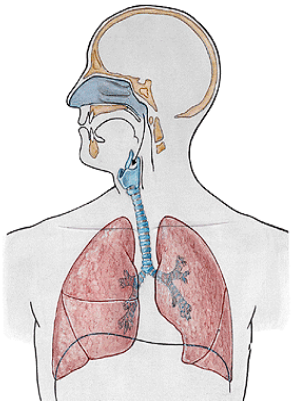
Respiratory system



Upper respiratory tract

- Cavum nasi
- Pharynx

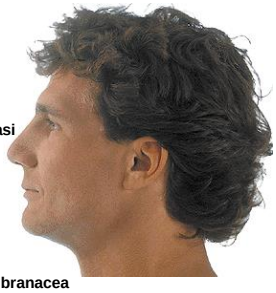
Lower respiratory tract

- Larynx
- Trachea
- Bronchi

Repiratory organ

- Lungs

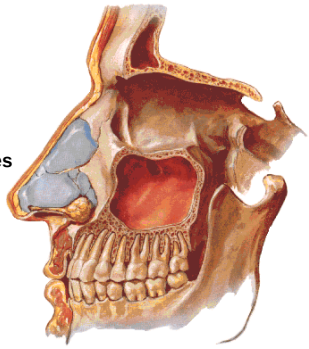
External nose



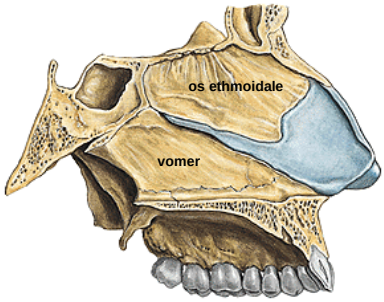
- Radix nasi
- Dorsum nasi
- Apex nasi
- Nares
- Alae nasi
- (Pars membranacea septi nasi)

Nasal cartilages

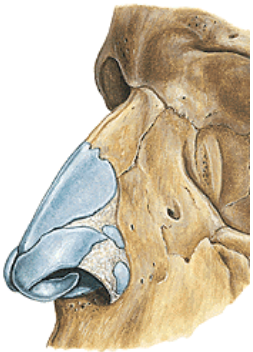
- Cartilago septi nasi
- Cartilago nasi lateralis
- Cartilago alaris major
- Cartilagines alares minores
- Cartilagines nasales accessoriae
- Cartilago vomeronasalis



Septal cartilage



Lateral nasal cartilage

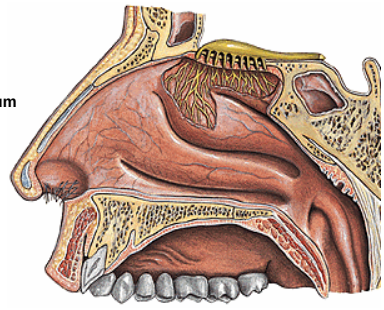


Nasal cavity

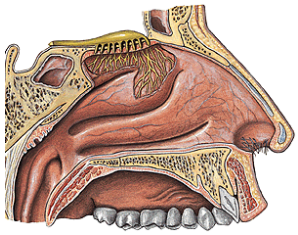
1. Vestibulum nasi

   Skin with hairs - vibrissae

2. Cavum nasi proprium



Proper nasal cavity



meatus nasi superior

meatus nasi medius

meatus nasi inferior

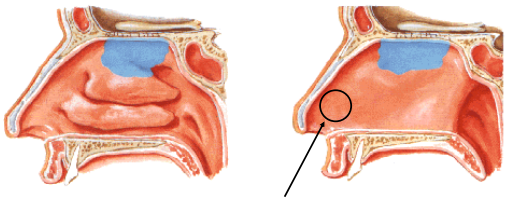
meatus nasi communis

meatus nasopharyngeus

Mucous membrane of nasal cavity

Regio olfactoria (2,5 cm^2)

Regio respiratoria – plexus cavernosi concharum



locus haemorrhagicus Kiesselbachi

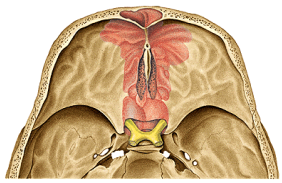
Paranasal sinuses

Sinus maxillaris

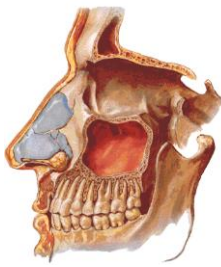
Sinus frontalis

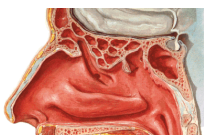
Sinus ethmoidalis (cellulae ethmoidales)

Sinus sphenoidalis



Maxillary sinus





25 ml, recessus (alveolaris, frontalis…)

hiatus sinus maxillaris

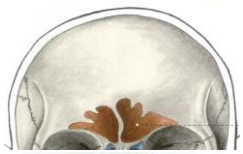
hiatus semilunaris (infundibulum ethmoidale)

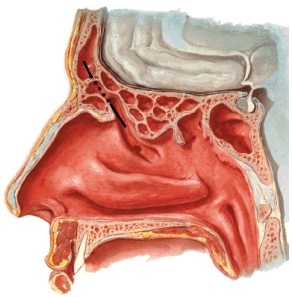
Frontal sinus

15 ml

septum sinuum frontalium

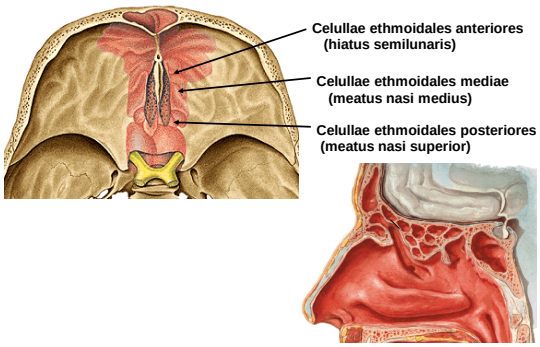
infundibulum ethmoidale (hiatus semilunaris)





Ethmoid sinus

Celullae ethmoidales (3-18)



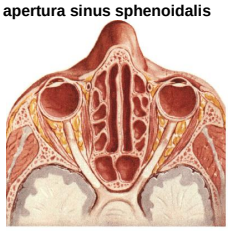
Sphenoid sinus

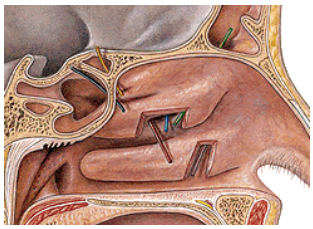
6 ml

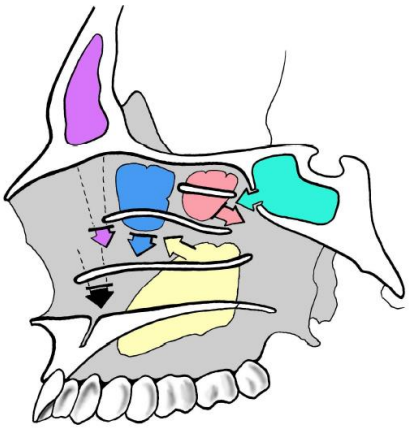
septum sinuum sphenoidalium

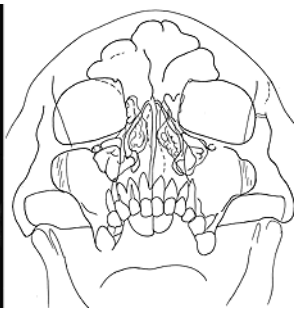
recessus sphenoethmoidalis

apertura sinus sphenoidalis



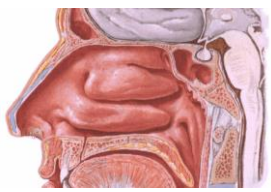






PHARYNX

Pars nasalis, oralis, laryngea



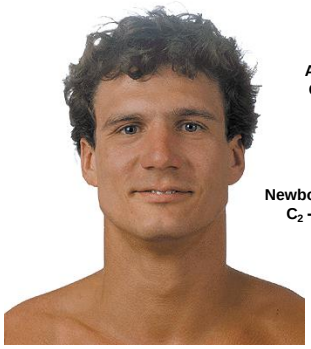
Fornix pharyngis: tonsilla pharyngea

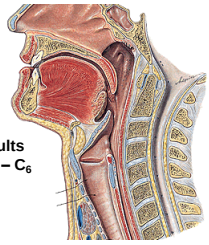
Ostium pharyngeum tubae auditivae:

- Torus tubarius
- Plica salpingopharyngea
- Torus levatorius
- Plica salpingopalatina

LARYNX

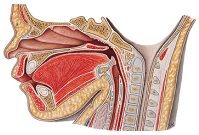
Prominentia laryngea





Adults
$C_4 – C_6$

Newborn
$C_2 – C_4$



Laryngeal cartilages:

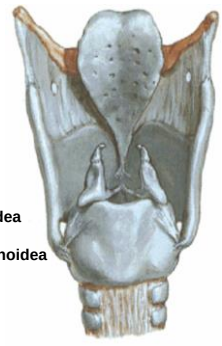
- Cartilago thyroidea
- Cartilago cricoidea
- Cartilago arytaenoidea
- Cartilago epiglotica
- Cartilago corniculata
- Cartilago cuneiformis
- Cartilago sesamoidea (triticea)

Thyroid cartilage

- Lamina dextra et sinistra
- Incisura thyroidea superior et inferior
- Cornua superiora et inferiora
- Facies articulares cricoidea
- Linea obliqua
- Foramen thyroideum

Cricoid cartilage

- Arcus
- Lamina
- Facies art. thyroidea
- Facies art. arytaenoidea

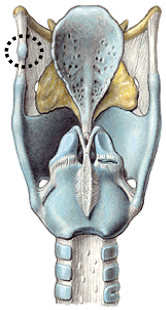


Arytenoid cartilage

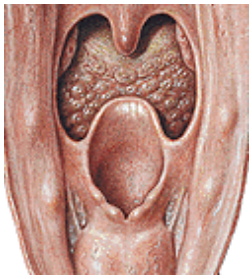
- Basis (facies art. cricoidea)
- Apex (cartilago corniculata)
- Processus muscularis
- Processus vocalis (lig. vocale)
- Facies anterolateralis
  - Crista arcuata
    - Colliculus
    - Fovea triangularis
    - Fovea oblonga
- Facies medialis (rima glottidis)
- Facies posterior

Epiglottic cartilage

Tritiate cartilage



Corniculate cartilage, cuneiform cartilage



Thyrohyoid membrane

Lig. thyrohyoideum medianum

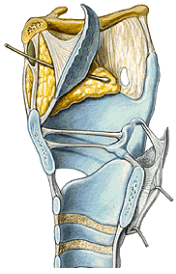
Lig. thyrohyoideum laterale

Lig. hyoepiglotticum

Lig. thyroepiglotticum

Bursa hyoidea

Spatium praeepiglotticum



Fibroelastic membrane of larynx

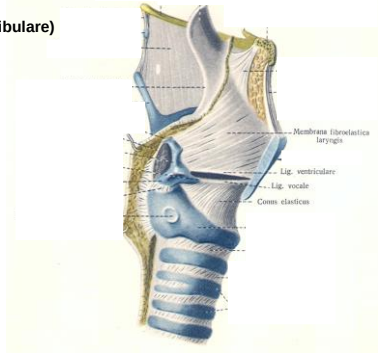
1. MEMBRANA QUADRANGULARIS

lig. ventriculare (vestibulare)

2. CONUS ELASTICUS

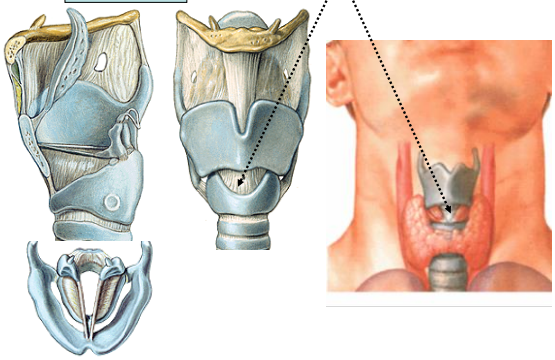
lig. vocale

lig. cricothyroideum



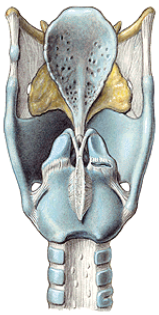
Elastic cone

Coniotomy



Cricotracheal ligament

Cricopharyngeal ligament (ligamentum jugale)



Muscles of epiglottis:

MUSCULUS THYROEPIGLOTTICUS

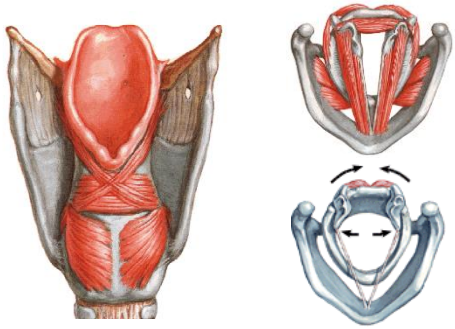
opens aditus laryngis

MUSCULUS ARYEPIGLOTTICUS

closes aditus laryngis

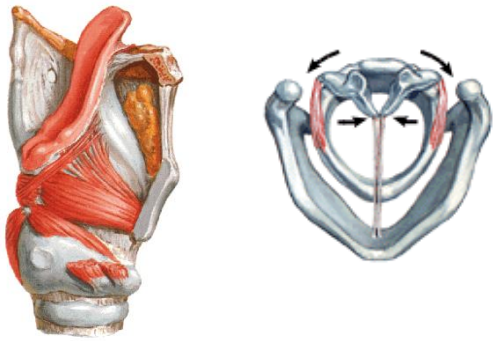
Abductors of rima glottidis - respiratory position

MUSCULUS CRICOARYTENOIDEUS POSTERIOR (POSTICUS)

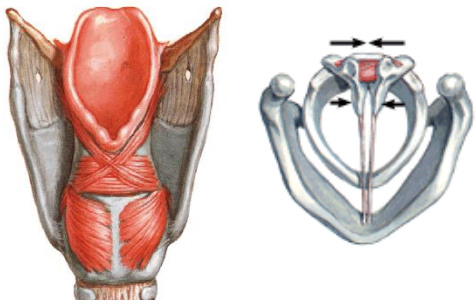


Adductors of rima glottidis – speaking position

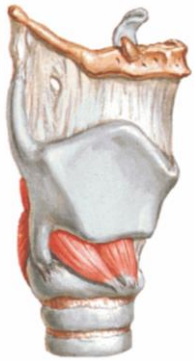
MUSCULUS CRICOARYTENOIDEUS LATERALIS



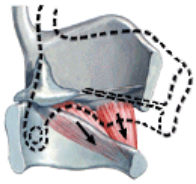
MUSCULUS ARYTAENOIDEUS (TRANSVERSUS, OBLIQUUS)



Tensors of vocal folds



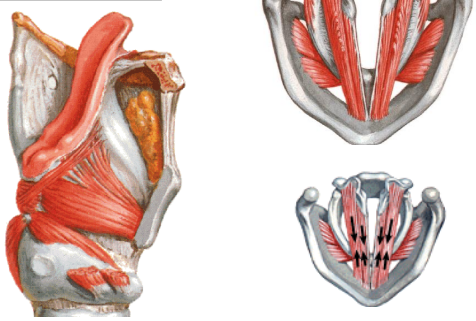
MUSCULUS CRICOTHYROIDEUS



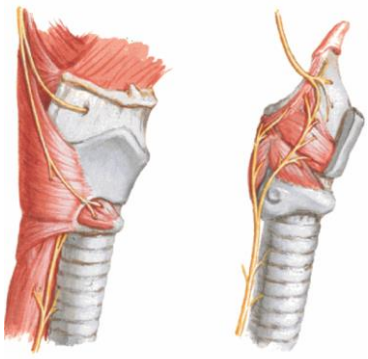
Strain the vocal folds

MUSCULUS THYROARYTAENOIDEUS

MUSCULUS VOCALIS



Innervation of laryngeal muscles



Nervus vagus

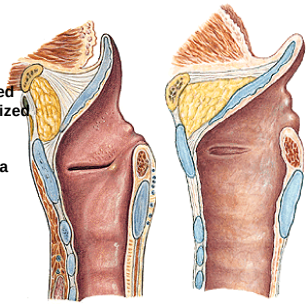
Mucous membrane

pseudostratified columnar, ciliated
stratified squamous, non-keratinized (vocal folds)
gll. laryngeae
lymphatic tissue-tonsilla laryngea

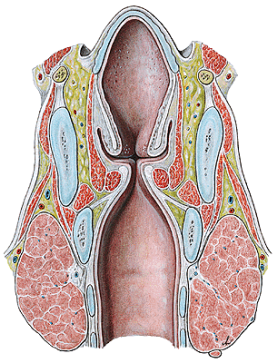
Submucous tissue

Rare tissue (oedema glottidis)

membrana fibroelastica laryngis



Laryngeal cavity



VESTIBULUM LARYNGIS

(aditus laryngis – rima vestibuli)

GLOTTIS

(rima vestibuli – rima glottidis)

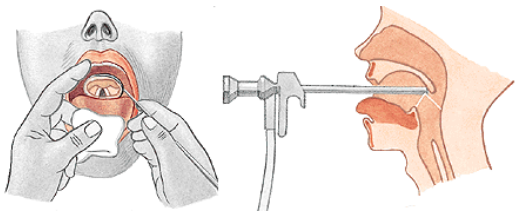
CAVUM INFRAGLOTTICUM

(rima glottidis - trachea)

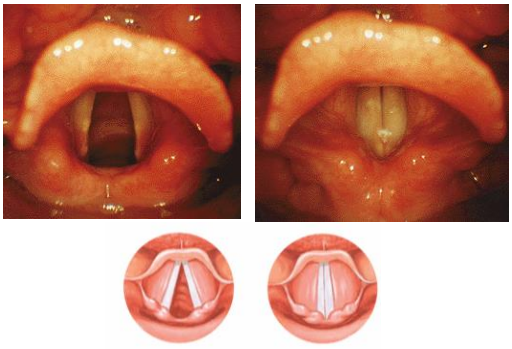
Laryngoscopy

direct

indirect



Laryngoscopic view

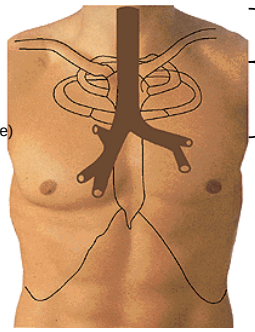


TRACHEA

(10 – 12 cm)

C_6 (cartilago cricoidea)

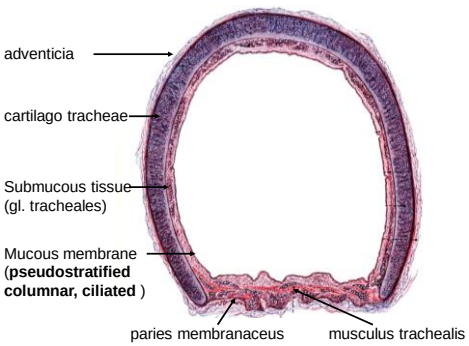
Th_{4-5} (bifurcatio tracheae)



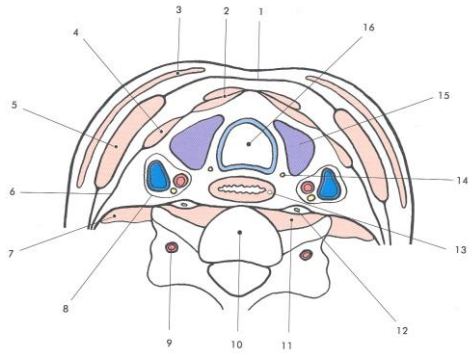
Pars cervicalis

Pars thoracica

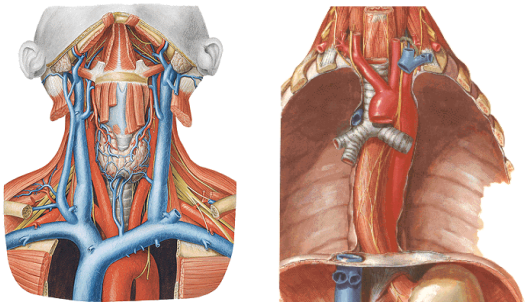
Tracheal wall



PARS CERVICALIS TRACHEAE



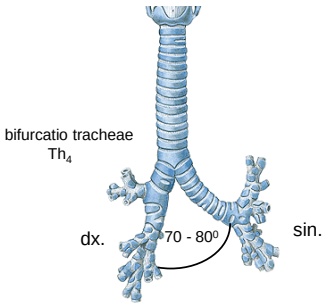
PARS THORACICA TRACHEAE



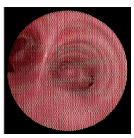
thymus, veins, arteries, tr. symphaticus, n.vagus –

n. laryngeus recurrens !!!, oesophagus, lymphatic nodes

BRONCHUS PRINCIPALIS DEXTER ET SINISTER



bronchoscopy



carina tracheae

Lungs

apex pulmonis

basis pulmonis

facies costalis

diaphragmatica

medialis

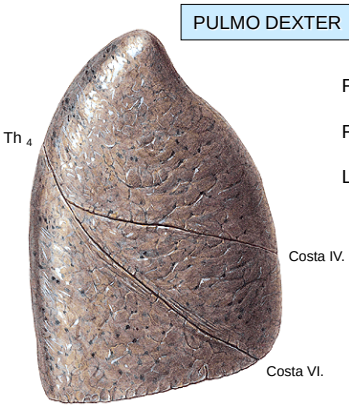
margo anterior

inferior

posterior

fissurae interlobares

PULMO DEXTER



Fissura obliqua

Fissura transversa

Lobus superior

medius

inferior

PULMO SINISTER

Fissura obliqua

Lobus superior

inferior

Incisura cardiaca

Lingula pulmonis

ARBOR BRONCHIALIS

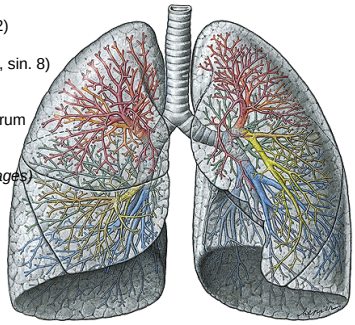
Bronchus principalis dx., sin.

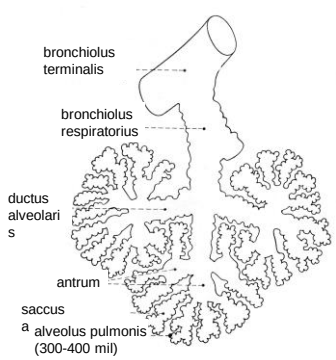
Bronchi lobares (dx. 3, sin. 2)

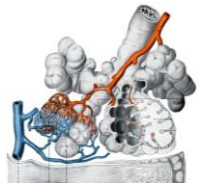
Bronchi segmentales (dx.10, sin. 8)
6-18 x ramified

Rami bronchiales segmentorum

Bronchioli terminales
(until 1 mm diameter– cartilages)

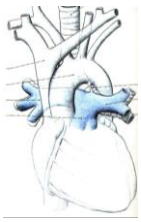




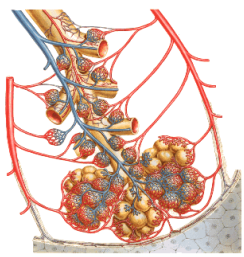


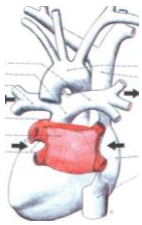
Functional blood circulation (pulmonary circulation)

truncus pulmonalis (a. pulmonalis dx. et sin.) → (- O_2) → LUNGS → (+ O_2) → Venae pulmonales



ventriculus dexter

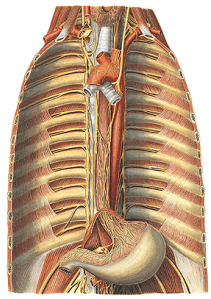




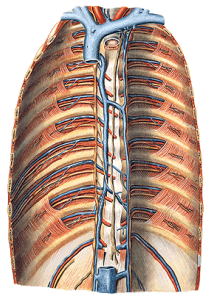
atrium sinistrum

NUTRITIVE BLOOD CIRCULATION

Aorta thoracica → rr. bronchiales

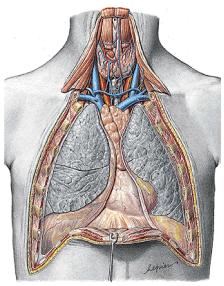


Vv. bronchiales → v. azygos, v. hemiazygos accessoria

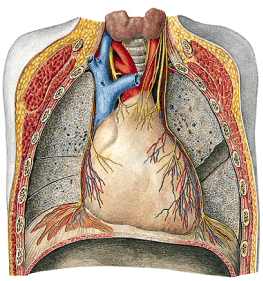


PLEURA

pleura parietalis
pleura visceralis
(lig. pulmonale)



cavum pleurae dextrum
cavum pleurae sinistrum
mediastinum

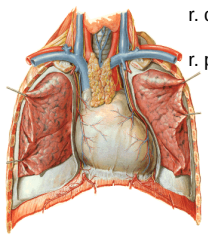


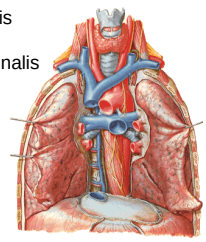
RECESSUS PLEURAE

r. costodiaphragmaticus

r. costomediastinalis

r. phrenicomediastinalis

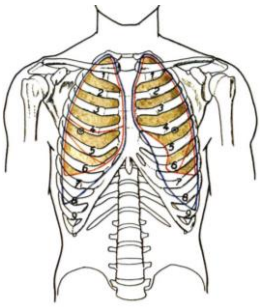


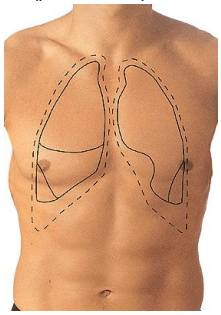


Projection of pleura

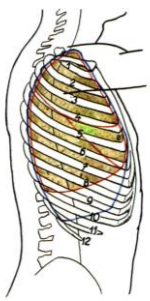
area interpleuralis superior (thymica)

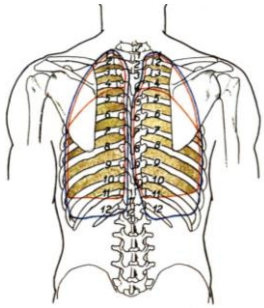
area interpleuralis inferior (pericardiaca)



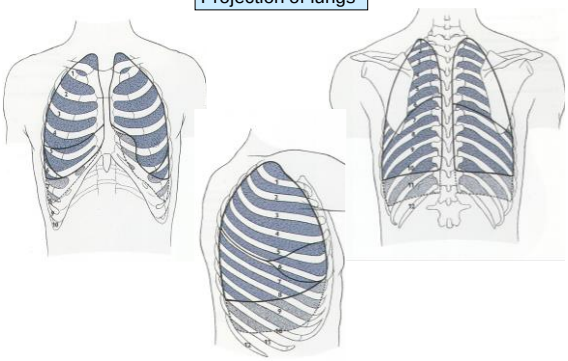


Recessus retrooesophageus Th_4 – Th_{12}

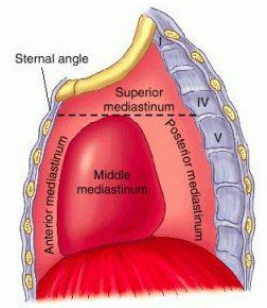




Projection of lungs



MEDIASTINUM



Mediastinum superius

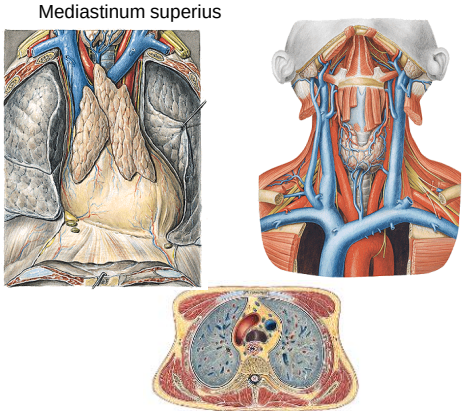
Mediastinum inferius:

anterius

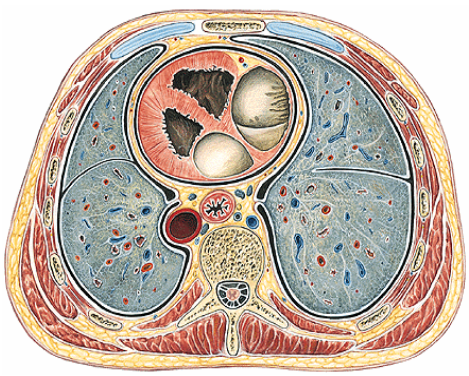
medium

posterius

Mediastinum superius



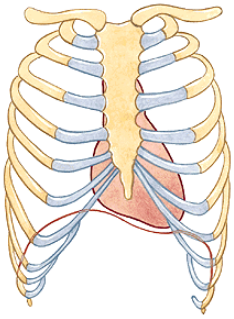
Mediastinum inferius

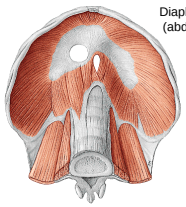


MECHANISM OF BREATHING

Capacity of thoracic cavity is increased:

INSPIRATION

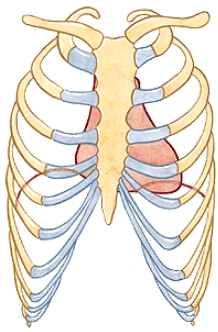




Diaphragmatic contraction (abdominal type)

mm. intercostales externi (costal type)

EXSPIRATION



Capacity of thoracic cavity is decreased:

- Diaphragm and mm. intercostales externi are relaxed
- Contraction of mm. intercostales interni a intimi
- Weight of thorax
- Elasticity of rib cartilages
- Elasticity of lungs
- Pressure of abdominal organs