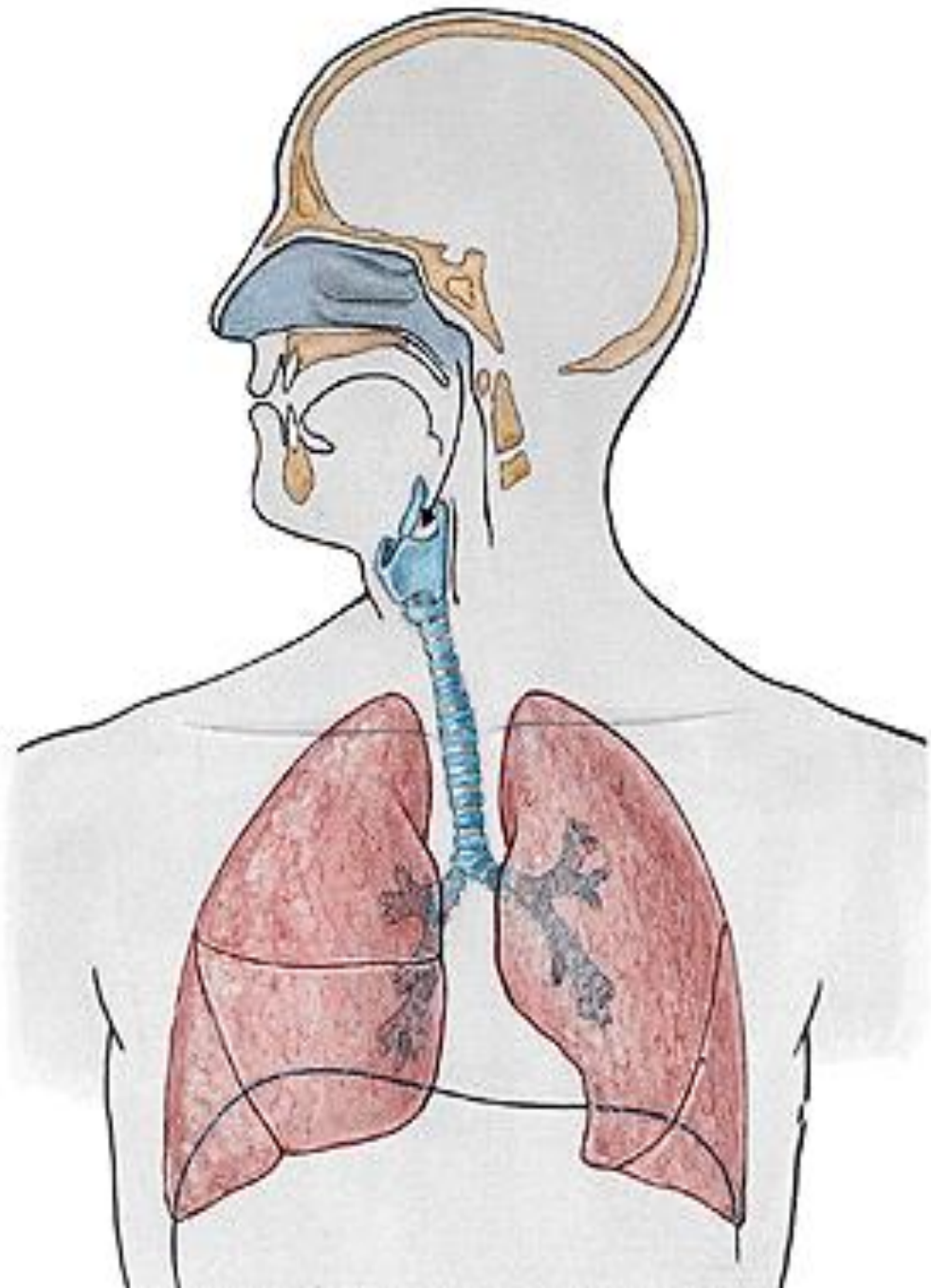


RESPIRATORY SYSTEM



Upper respiratory tract

Cavum nasi

Pharynx

Lower respiratory tract

Larynx

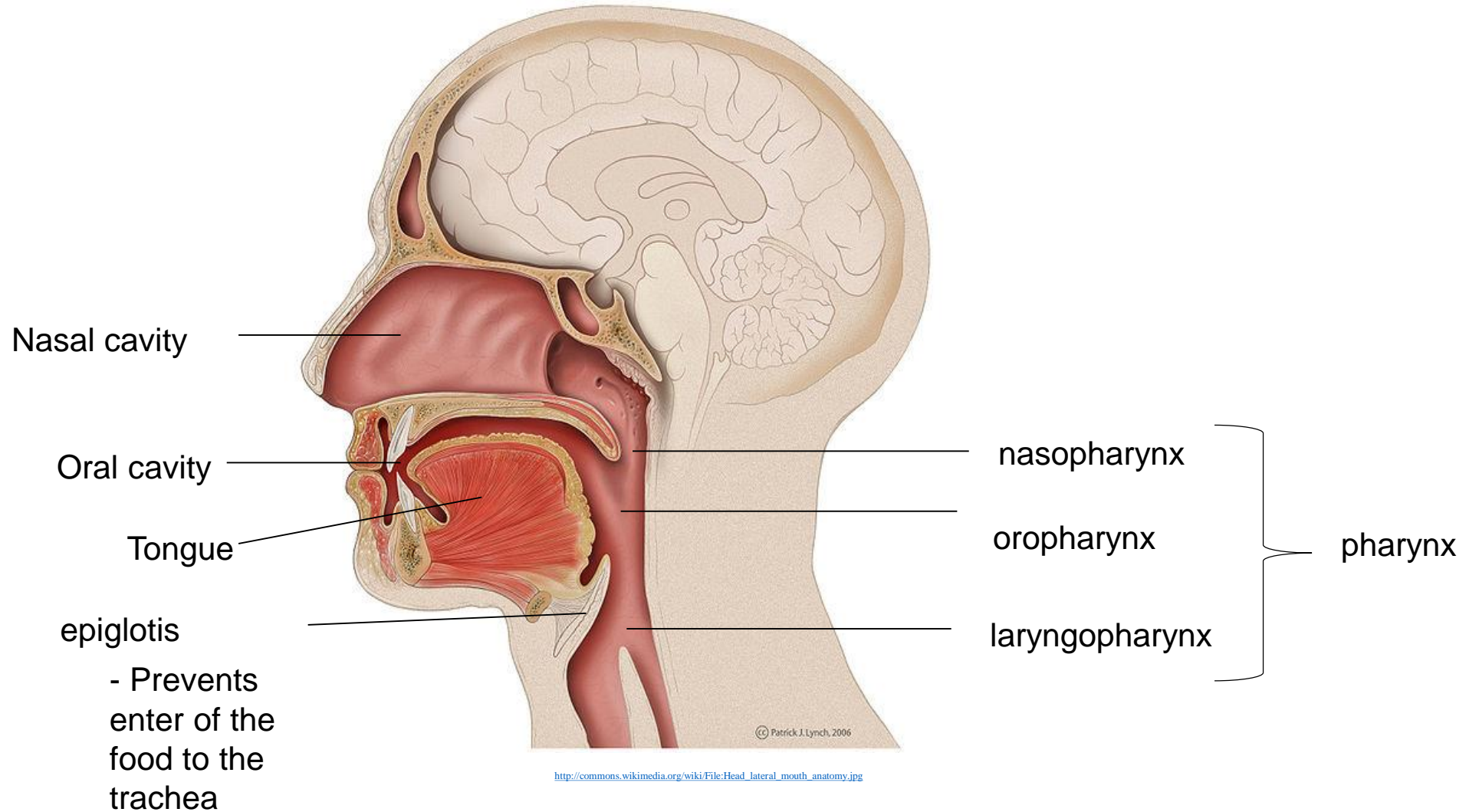
Trachea

Bronchi

Respiratory organ

Lungs

Upper respiratory tract



NASUS EXTERNUS

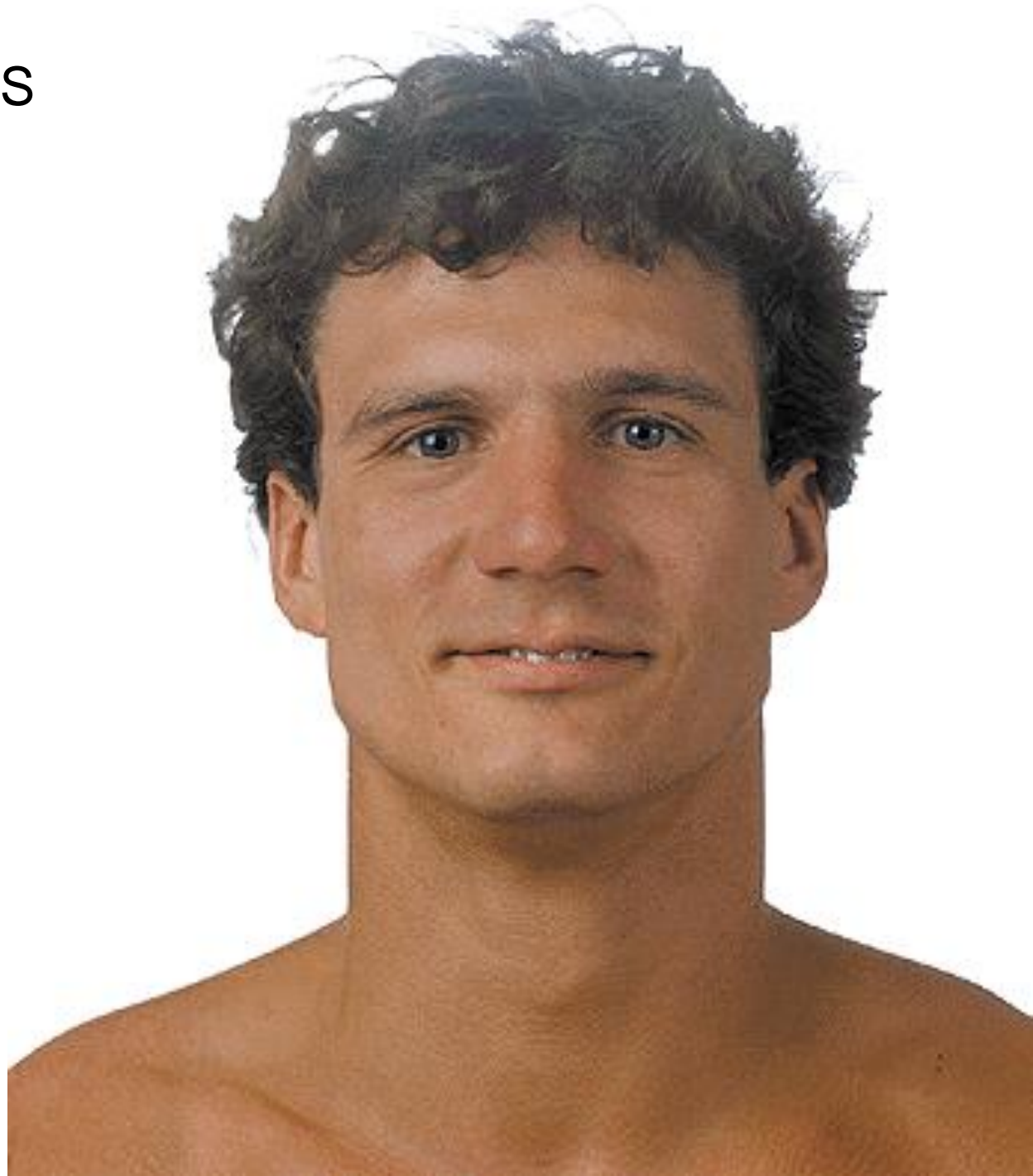
Radix nasi

Dorsum nasi

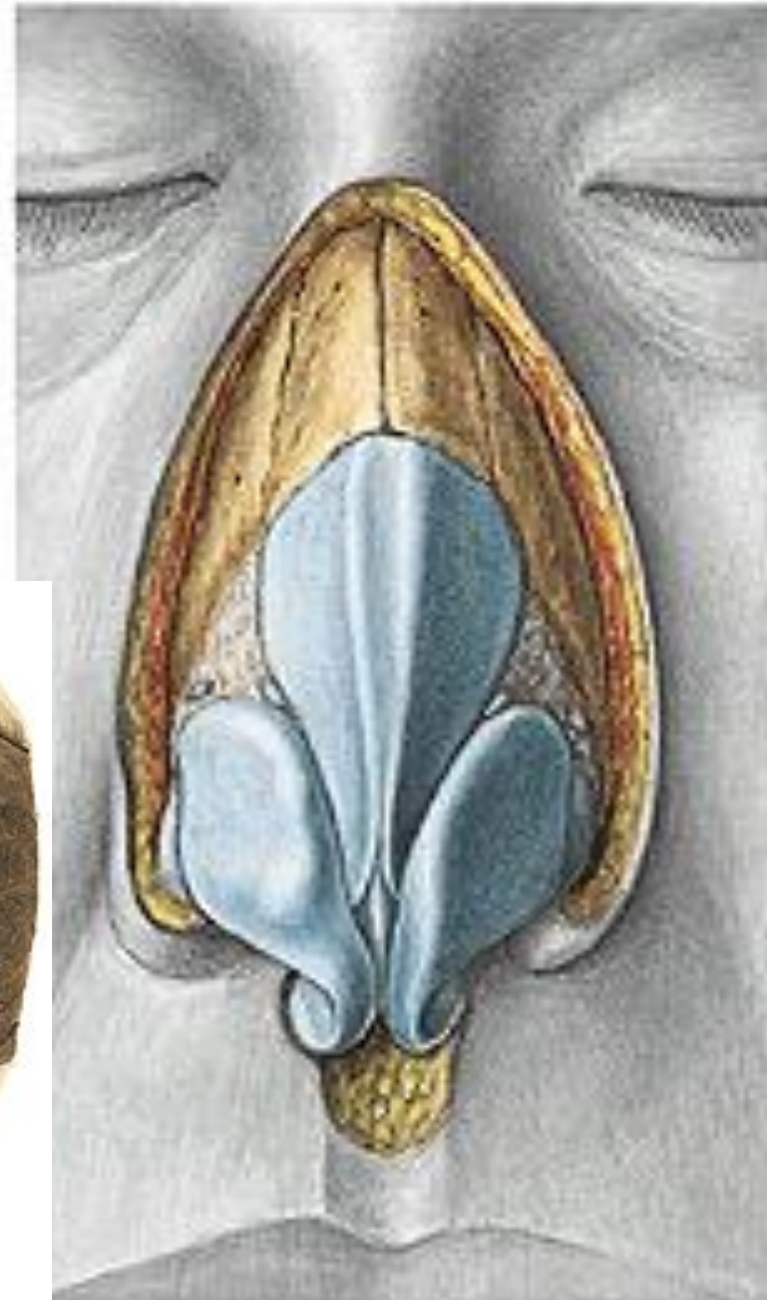
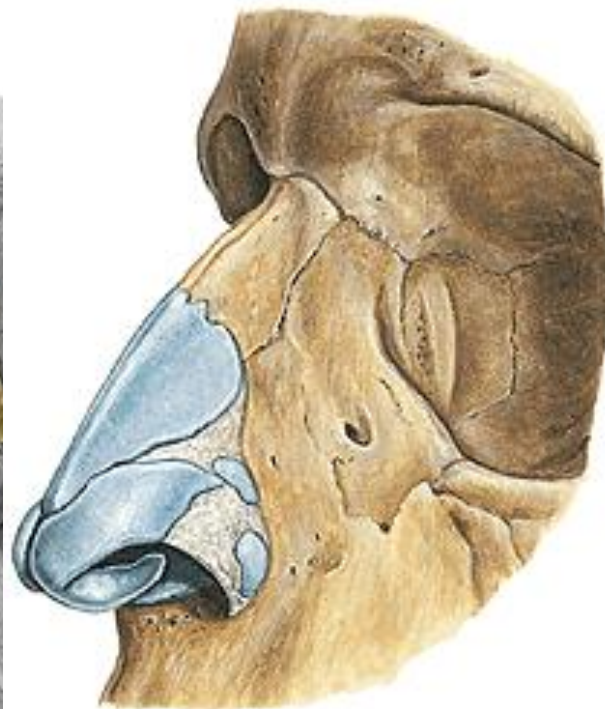
Apex nasi

Nares

Alae nasi

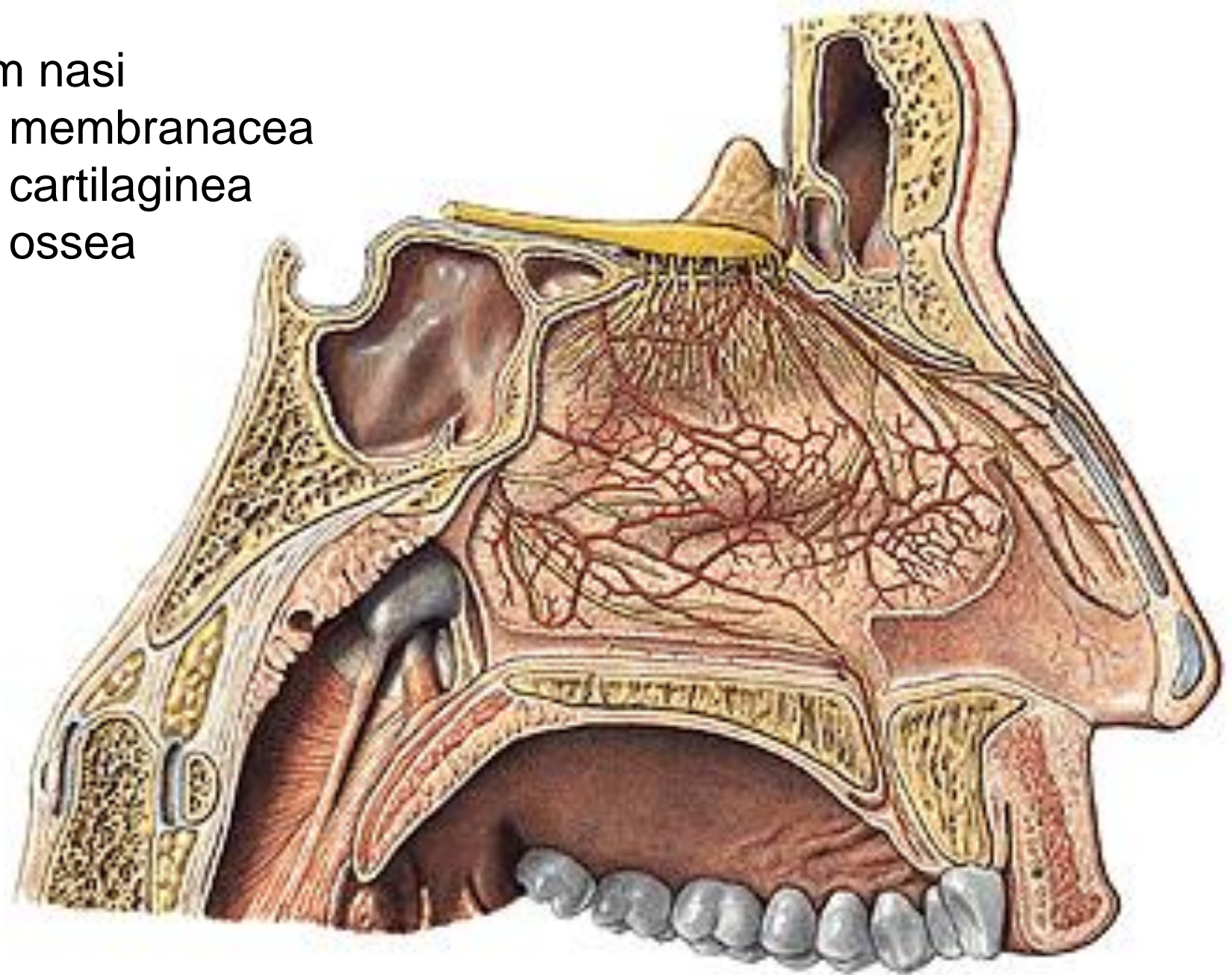


Cartilago nasi lateralis
Cartilago septi nasi
Cartilago alaris major
- crus laterale
- crus mediale
Cartilagine alares minores



Septum nasi

- pars membranacea
- pars cartilaginea
- pars ossea



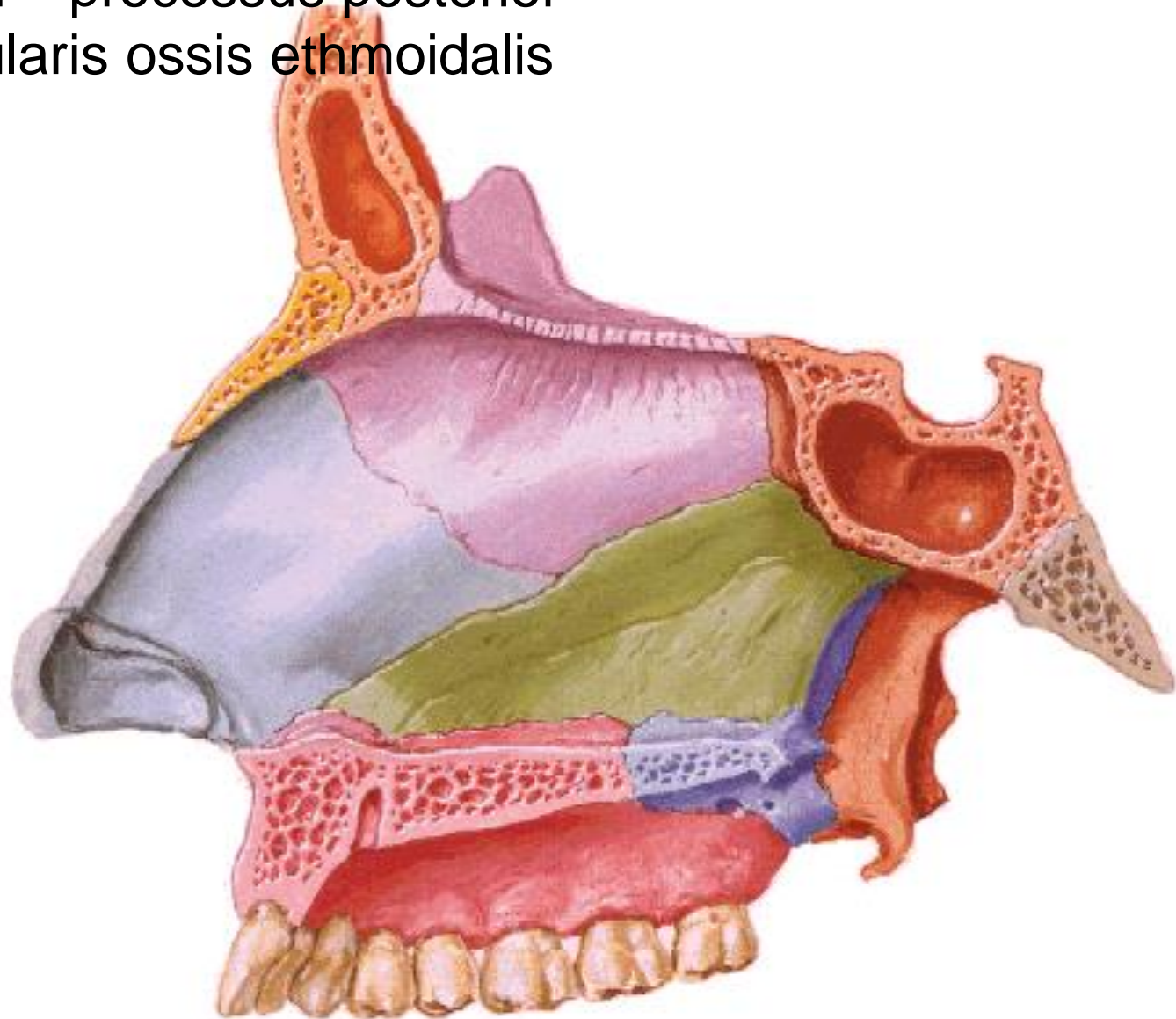
SEPTUM NASI

Cartilagine alares majores – crura medialis

Cartilago septi nasi – processus posterior

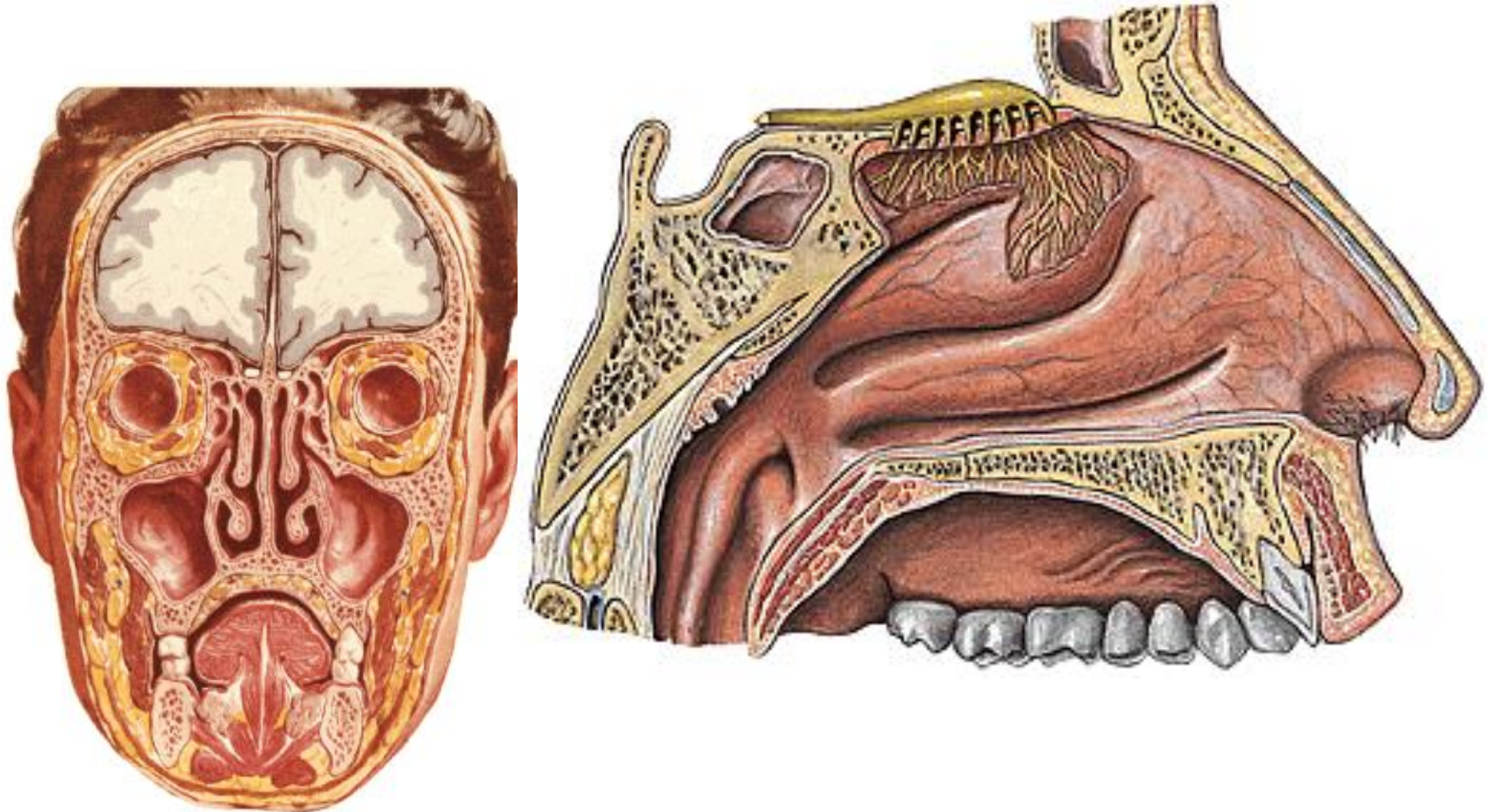
Lamina perpendicularis ossis ethmoidalis

Vomer



CAVITAS NASI

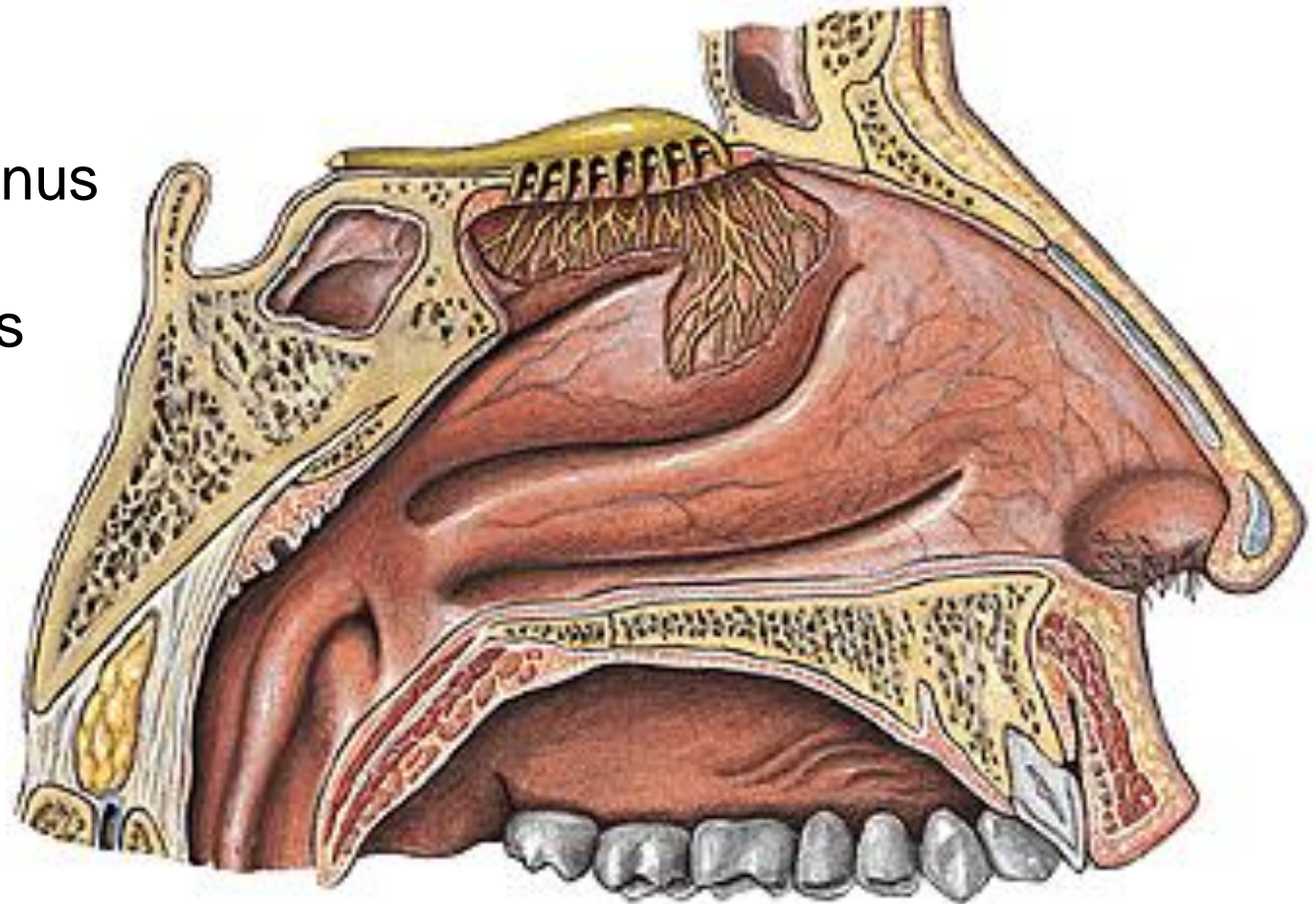
- vestibulum – limen, vibrisae, recessus apicis nasi
- cavitas nasi propria – meatus nasi sup., medius, inf.
meatus nasi communis, meatus nasopharyngeus, choanae



Superior wall: cartilago nasi lateralis, os nasale,
pars nasalis ossis frontalis, lamina cribrosa
ossis ethmoidalis, corpus ossis sphenoidalis

Inferior wall:
processus palatinus
maxillae, lamina
horizontalis ossis
palatini

canalis incisivus

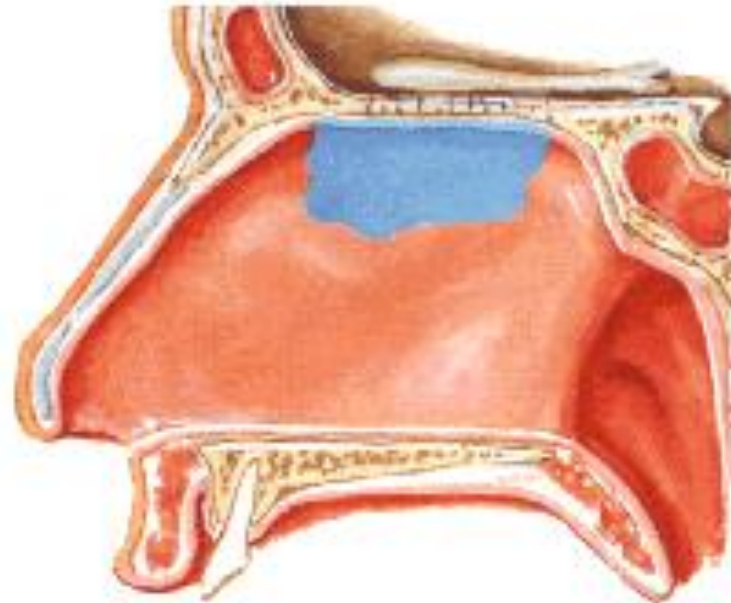
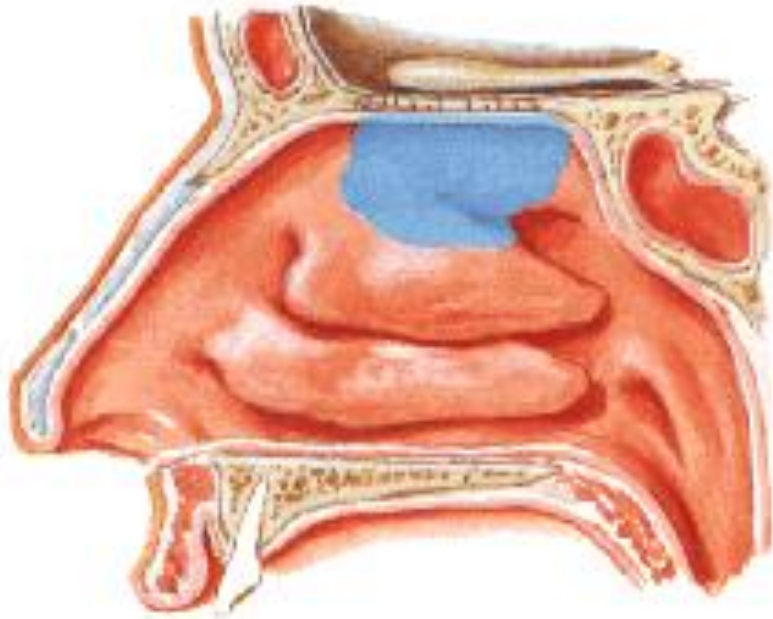


NASAL MUCOSA

Regio respiratoria

plexus cavernosi - epistaxis

Regio olfactoria



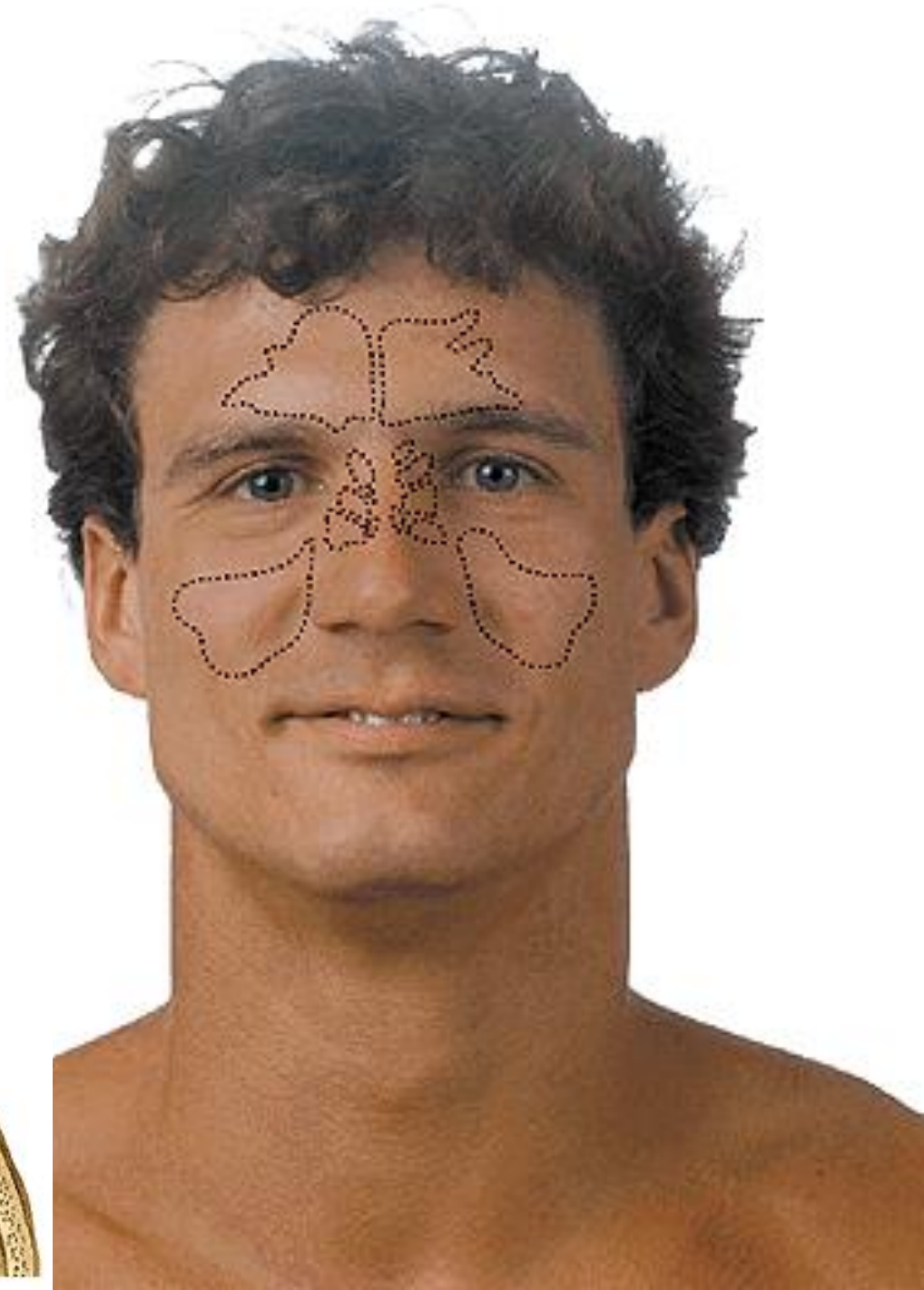
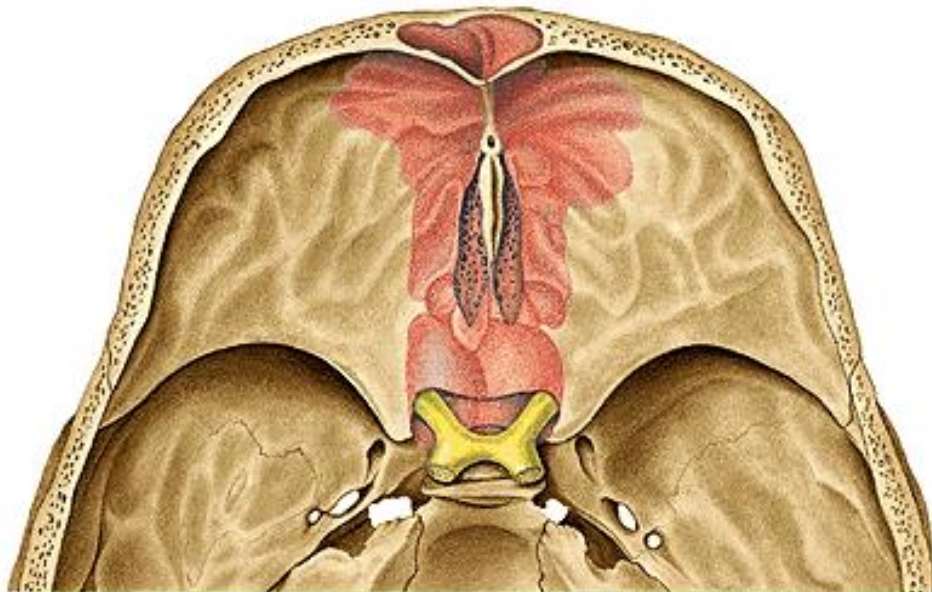
SINUS PARANASALES

Sinus maxillaris

Sinus frontalis

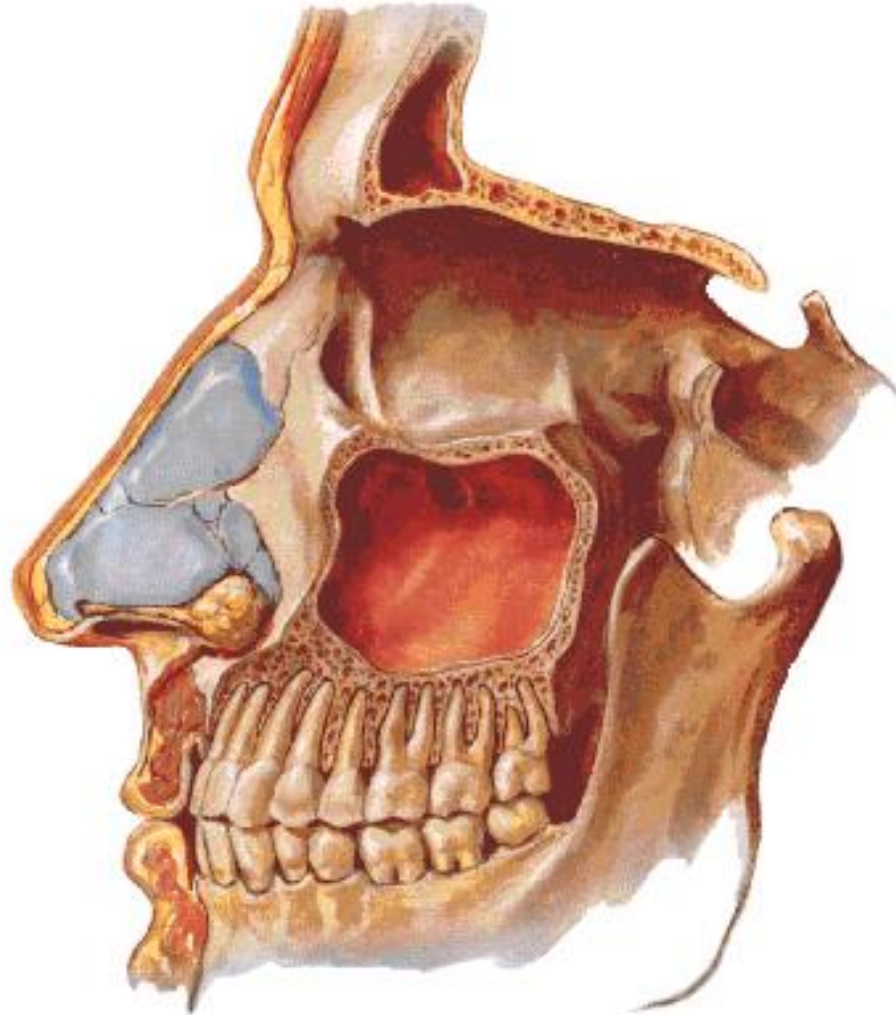
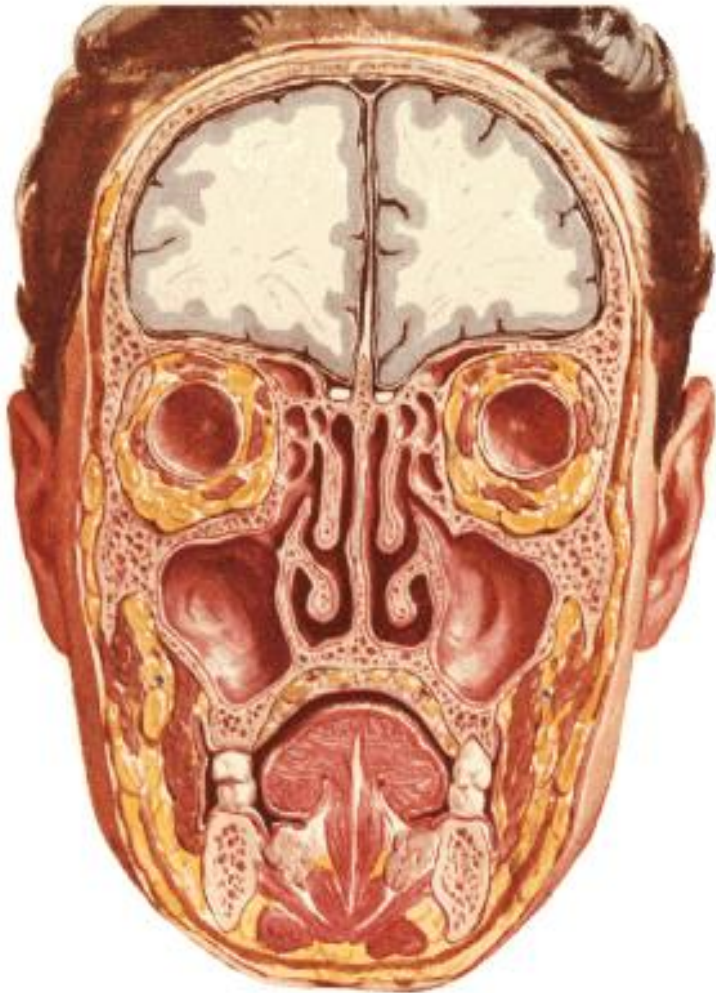
Sinus ethmoidales

Sinus sphenoidalis



SINUS MAXILLARIS
(Antrum of Highmore)

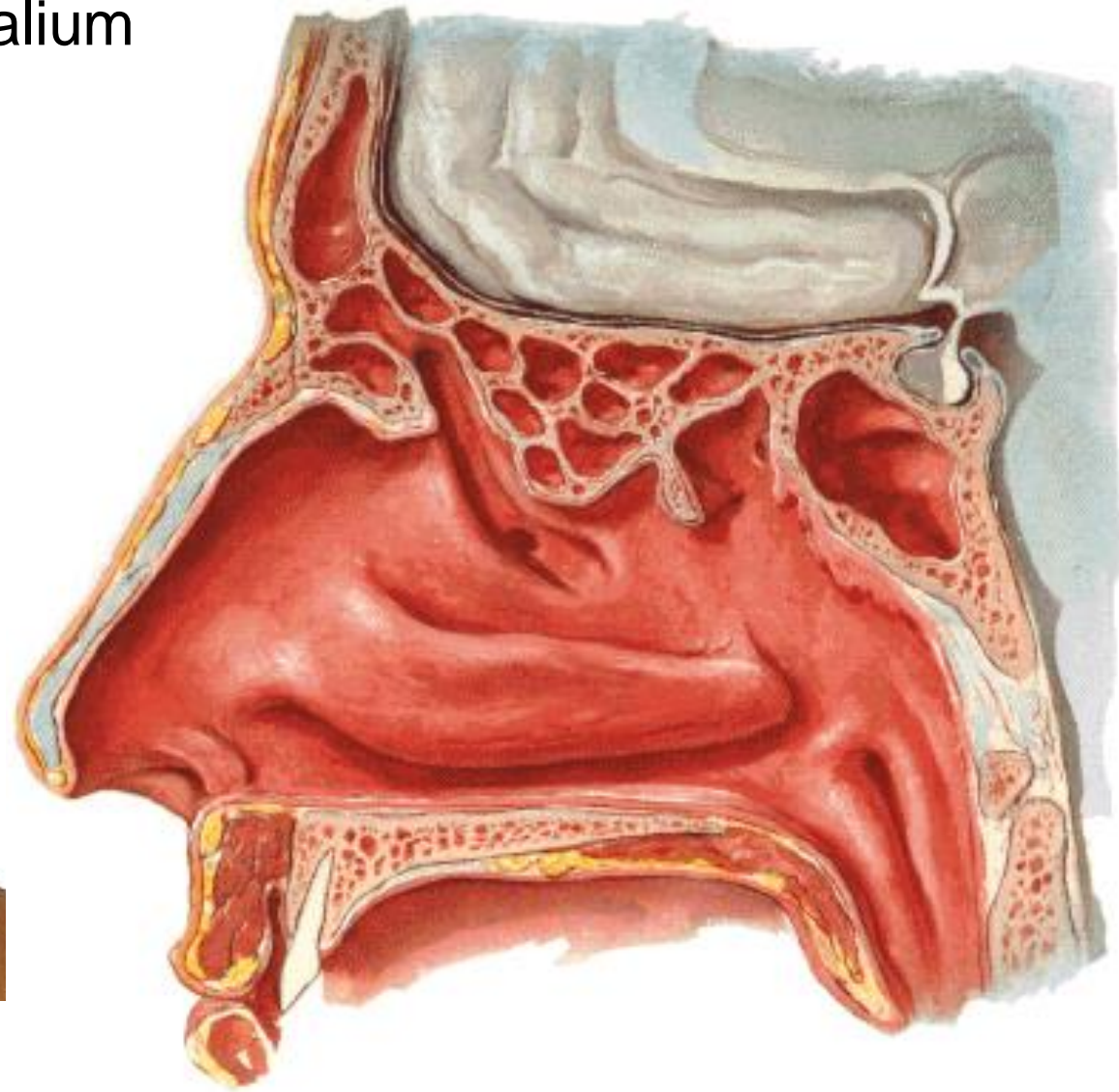
– hiatus sinus maxillaris

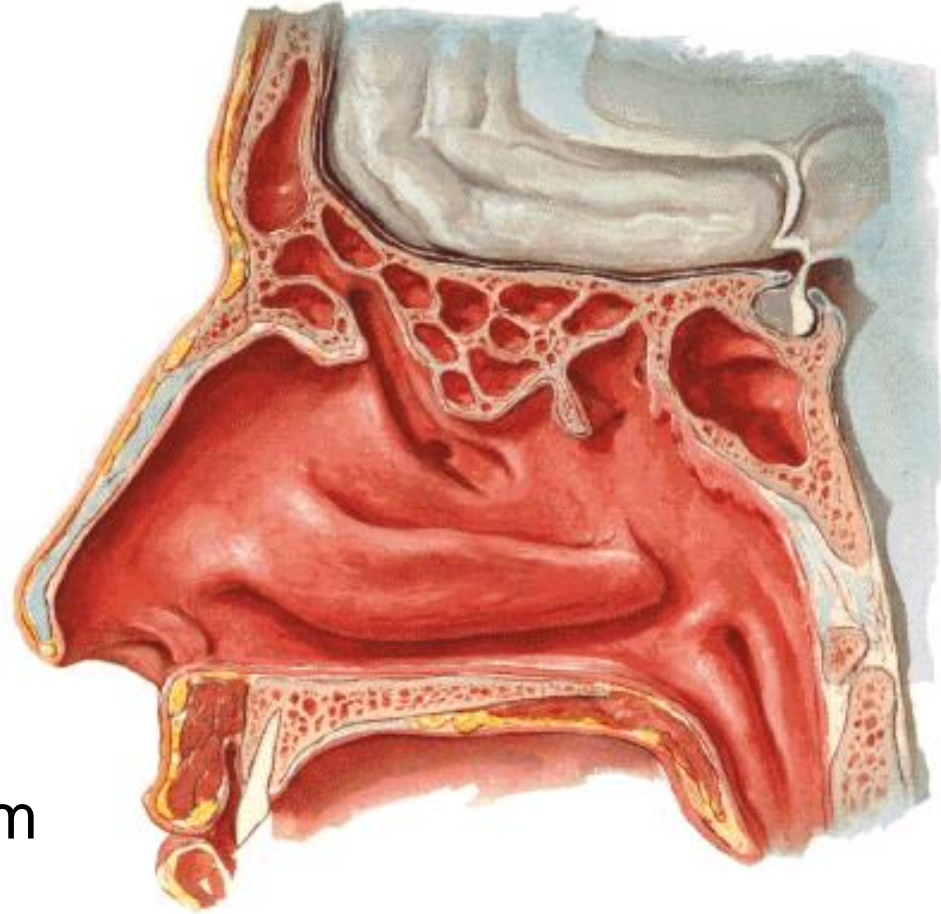
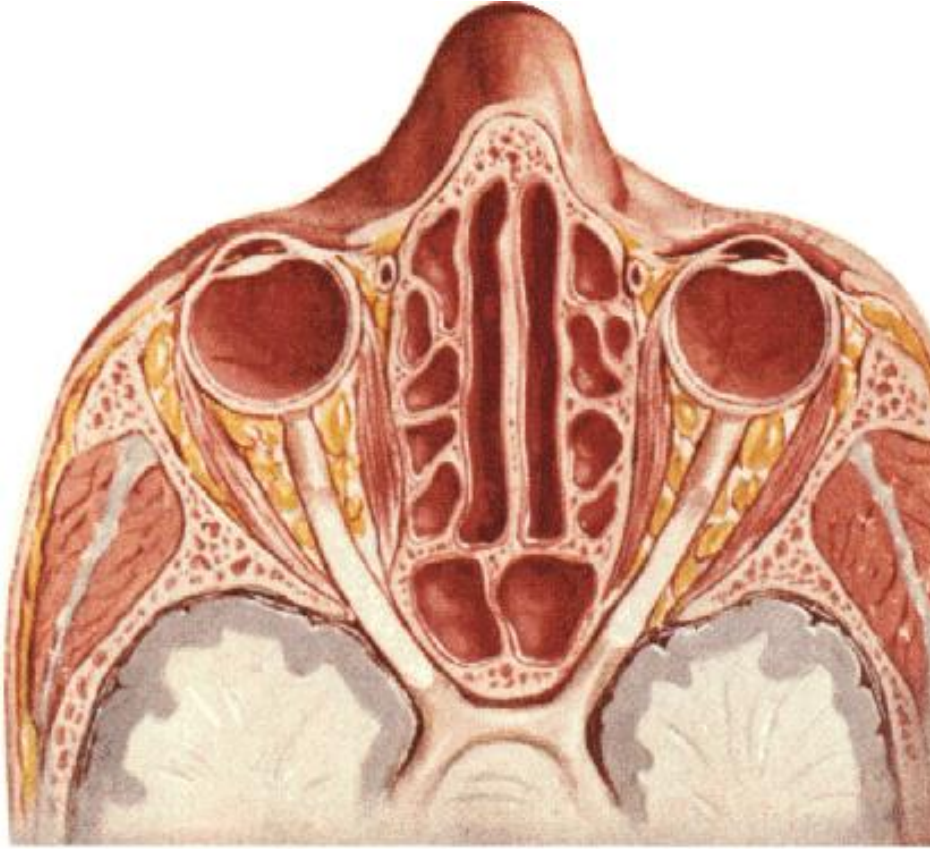


SINUS FRONTALIS

Septum sinuum frontaliu

Hiatus semilunaris



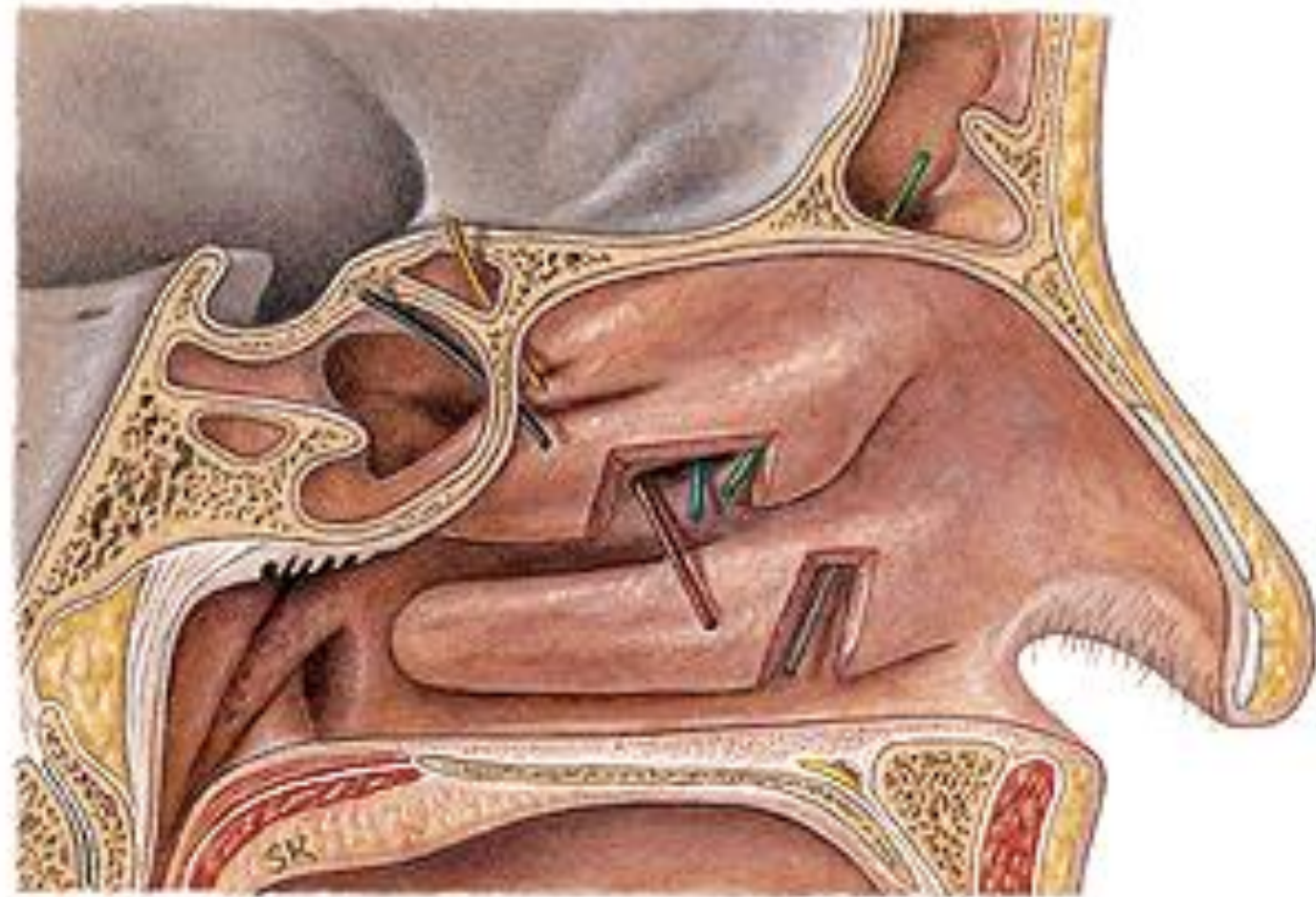


CELLULAE ETHMOIDALES
SINUS SPHENOIDALIS
Septum sinuum sphenoidalium
Apertura sinus sphenoidalis

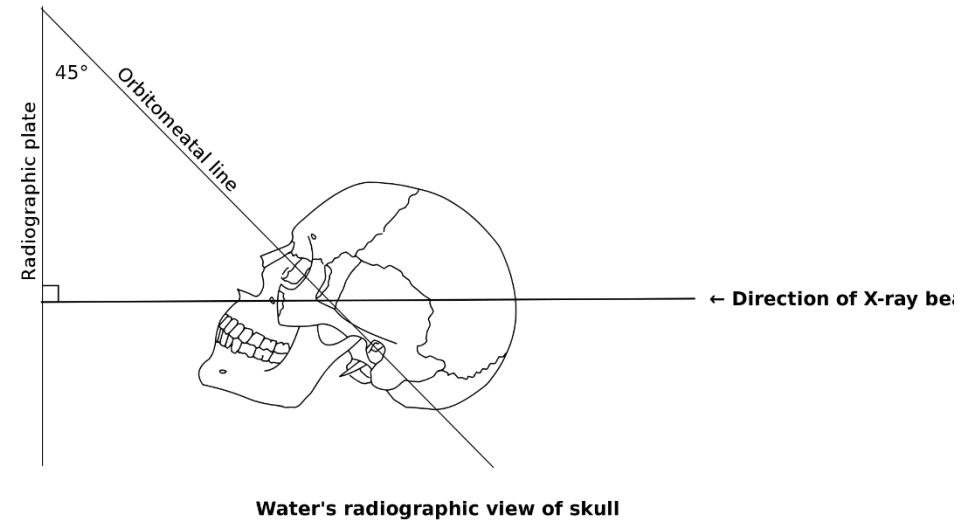
Meatus nasi inf. – ductus nasolacrimalis

Meatus nasi medius – hiatus semilunaris – sinus maxillaris,
sinus frontalis, cellulae ethmoidales anteriores

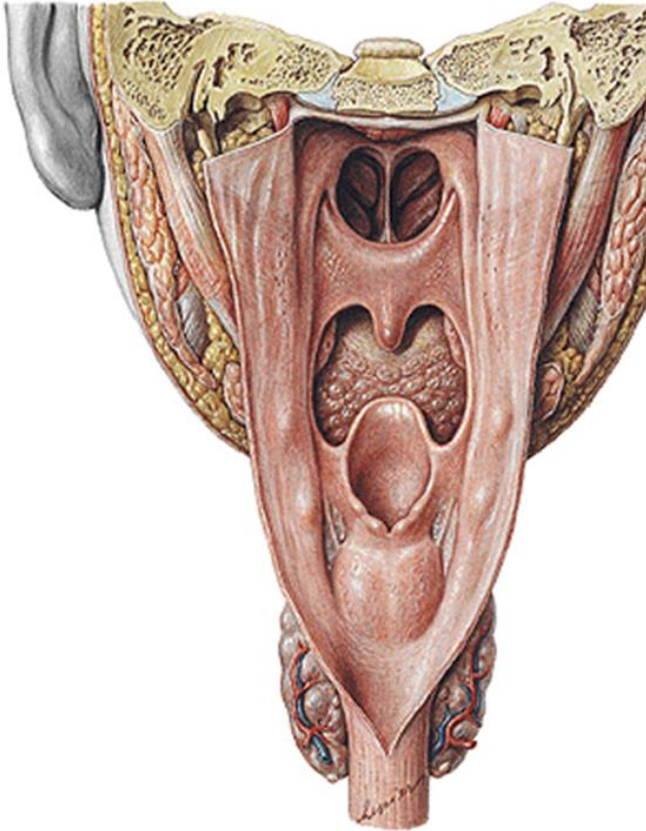
Meatus nasi sup. – cellulae ethmoidales posteriores, sinus
sphenoidalis



Waters' (Occipitomeatal) view



PHARYNX



Nasopharynx base – soft palate (tuba auditiva, tonsilla pharyngea)

Oropharynx (C2-4) - isthmus faucium with oral cavity (Waldeyer's lymphoepithelial ring)

Pars laryngea pharyngis (C4-C6 -oesophagus) in anterior wall - aditus laryngis

NASOPHARYNX

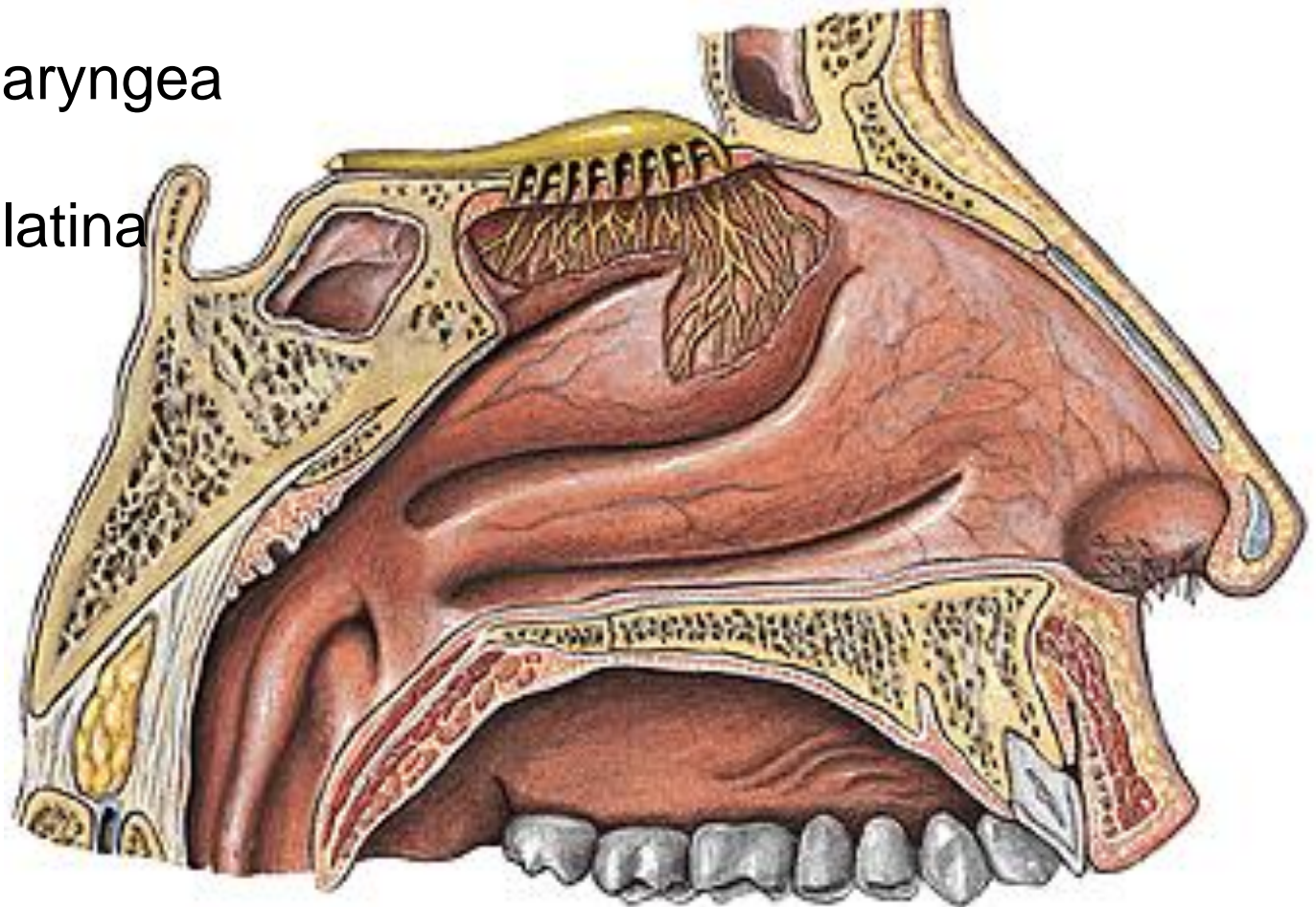
Ostium pharyngeum
tubae auditivae:

Torus tubarius

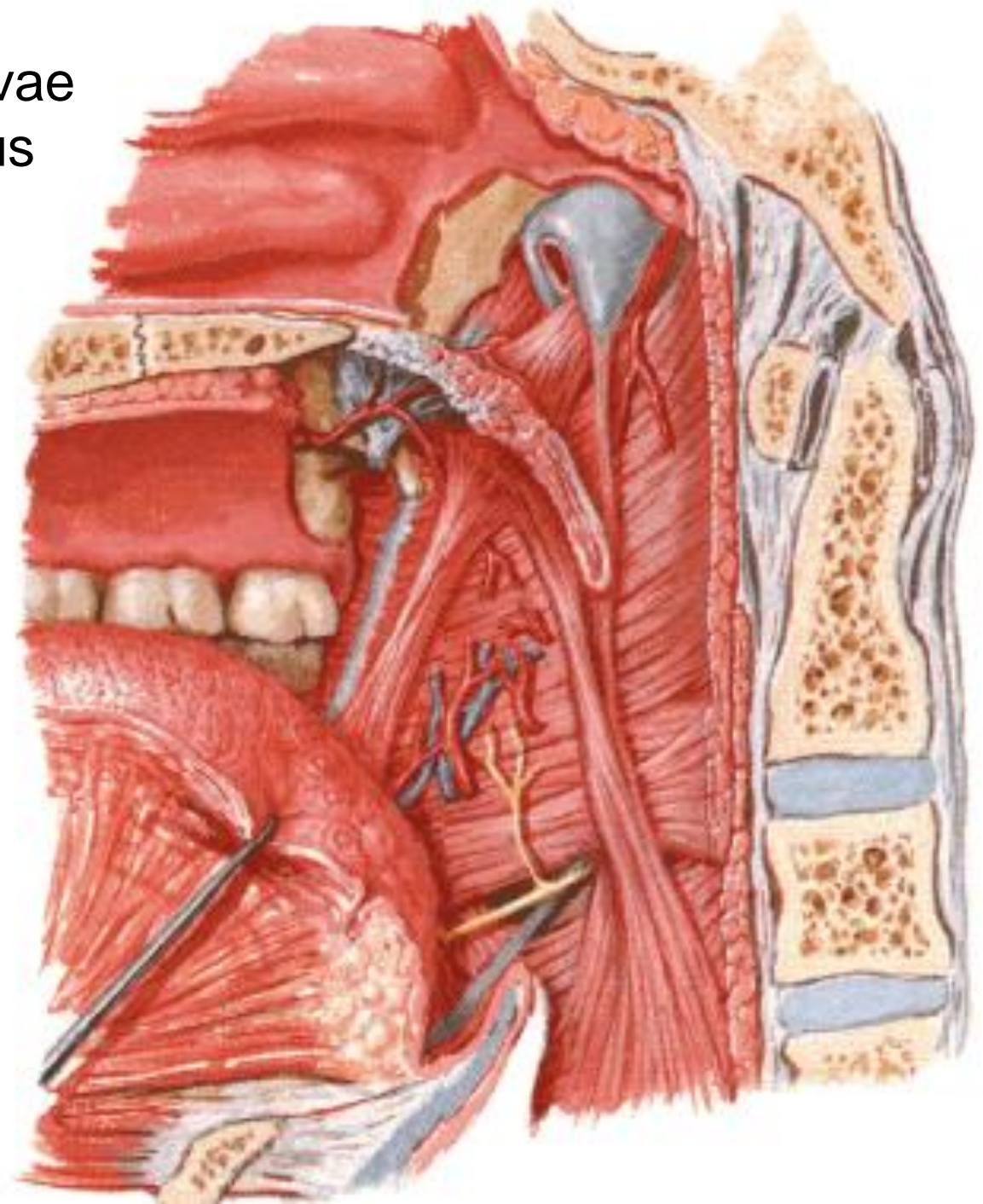
Plica salpingopharyngea

Torus levatorius

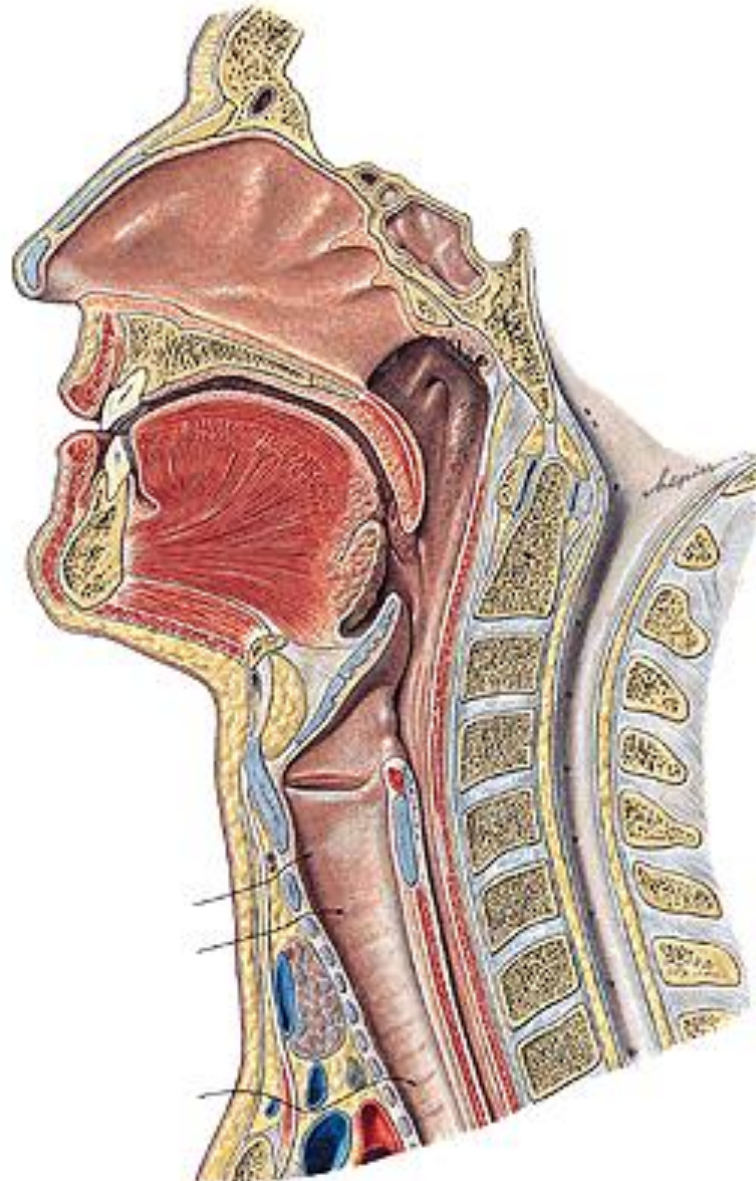
Plica salpingopalatina



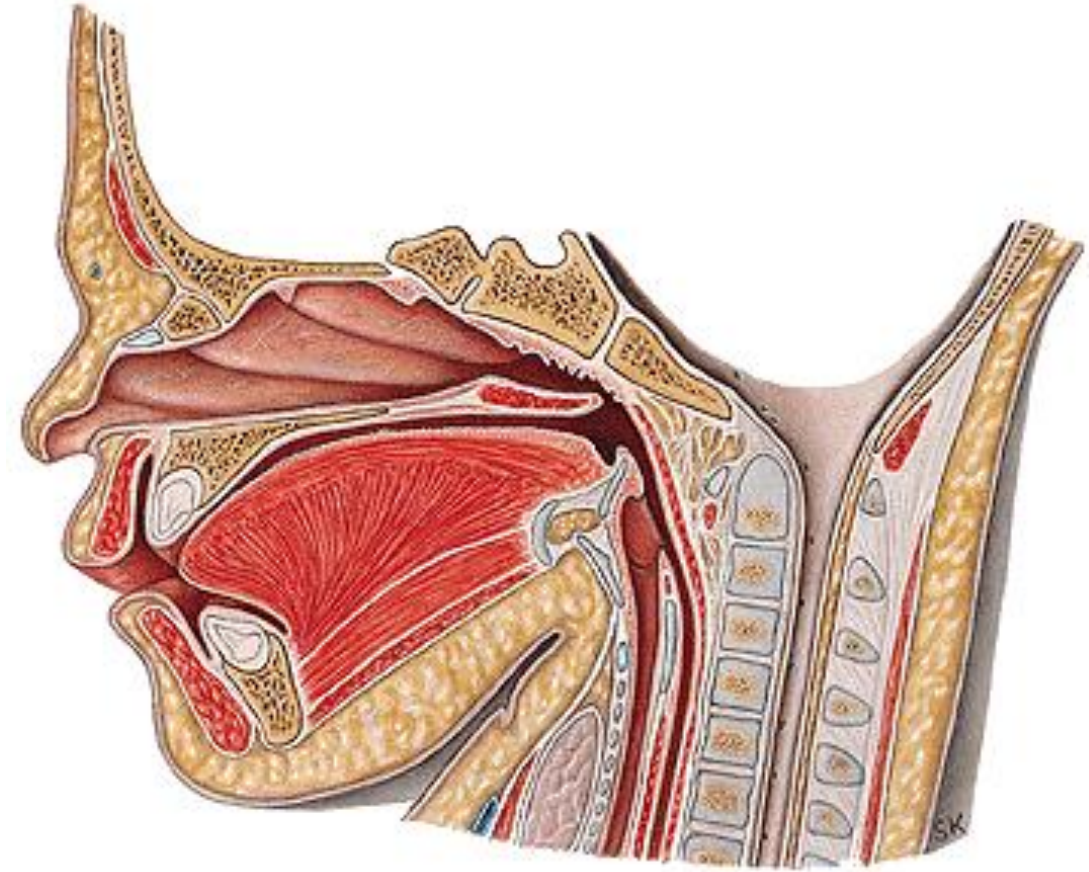
Cartilago tubae auditivae
M. salpingopharyngeus
M. levator veli palatini



LARYNX



← ADULT



↑ NEONATE

Prominentia laryngis



CARTILAGINES LARYNGIS:

Cartilago thyroidea

Cartilago cricoidea

Cartilago arytenoidea

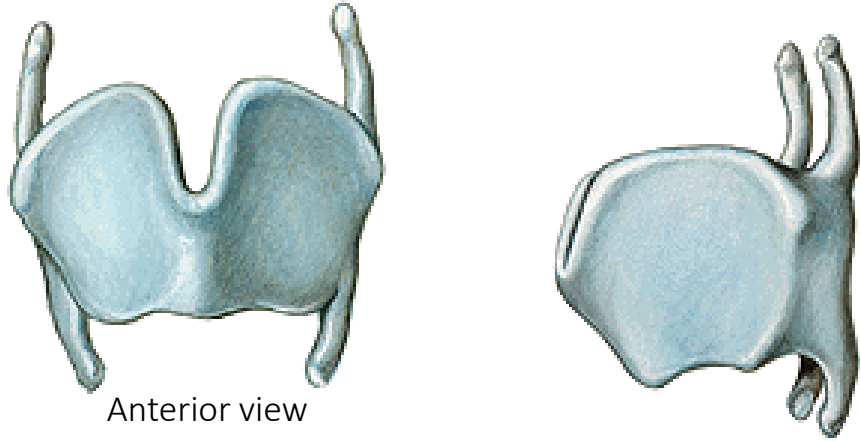
Cartilago epiglottica

Cartilago corniculata

Cartilago cuneiformis

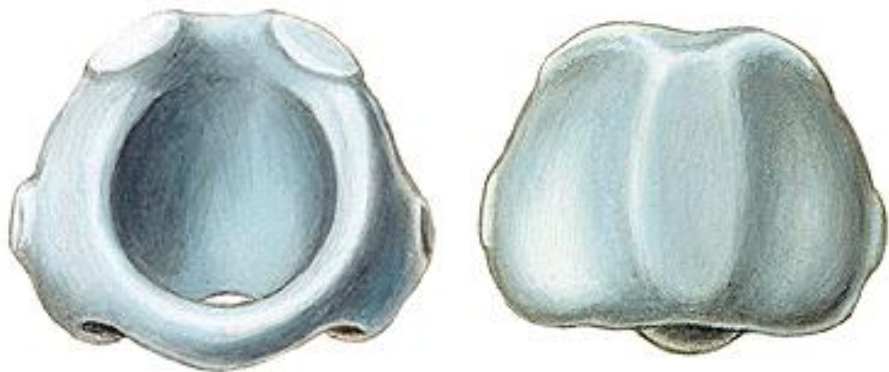


Cart. thyroidea (laminae, cornua, linea obliqua)



Anterior view

Cart. cricoidea (arcus, lamina)



Anterior view

posterior view

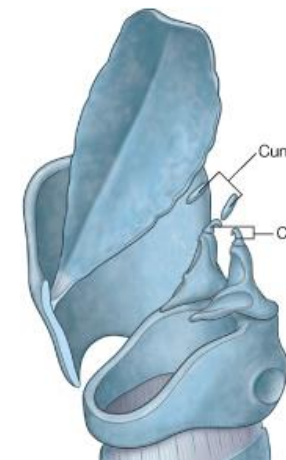
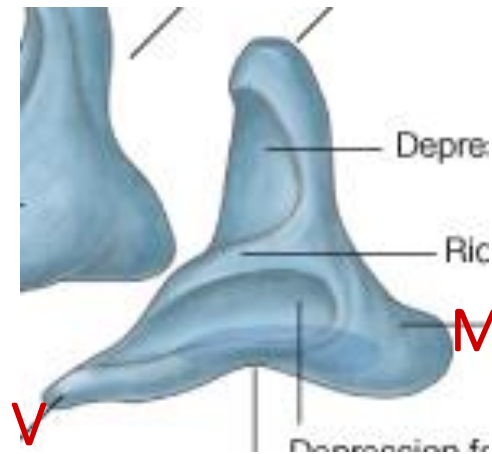
Cart. epiglottica (petiolus)



Cartt. arytenoideae (proc. muscularis a vocalis)

Cartt. cuneiformes

Cartt. corniculatae



Connections of laryngeal cartilages

Membrana thyrohyoidea

Lig. cricothyroideum (coniotomy)

Membrana quadrangularis

(from epiglottis to the arytaenoid cartilage, ligg. vestibularia, plica vestibularis)

Conus elasticus

(between ligg. vocalia and arcus cartilaginis cricoideae)

Membrana fibrocartilaginea laryngis

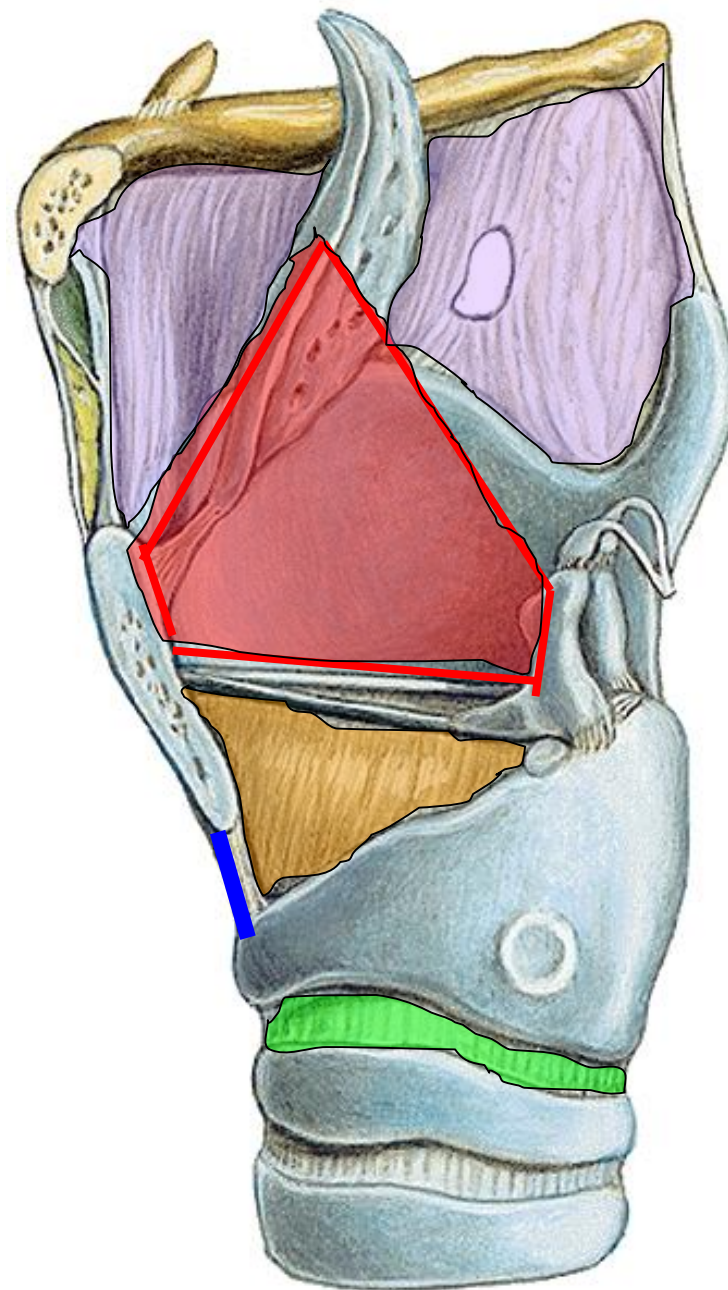
conus elasticus + membrana quadrangularis

Ligg. vestibularia (reinforced margine of membrana quadrangularis)

Ligg. vocalia (reinforced margine of conus elasticus)

- squamous epithelium („work“)
-

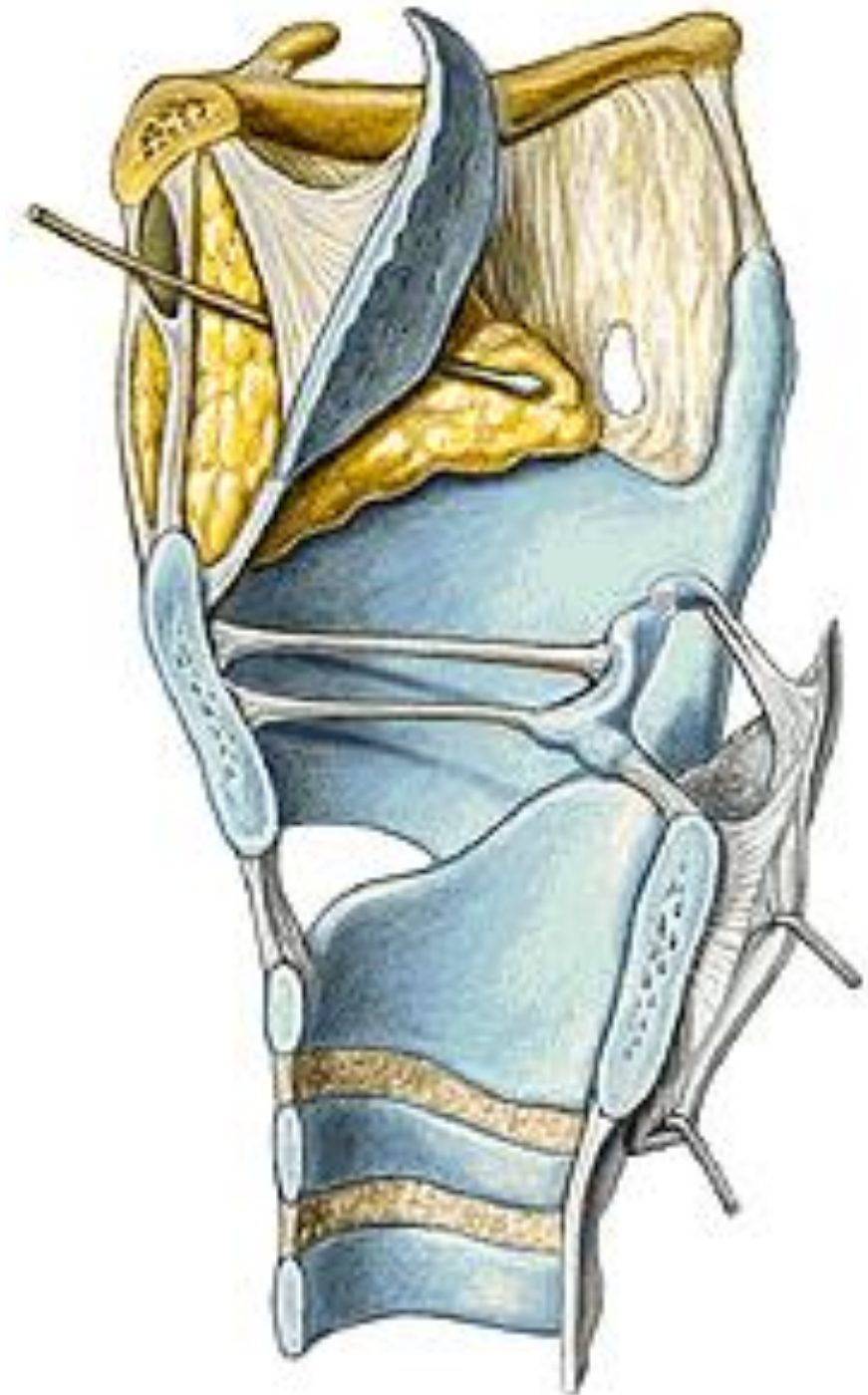
Lig. cricotracheale



MEMBRANA THYROIDEA
lig. thyroideum laterale
lig. thyroideum medianum



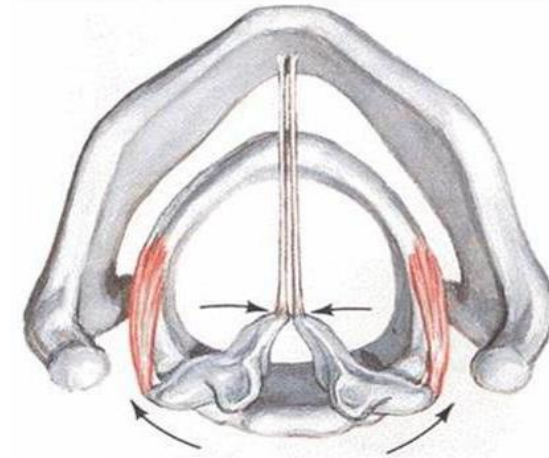
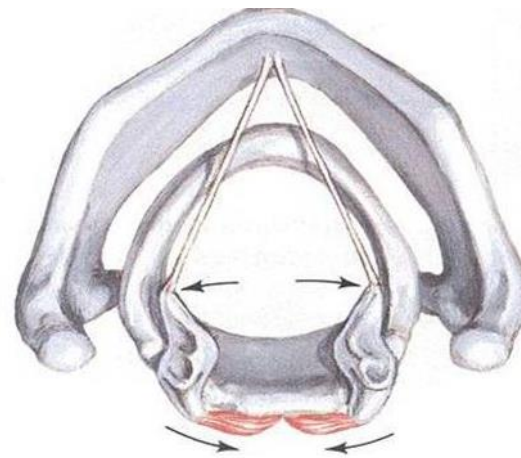
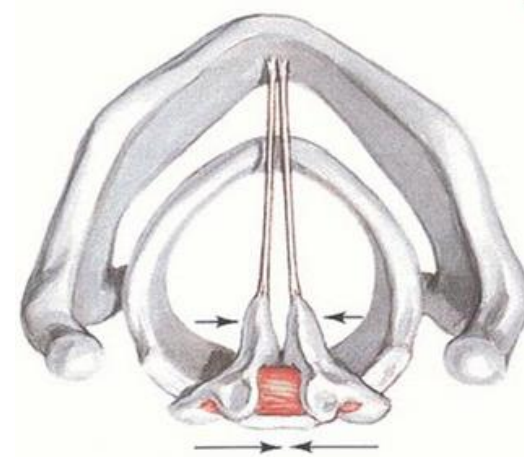
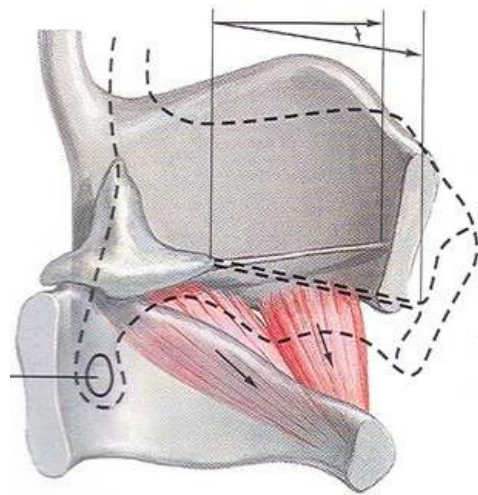
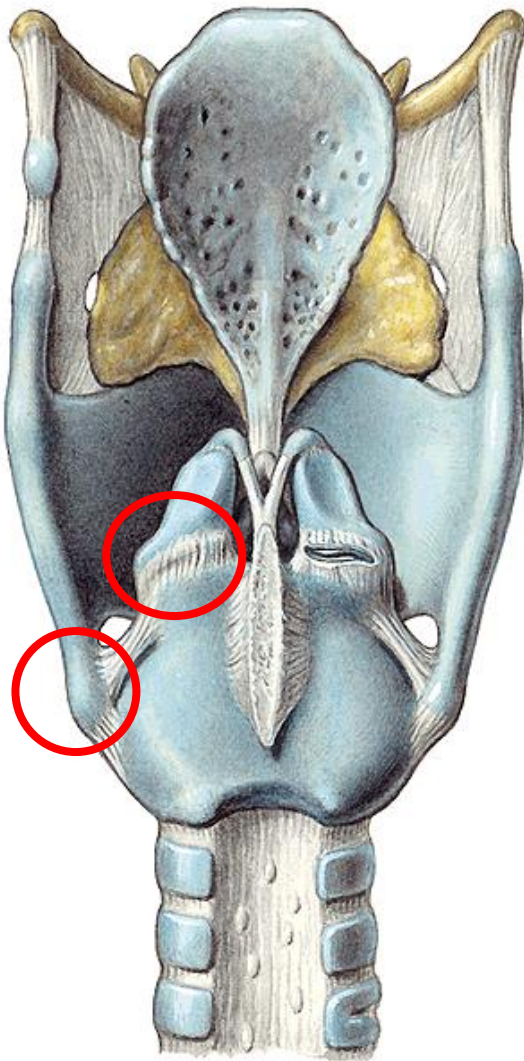
Lig thyroepiglotticum
Lig. hyoepiglotticum
Spatium praepiglotticum



Klouby:

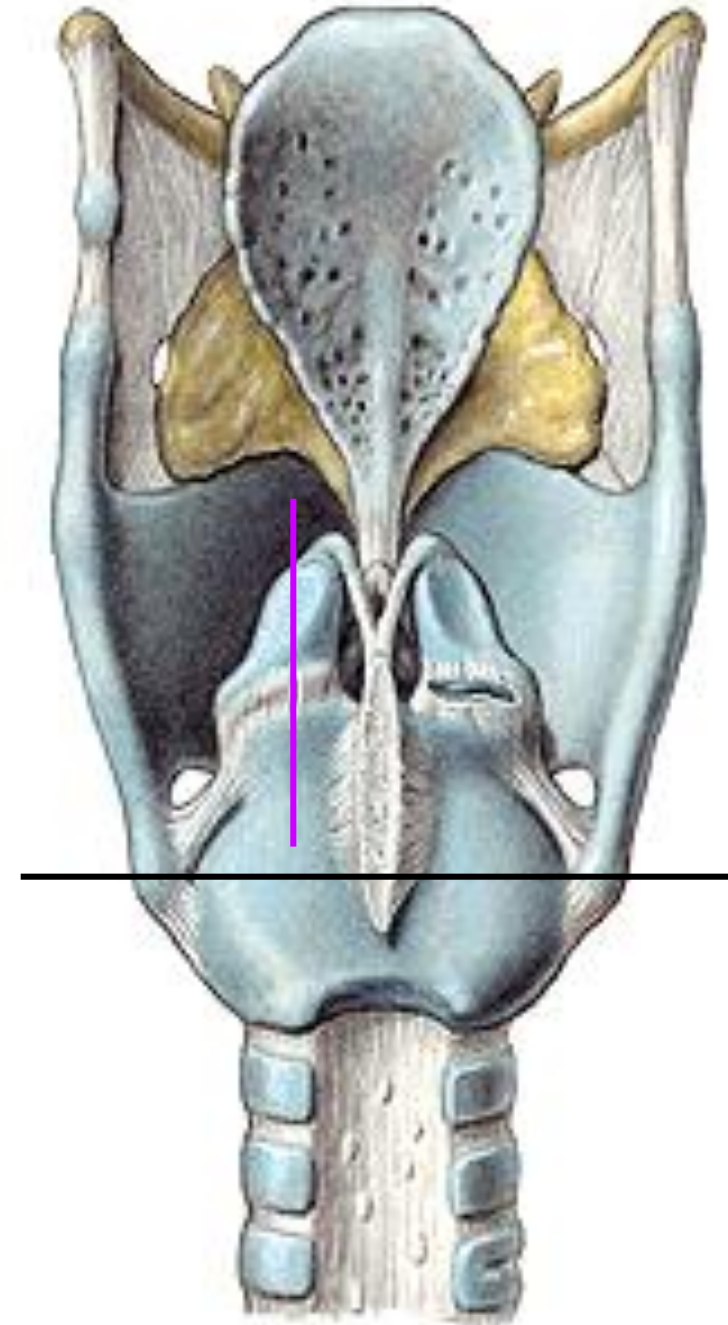
Art. cricothyroidea (rocking movements)

Art. cricoarytenoidea (rotation and translation movements– abduction and adduction of vocal cords)



ARTICULATIO CRICOARYTENOIDEA
-lig. cricoarytaenoideum post.

ARTICULATIO CRICOTHYROIDEA



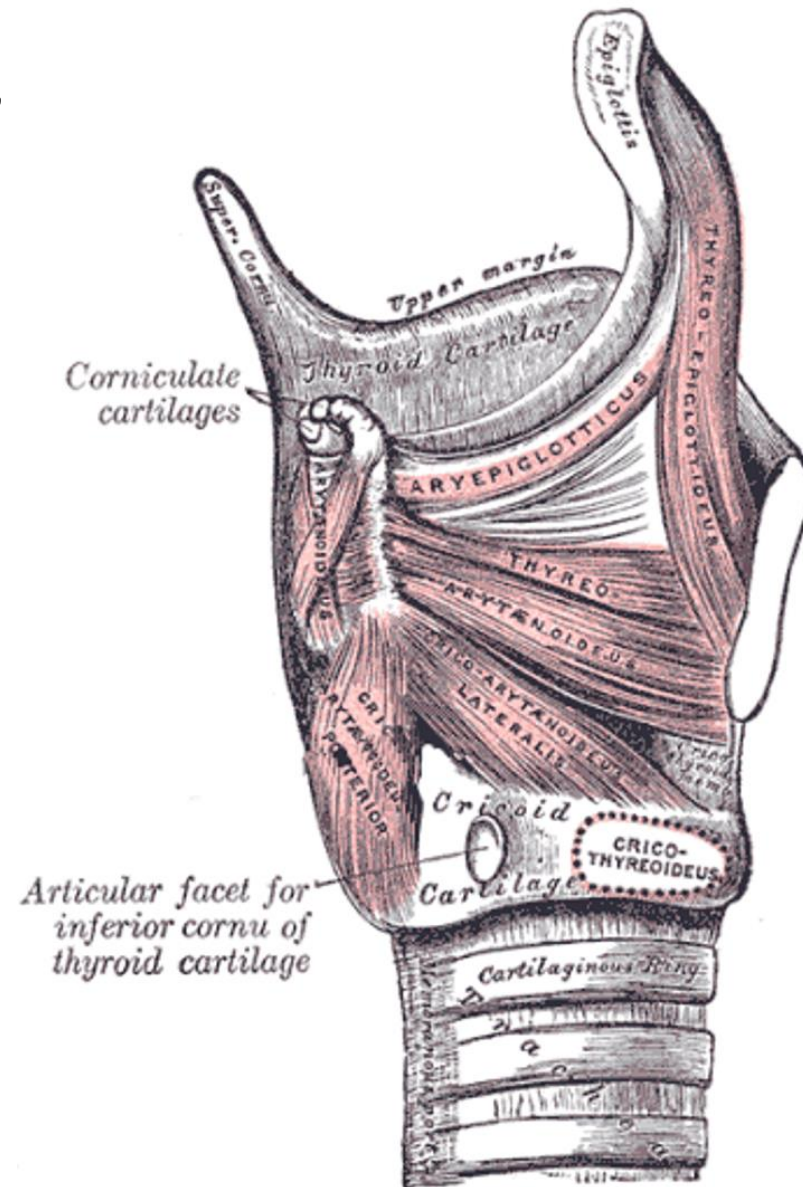
Laryngeal muscles

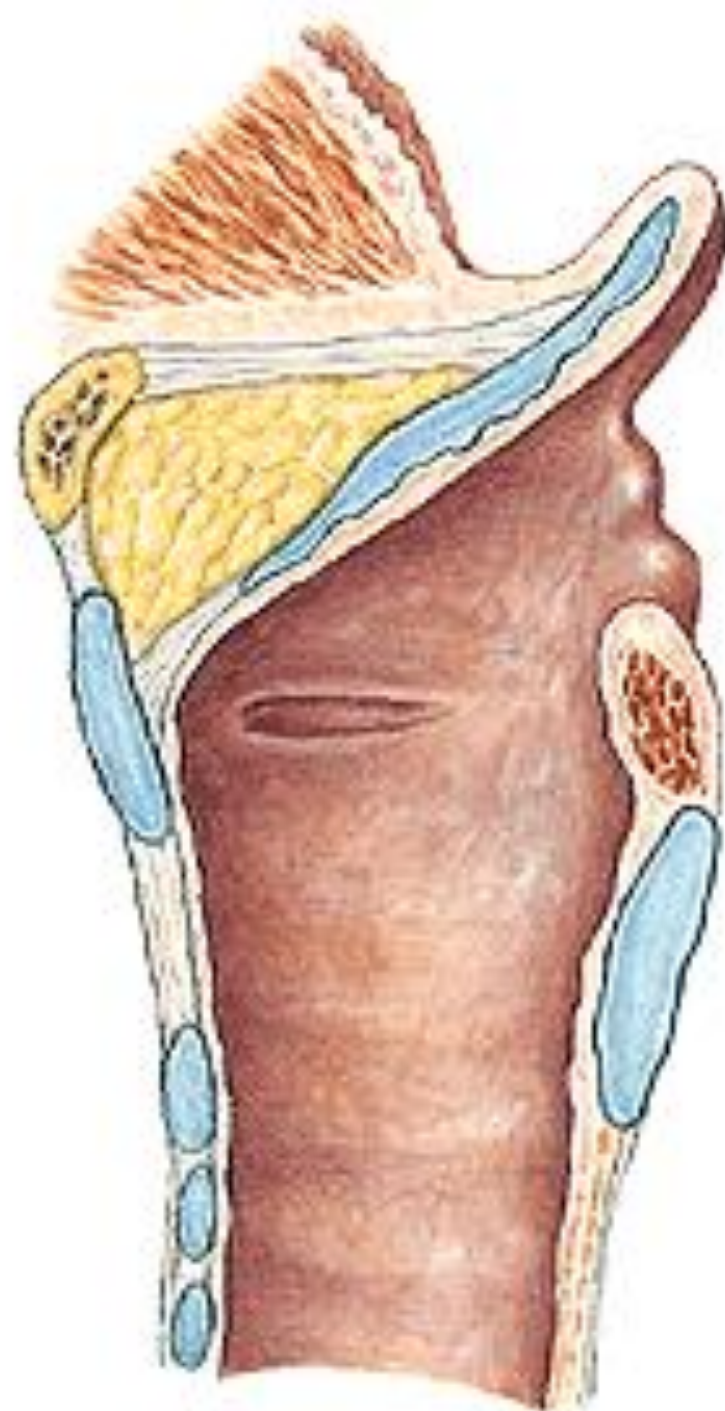
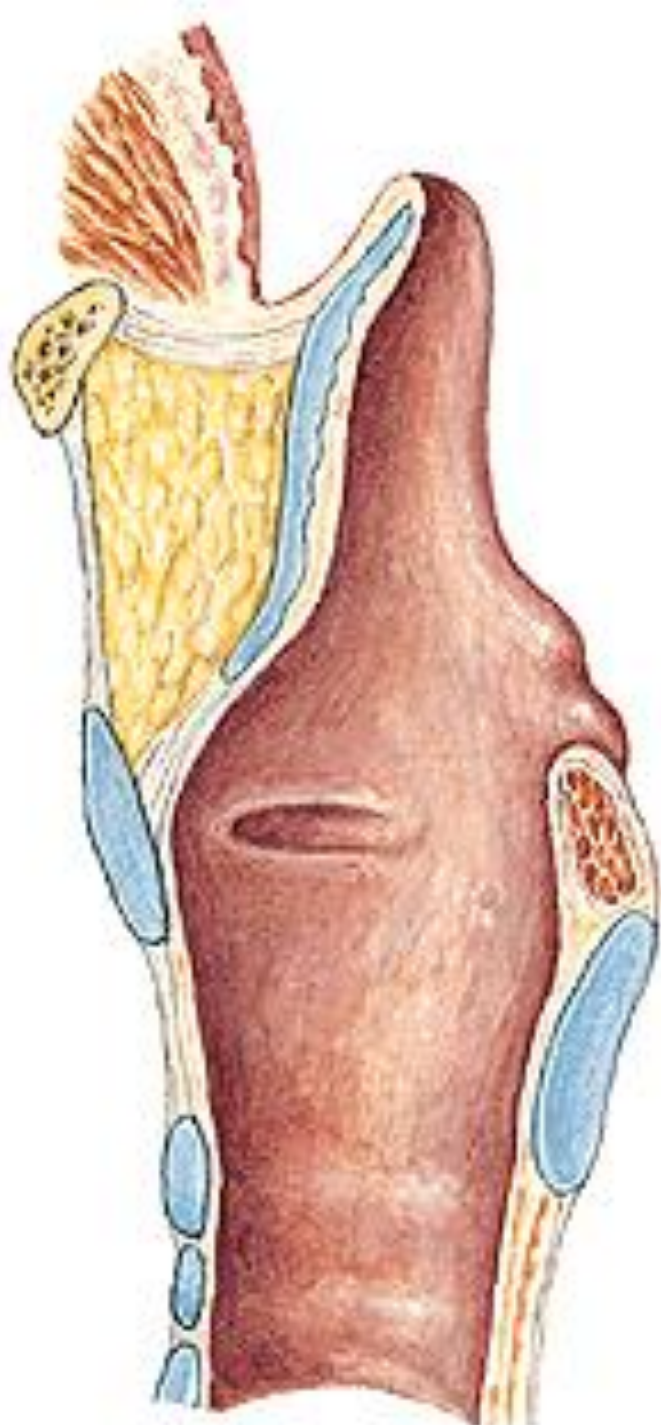
- muscles of the larynx affect length, tension and position of the vocal cords and position of the epiglottis affect

1) Muscles that moves with epiglottis

a) Musculus thyroepiglotticus
opens *aditus laryngis*

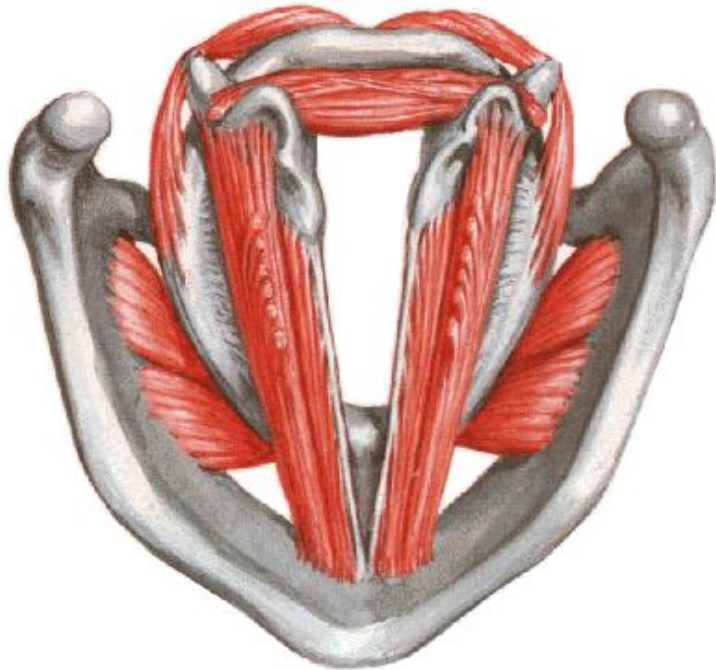
b) Musculus aryepiglotticus
closes *aditus laryngis*





M. thyroarytenoideus
(thyroepiglotticus)
M. vocalis

Rima glottidis – pars intermembranacea
– pars intercartilaginea



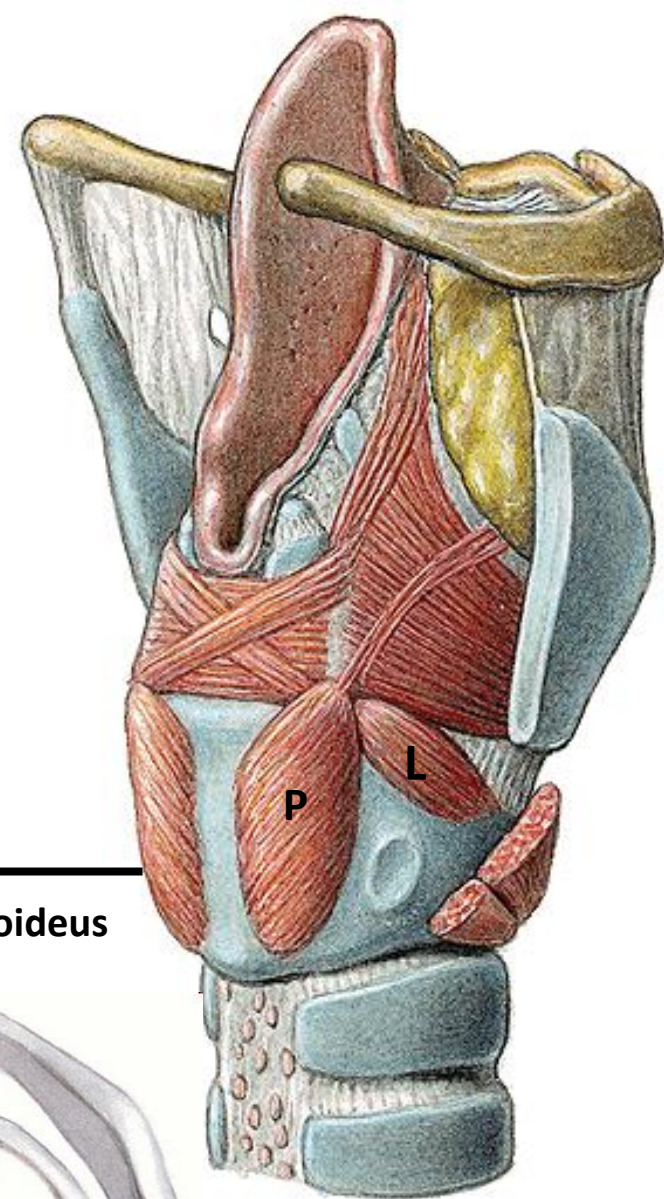
2) Muscles responsible for respiration (abduktion) and phonation (adduction) position of vocal cords:

a) Musculus cricoarytaenoideus lateralis

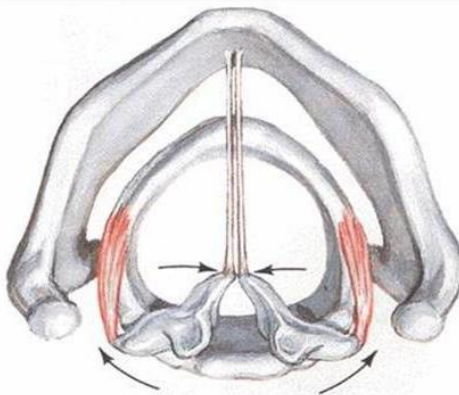
closes rima glottis (adduction of vocal cords) - phonation

b) Musculus cricoarytaenoideus posterior (musculus posticus) opens rima glottis – **abduktion of vocal cords** (ligg. vocalia) – respiration position

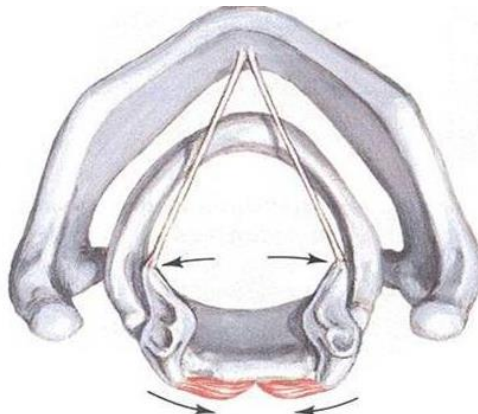
c) Musculus arytaenoideus
the strongest adductor



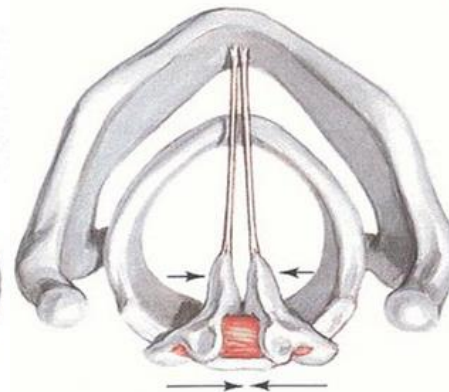
m. cricoarytaenoideus lateralis



m. cricoarytaenoideus posterior

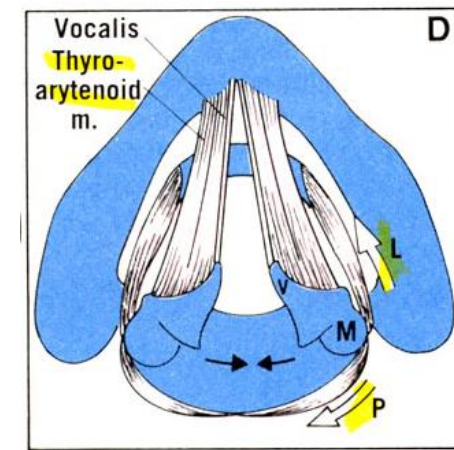
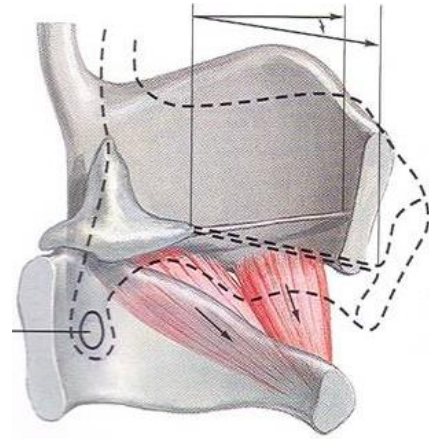


m. arytaenoideus



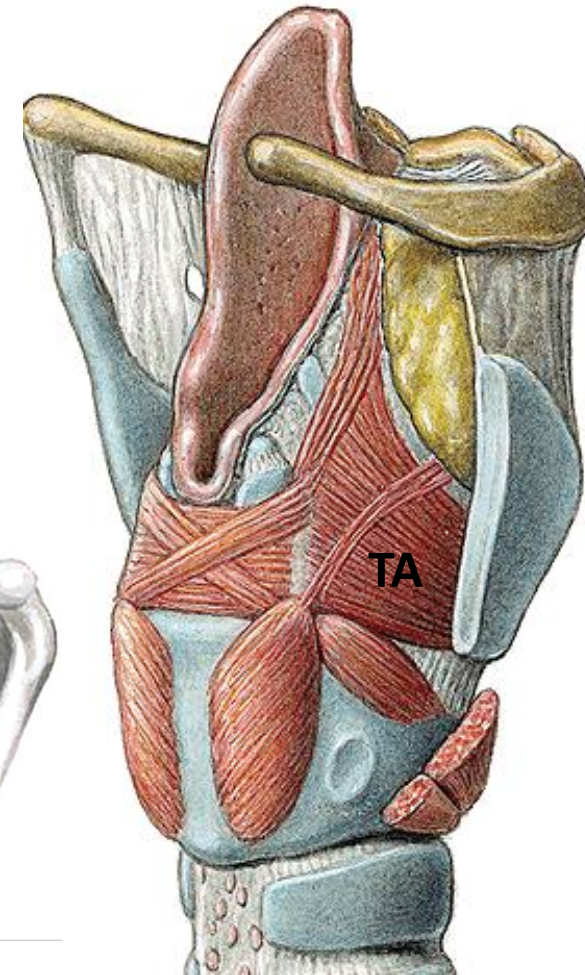
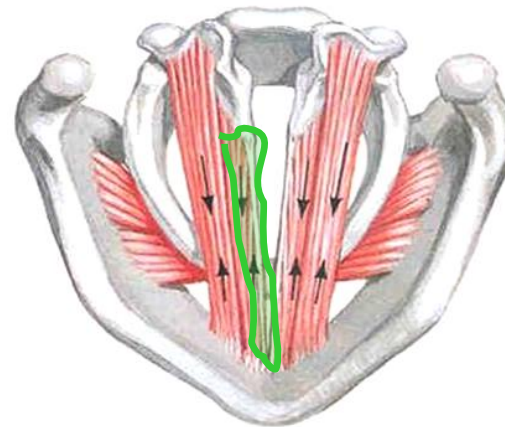
3) Muscles responsible for tension of vocal cords:

a) Musculus cricothyroideus
tenses vocal cords(tensor)



b) Musculus thyroarytaenoideus
relaxation of vocal cords

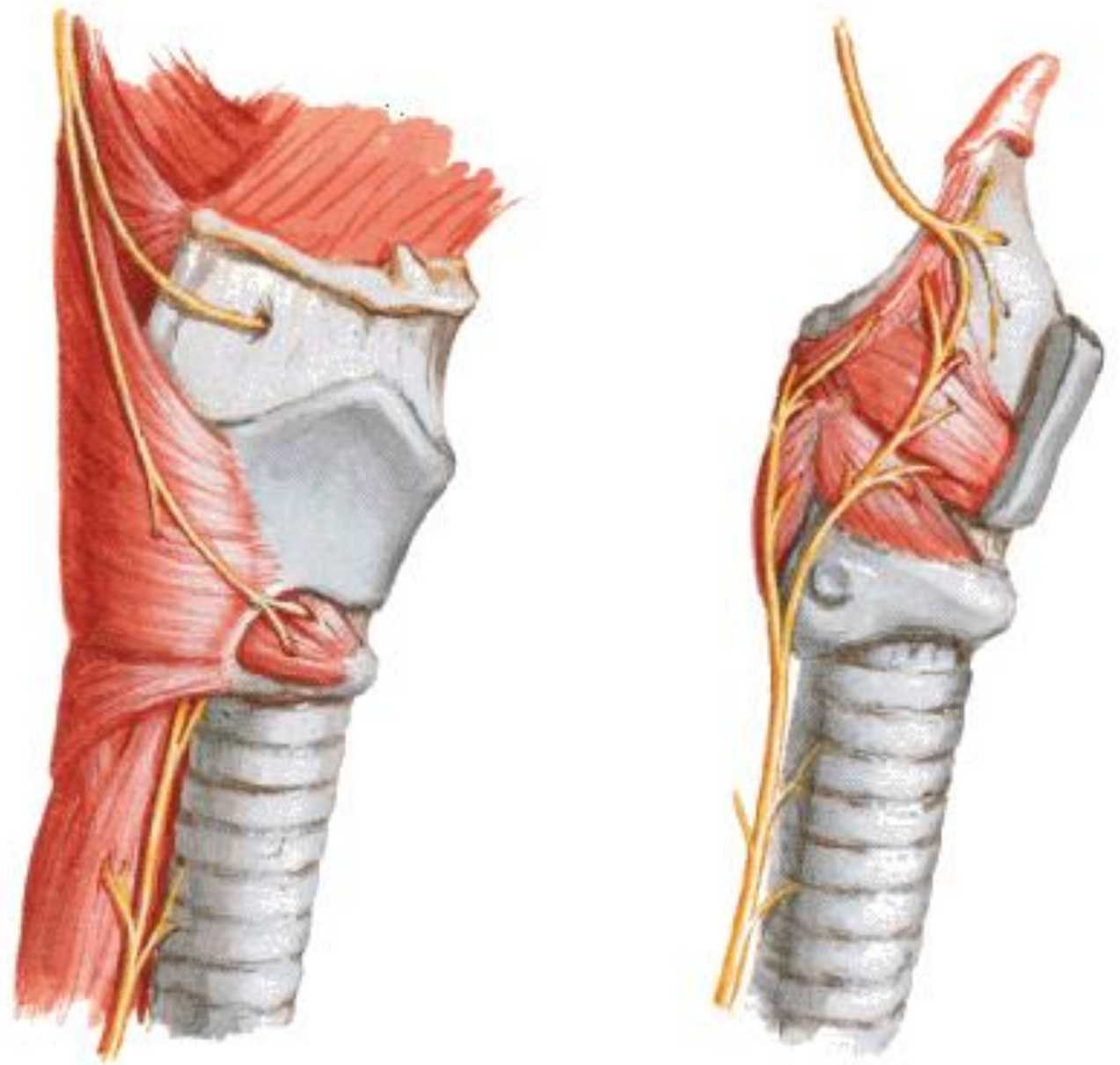
c) Musculus vocalis
Fine tension



Muscles of the larynx innervated
via *nervus vagus* :

nervus laryngeus superior
(*musculus cricothyroideus*)

nervus laryngeus inferior
(branch of *nervus laryngeus*
recurrens, all others laryngeal
muscles)



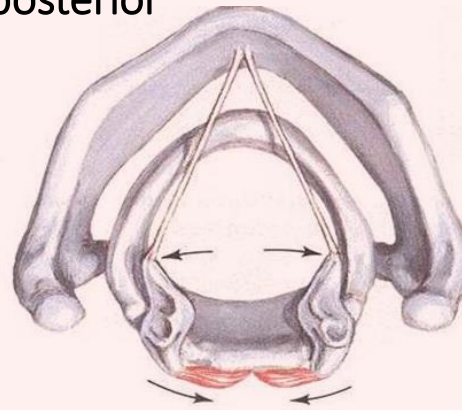
Respiration position

Vocal cords in **abduktion**

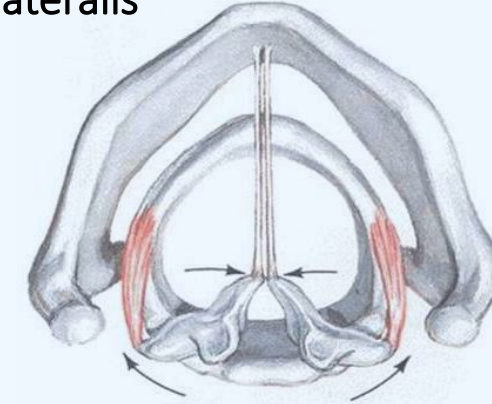
Phonation position

vazy hlasové in **adduktion**

m. cricoarytaenoideus posterior

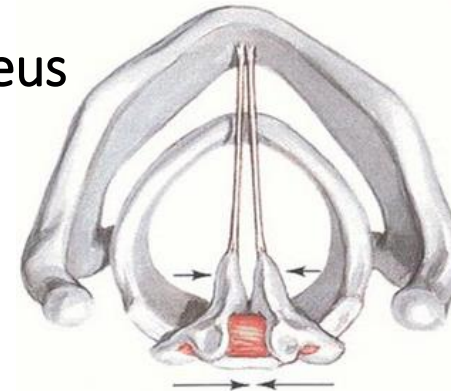


m. cricoarytaenoideus lateralis



Relaxation of vocal cords- m. thyroarytenoideus

Tension of vocal cords - m. cricothyroideus



m. arytaenoideus

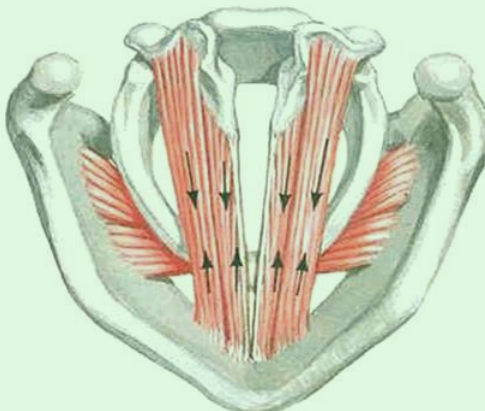
Submucous layer- ema

Folliculi lymph. laryngei

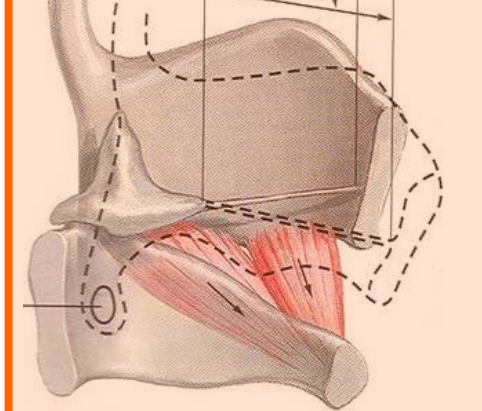
Tonsilla laryngea

Posterior side of epiglottis- taste buds

m. thyroarytaenoideus



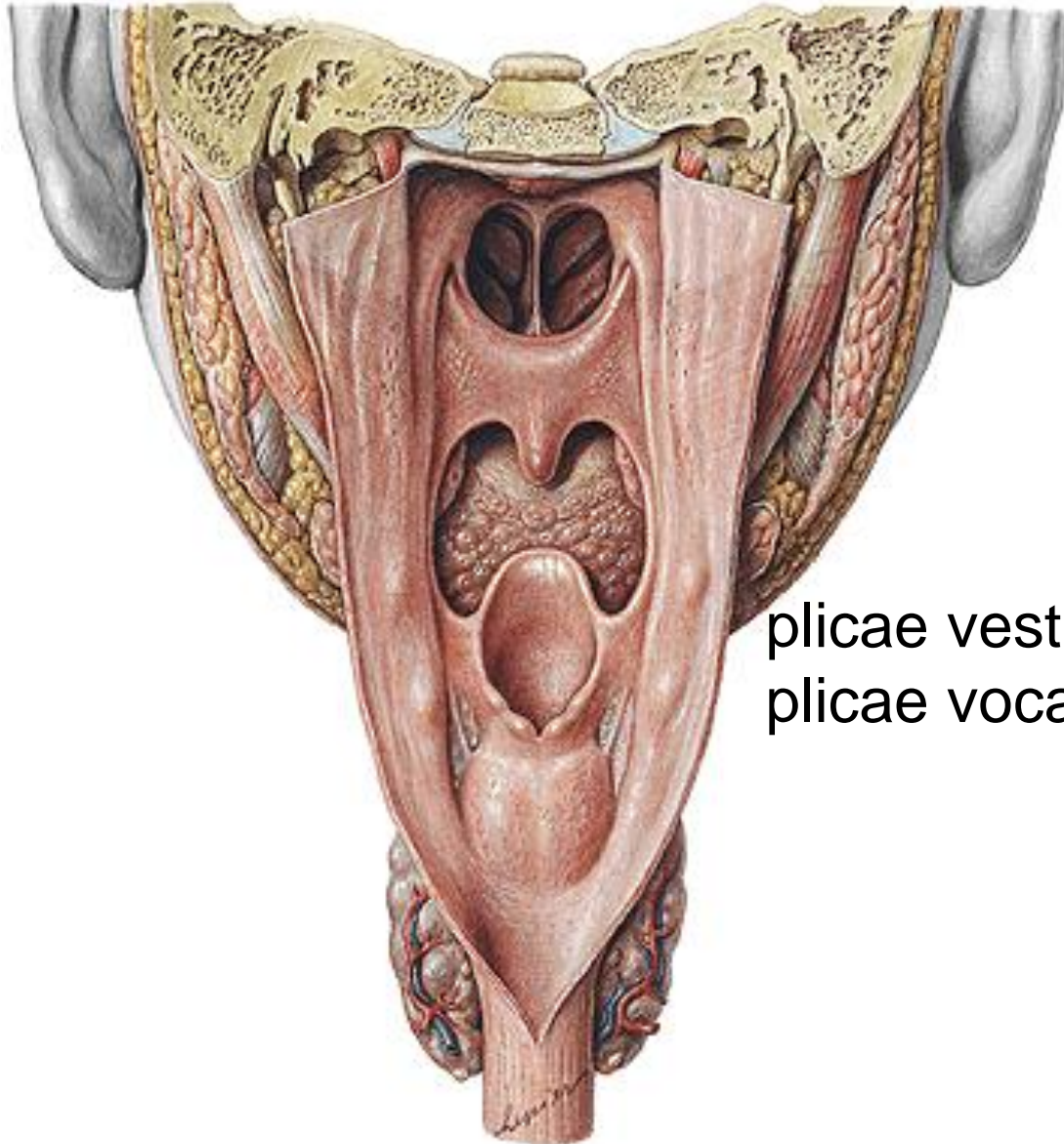
m. cricothyroideus



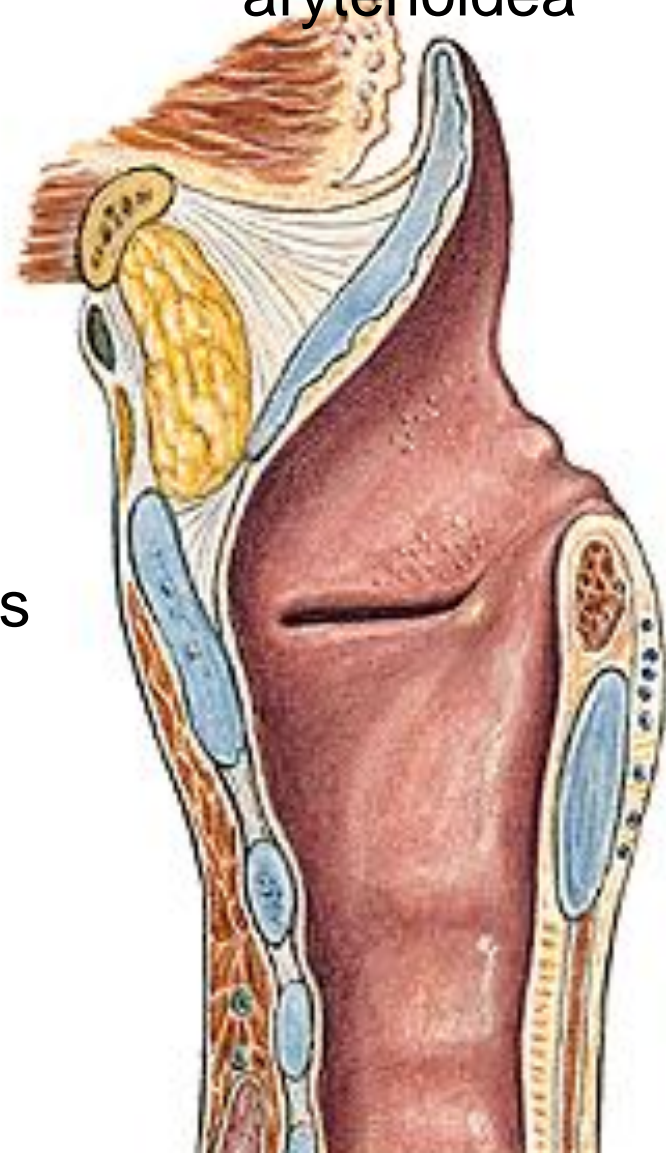
CAVITAS LARYNGIS

-aditus laryngis-plicae aryepiglotticae (tuberculum cuneiforme et corniculatum), plica interarytenoidea, incisura inter-

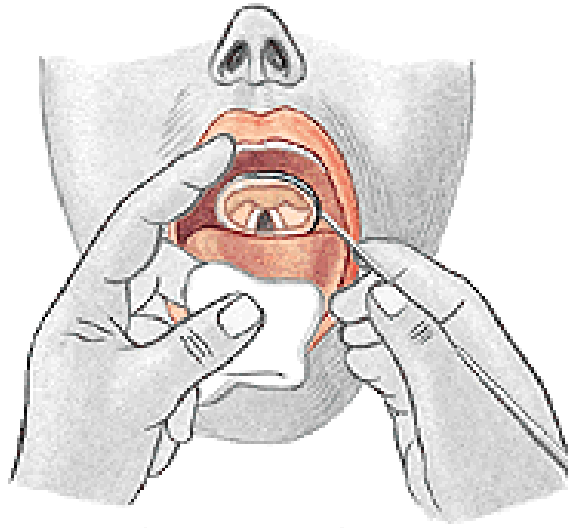
arytenoidea



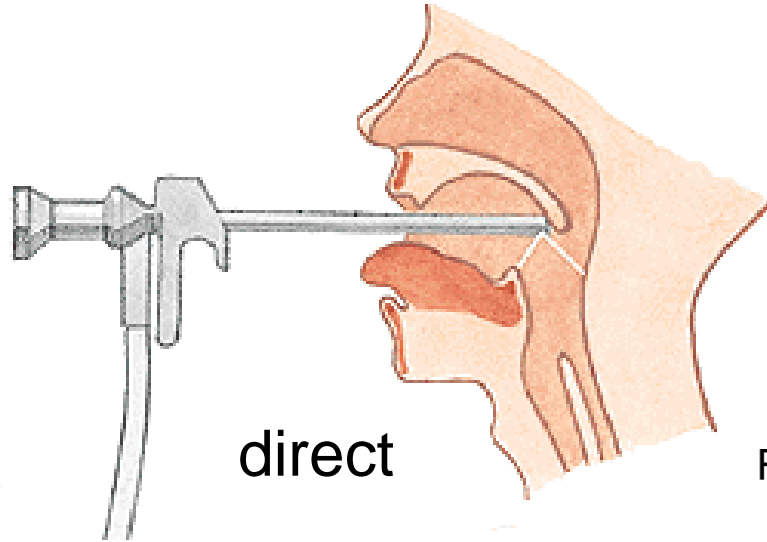
plicae vestibulares
plicae vocales



LARYNGOSCOPY



indirect



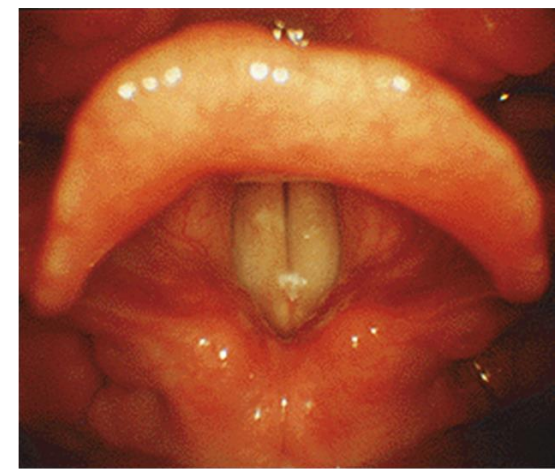
direct

RESPIRATION

PHONATION

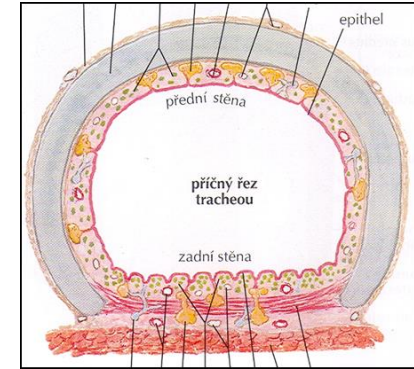
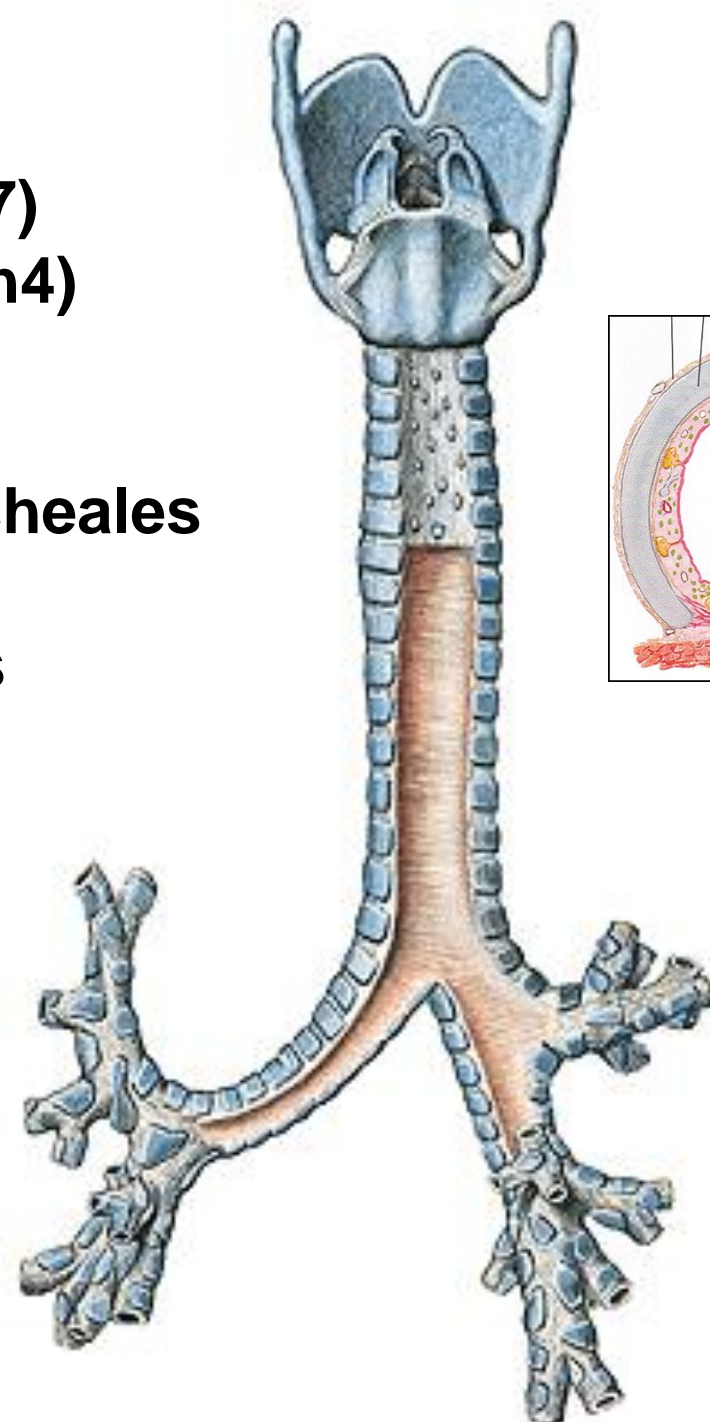
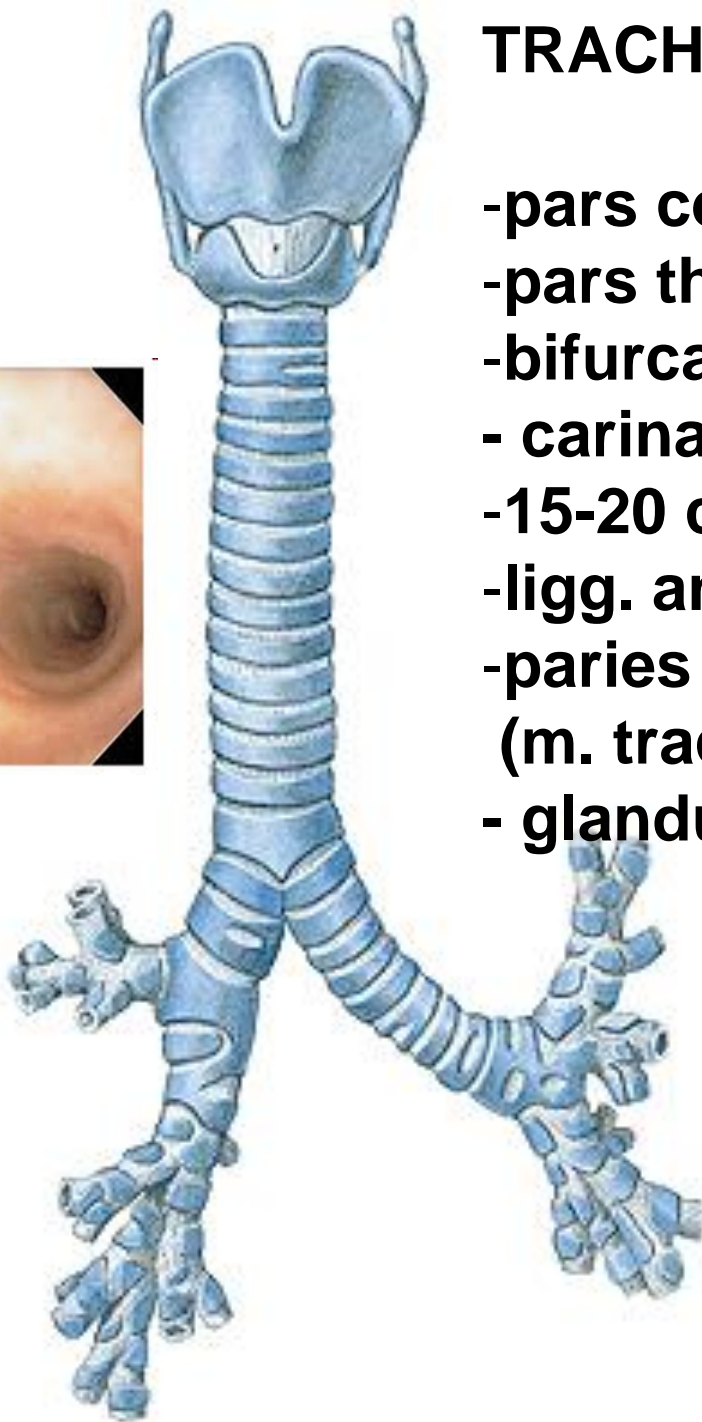
Vocal Cords up close while singing

<https://www.youtube.com/watch?v=-XGds2GAvGQ>

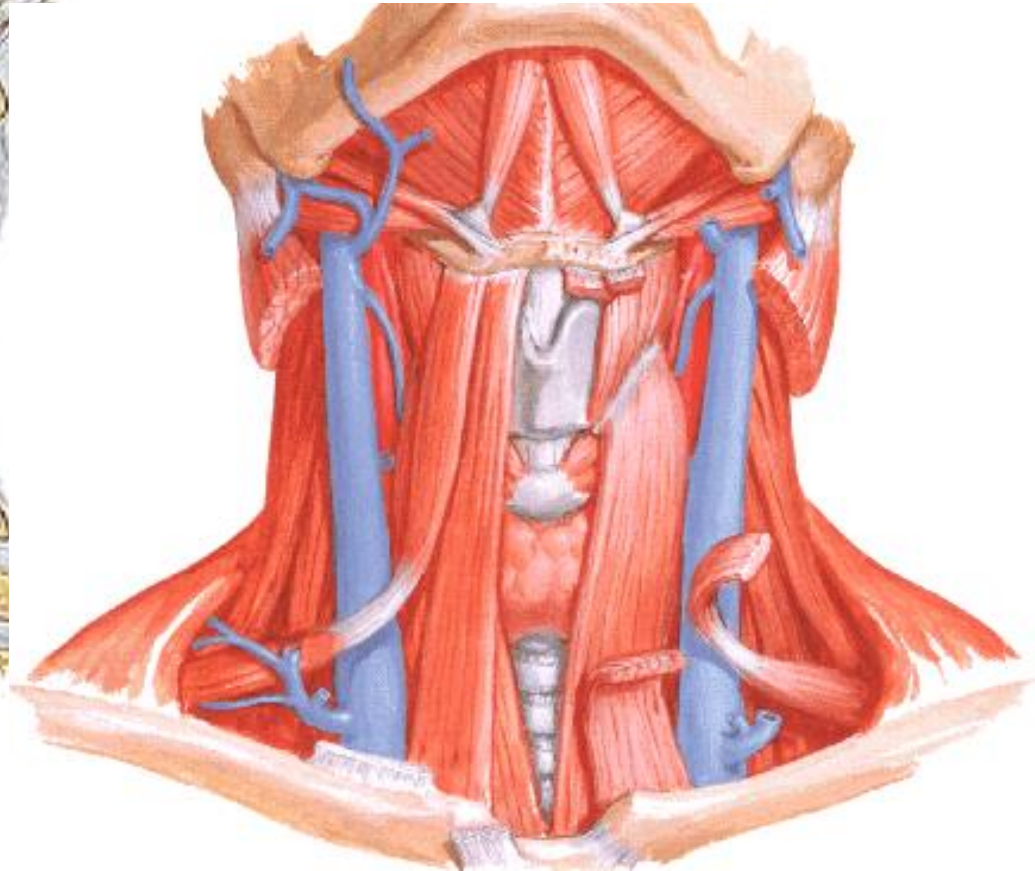
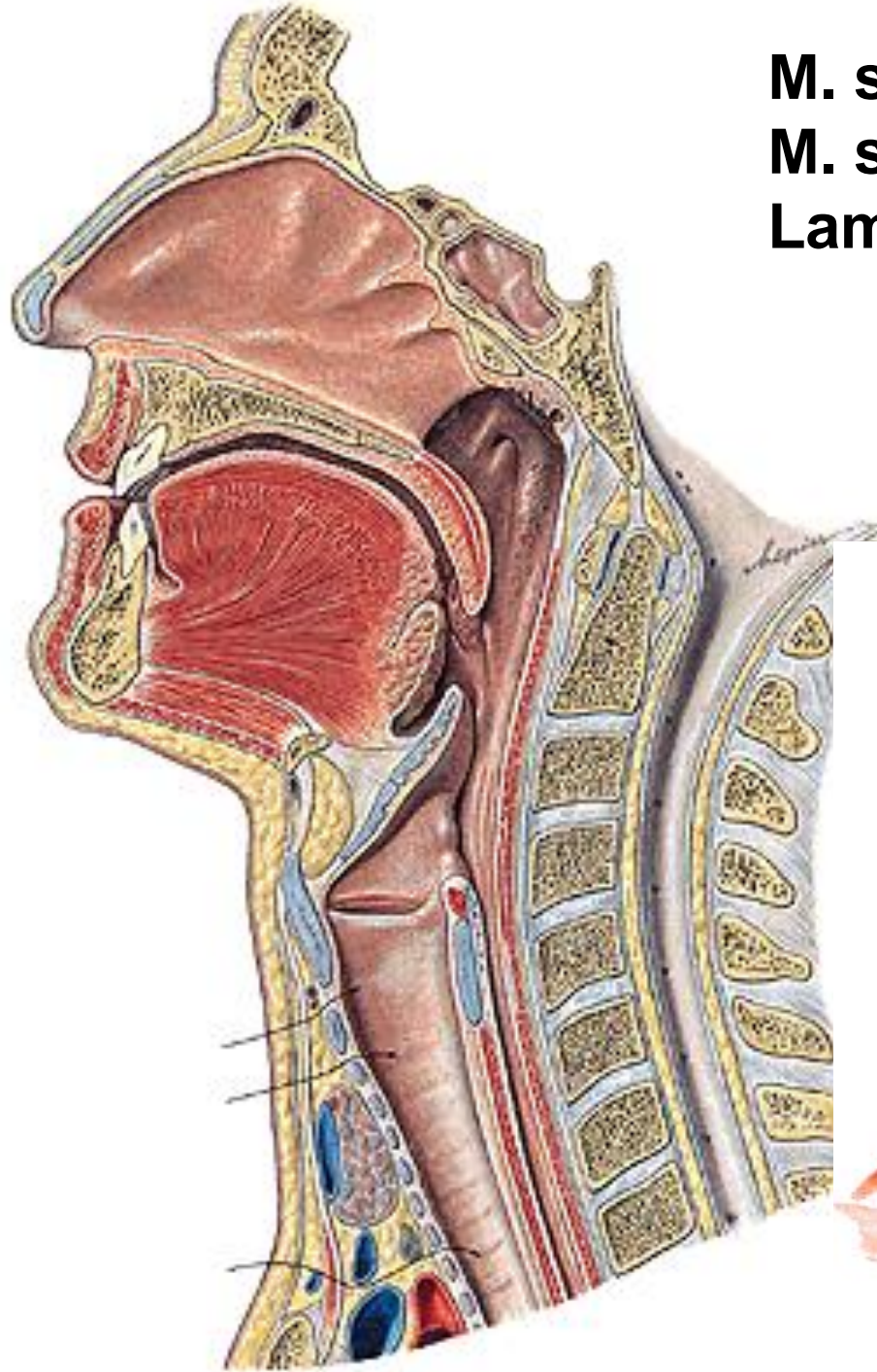


TRACHEA

- pars cervicalis (C6- C7)
- pars thoracica (Th1-Th4)
- bifurcatio tracheae
- carina tracheae
- 15-20 cartilagineae tracheales
- ligg. anularia
- paries membranaceus (m. trachealis)
- glandulae tracheales



M. sternohyoideus
M. sternothyroideus
Lamina pretrachealis fasciae colli



TOPOGRAPHY OF THE TRACHEA

-**isthmus glandulae thyroideae**

-**vv. thyroideae inferiores**

-truncus brachiocephalicus

-arcus aortae

-v. brachiocephalica sinistra

-v. cava sup.

-**a. carotis communis**

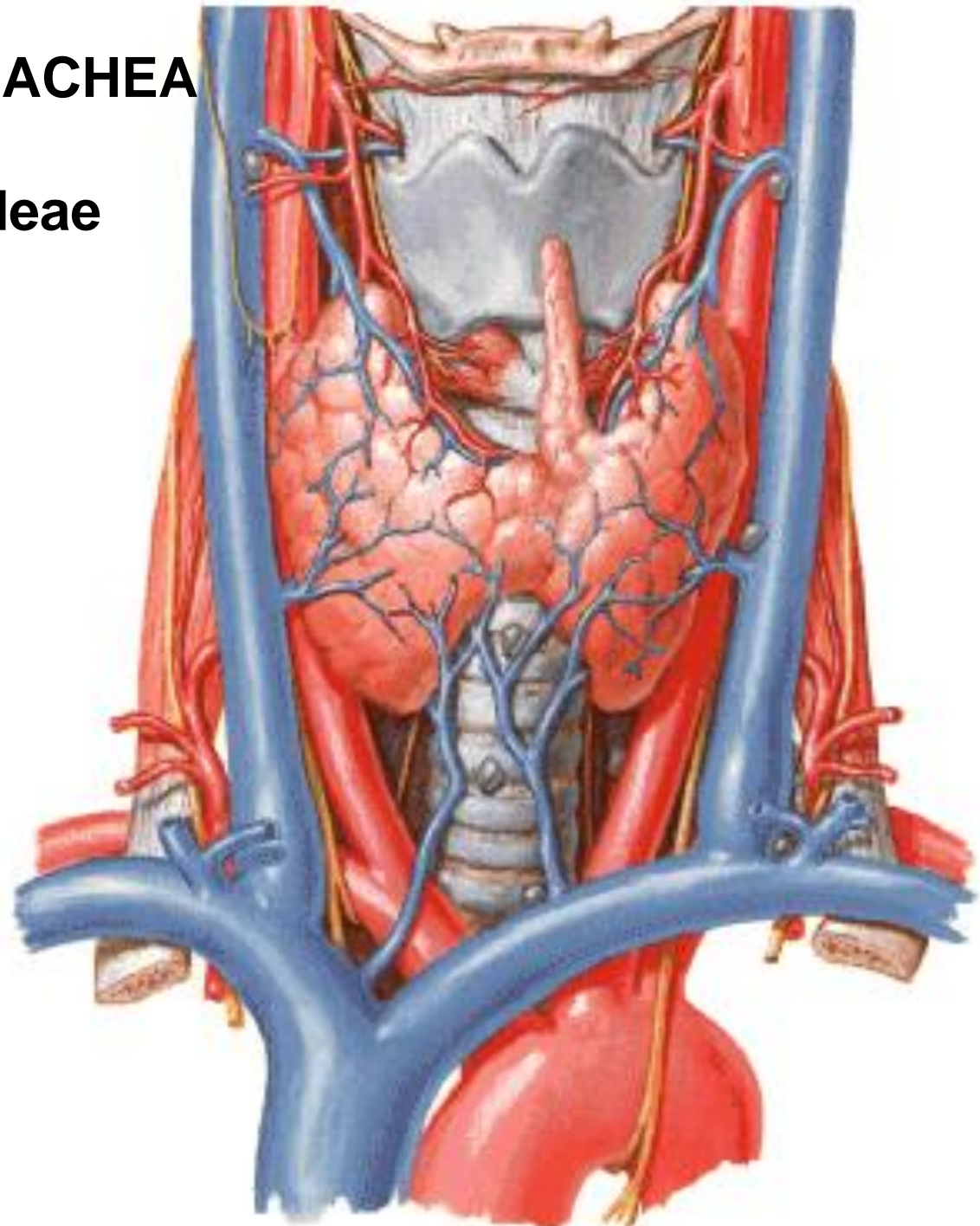
-**v. jugularis int.**

-**n. vagus**

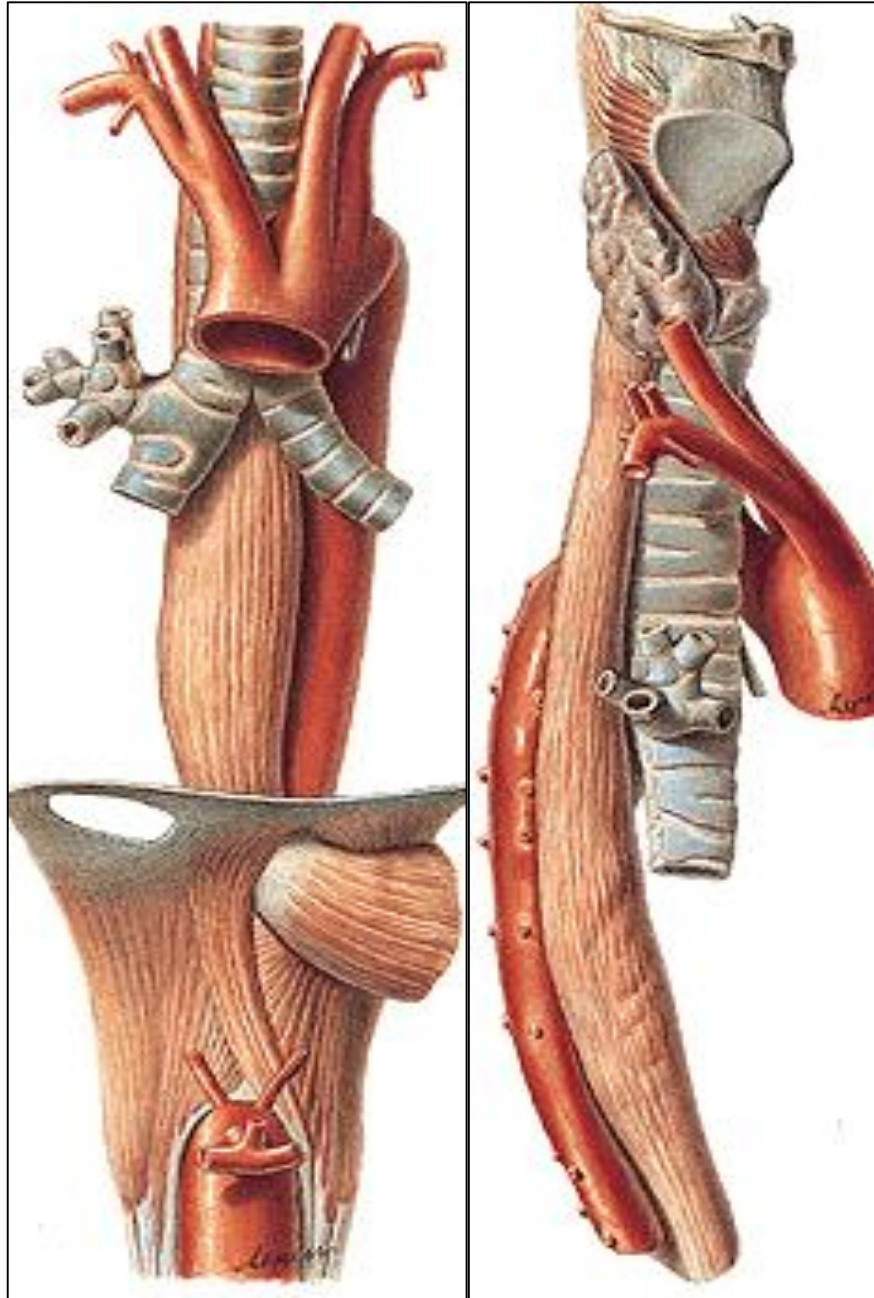
-**oesophagus**

-**n. laryngeus recurrens**

-nodi lymph. paratracheales

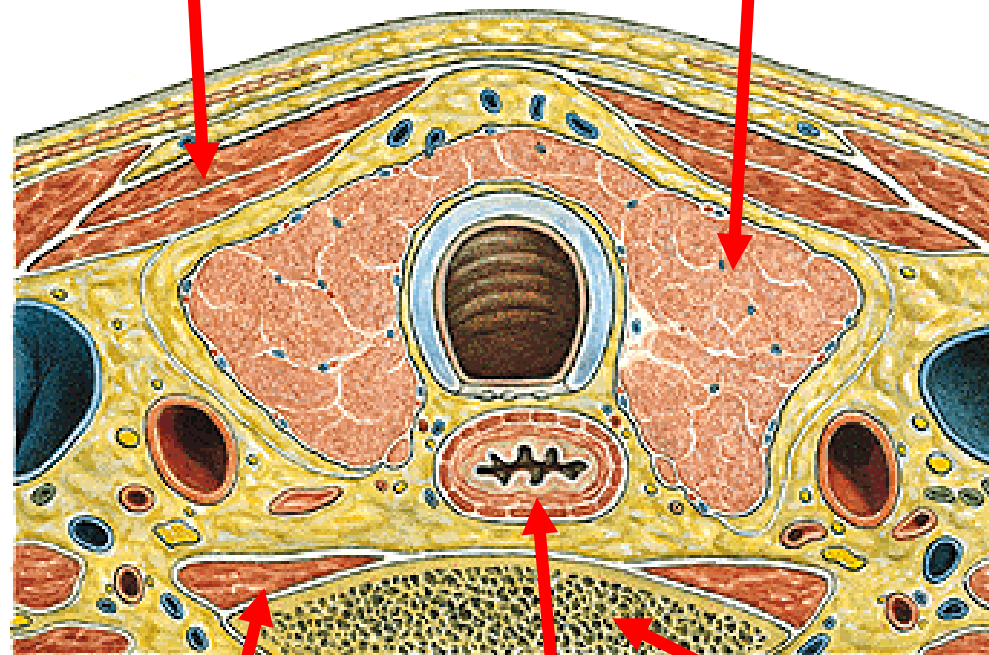


Syntopy: thyroid gland anteriorly, oesophagus posteriorly



Infrahyoid muscles

Lobe of the thyroid gland

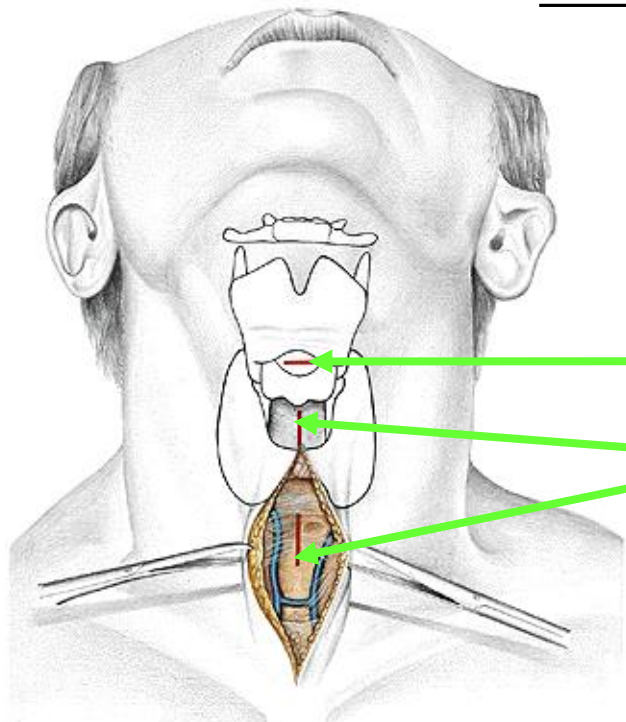


Prevertebral muscles

Cervical vertebra

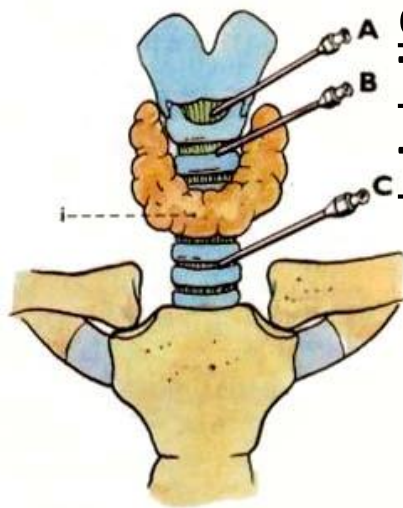
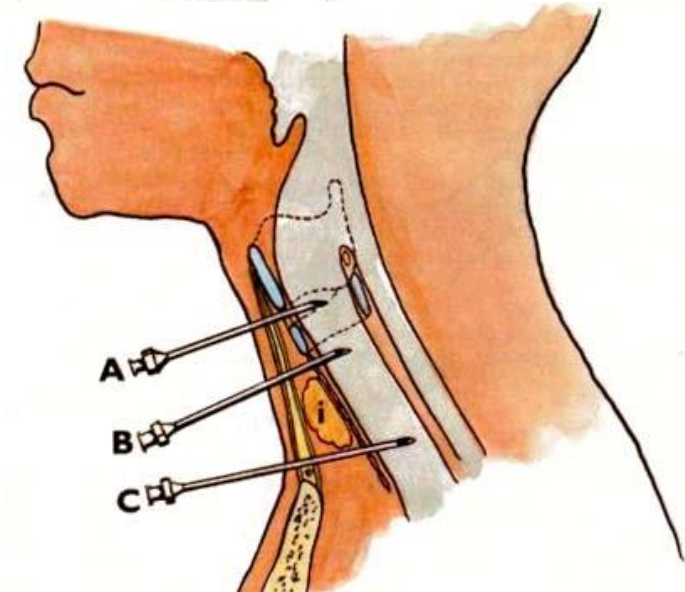
oesophagus

Coniotomy, Tracheotomy



Coniotomia (cricothyrotomia) (lig. cryothyroideum)

Tracheotomia



coniotomy

Tracheotomy superior

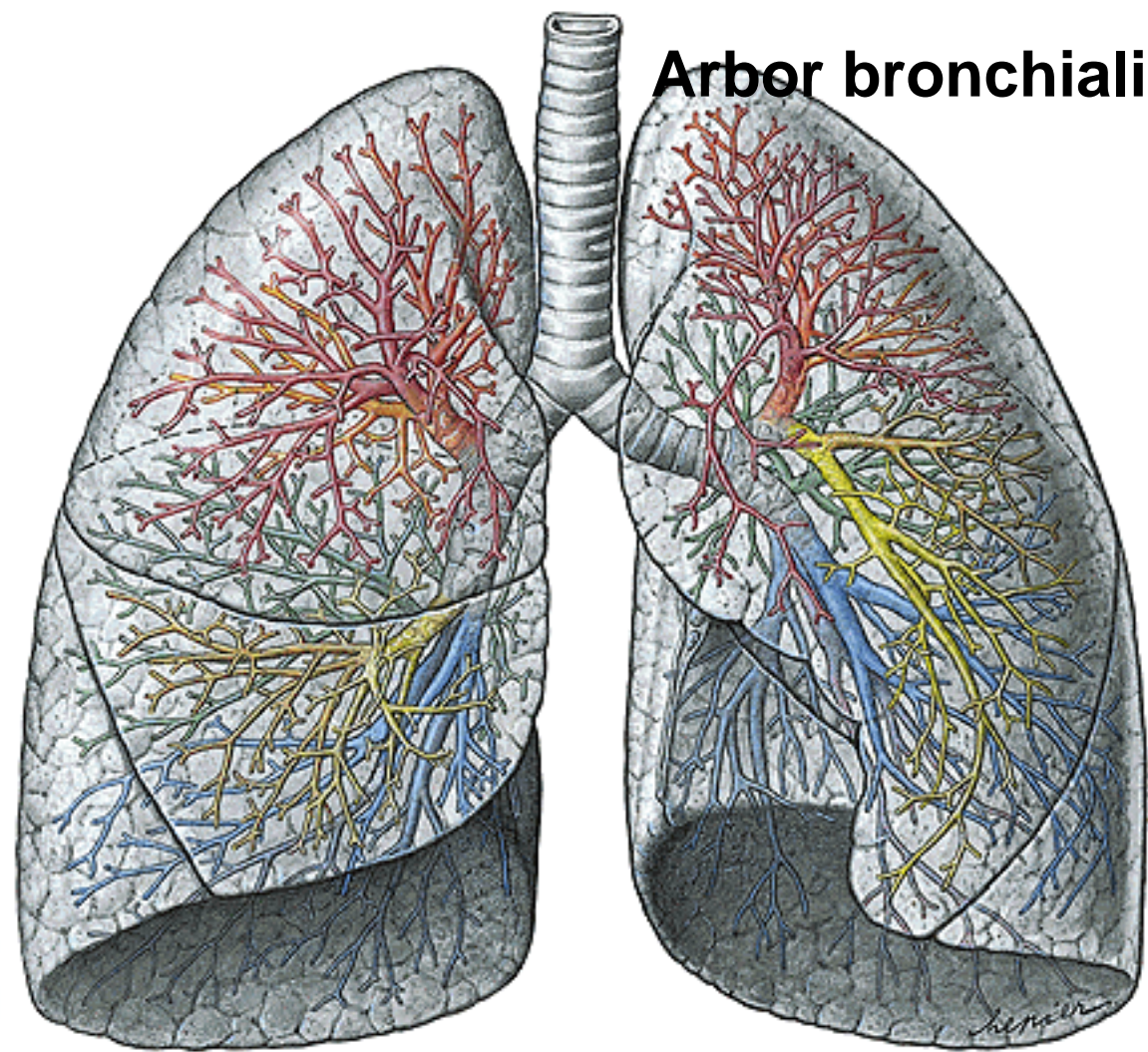
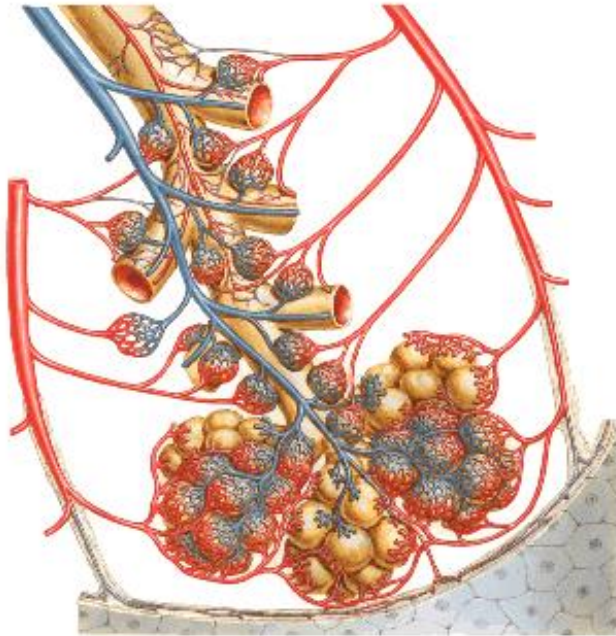
Tracheotomy inferior

BRONCHI

- principales
- lobares
- segmentales

BRONCHIOLI

ALVEOLI



Arbor bronchialis

PULMO DEXTER

Lobus superior,
medius et inferior

Fissura obliqua
et horizontalis



Apex pulmonis

Basis pulmonis
(facies diaphragmatica)

Facies costalis

Facies mediastinalis

Margo anterior

inferior

posterior

PULMO SINISTER

Lobus superior et
inferior

Fissura obliqua

Incisura cardiaca

Lingula



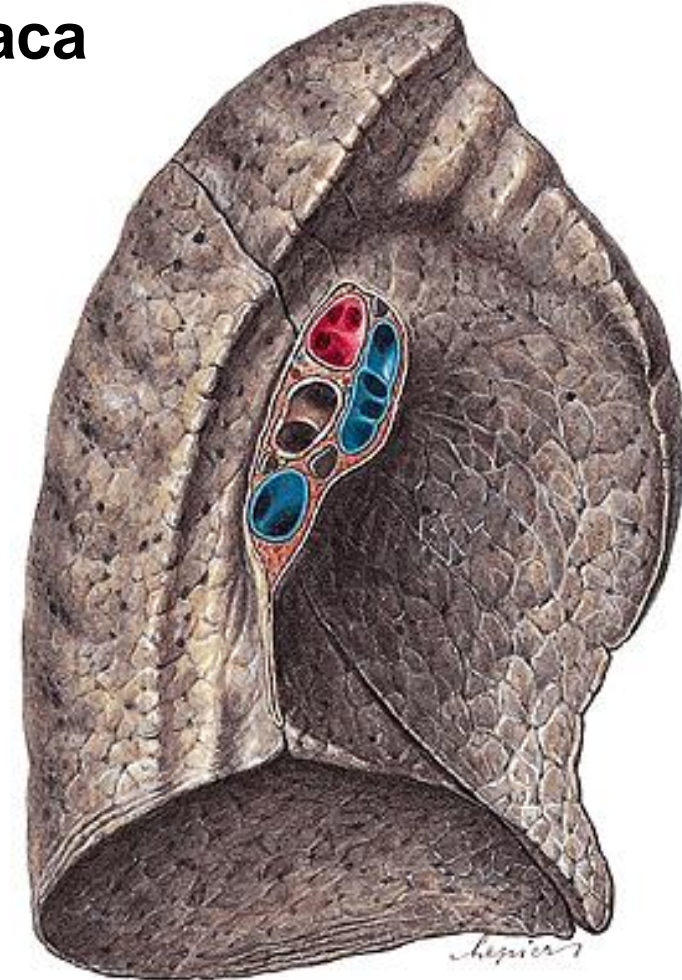
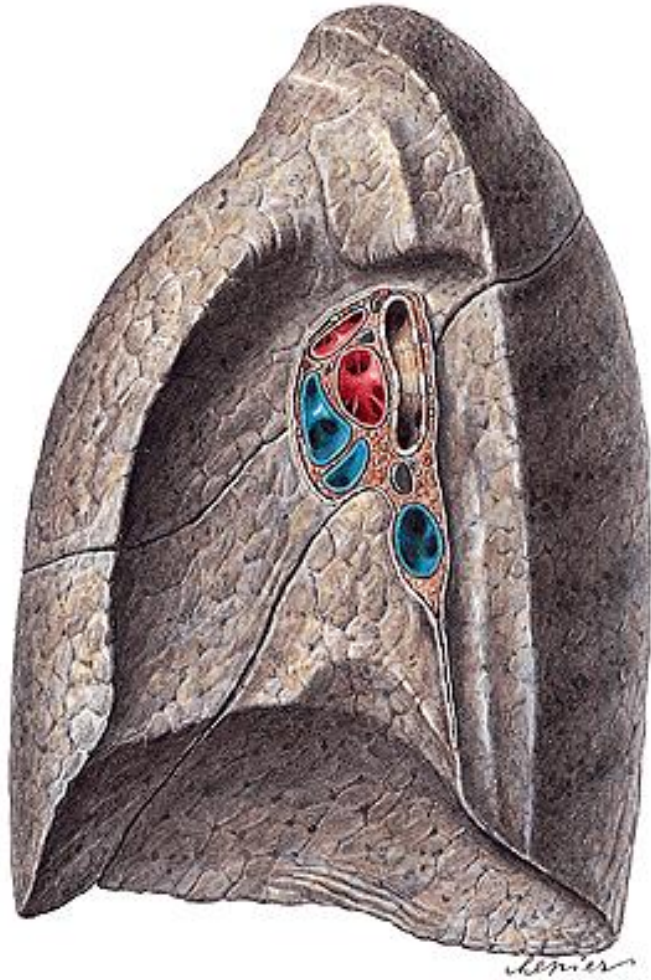
FACIES MEDIASTINALIS

hillum pulmonis

radix pulmonis

lig. pulmonale

impressio cardiaca



SEGMENTA BRONCHOPULMONALIA DEXTRA

1. s. apicale

2. s. posterius

3. s. anteriorus

4. s. laterale

5. s. mediale

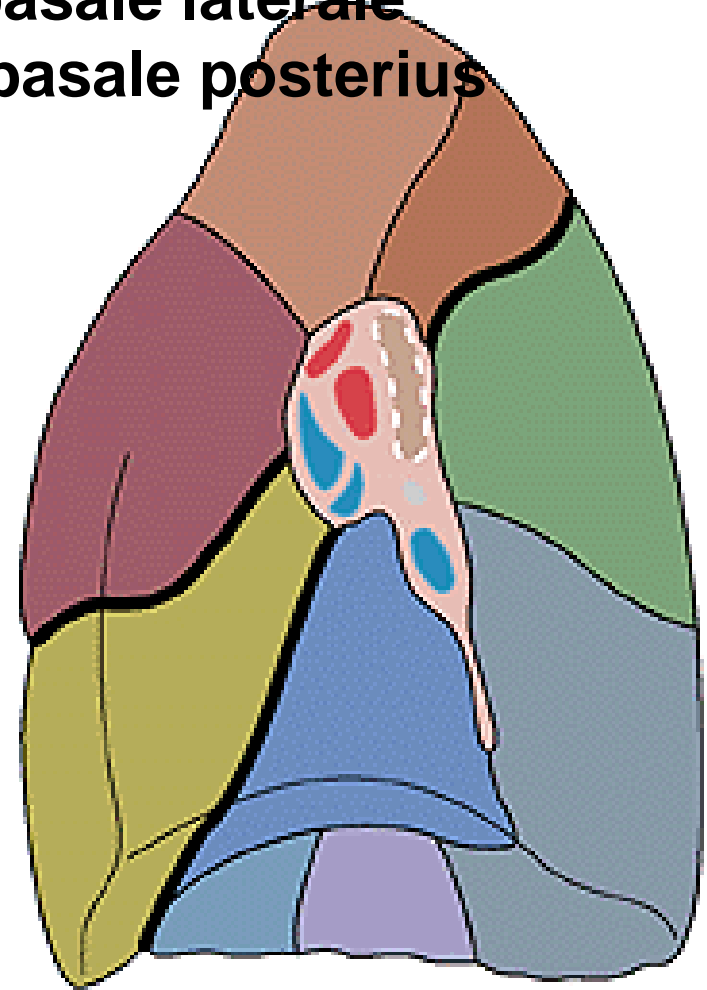
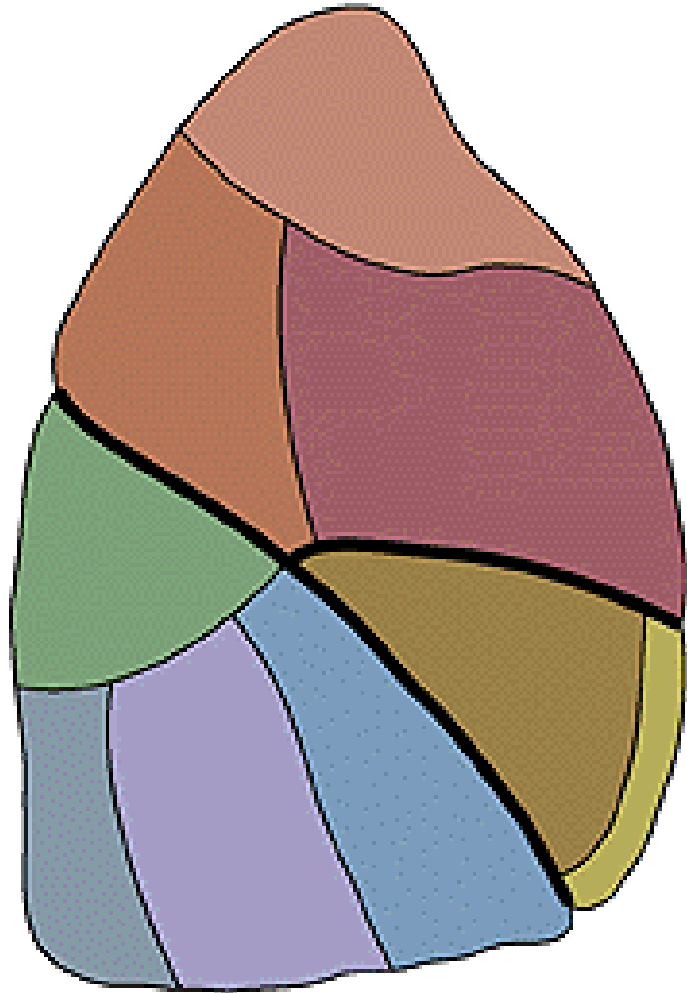
6. s. apicale

7. s. basale mediale

8. s. basale anteriorus

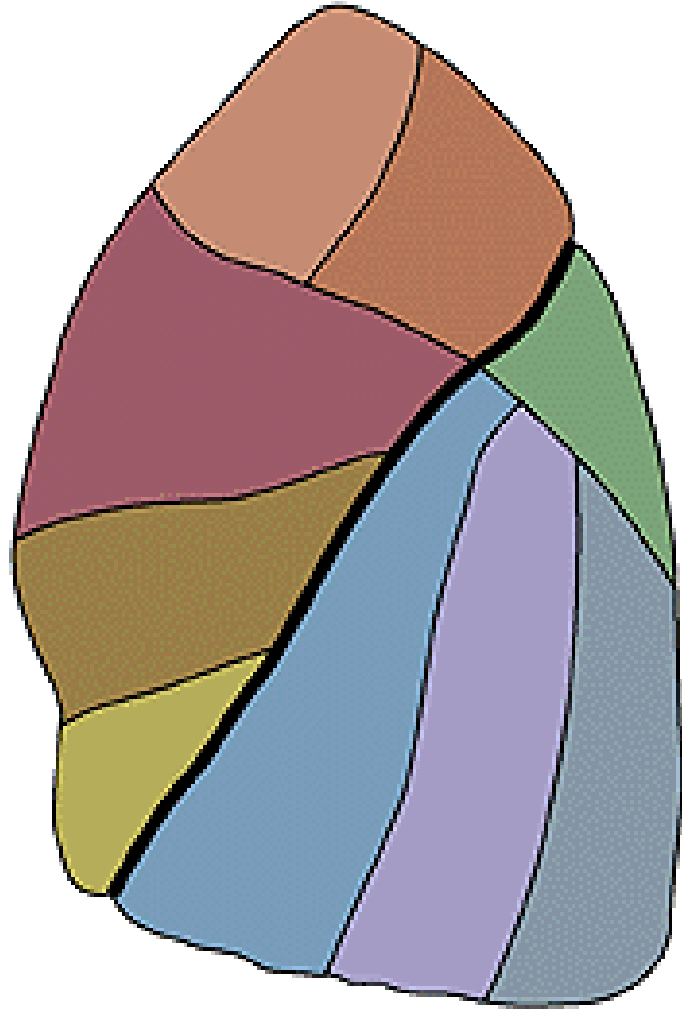
9. s. basale laterale

10. s. basale posterius

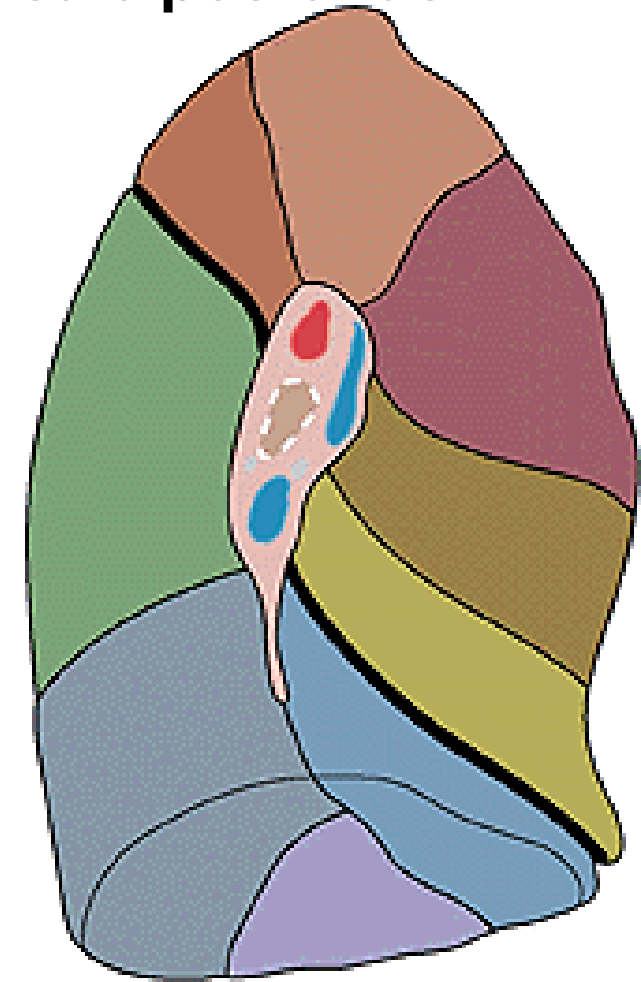


SEGMENTA BRONCHOPULMONALIA SINISTRA

- 1+2. s. apicoposterius
- 3. s. anterior
- 4. s. lingulare superius
- 5. s. lingulare inferius



- 6. s. apicale
- (7. s. basale mediale)
- 8. s. basale anterior
- 9. s. basale laterale
- 10. s. basale posterius



PLEURA - visceralis

- parietalis - costalis

- diaphragmatica

- mediastinalis

Cavitas pleuralis

Cupula pleurae

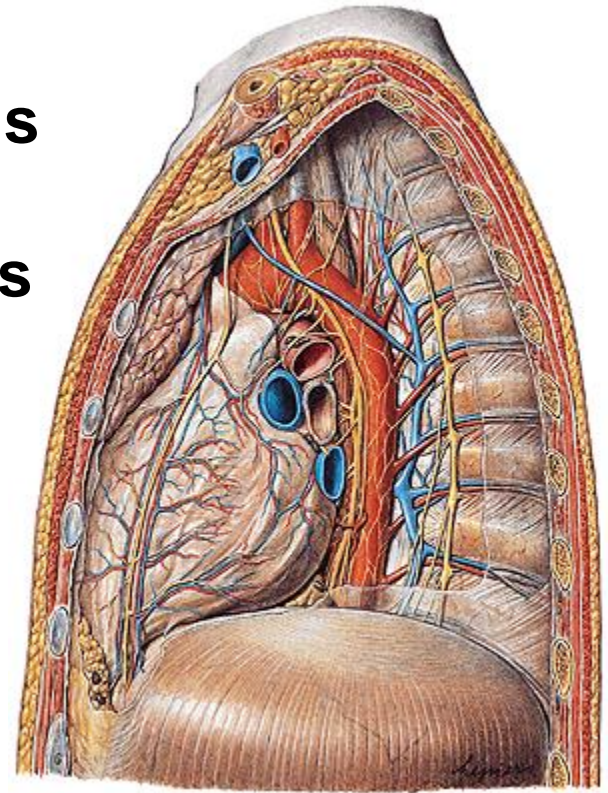
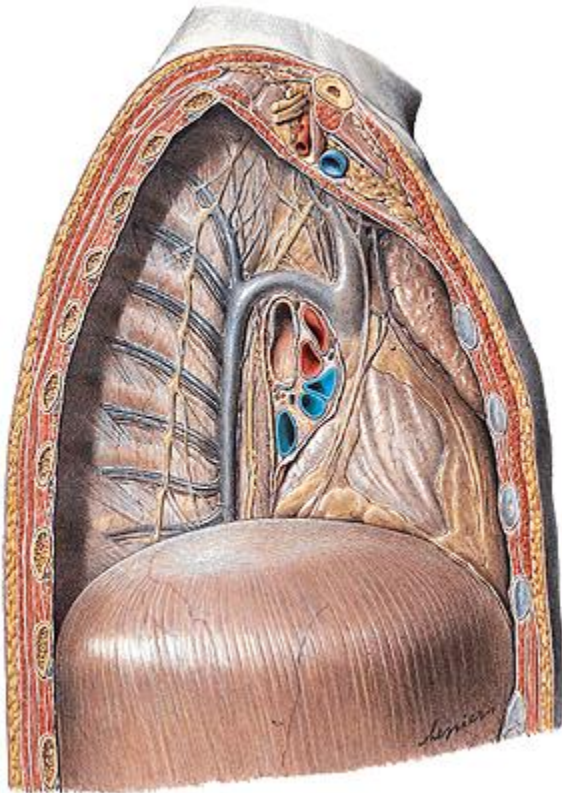
Recessus pleurae:

r. costodiaphragmaticus

r. costomediastinalis

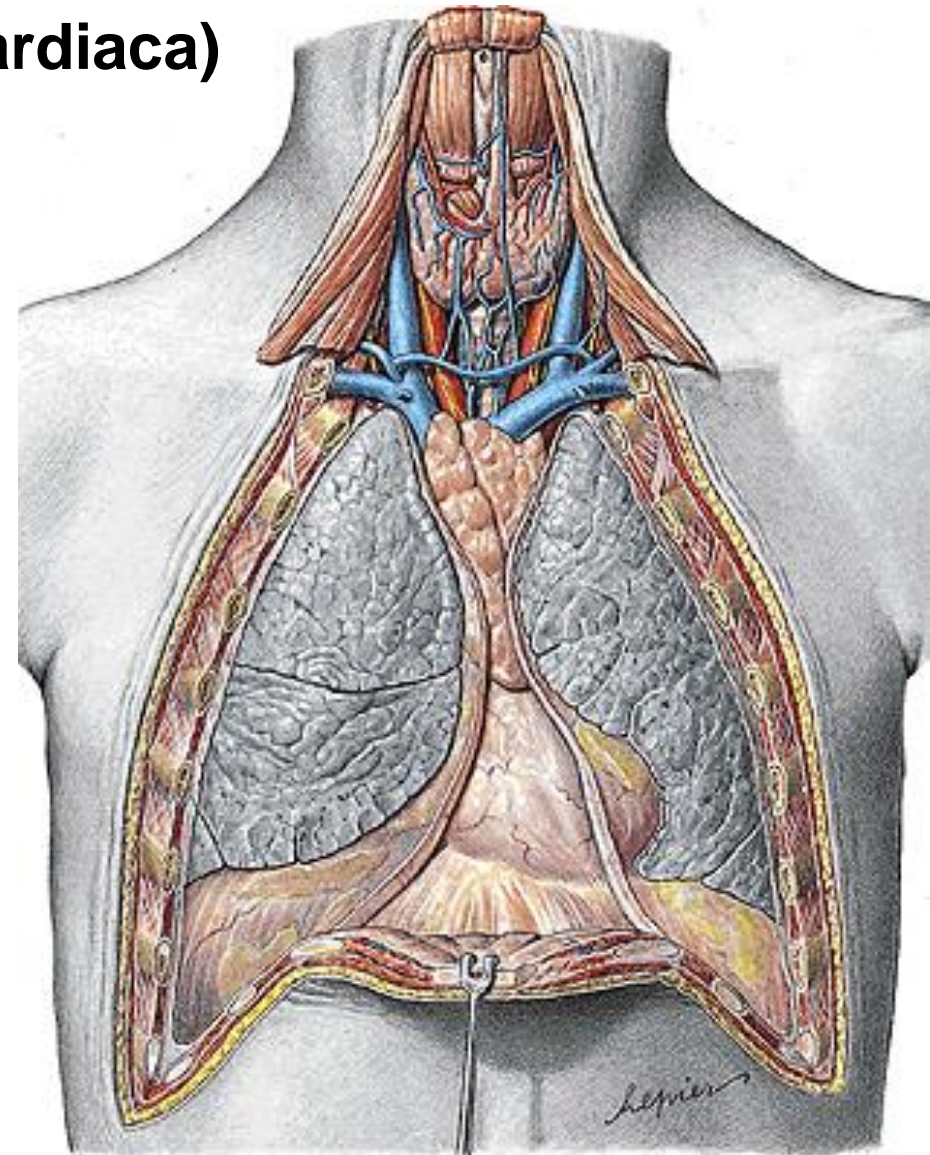
r. phrenicomediastinalis

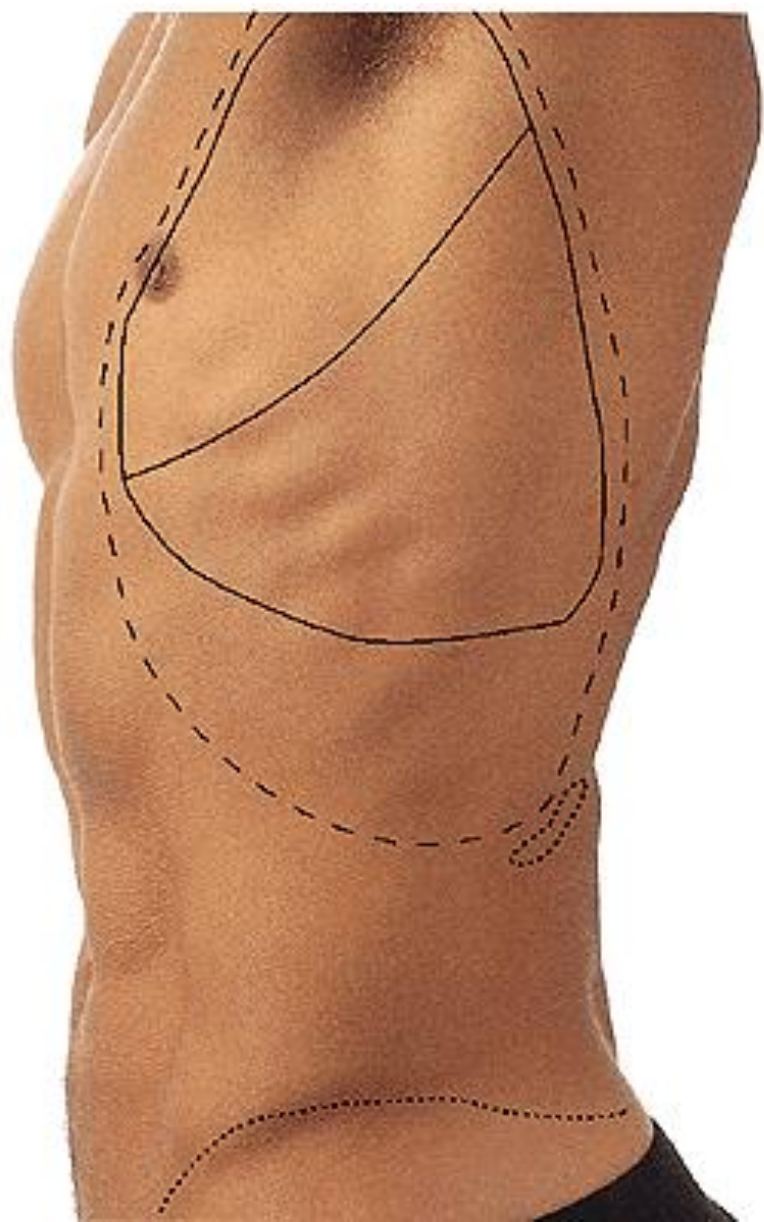
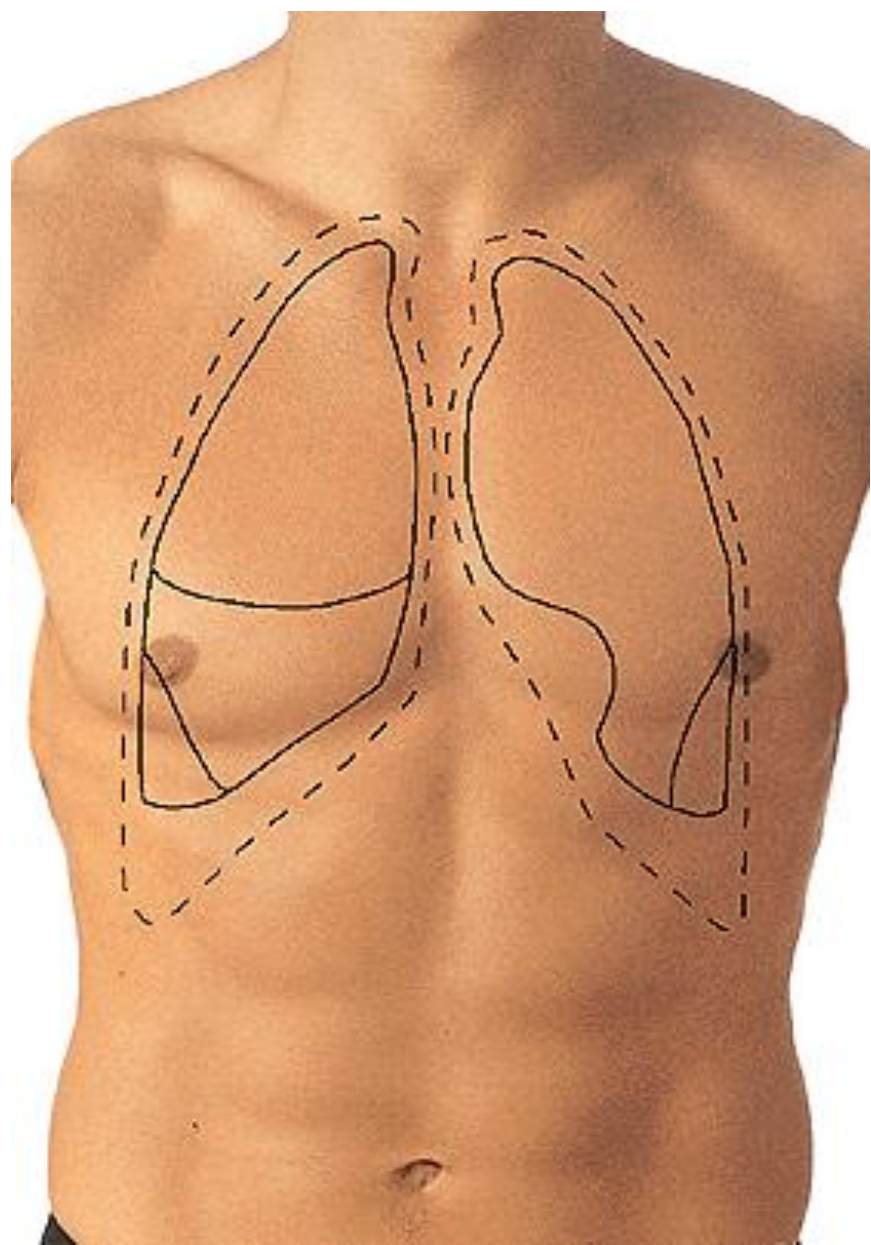
Pneumothorax



Area interpleuralis sup. (thymica)

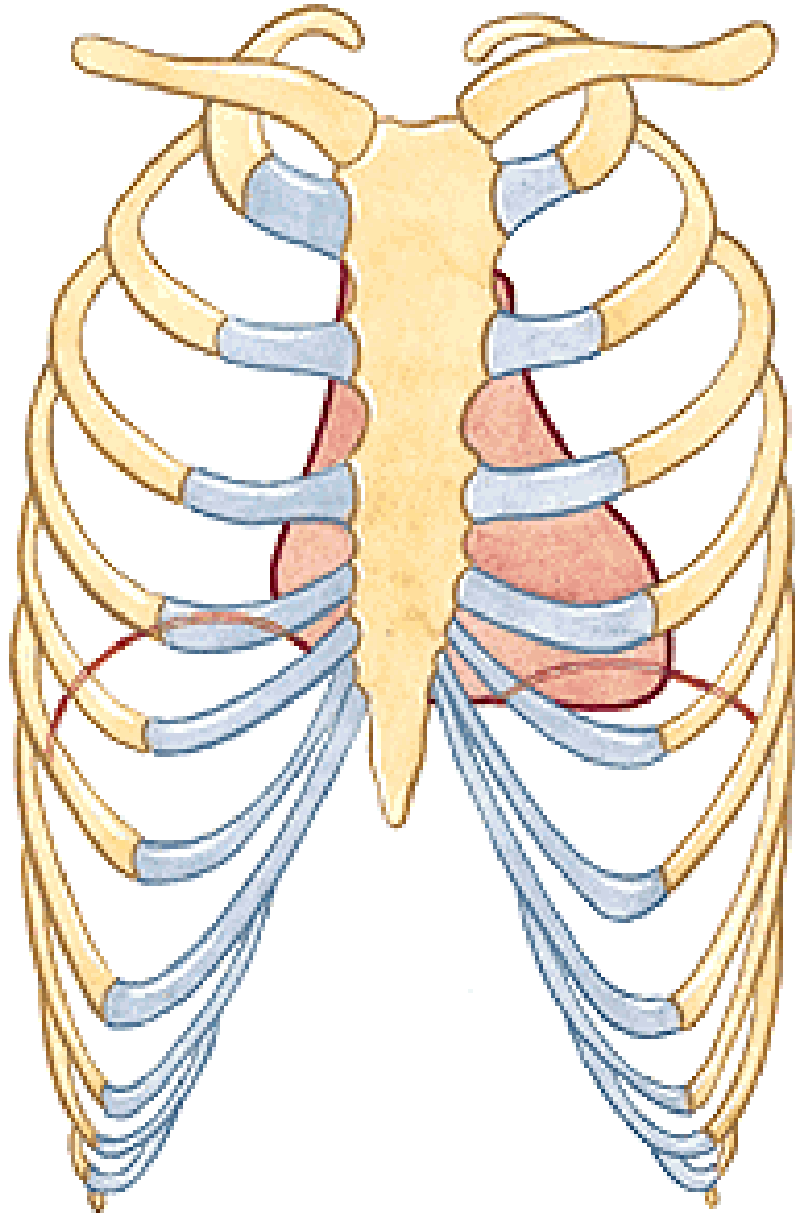
Area interpleuralis inf. (pericardiaca)



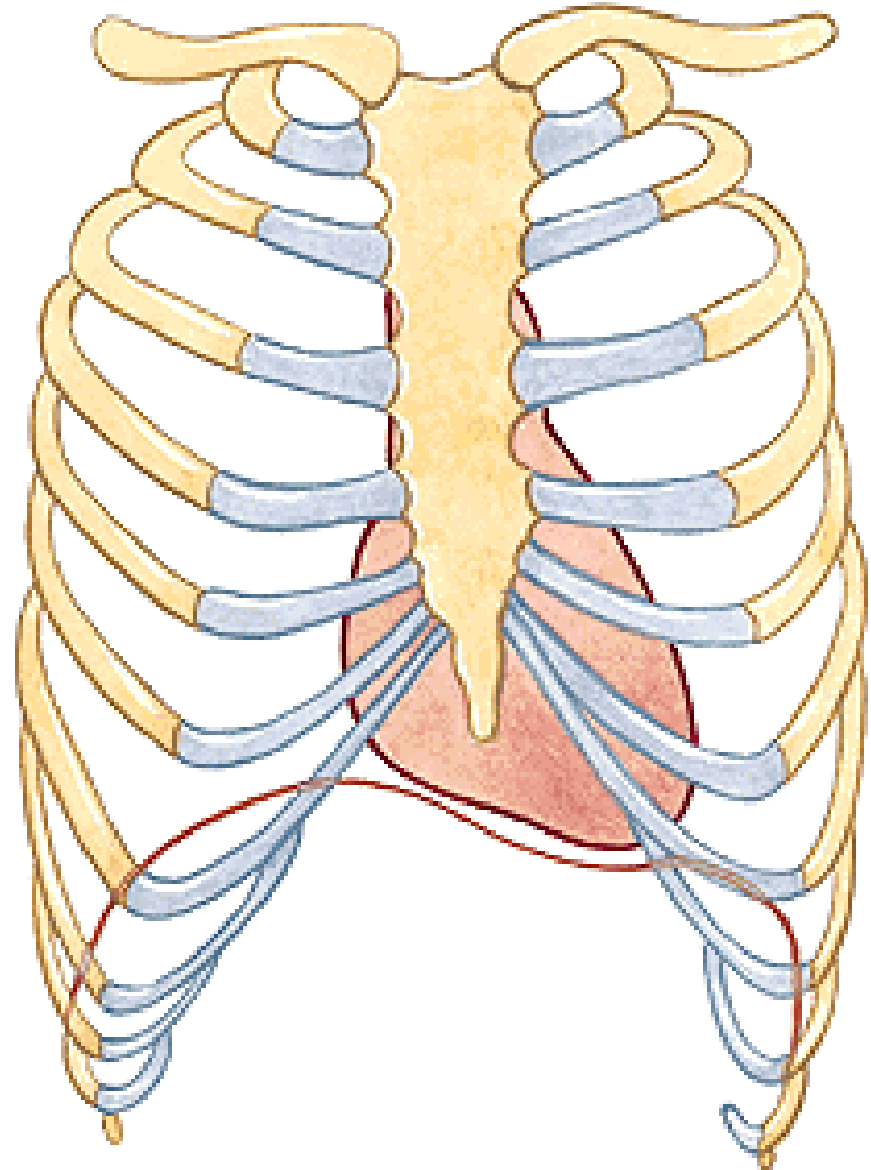


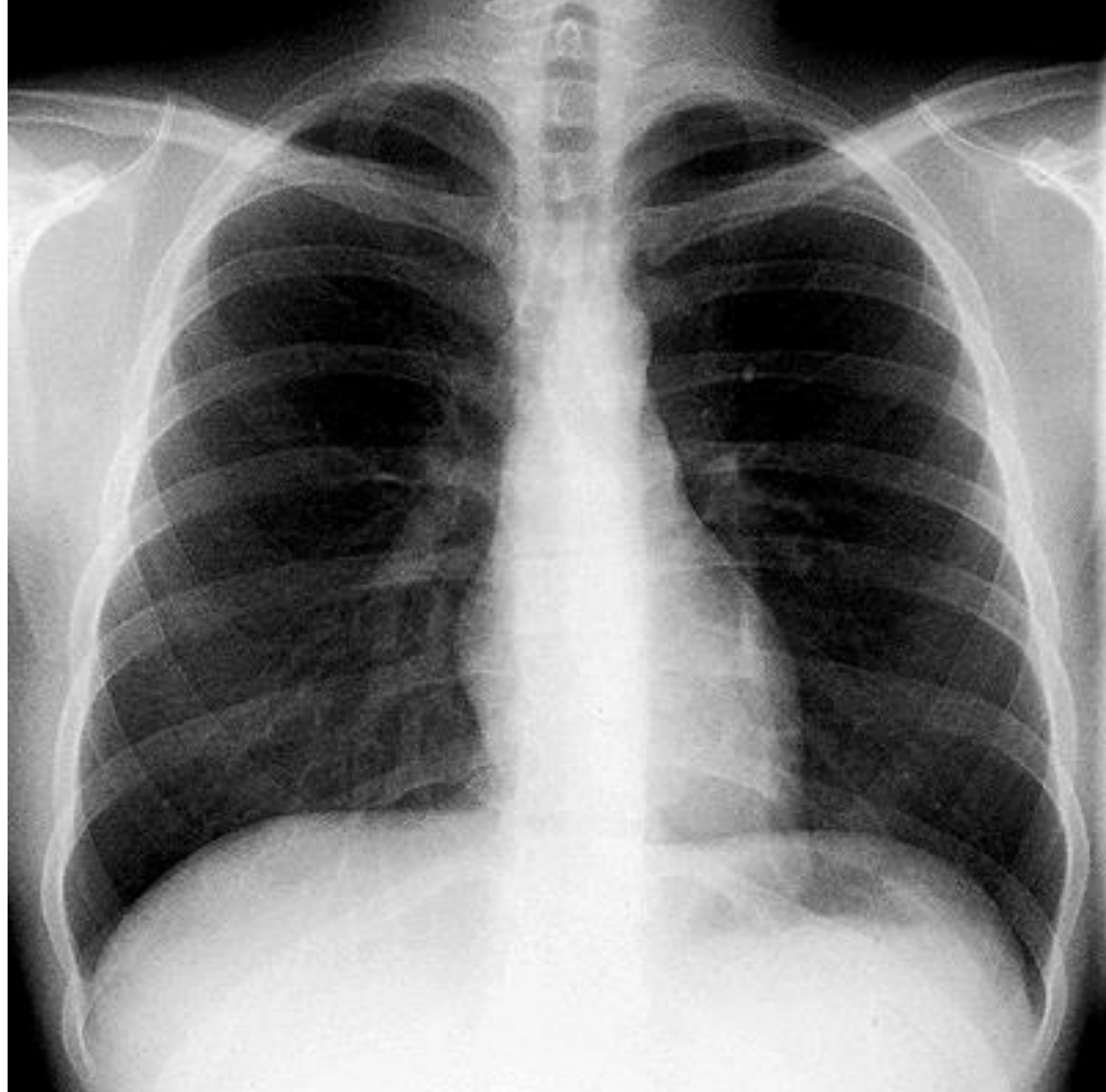


EXPIRATION

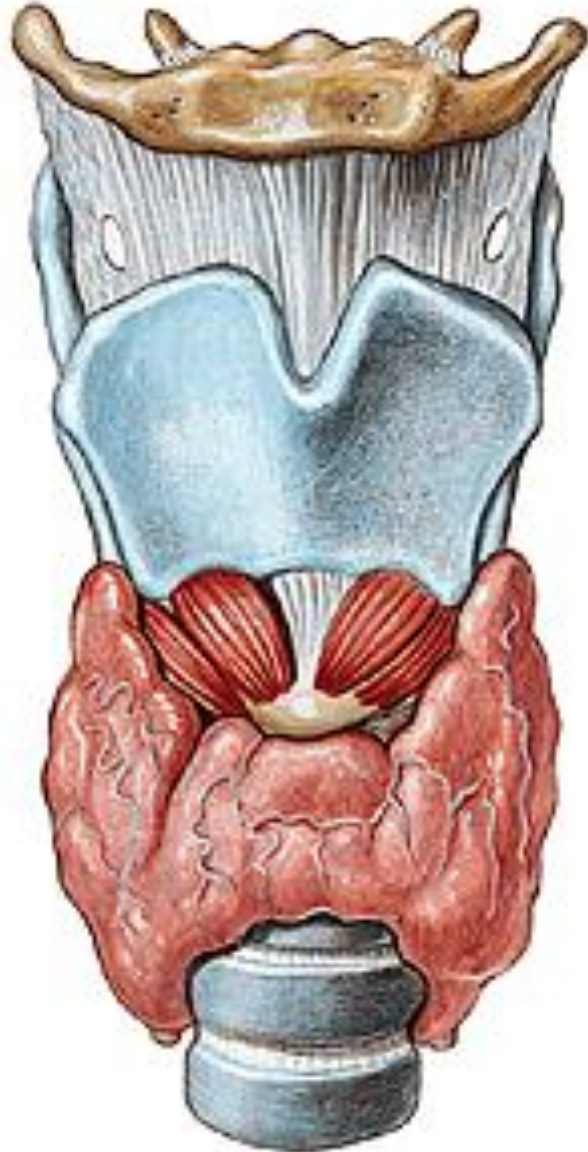


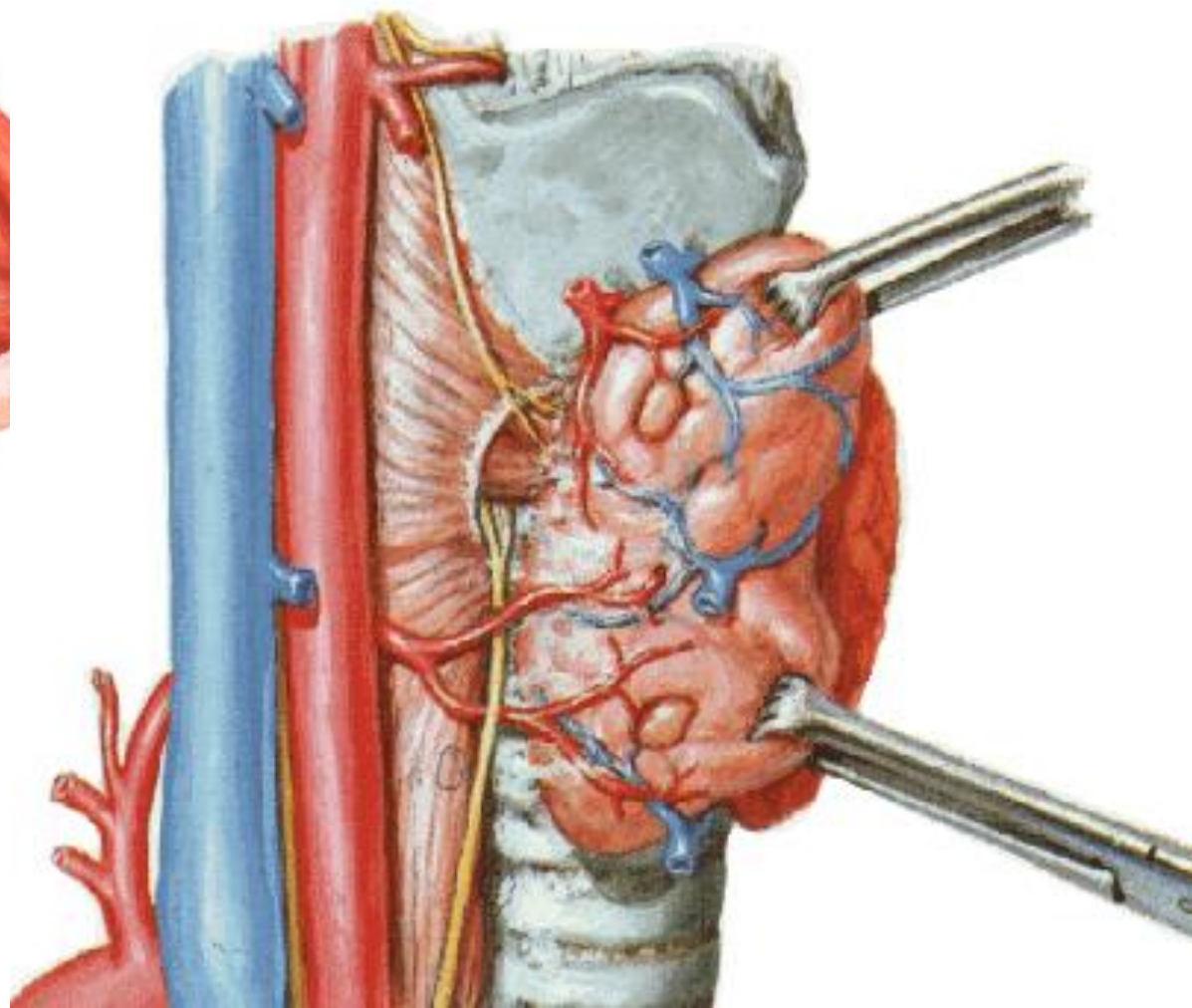
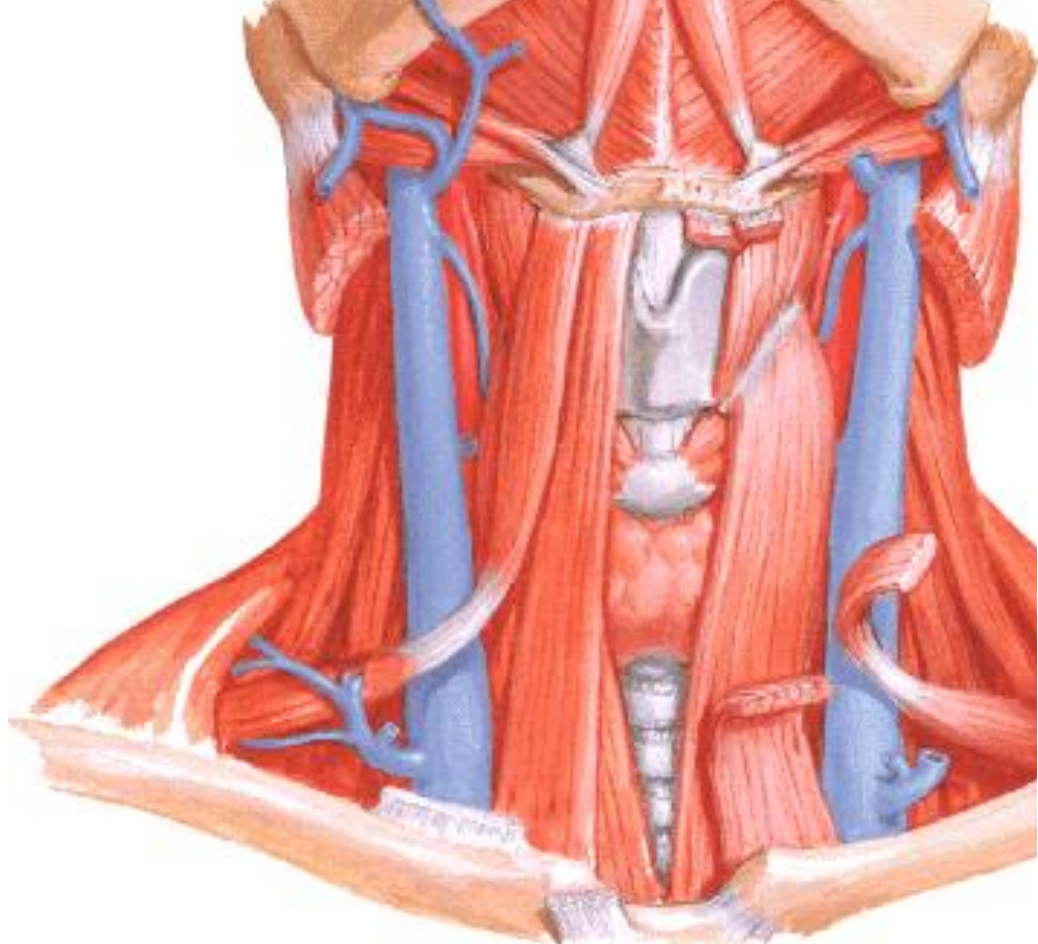
INSPIRATION



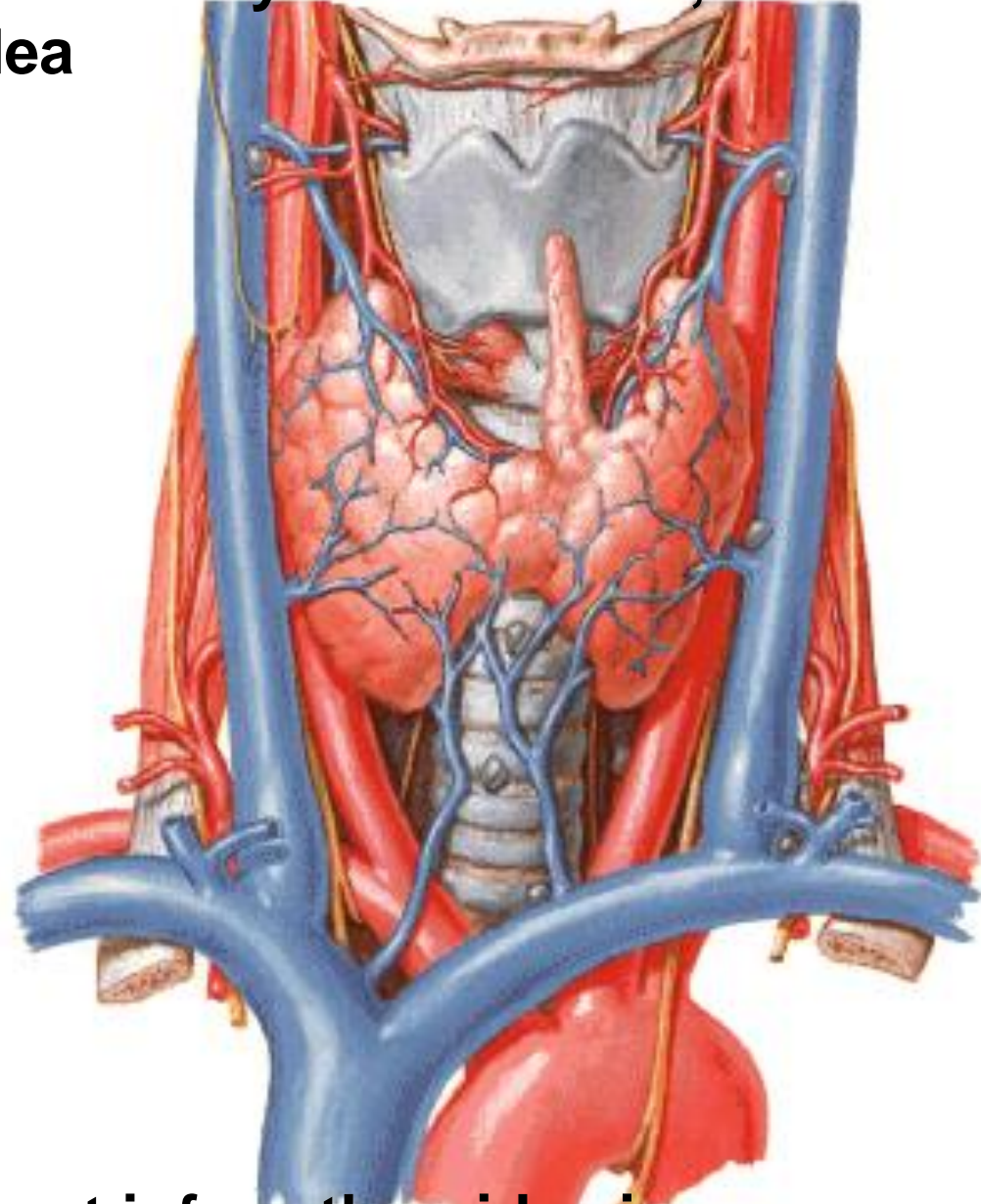
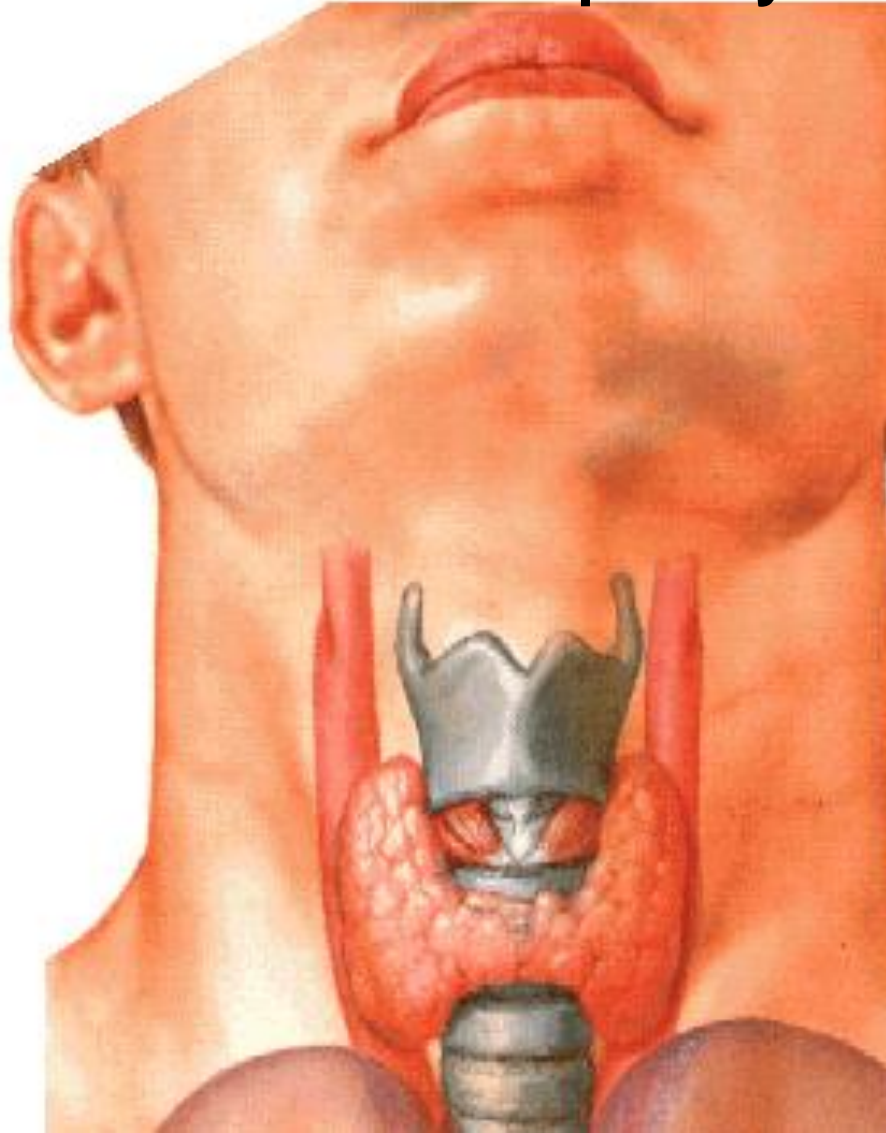


GLANDULA THYROIDEA – lobus dexter
- lobus sinister
- isthmus
- lobus
pyramidalis



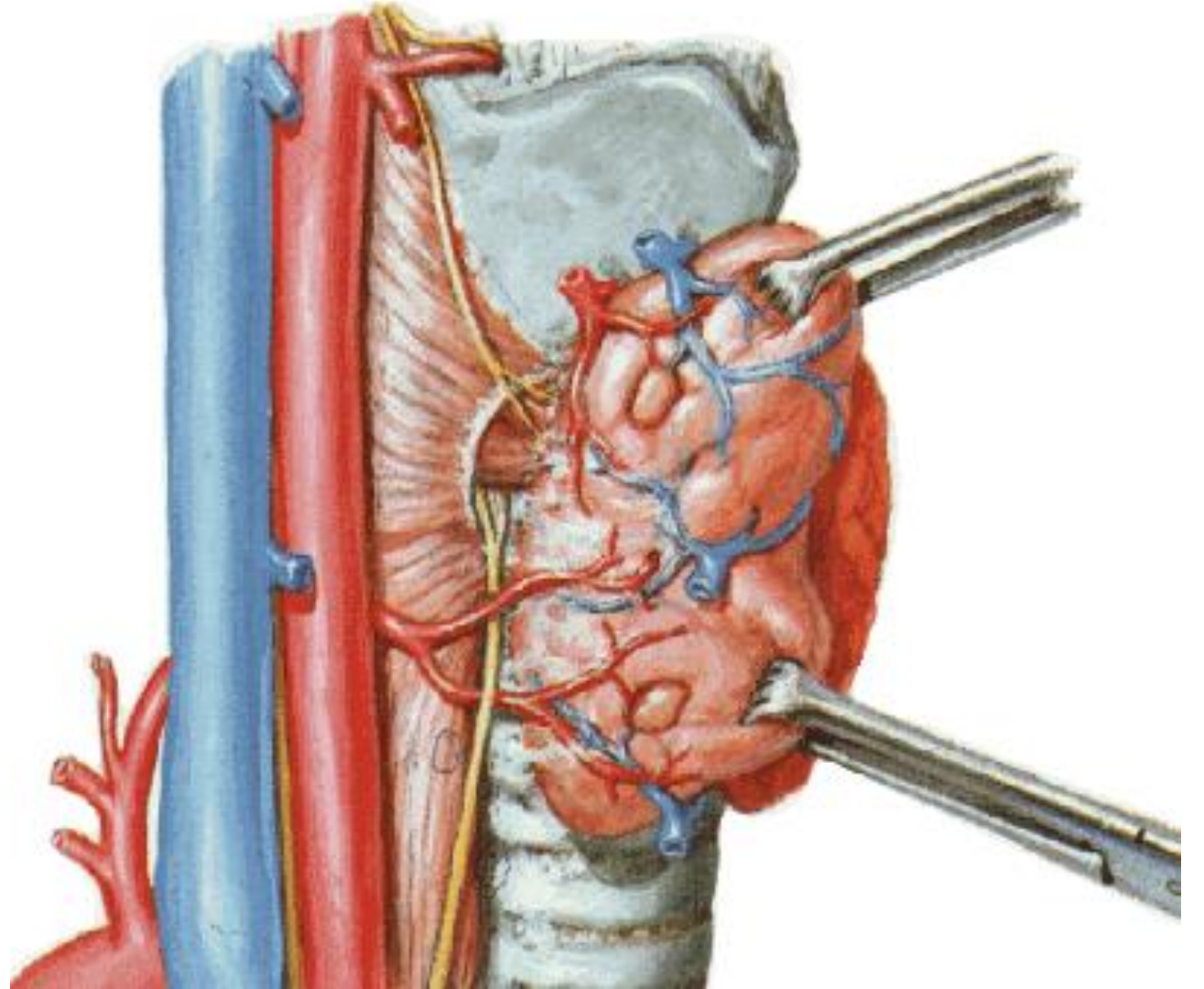
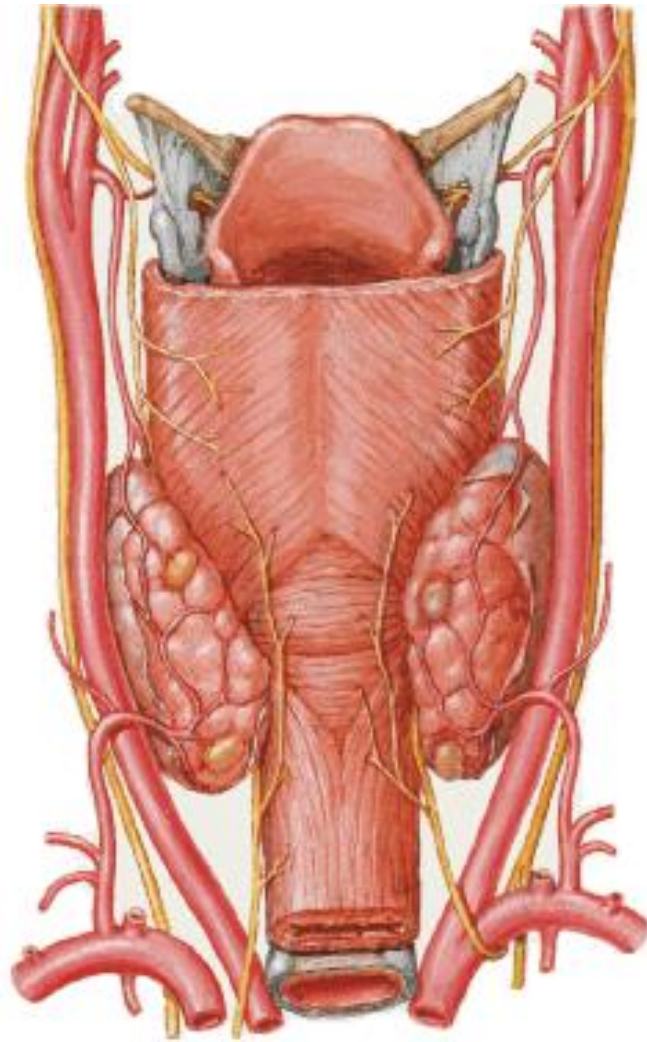


**Capsula propria, folliculi, colloid – thyroid hormone, calcitonin
Fascia externa s. perithyroidea**

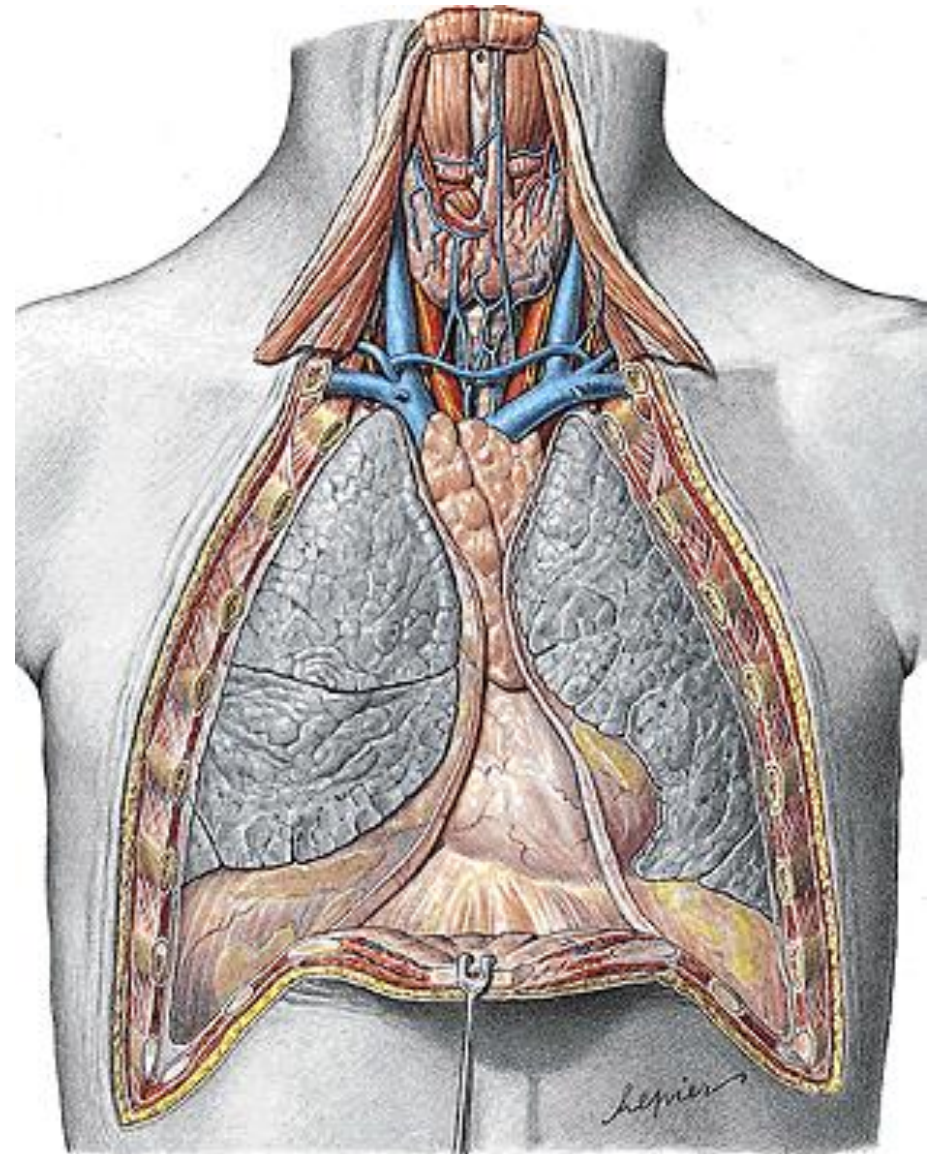
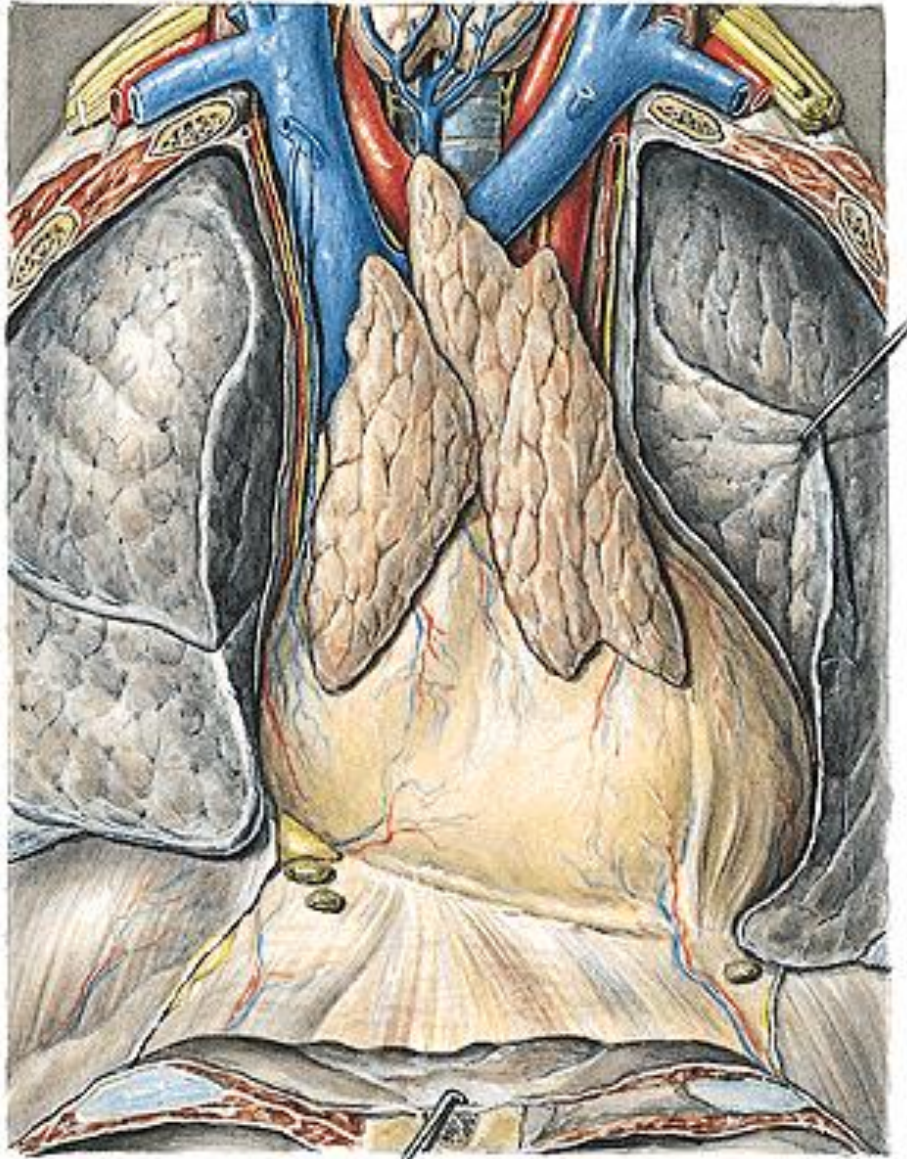


**A. et v. thyroidea sup. et inf., a. thyroidea ima,
nll. cervicales prof., nll. paratracheales**

**GLANDULAE PARATHYROIDEAE –sup. et inf.
Parathormone (parathyroid hormone; PTH)**

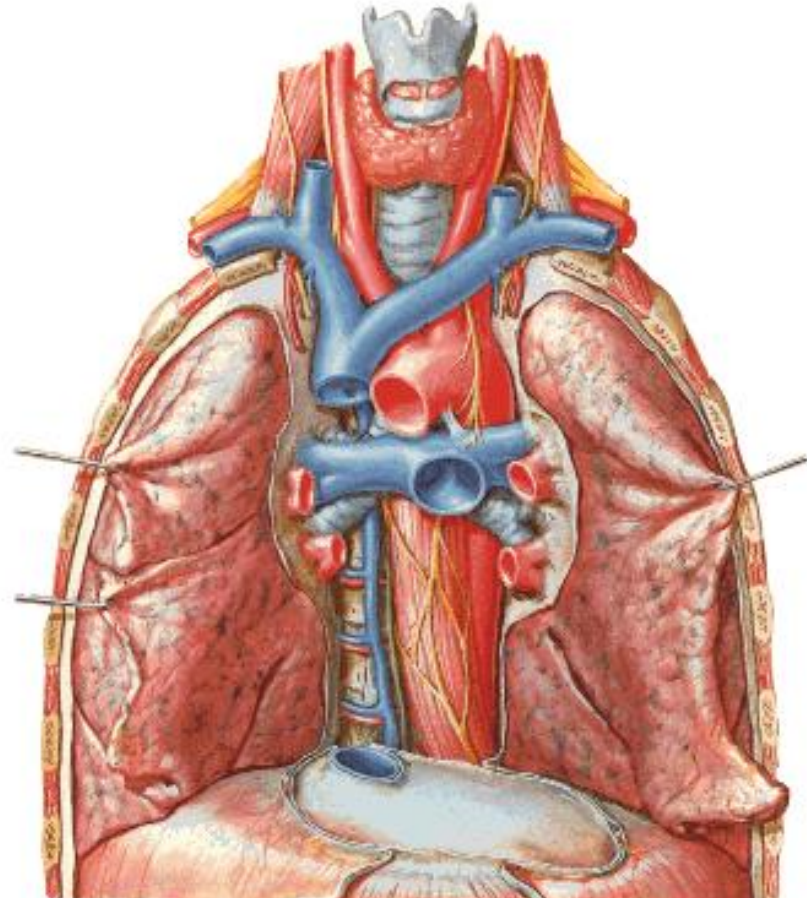
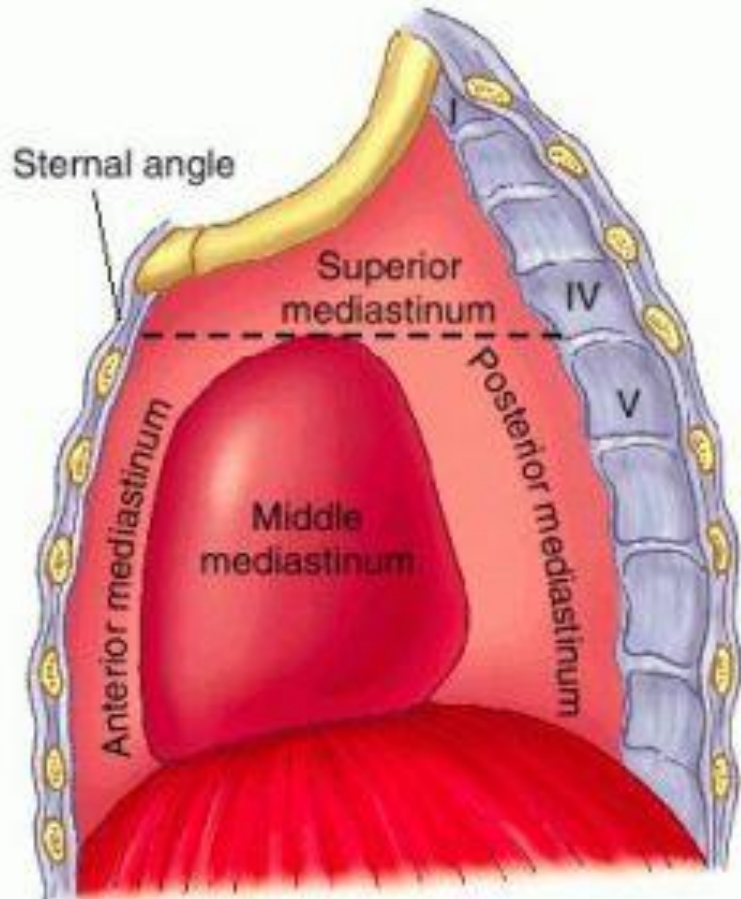


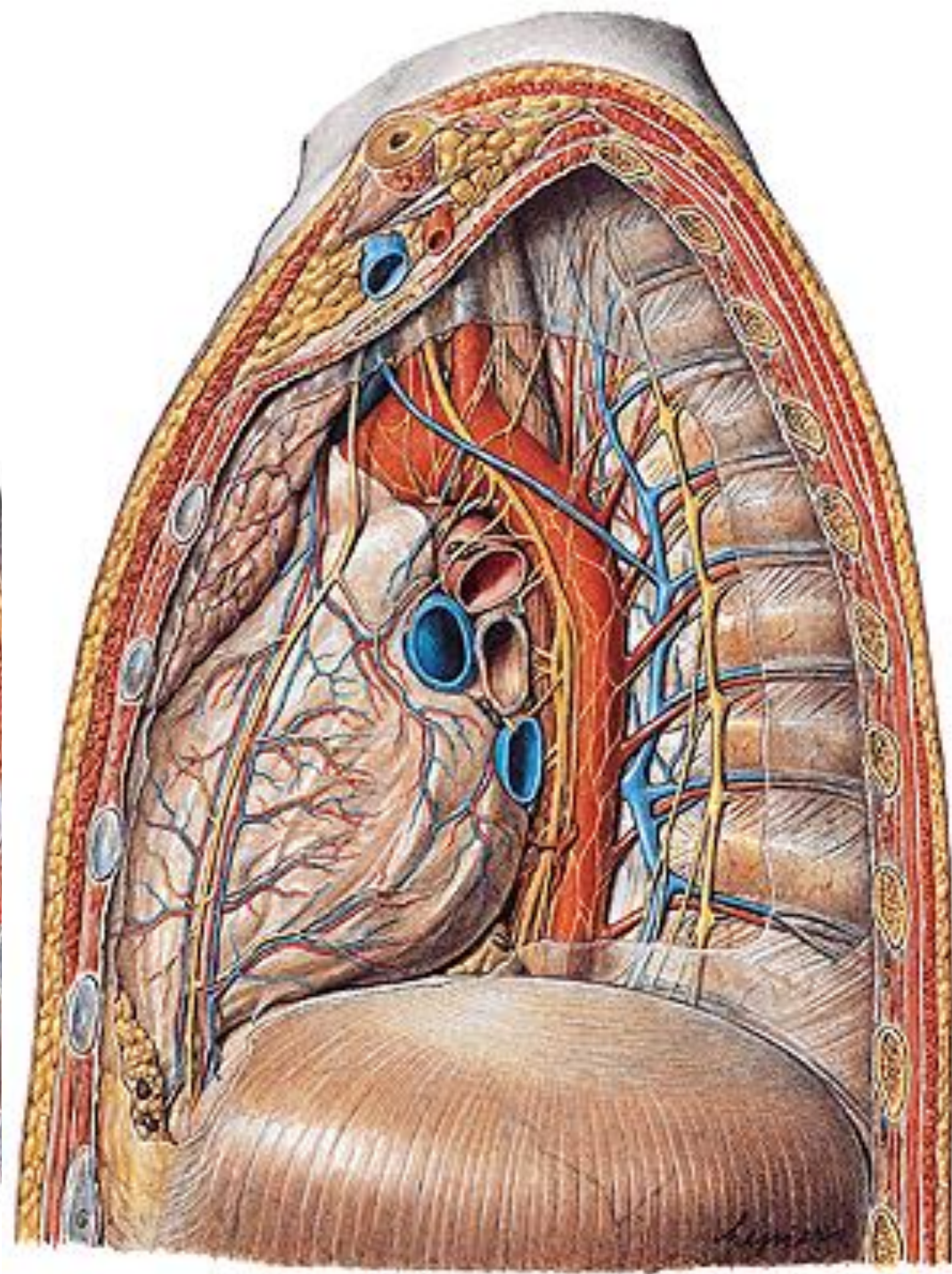
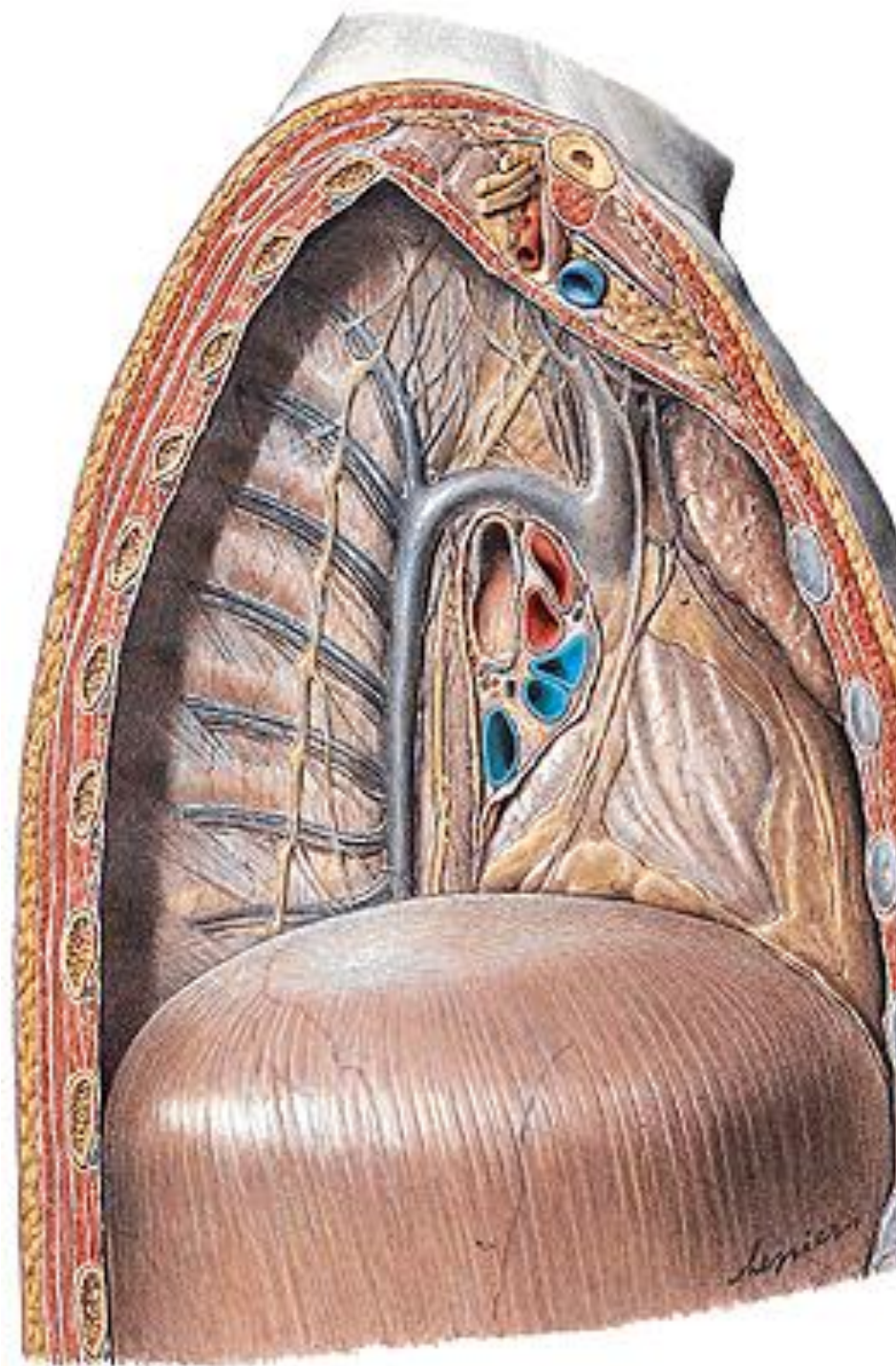
THYMUS

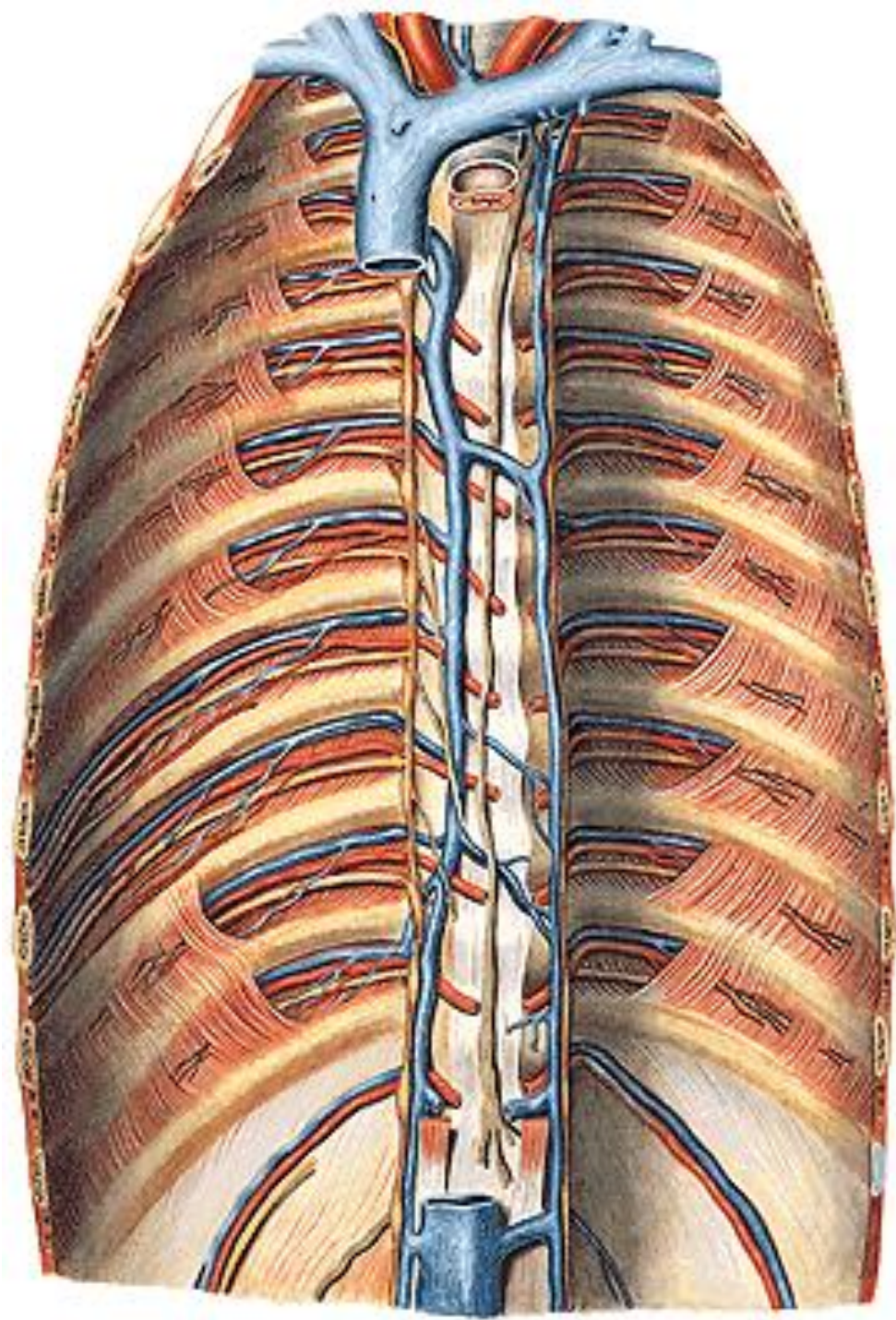
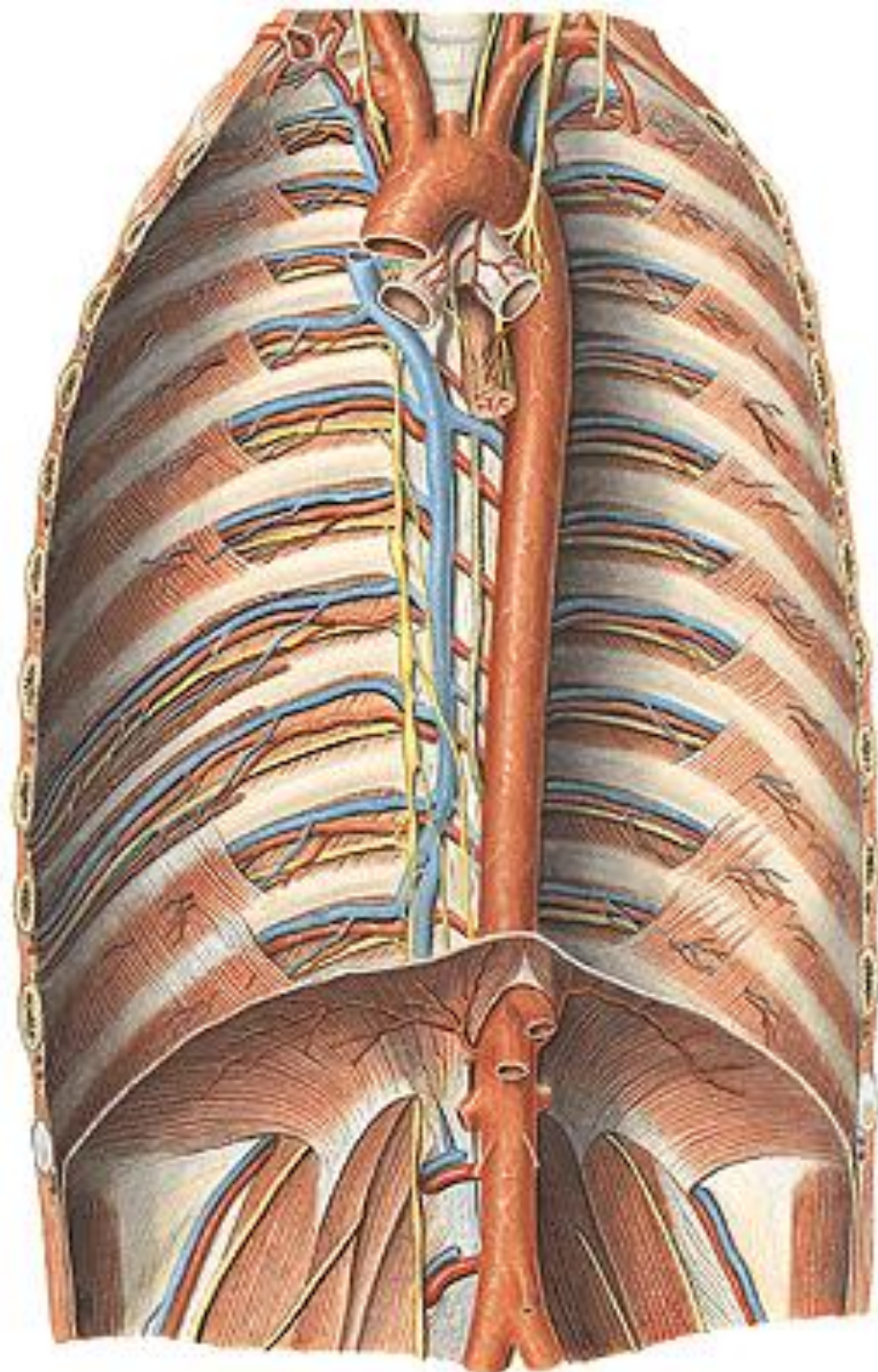


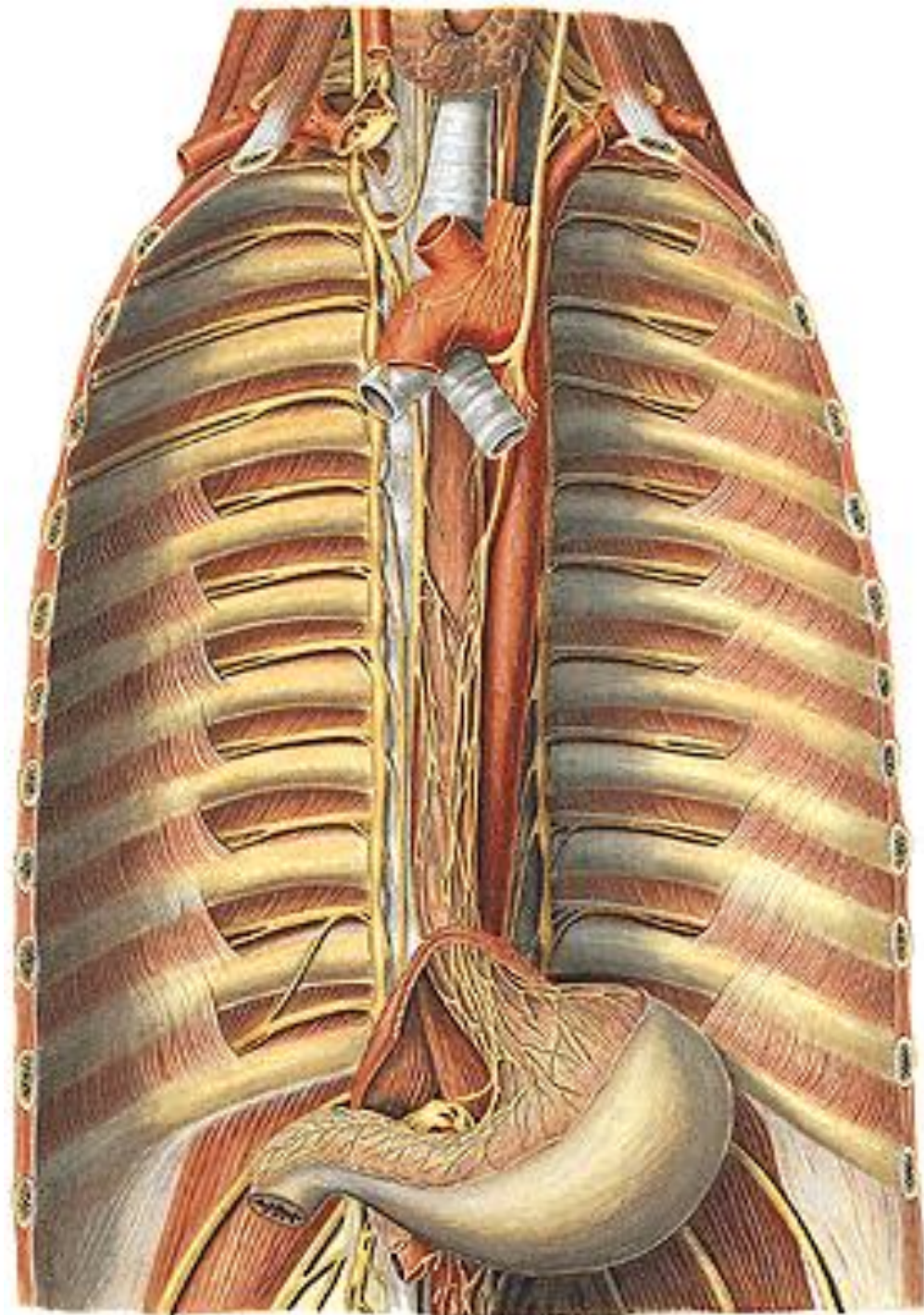
MEDIASTINUM

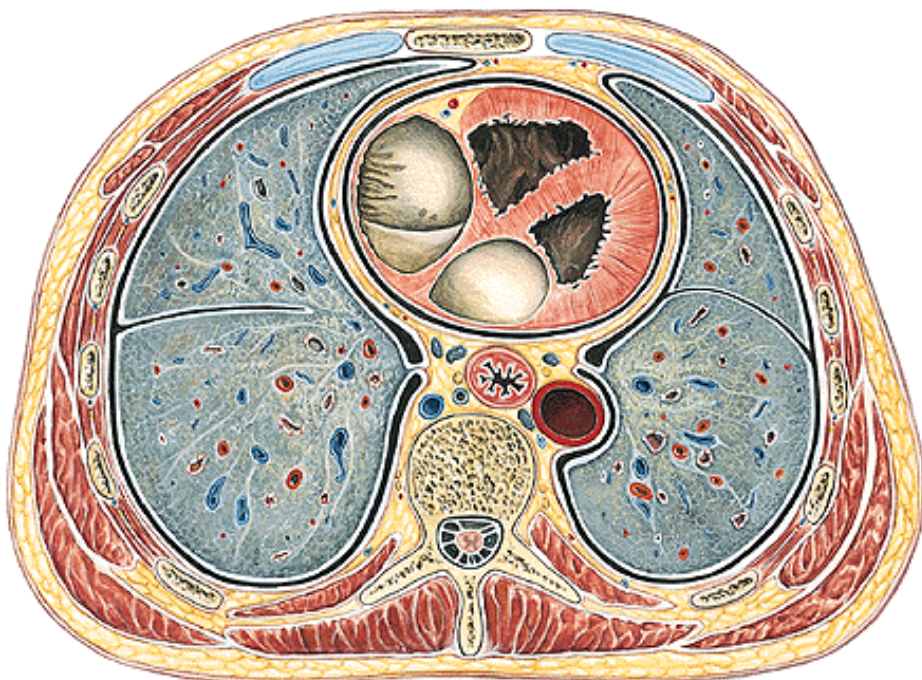
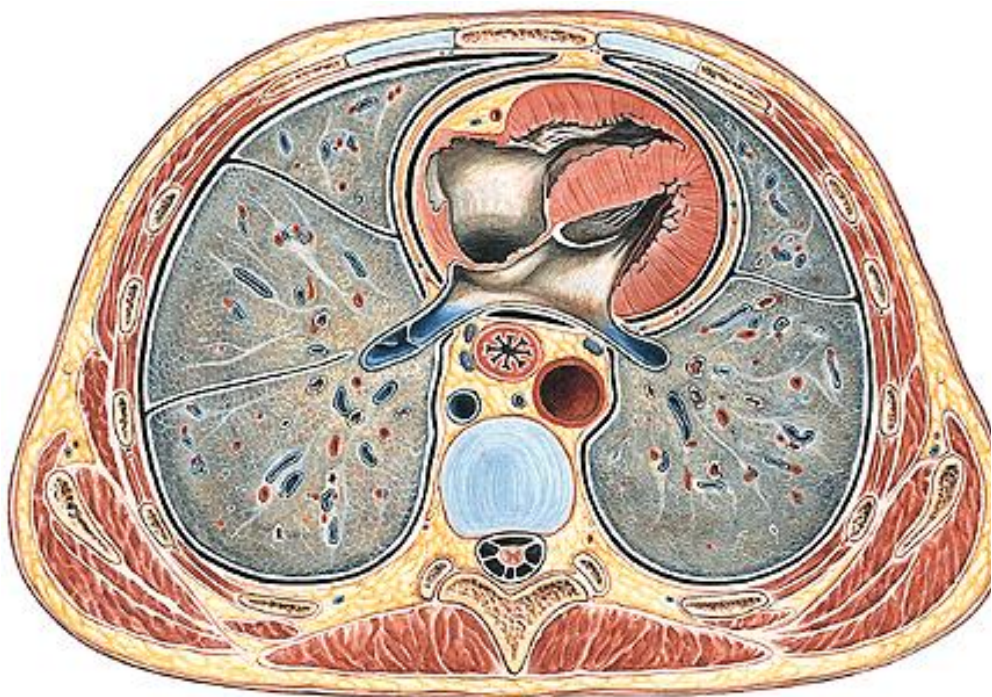
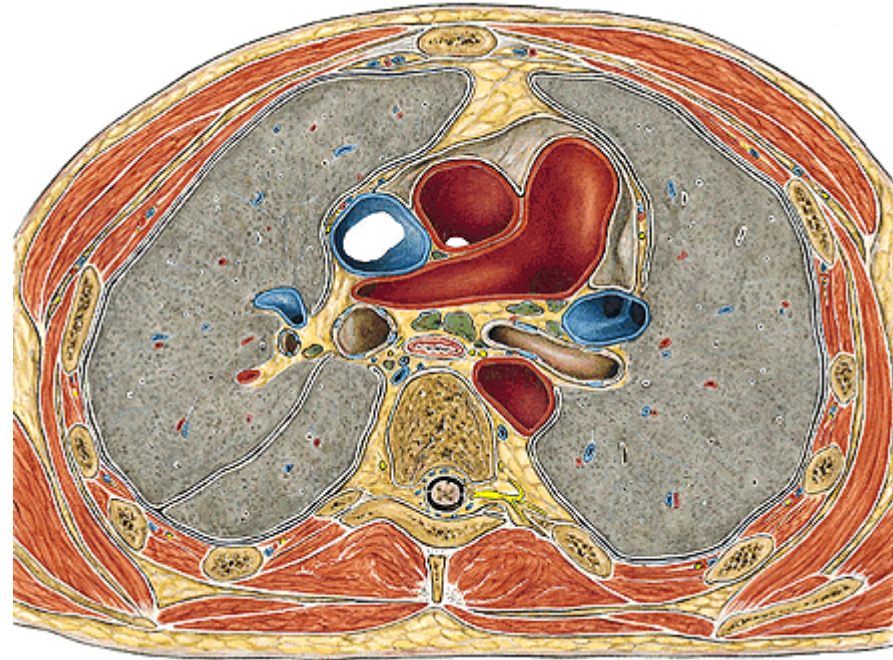
- superius
- inferius - anterius
 - medium
 - posterius







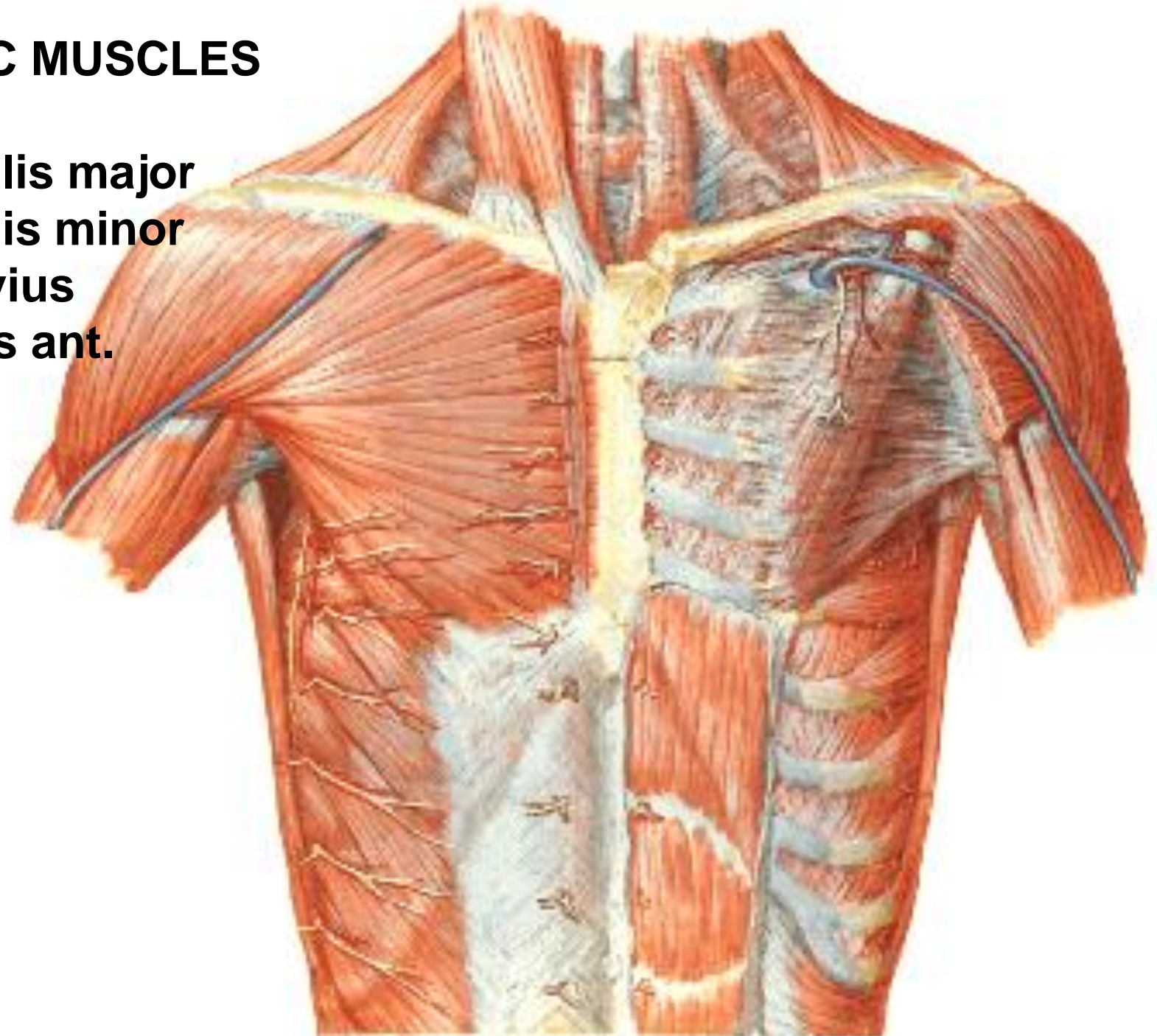


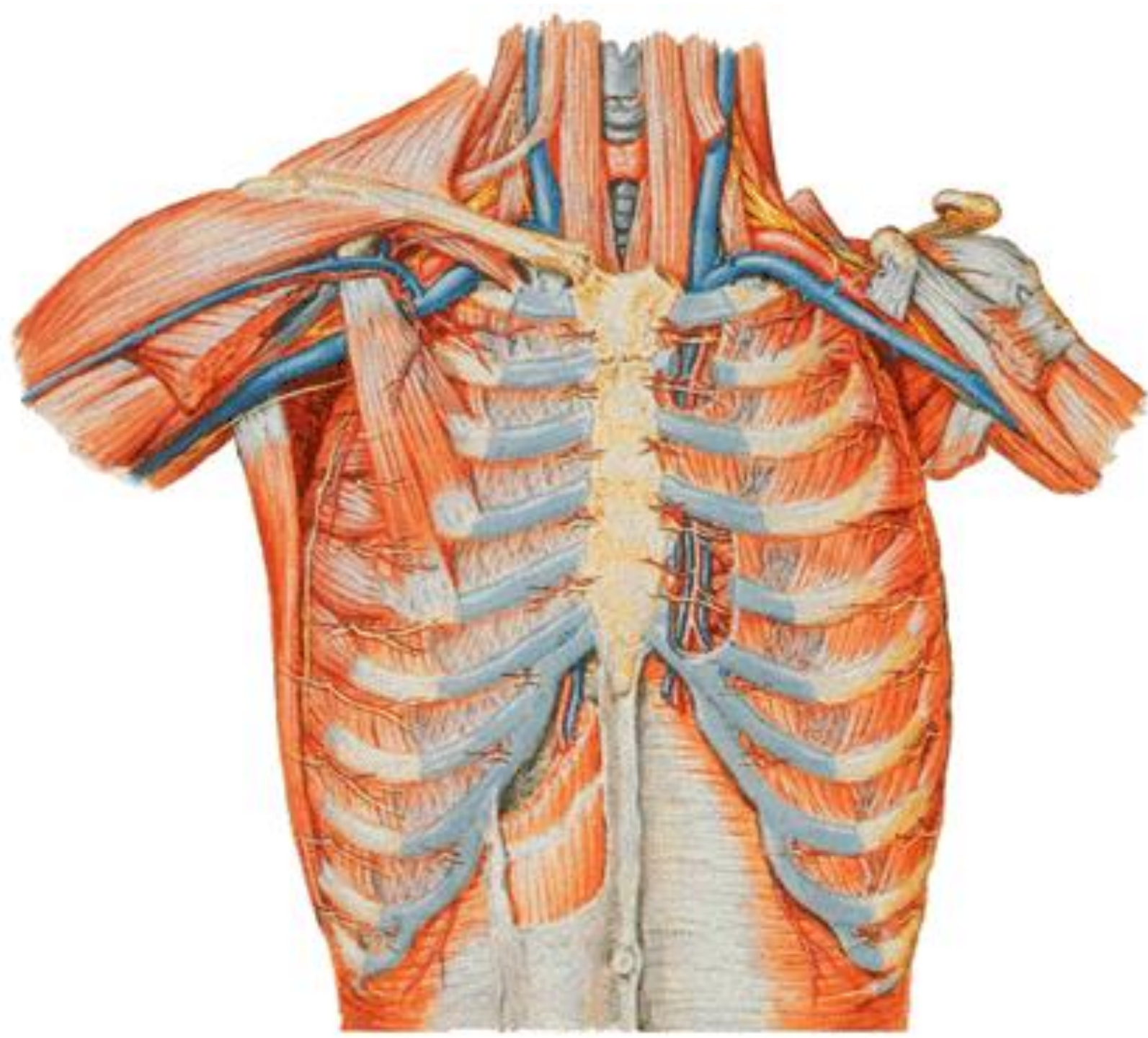


MUSCULI THORACIS

EXTRINSIC MUSCLES

M. pectoralis major
M. pectoralis minor
M. subclavius
M. serratus ant.





INTRINSIC MUSCLES

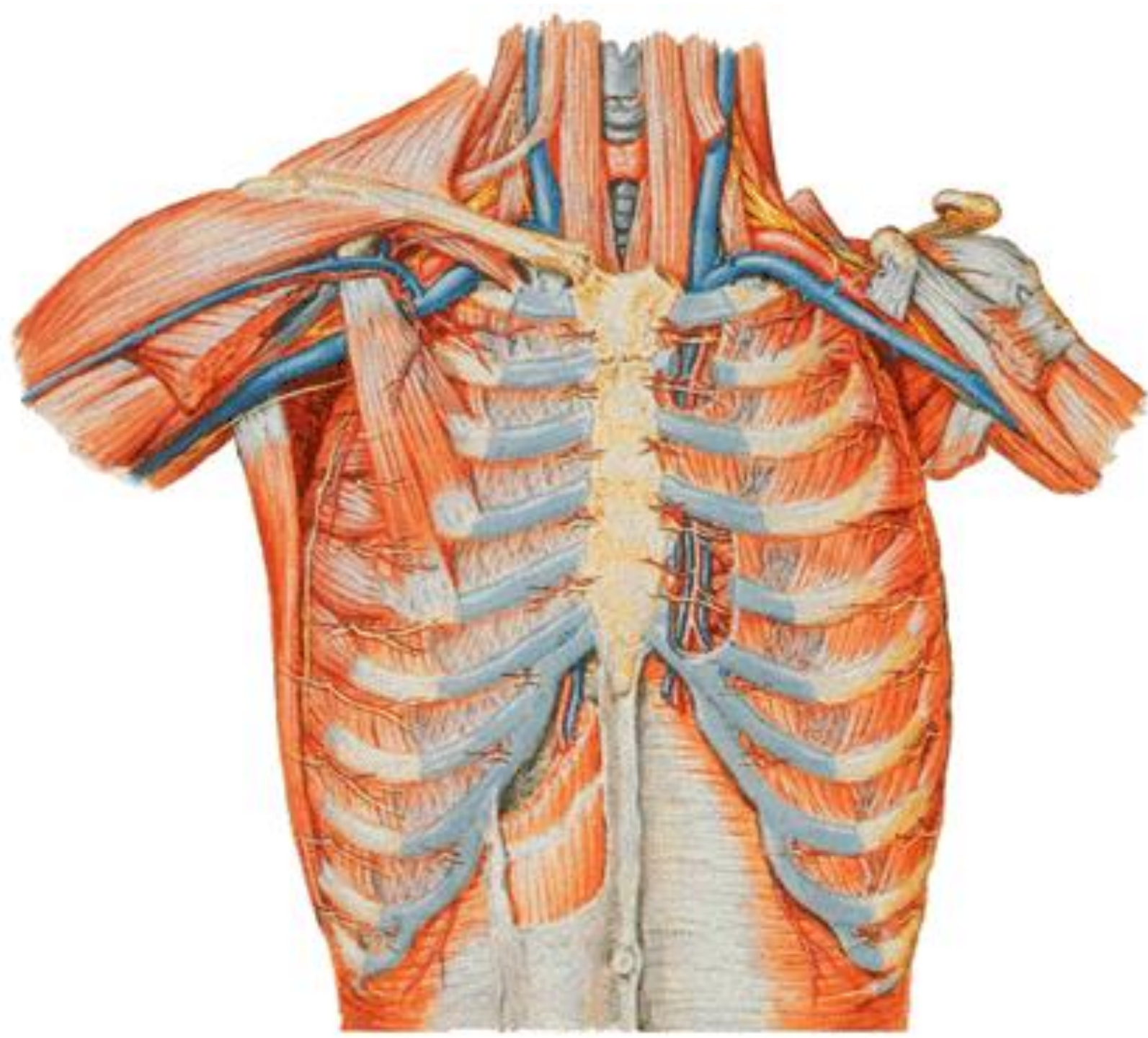
M. intercostales externi

M. intercostales interni

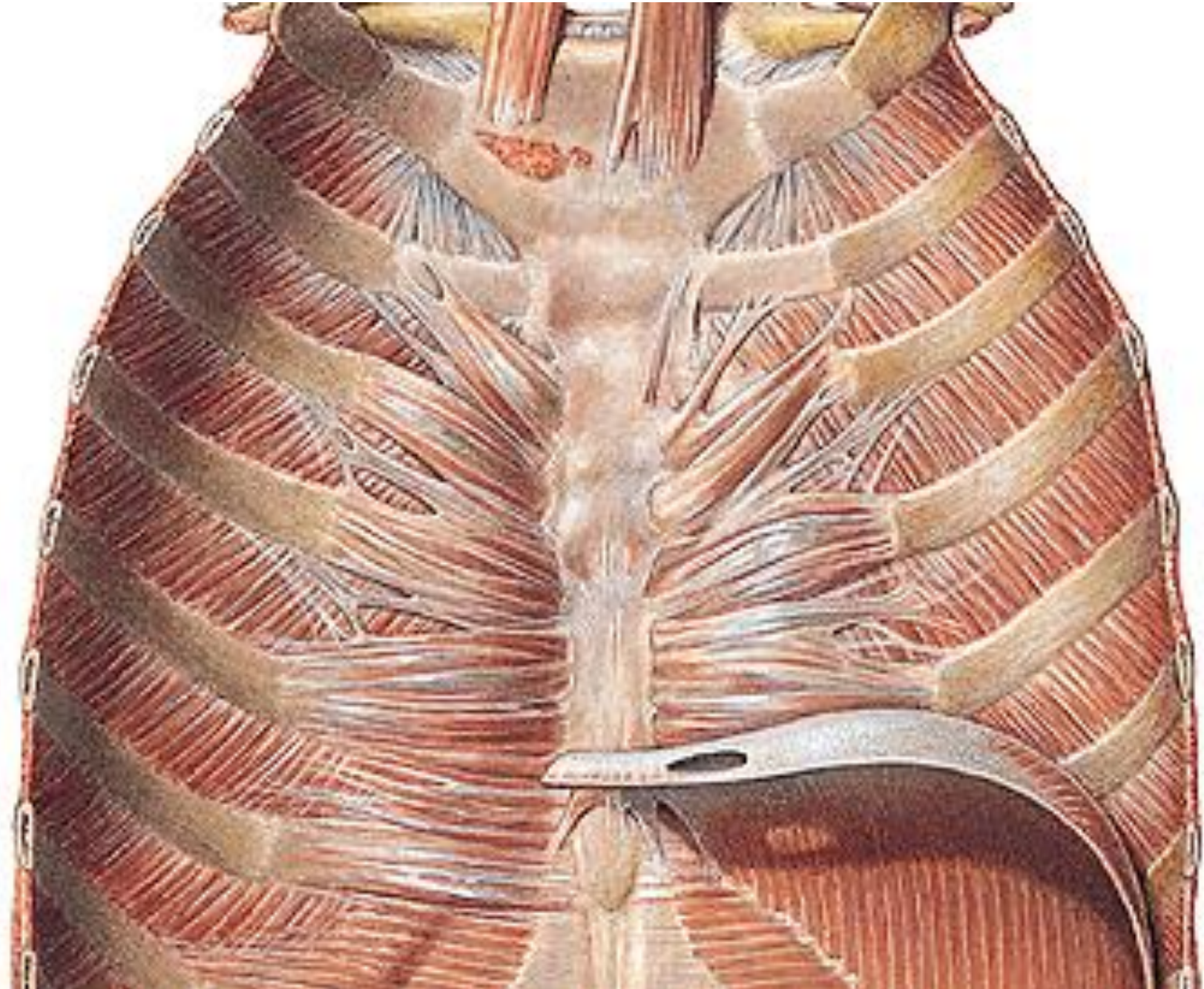
M. intercostales intimi

M. subcostales





M. transversus thoracis



DIAPHRAGM

Centrum tendineum

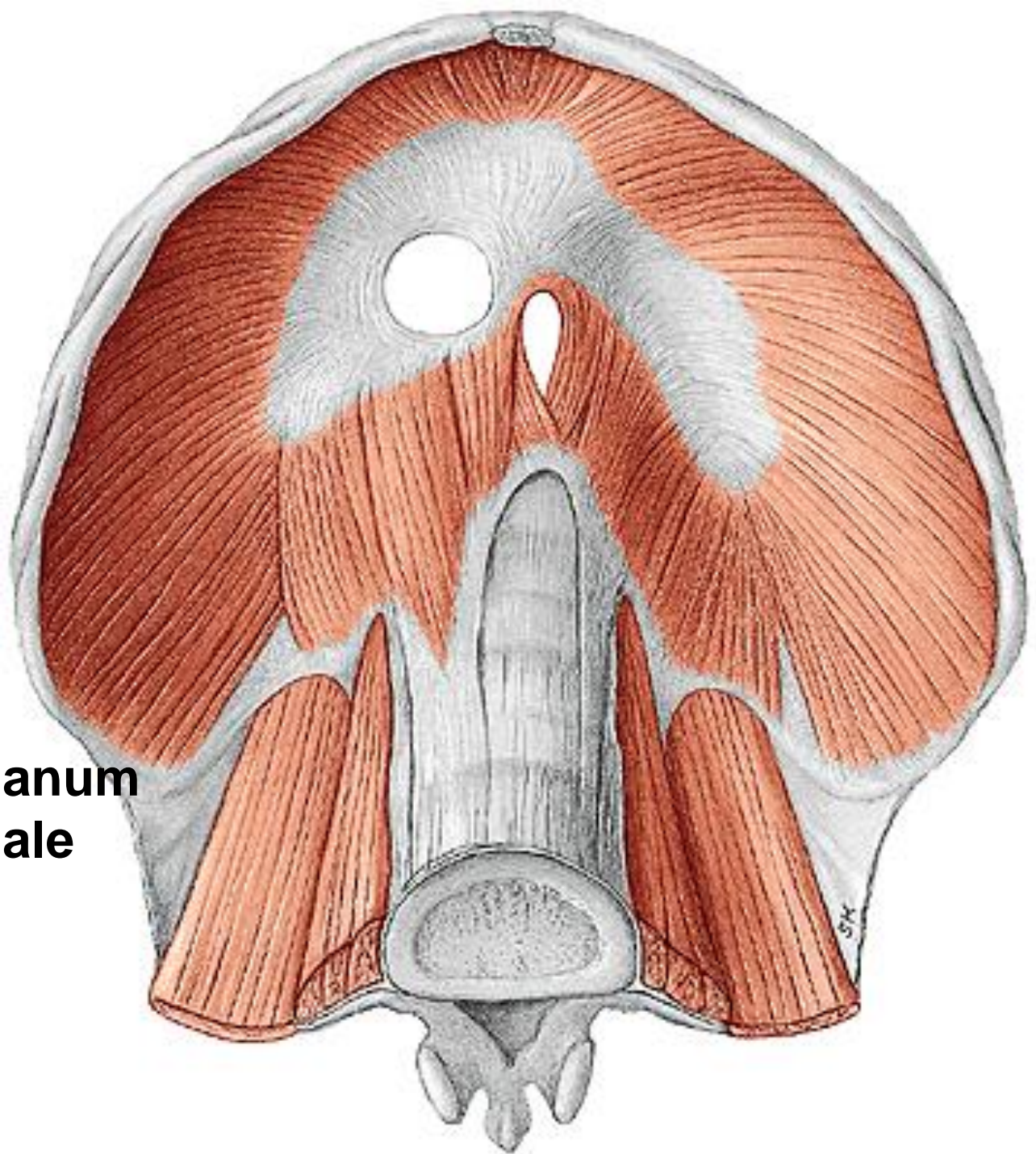
- foramen VCI

Pars sternalis

Pars costalis

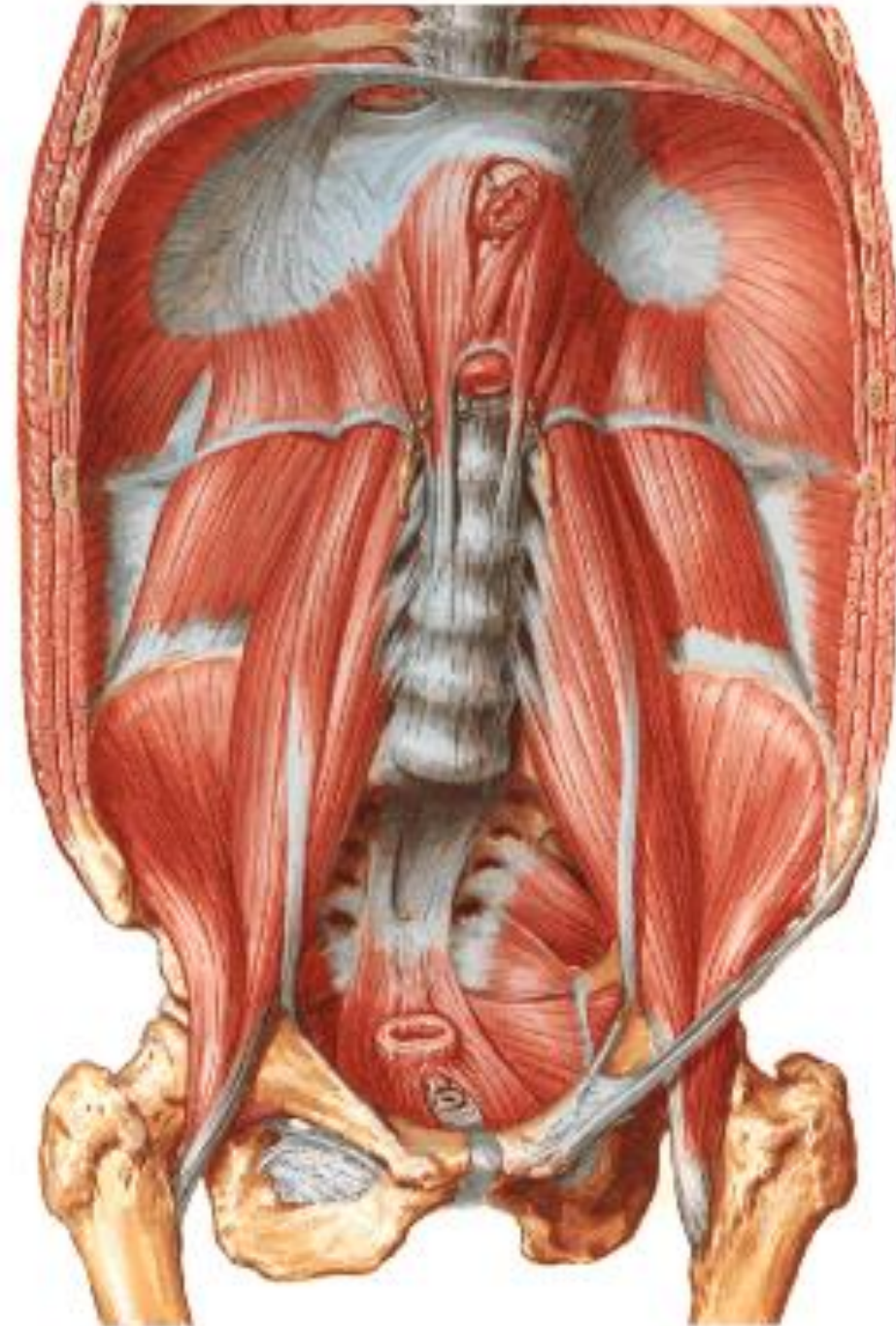
Pars lumbalis

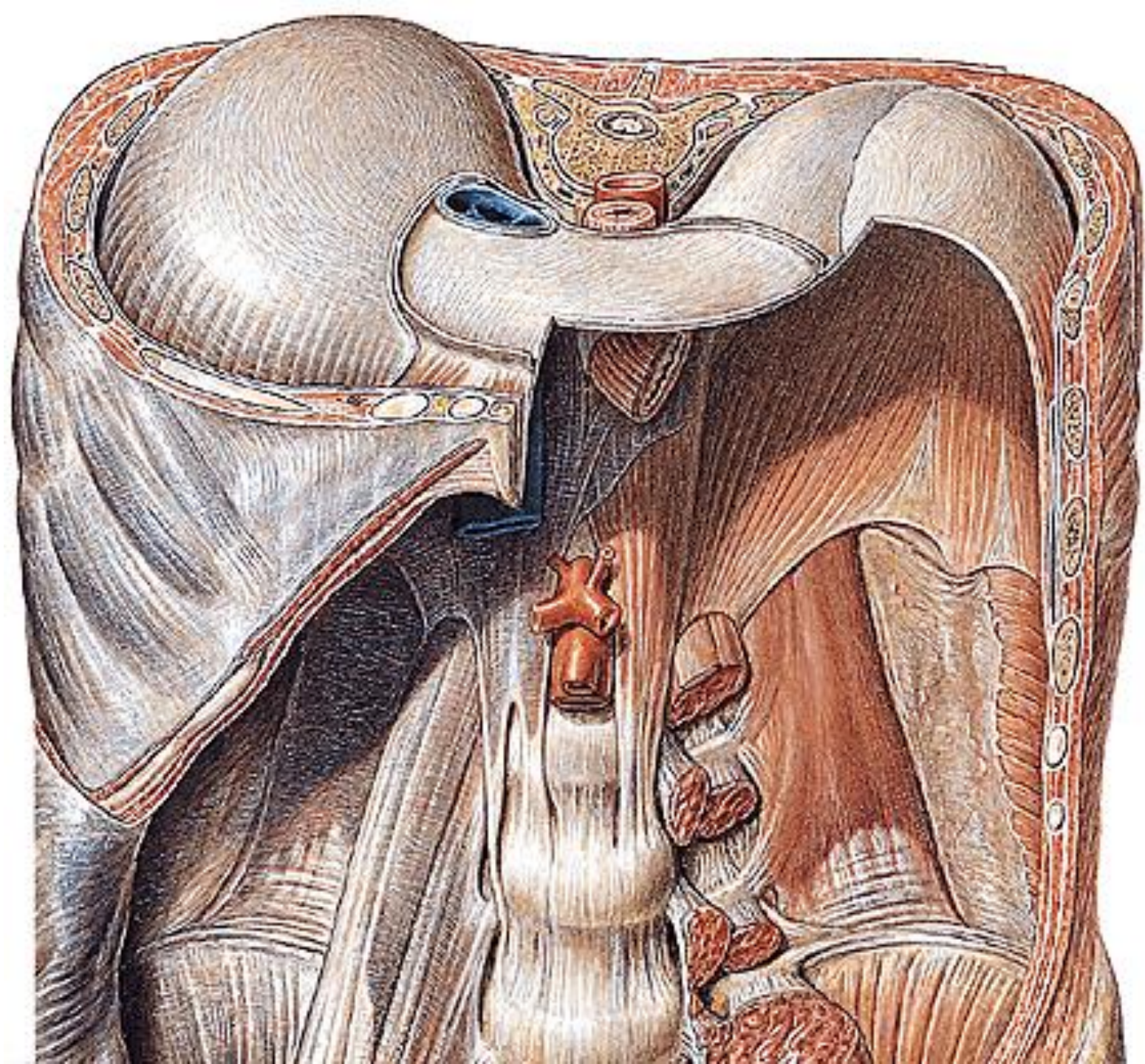
- crus dextrum
- crus sinistrum
- lig. arcuatum medianum
- lig. arcuatum mediale
- lig. arcuatum lat.



Hiatus esophageus

Hiatus aorticus





Illustrations and photographs were copied from:
Atlas der Anatomie des Menschen/Sobotta.
Putz,R., und Pabst,R. 20. Auflage. München:
Urban & Schwarzenberg, 1993
Netter: Interactive Atlas of Human Anatomy.
Windows Version 2.0