
Gl. Submandibular and gl. sublingual
- N. petrosus minor (n.IX) --- ggl. oticum --- n. auriculotemporalis (V/3)
Gl. parotis



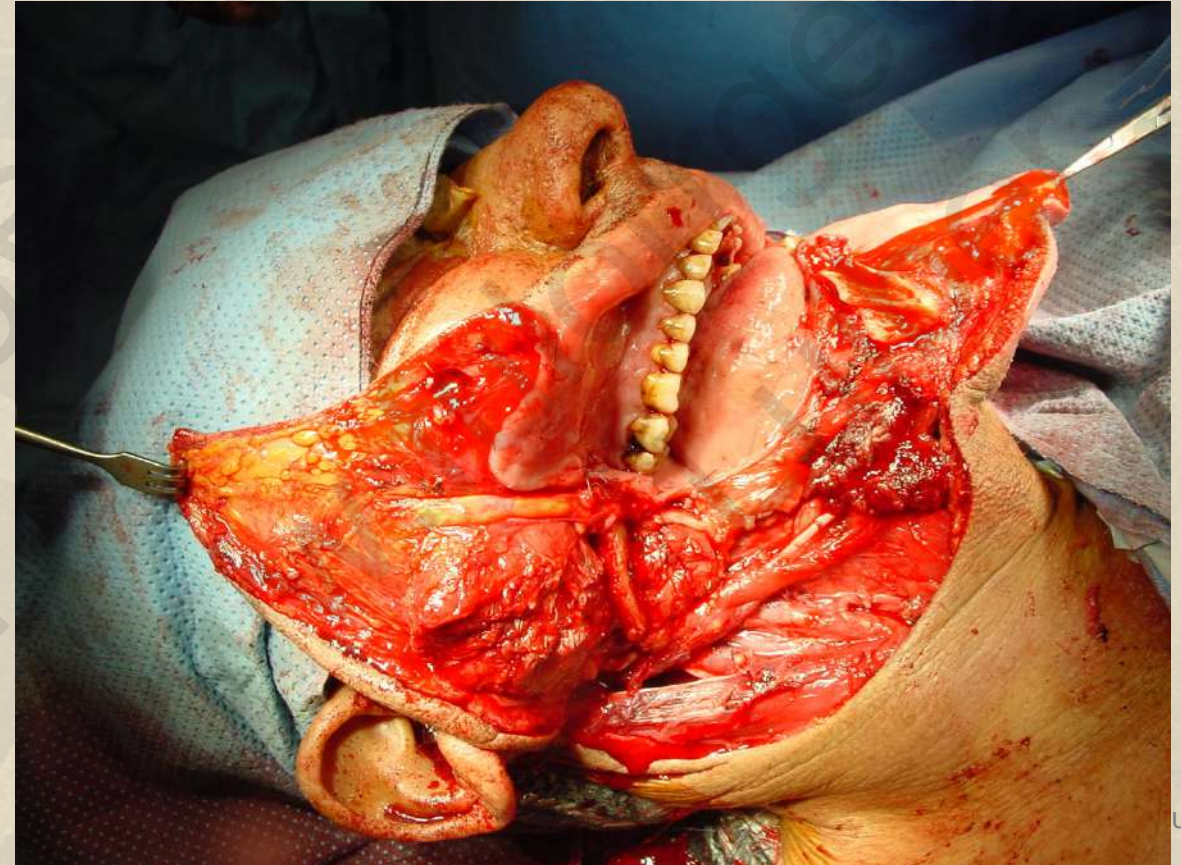
Frenulum linguae – short (frenulum breve=tongue tie) – Speech disorder! Scleroderma (adult)

Floor of mouth – rich in vascular supply → absorption of medicines are quick (drug metabolism detours the liver!)

Malignant tumours of oral cavity

Oral cavity ca. **RISK factors:**

- Smoking
- Poor oral hygiene
- HPV
- Alcohol



Tongue

- ♦ Motoric innervation by XII. cranial nerve
 - ♦ M. genioglossus pushes the tongue out $\Rightarrow$ n. XII unilateral palsy
 $\rightarrow$ tongue tip deviates to paralyzed side
- "Tongue is the mirror of health" (Chineses traditional medicine)



Oedema of tongue due to oro-pharyngeal malignancy



Soft palate- uvula

Oral cavity ends at the level of anterior pillars.
Posterior to this starts the **Mesopharynx** = Oropharynx

Ishtmus faucium:

Palato glossal – palate pharyngeal arches – uvula – tongue base

Soft palate examination:

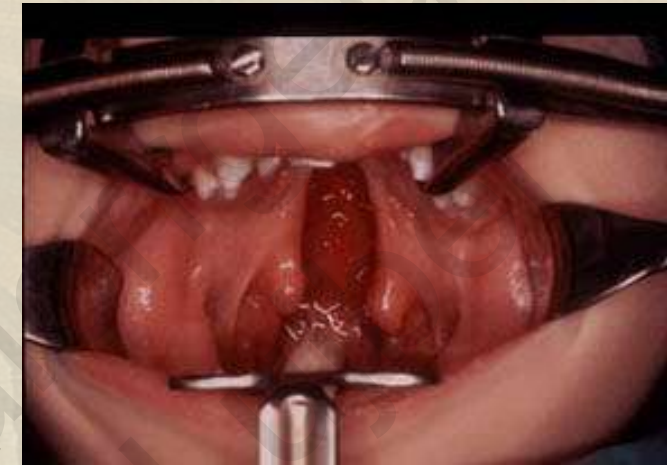
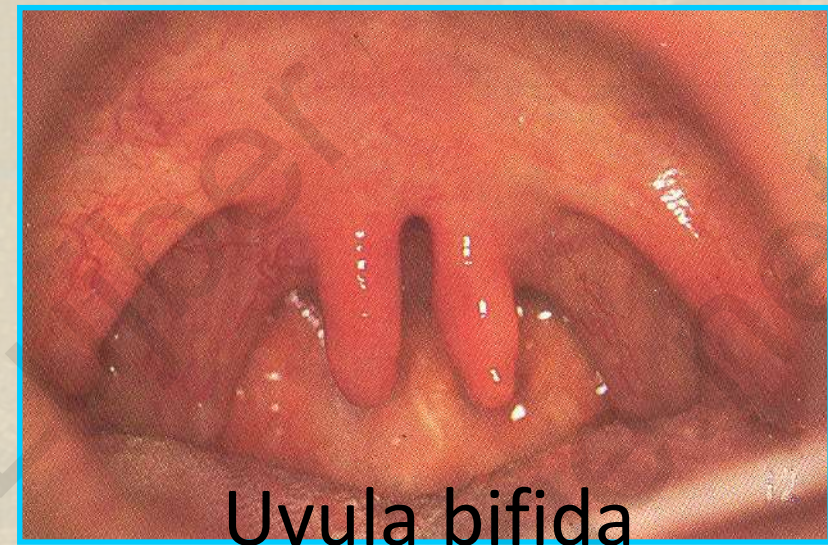
Pt. should say “A” ⇒ soft palate elevates symmetrically & uvula stays in midline

n IX. palsy ⇒ paralyzed side stays put,
innervated side elevates (“curtain” sign) &
uvula deviates to innervated side

m. uvulae innervation: n. vagus, poor, asymmetric innervation frequent in elderly

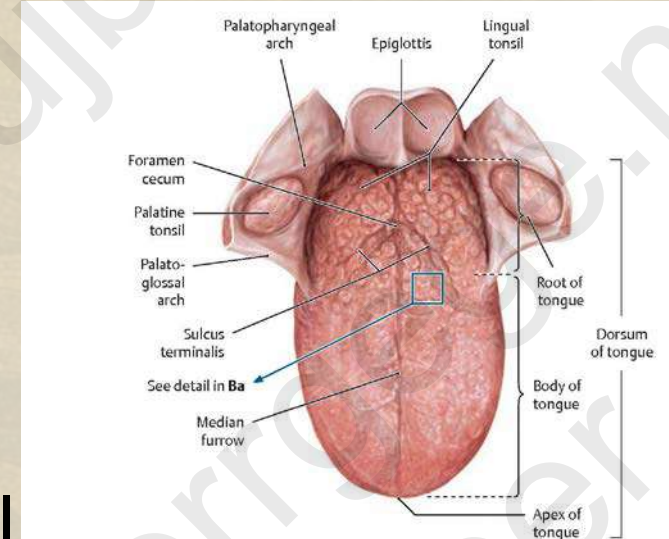
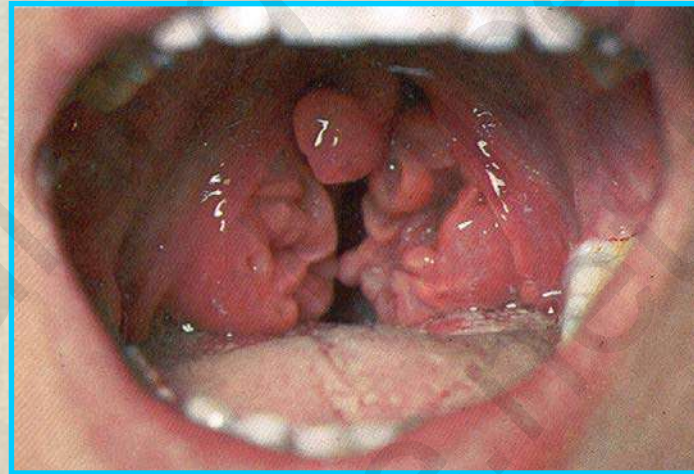
Soft palate loose, uvula elongated ⇒ “benign” snoring,
Obstructive sleep apnoe syndrome, hypertension...

Oedema of uvulae-allergy medicine, food...



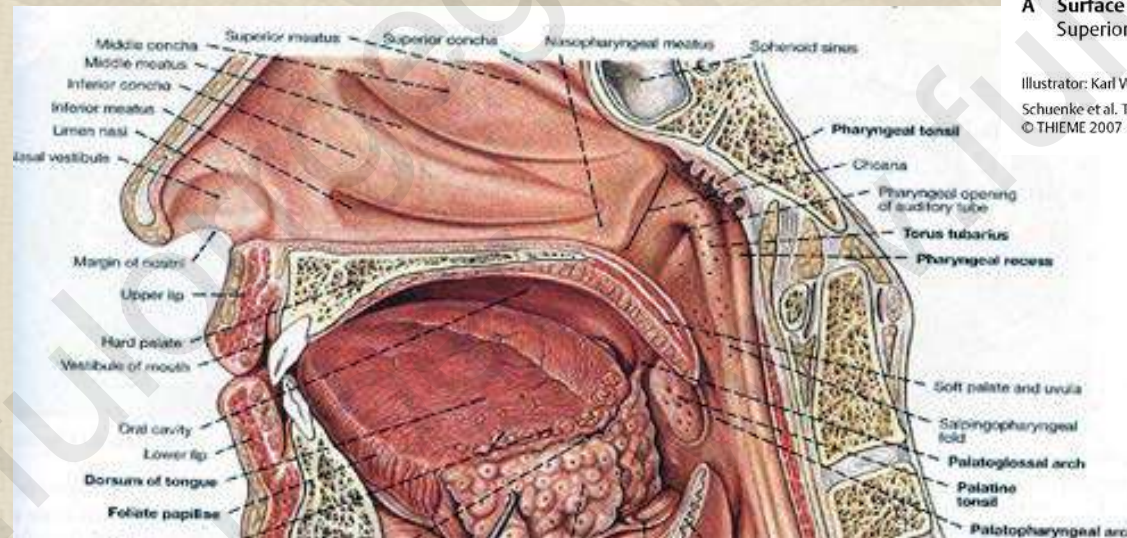
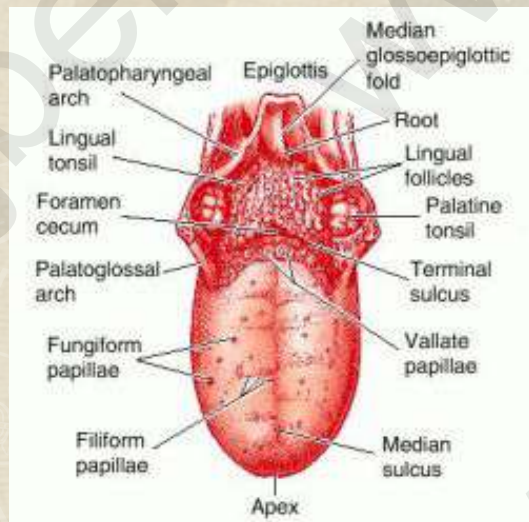
Line of defence - Waldeyer's ring

- ◆ Adenoid tissue
- ◆ Palatine tonsils
- ◆ Lingual tonsil
- ◆ Small lymphatic tissues in pharyngeal wall



A Surface anatomy of the lingual mucosa
Superior view.

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Acute tonsillitis

Causes:

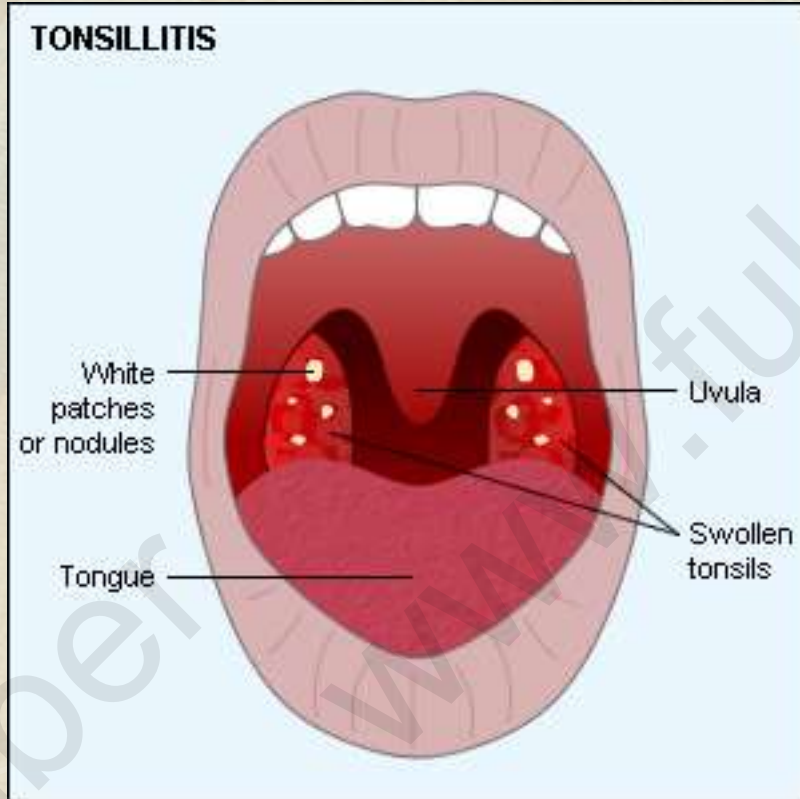
- ♦ Viral (Adults 95%, Child 60-75%)
(rhino-,RS-resp. syncytial, adeno-, entero-, infl. A,- B, EBV, CMV, Coxackie)
- ♦ Bacterial (β -streptococc.pyogenes type A, Neisseria, mycoplasma, Chlamydia)
only colonizing!
Staphylococc., Streptococc. Pneumococcus, Haem. Infl., E. coli

Symptoms:

- ♦ Sore throat, fever, malaise, excessive secretion
- ♦ Referred otalgia, abdominal pain
- ♦ Rhinorrhea (rhinitis), hoarseness (laryngitis), diarrhoe (enteritis) VIRAL!!!
- ♦ Other symptoms → see later

O/E:

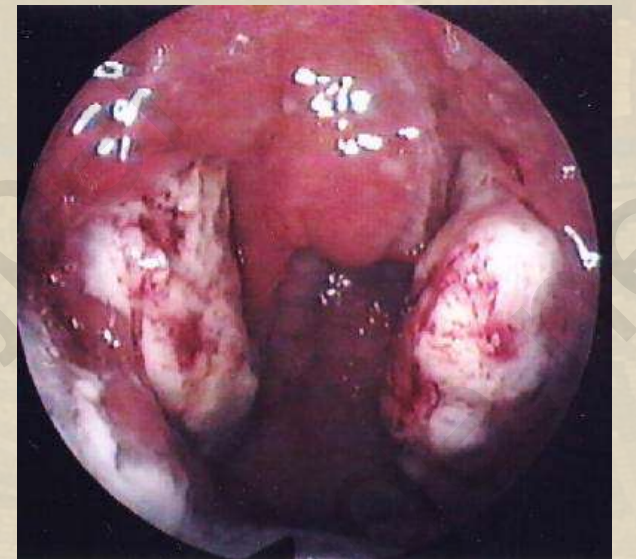
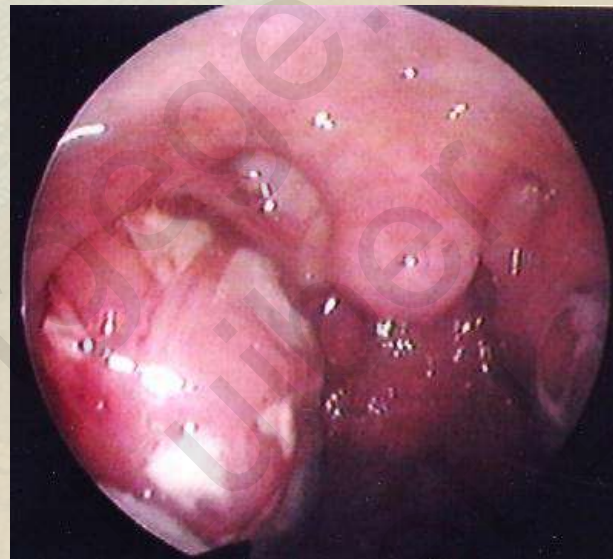
Red, swollen, oedema, crypts with debris desquamated epithelium and pus, cervical lymphadenitis, pus exudates,
(rapid Streptococc. test), throat swab, L shift leuko., ASO (AST)



follicular tonsillitis



membranous tonsillitis



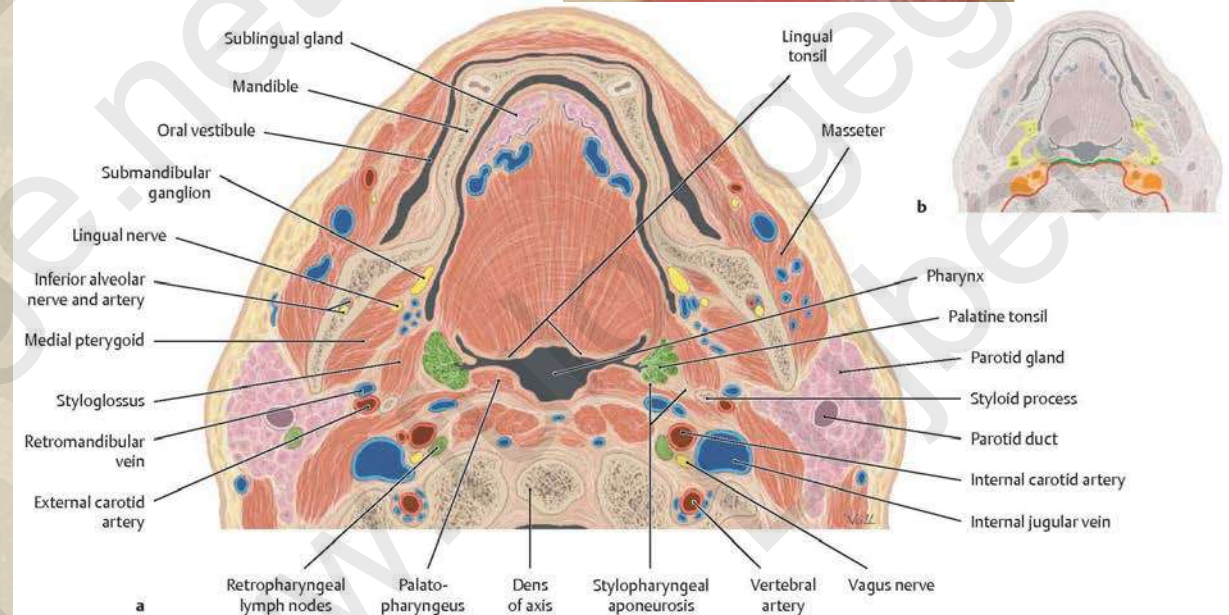
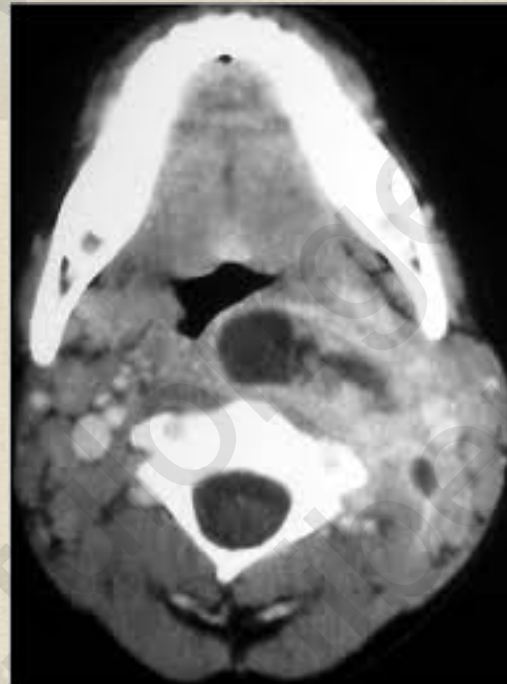
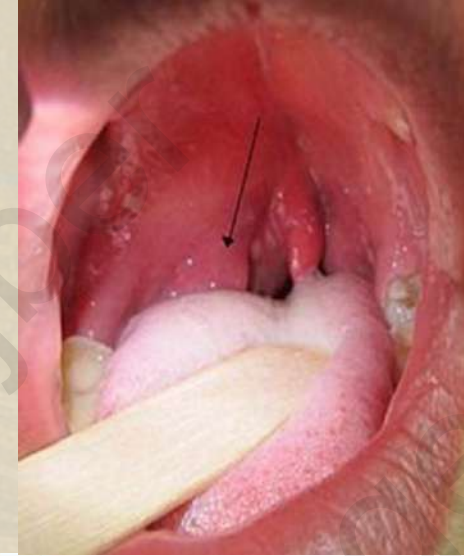
Complications

Peritonsillar abscess (Quinsy)

Retro- / Para pharyngeal abscess

Sequale of β -haemolytic Streptococci

- carditis
- rheumatic fever
- glomerulonephritis
- arthritis



A Parapharyngeal space, superior view (after Fritsch and Kühnel)

a Transverse section of the neck at the level of the tonsillar fossa.

b The retropharyngeal space (green) directly borders the prevertebral lamina (red).

Illustrator: Markus Voll

pp. 40-41

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Tonsillectomy

- ◆ Recurrent acute bact. tonsillitis (3-4, 6 / yr)
- ◆ Post Quinsy
- ◆ Obstruction
 - OSAS Hypertrophy in children!, "kissing tonsils", ads.
 - Mononucleosis ("hot tonsillectomy")
 - Quinsy
- ◆ Glomerulonephritis, rheumatoid fever, carditis, RA, dermatology
- ◆ Unilateral enlargement or ulcerated / bleeding tonsils
- ◆ Cranio-facial anomalies (bite asymmetry)- tonsillectomy before brace fitting



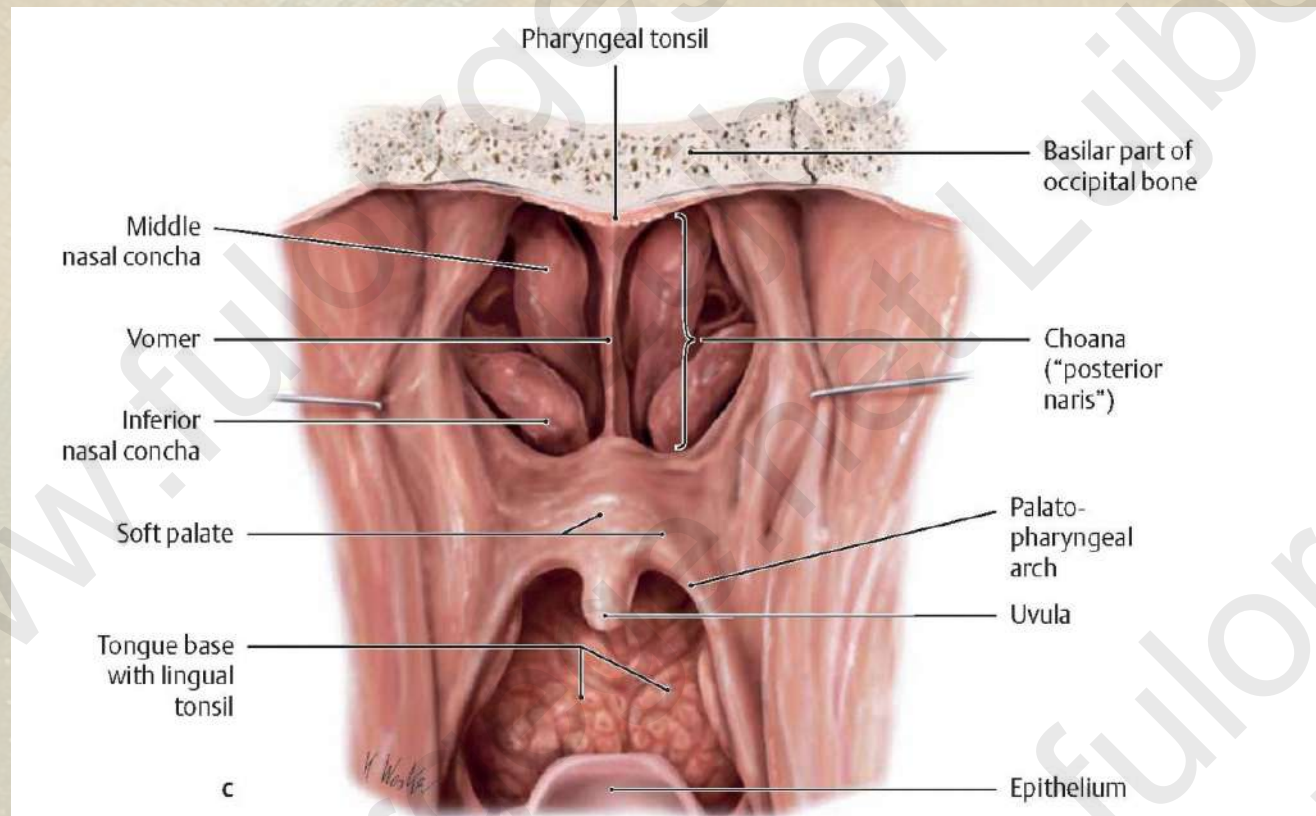
Complication of tonsillectomy

- ◆ Primary or Secondary post-tonsillectomy
BLEEDING
(can be fatal!)

Blood supply of palatine tonsils:

1. a. palatina ascendens (a. facialis)
2. a. lingualis
3. a. palatina descendens (a. maxillaris)
4. a. pharyngea ascendens

Nasopharynx (epipharynx, postnasal space)



B Mucosa of the nasal cavity

c Posterior view through the choanae into the nasal cavity.

Illustrator: Karl Wesker

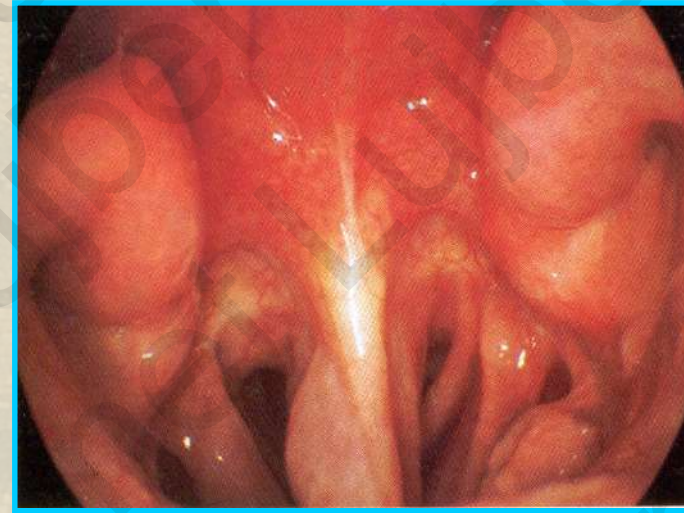
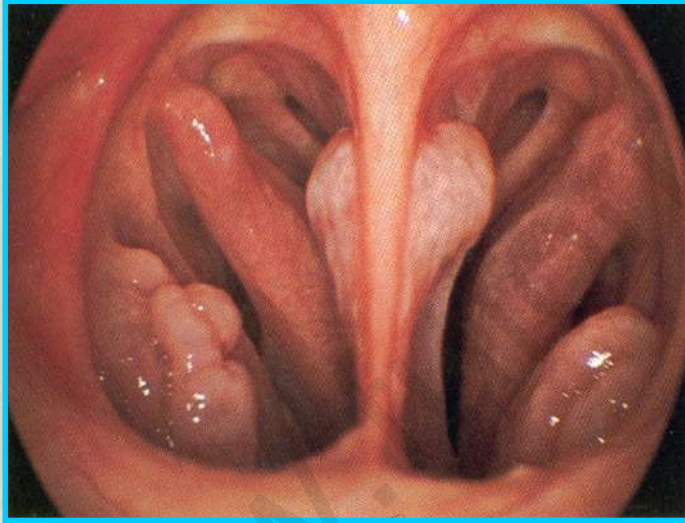
pp. 114-115

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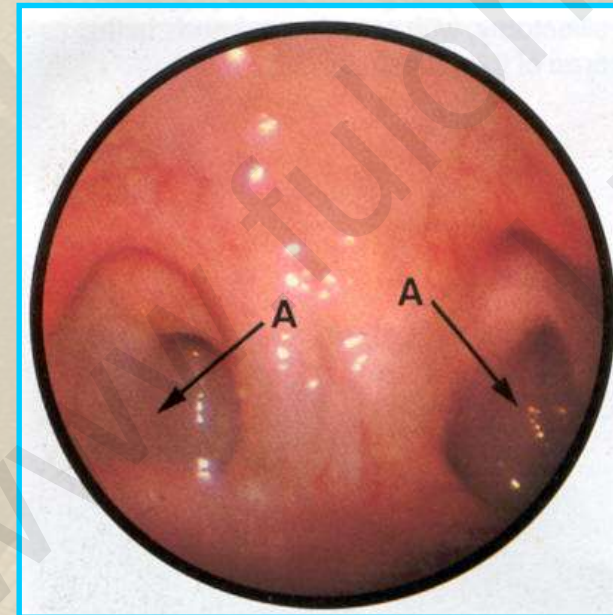
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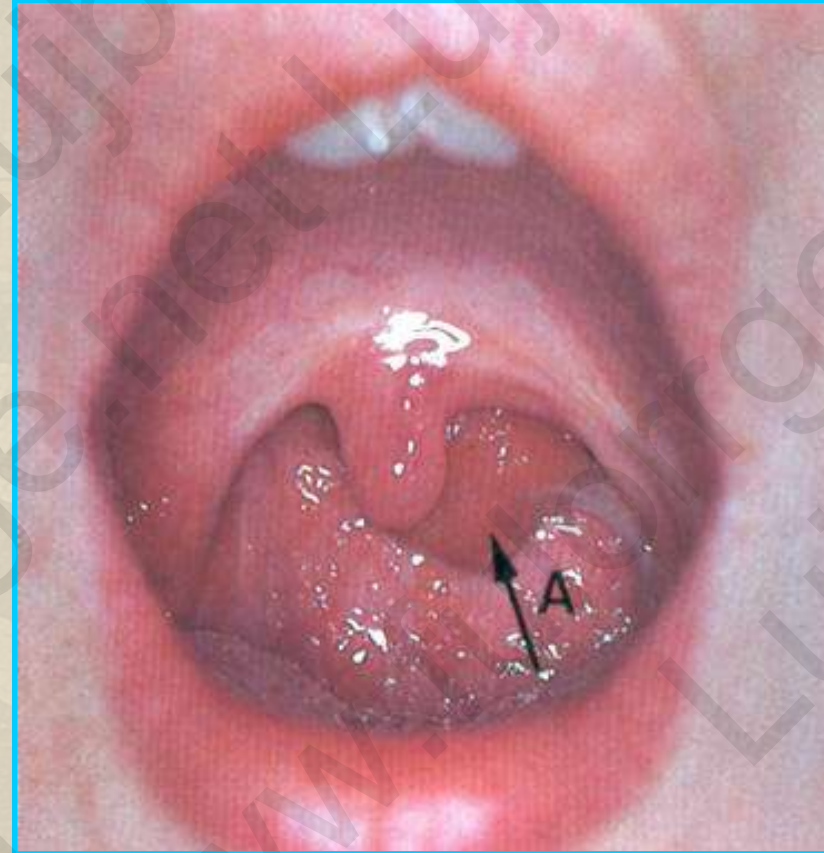
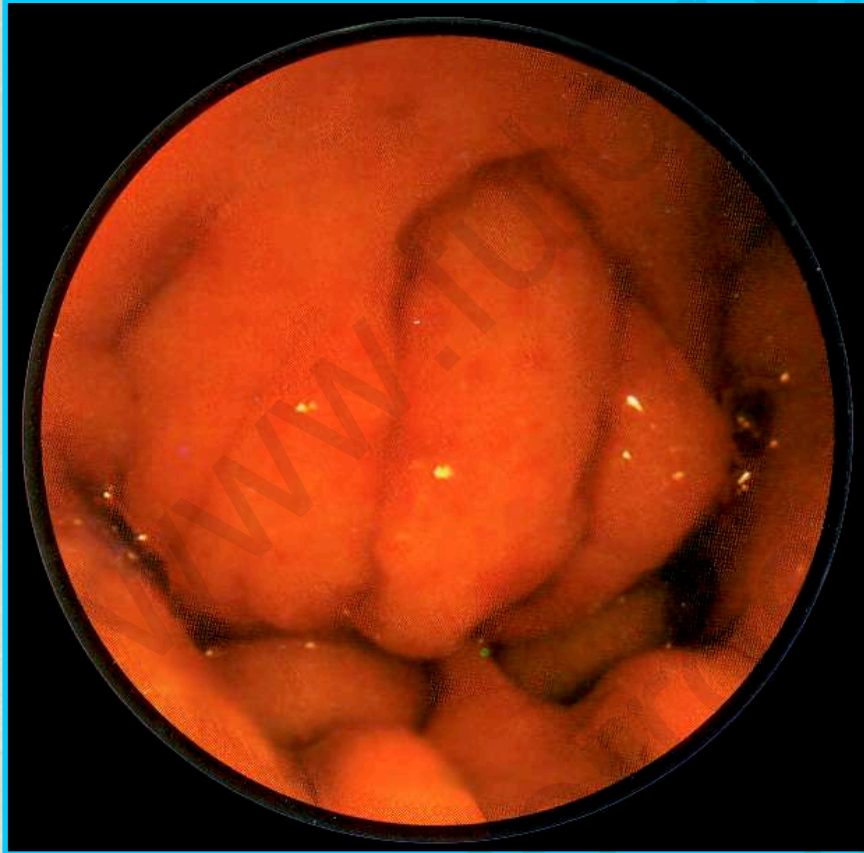
Naso-/epipharynx anatómiai képletei



- ◆ Anterior: choanae (atresia)
- ◆ Superior: (fornix) floor of sinus sphenoidalis
- ◆ Posterior-superior: adenoid tissue
- ◆ Lateral: Eustachian tube's orifice
Torus tubarius
Rosenmüller's fossa
Tonsilla tubaria
- ◆ Anterior-inferior: soft palate

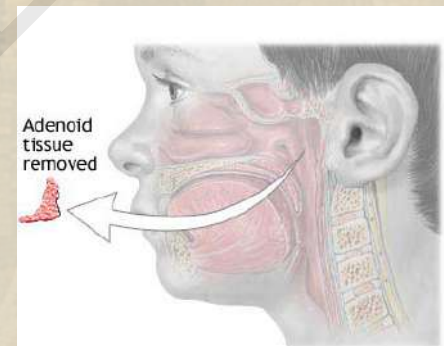


Adenoid hyperplasia



Adenoid hypertrophy

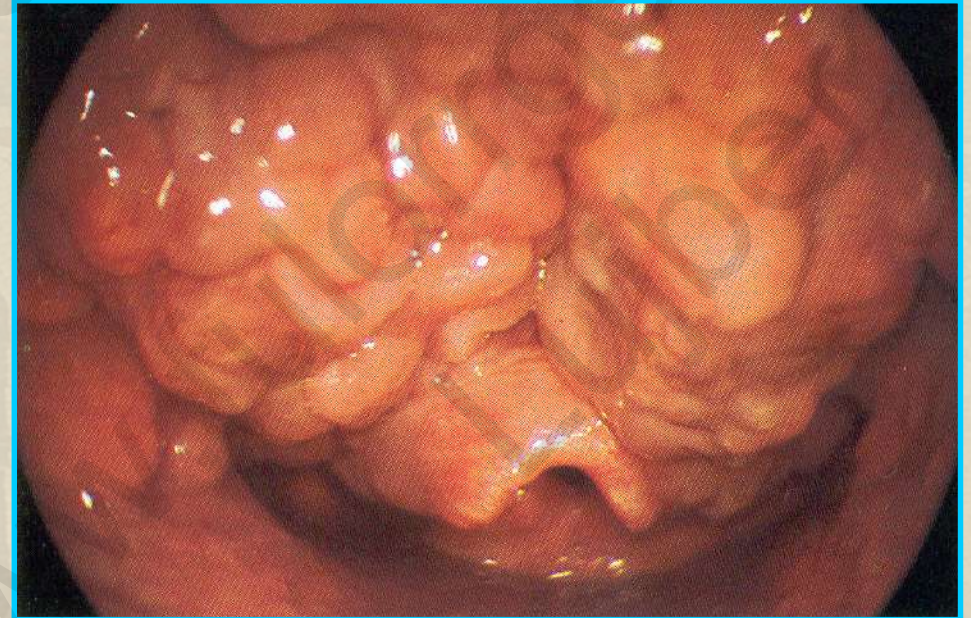
- ◆ Vegetatio adenoides = adenoides in nasopharynx
 - ◆ Hypertrophy
 - **nasal blockage**, open mouth breathing, adenoid face
 - recurrent **rhinosinusitis** (no ventilation and drainage of sinuses)
 - **Eustacian tube blockage** – sequelae are_
 - OME (otitis media with effusion)
 - SOM (serous otitis media)
- IT equalizes the pressure between ME and environment. If blocked, O₂ absorbed from ME, air pressure drops in ME, TM retracts, ME effusion builds up.
- (by the way! Direct infection from nose to Middle Ear via the E.Tube. can take place/Acute otitis media/)
- **OSAS** stertor=loud snoring, apnoea, irreg. resp., arousals, enuresis, daytime sleepiness, cor pulmonale, alveolar hypoventilation, cardiac dysrhythmias, acute cardioresp. failure, sudden death



If palatine **tonsils** are **removed**

- Lingual tonsils compensatory hypertrophy
- Small lymphatic tissues in paryngeal wall hypertrophize
- more frequent lateral pharyngitis

Hypertrophy- OSAS



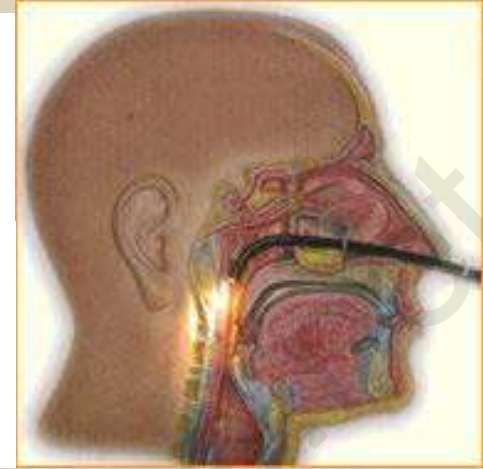
Vallecula epiglottica

- Foreign body can stuck into here
food, fish bone, toys, coins
- Tomours



Larynx -hypopharynx

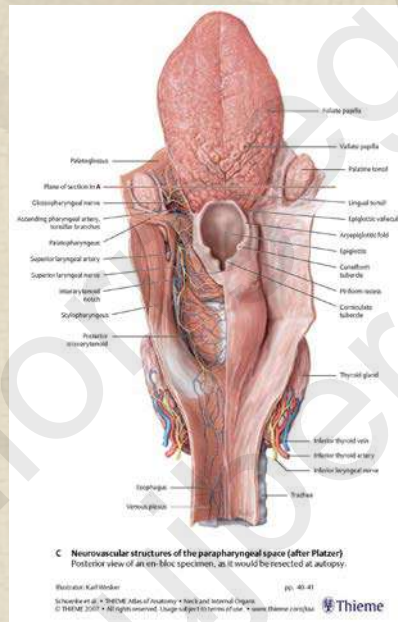
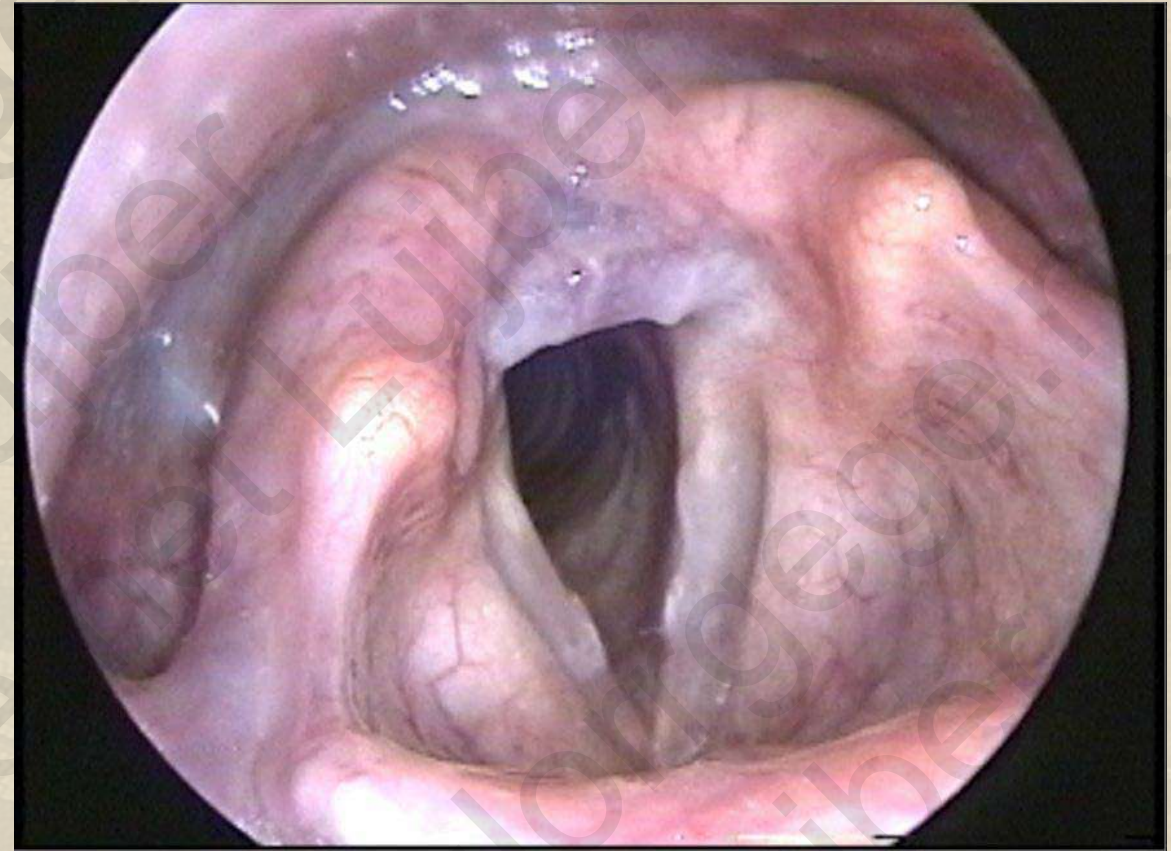
- ◆ Special instruments needed to visualize



- ◆ Diseases of this area cause significant symptoms!
 - airway obstruction –**suffocation** urgent action needed! **Dyspnoea**
 - vocal cord lesions – **raucedo**-hoarseness, **dysphonia**, **aphonia**
 - hypopharynx lesions – **dysphagia**, **odynophagia**, **aphagia**

Aditus laryngis

- Rim of epiglottis
- Plica ary-epiglottica
- Arythenoid cartilage
- Commissura posterior



Acute airway obstruction

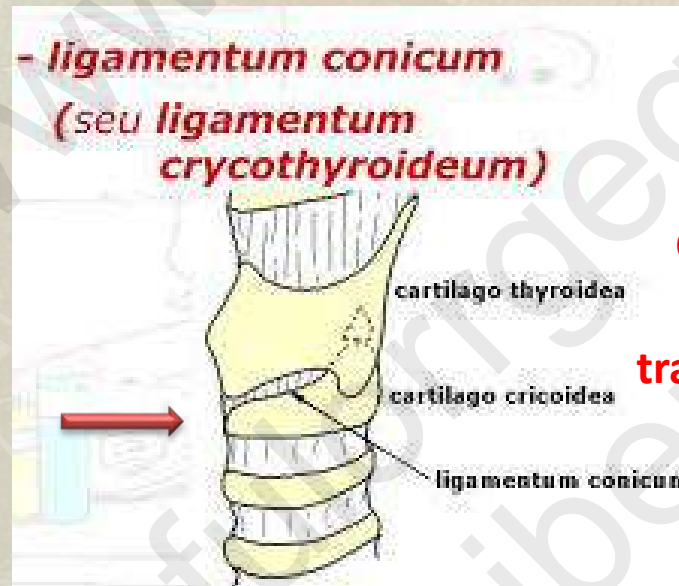
Resuscitation **ABC**

Signs:

- Inspiratory stridor
- Accessory breathing muscles are working (nasal alae, m.sternocleidomastoideus, m.intercostal.)
- Abdominal movement (diaphragm), supraclavicular, jugulum, subxiphoid regions ident
- Sweating, pale, lips cianotic
- Heart rate high
- Panics

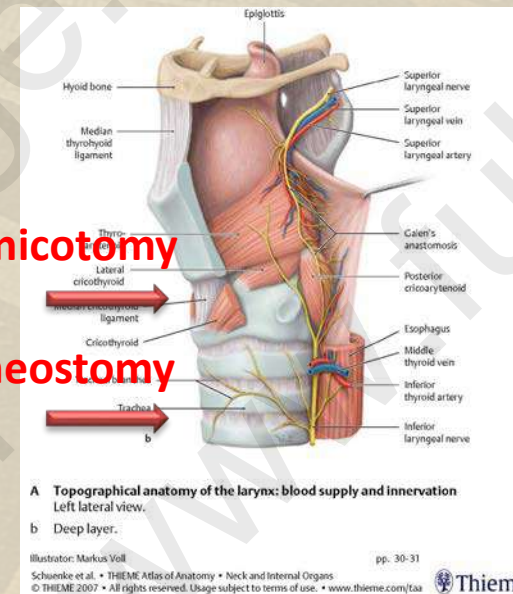


Intubation



Conicotomy
tracheostomy

conicotomy



A Topographical anatomy of the larynx: blood supply and innervation
Left lateral view.
b Deep layer.

Illustrator: Markus Voll
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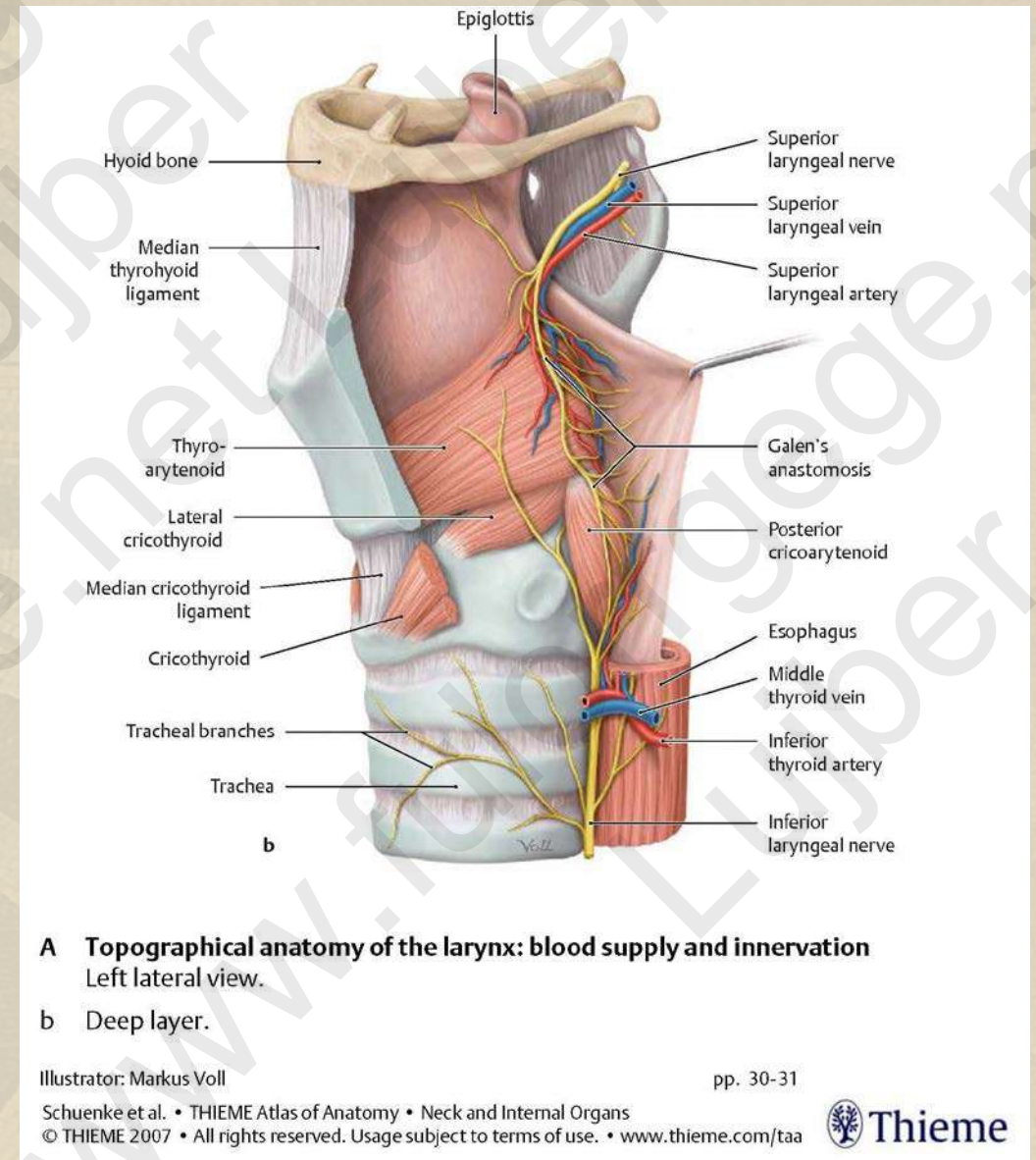
Tracheostomy

Cricoid cartilage very sensitive!

- Long term intubation
- Direct trauma of cartilage e.g. bike accident, assault
- Conicotomy which is not transferred to tracheotomy



Subglottic or tracheal stenosis



Larynx

♦ Innervation

n. laryngeus sup. → sensory innerv. /aditus laryngis/
→ motoric /m. cricothyroideus/

n. laryngeus inf. → motoric /all intrinsic laryngeal muscles except m.cricothyroideus/

Posterior cricoarytenoid muscle

Abduct the vocal folds (open the rima glottidis)

Lateral cricoarytenoid muscle

Adduct the vocal folds (close the rima glottidis)

Transverse arytenoid muscle, thyroarytenoid muscle

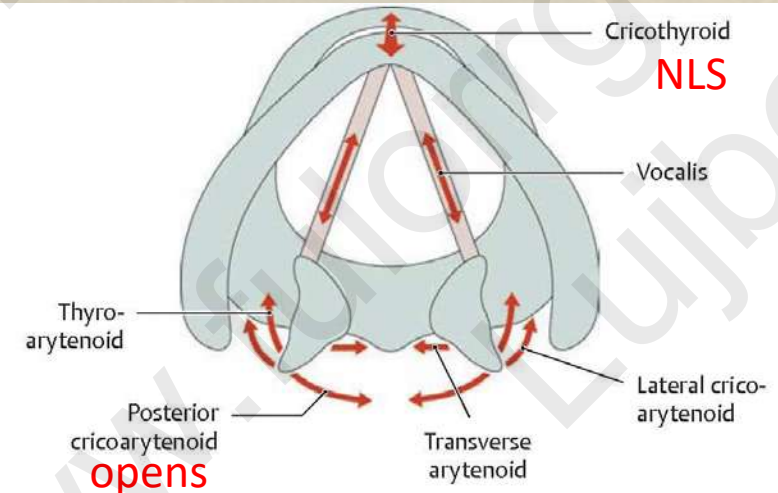
Adduct the vocal folds (close the rima glottidis)

Cricothyroid muscle, vocalis muscle

Tighten the vocal folds

LAR:

Laryngeal Adduction Reflex



B The laryngeal muscles and their actions (arrows indicate directions of pull)

Illustrator: Markus Voll

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Laryngeal nerve palsy

- ◆ Thyroid surgery
- ◆ Cancers-larynx, pharynx, thyroid, parathyroid....
- ◆ Viral infections
- ◆ Central nervous system pathologies
- ◆ Ortner's syndrome (cardio-vocal syndrome),
(rare left LRN palsy, expansion of structures within the [heart](#) or major blood vessels impinges upon the nerve)

Bilateral recurrent nerve palsy → vocal cords fixed in paramedian position, airway is obstructed → suffocation!!!

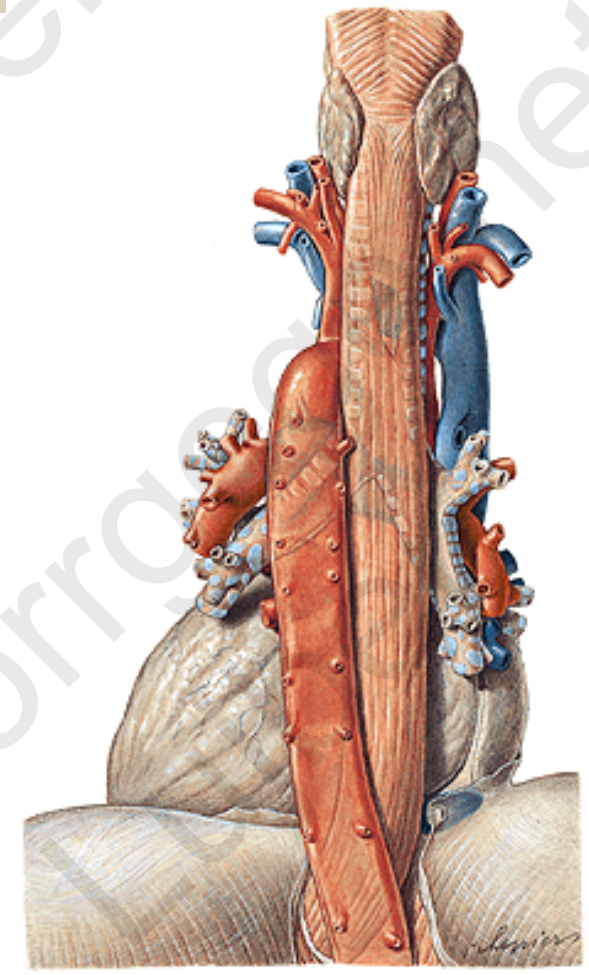
Larynx – hypopharynx

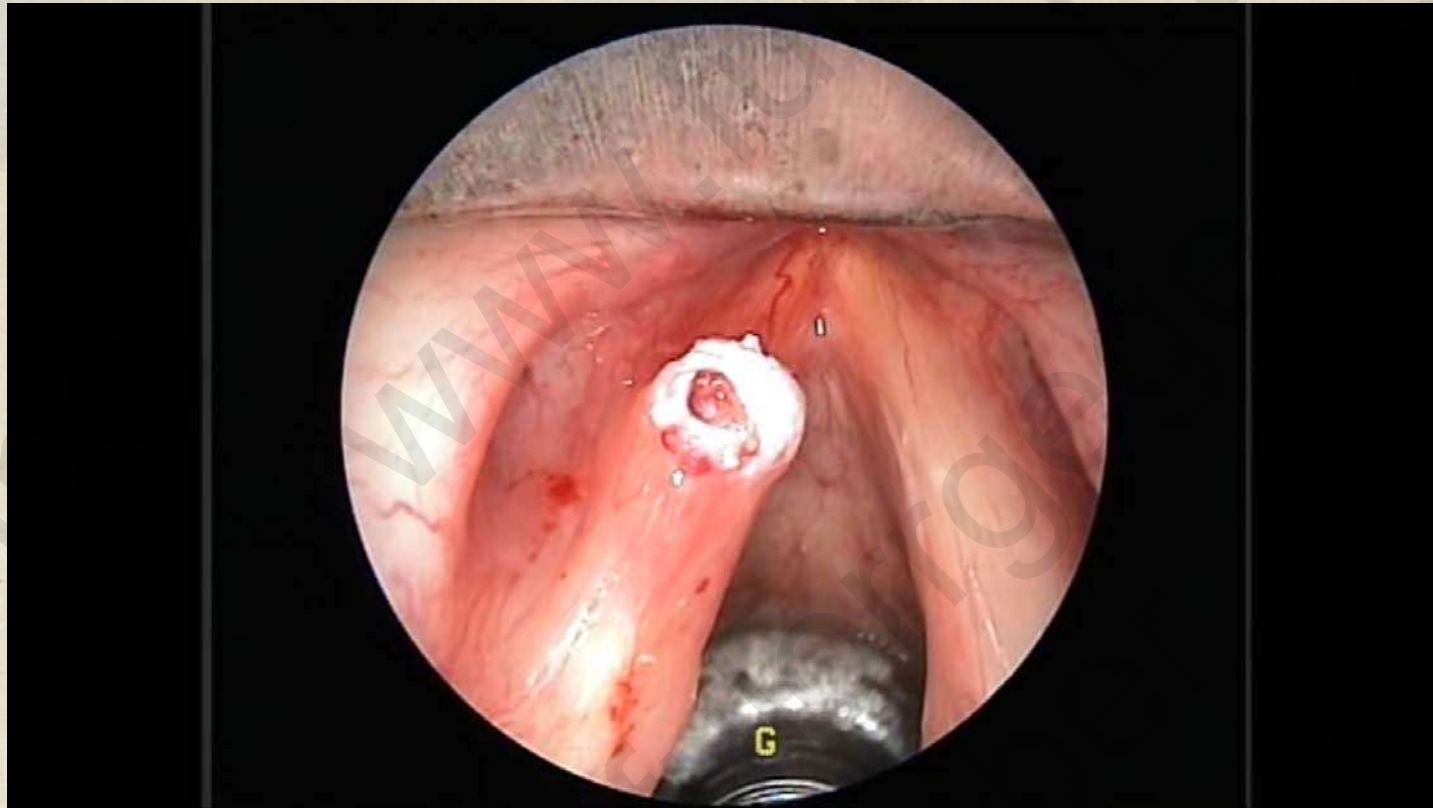
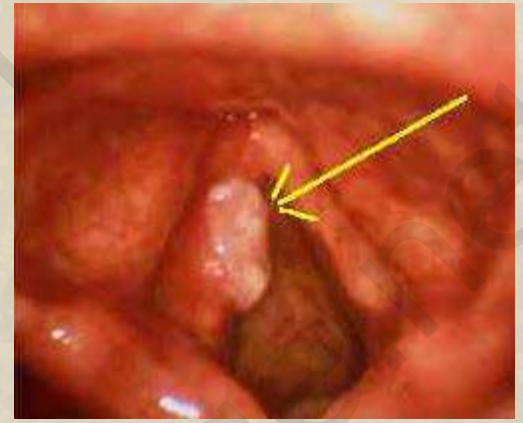
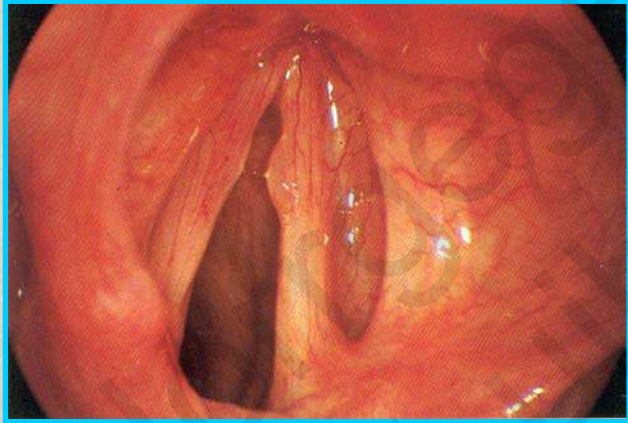
Trachea – Esophagus

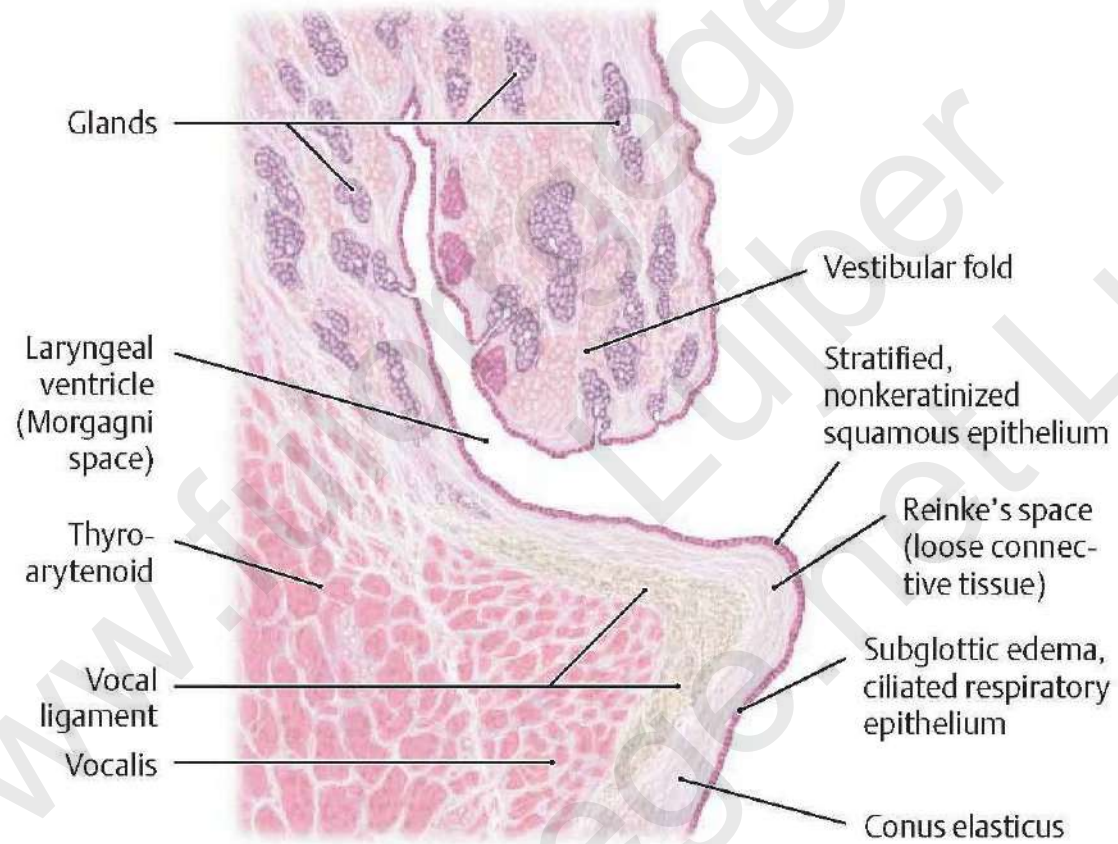
Close proximity!



Drinking of „**hot tea**” helps in laryngo-tracheal infections e.g. „flu”.







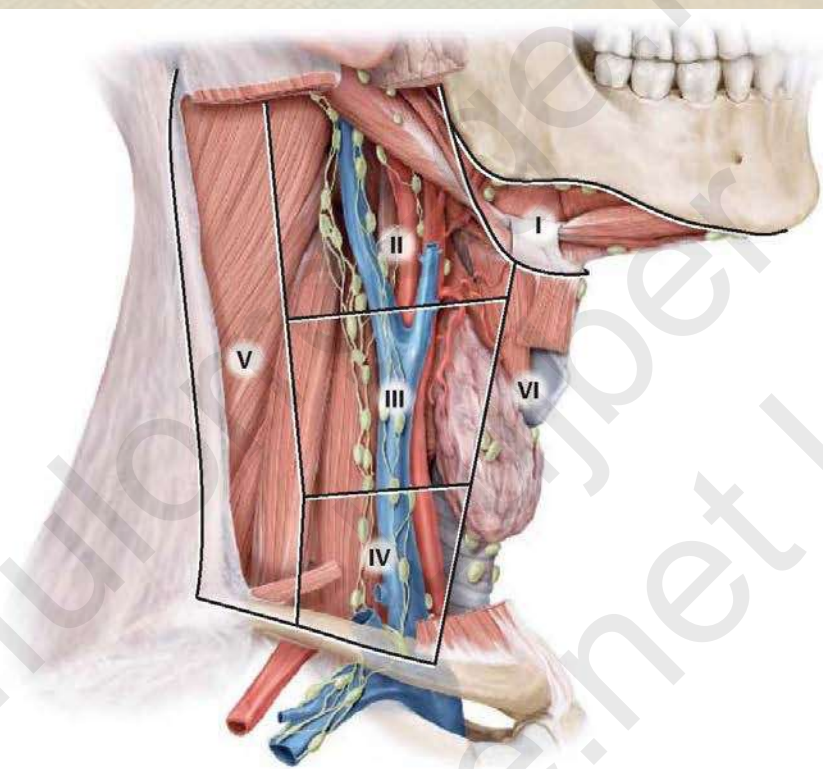
D Structure of the vocal fold
Schematic coronal histologic section, posterior view.

Illustrator: Markus Voll

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B Deep cervical lymph nodes

Right lateral view.

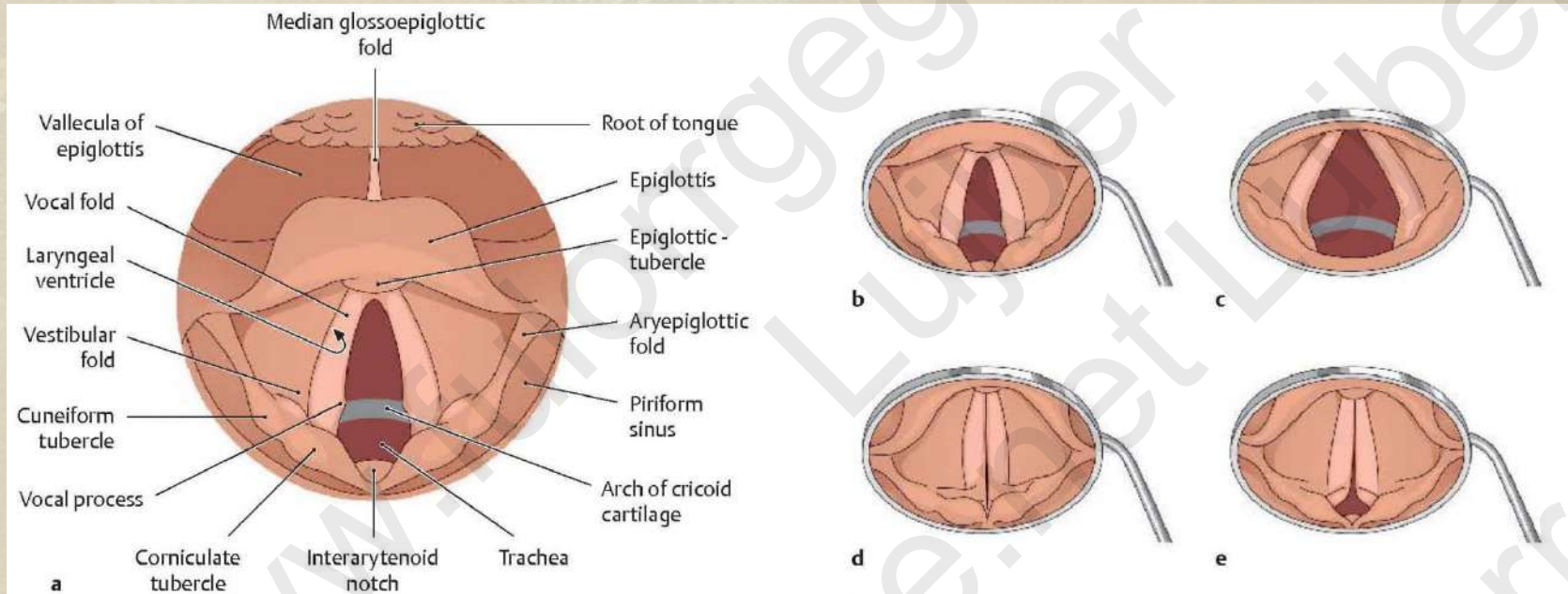
- I Submental and submandibular lymph nodes.
- II Upper lateral lymph nodes.
- III Middle lateral lymph nodes.
- IV Lower lateral lymph nodes.
- V Lymph nodes in the posterior cervical triangle.
- VI Anterior cervical lymph nodes (anterior group of cervical nodes).

Illustrator: Karl Wesker

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D Appearance of the larynx on indirect laryngoscopy (after Berghaus, Rettinger, and Böhme)

- a Depiction of the larynx in the examiner's mirror.
- b Respiratory position: opening of the rima glottidis during normal respiration.
- c Respiratory positions: opening of the rima glottidis during vigorous respiration.
- d Phonation position with vocal folds completely adducted.
- e Vocal folds slightly abducted in their posterior third during whispered speech.

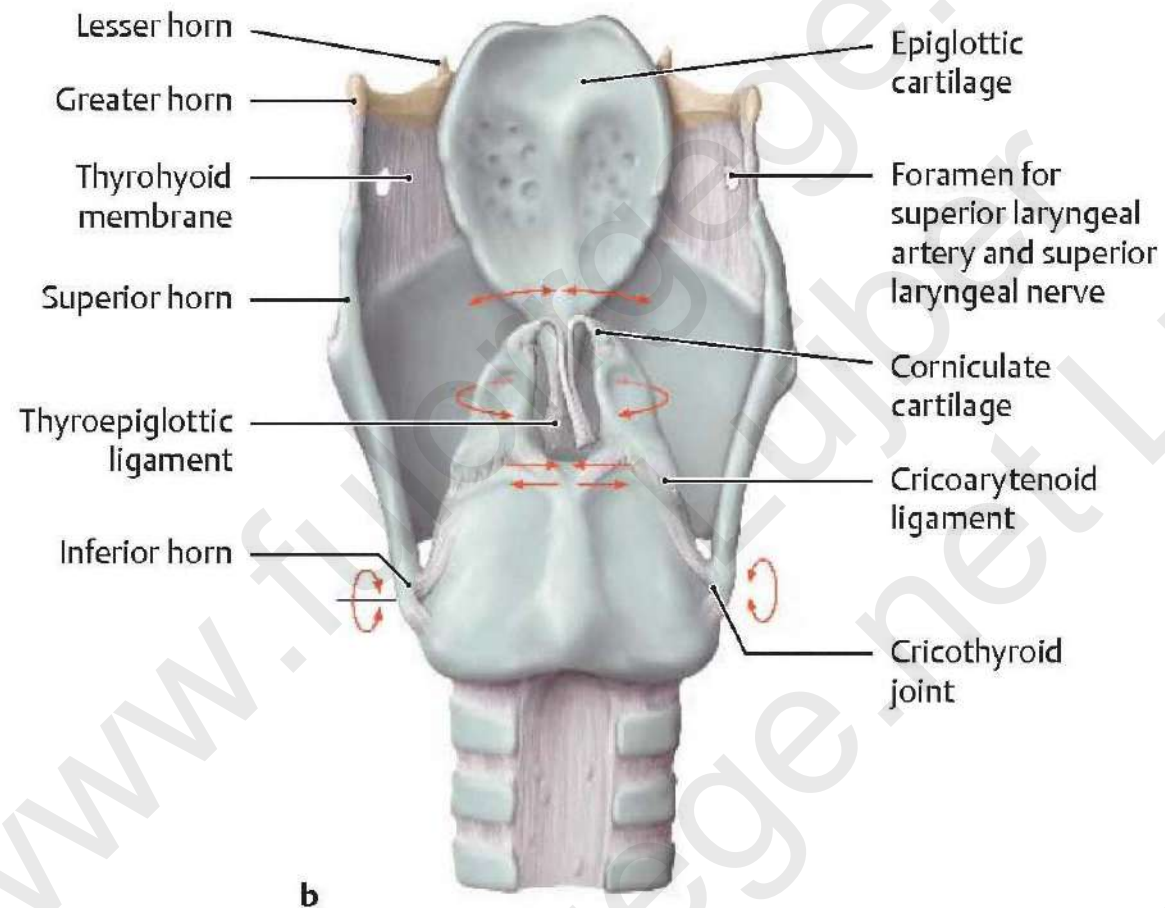
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C Laryngeal cartilages and ligaments

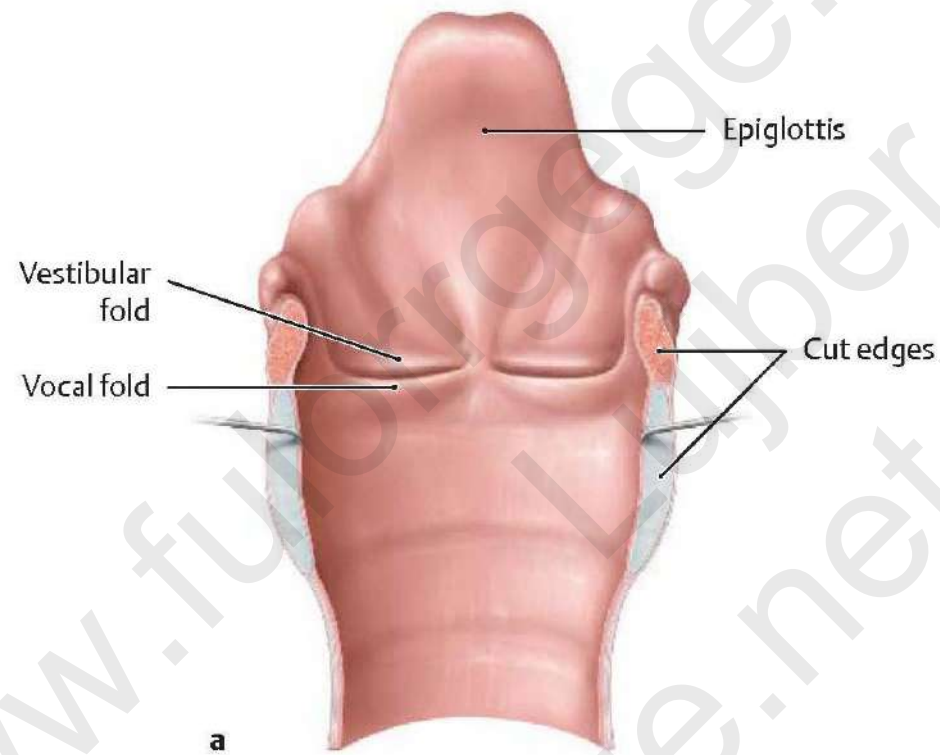
b Posterior view.

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A Cavity of the larynx: mucosal surface anatomy and division into levels

a Posterior view.

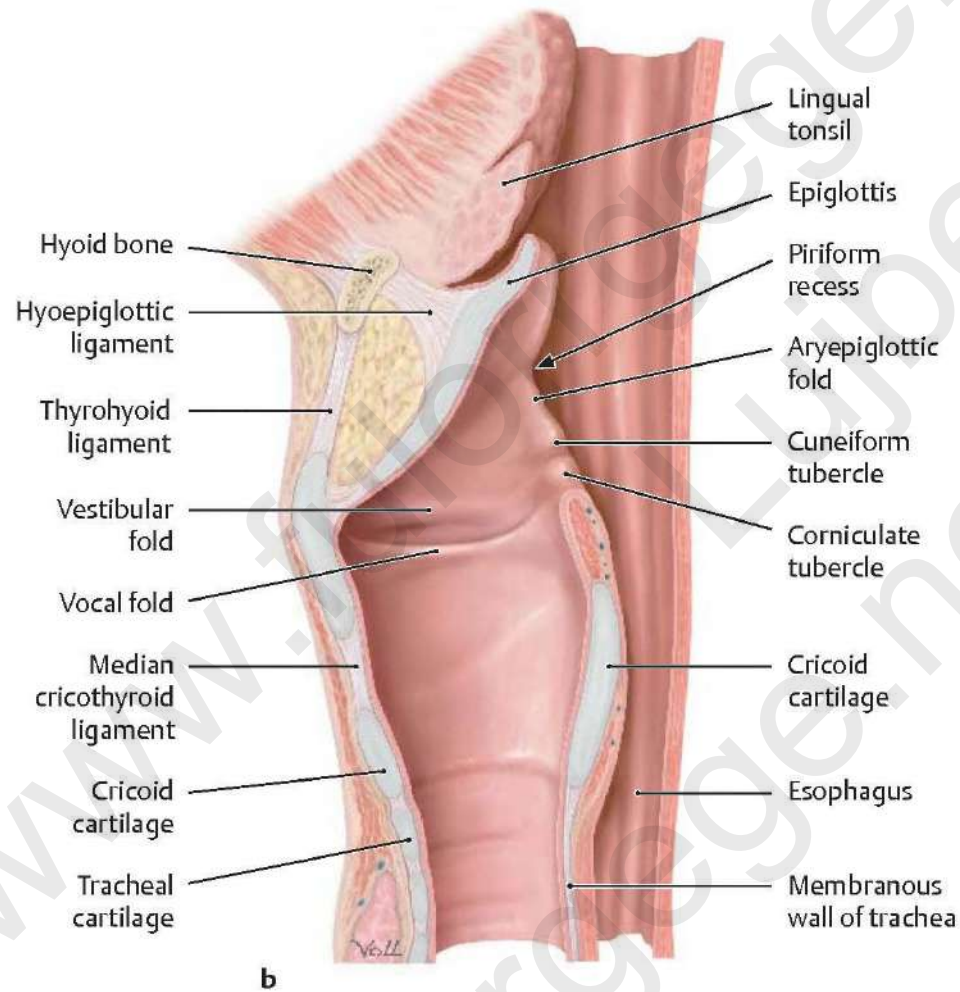
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A Cavity of the larynx: mucosal surface anatomy and division into levels

b Midsagittal section viewed from the left side.

Illustrator: Markus Voll

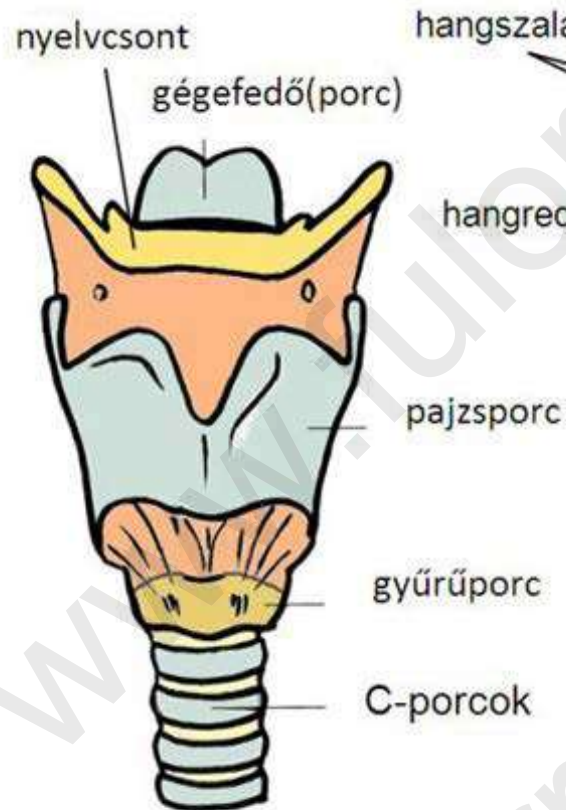
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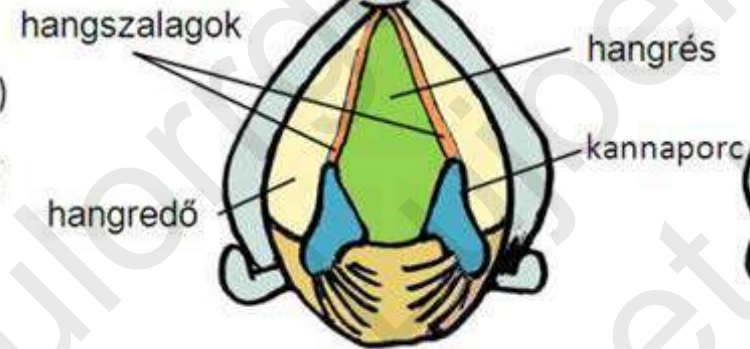


Előlnézet

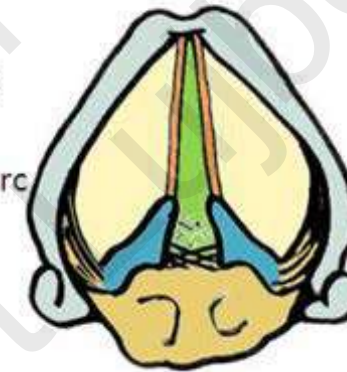


ELTE TTK Állattan

Felülnézet



A hangrész tágítása és
ezáltal a hangerő növelése



A hangrész szűkítése és ezáltal a
hangerő csökkentése



A hangszalagok lazítása -
a hang mélyül



A hangszalagok feszítése - a
hangmagasság nő

Thank you for your attention !

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