

UPPER RESPIRATORY TRACT

The external nose – Nasus externus

Radix nasi

Dorsum nasi

Apex nasi

Nares (nostrils)

Alae nasi

Cartilagine nasales:

Cartilago septi nasi - processus posterior

Cartilago nasi lateralis

**Cartilago alaris major - crus mediale
- crus laterale**

Cartilago alaris minor

Cartilagine nasales accessoriae - inconstant

The nasal cavity - Cavitas nasi

Vestibulum nasi - limen nasi

vibrisae

recessus apicis nasi

Cavitas nasi propria – meatus nasi superior – sinus sphenoidalis, cellulae ethm. post.

- **meatus nasi medius – sinus maxillaris, frontalis, cellulae ethm. ant et mediae**

- **meatus nasi inferior - ductus nasolacrimalis**

- **choanae**

- **meatus nasi communis**

- **meatus nasopharyngeus**

Septum nasi - pars membranacea

- **pars cartilaginea** - cartilago septi nasi, crus mediale cartilagine alaris nasi

- **pars ossea** - lamina perpendicularis ossis ethmoidalis, vomer

The roof of the nasal cavity - cartilago nasi lateralis, os nasale, pars nasalis ossis frontalis, lamina cribrosa ossis ethmoidalis, corpus ossis sphenoidalis

The lower wall – processus palatinus maxillae, lamina horizontalis ossis palatini

ductus incisivus

Mucosa - regio respiratoria - plexus cavernosi concharum, epistaxis

- **regio olfactoria**

A. sphenopalatina (A. maxillaris)

A. ethmoidalis ant. et post. (A. ophthalmica)

N. nasopalatinus, n. palatinus major (N. maxillaris – CNV)

N. ethmoidalis ant (N. nasociliaris – N. ophthalmicus – CNV)

The paranasales sinuses – Sinus paranasales

Sinus maxillaris (Antrum Highmori)- recessus frontalis, zygomaticus, palatinus, alveolaris

medial wall neighbours with the nasal cavity

roof - the orbit

dorsal wall - fossa infratemporalis

ventrolateral wall - to the face

hiatus sinus maxillaris - infundibulum ethmoidale - hiatus semilunaris

Rr. alveolares sup. (A. maxillaris)
Rr. alveolares sup. (N. maxillaris – CNV)

Sinus frontalis - septum sinuum frontalem

A. supraorbitalis (A. ophthalmica)
N. supraorbitalis (N. ophthalmicus – CNV)

Sinus ethmoidales (3-18 cellulae ethmoidales)

- **anteriores** - infundibulum ethmoidale
- **posteriores** - meatus nasi superior

A. ethmoidalis ant. et post. (A. ophthalmica)
N. ethmoidalis ant. et post. (N. nasociliaris - CNV)

Sinus sphenoidalis - septum sinuum sphenoidalium

- **apertura sinus sphenoidalis**

LOWER RESPIRATORY TRACT

Larynx

- **prominentia laryngis**

Cartilagine laryngis:

Cartilago thyroidea - lamina dextra et sinistra

- **incisura thyroidea sup.**
- **incisura thyroidea inf.**
- **cornua superiora - lig. thyroidea lateralia**
- **cornua inferiora - facies art. cricoidea**
- **linea obliqua**
- **foramen thyroideum - n. laryngeus sup**

Cartilago cricoidea - lamina

- **arcus**
- **facies art. arytenoidea**
- **facies art. thyroidea**

Cartilago arytenoidea - apex

- **basis- facies art. cricoidea**
- **facies anterolateralis - colliculus**
 - **crista arcuata**
 - **fossa triangularis**
 - **fovea oblonga**
- **facies posterior**
- **facies medialis**
- **proc. vocalis**
- **proc. muscularis**

Cartilago epiglottica - petiolus epiglottidis

- **lamina epiglottidis**

Cartilago corniculata – tuberculum corniculatum

Cartilago cuneiformis – tuberculum cuneiforme

Laryngeal joints

Articulatio cricoarytenoidea - lig. cricoarytenoideum post. - abduction and adduction of the vocal cords.

Articulatio cricothyroidea - oscillating movements of the thyroid cartilage

Membrana thyroidea (thyrohyoidea) - lig. thyroideum medianum

– **lig. thyrohyoideum laterale**

Lig. cricothyroideum (conus elasticus)

Ligamentum vocale - plica vocalis.

Lig. cricotracheale

Lig. thyroepiglotticum

Lig. hyoepiglotticum - spatium preepiglotticum

Membrana quadrangularis - lig. ventriculare (vestibulare) plica vestibularis

Membrana fibroelastica laryngis

Laryngeal muscles

Muscles moving with the epiglottis

M. thyroepiglotticus opens the aditus laryngis.

M. aryepiglotticus closes the aditus laryngis.

Muscles ensuring abduction or adduction of vocal cords (movement in the cricoarytaenoid joint)

M. cricoarytenoideus post. (posticus) - respiratory position - abduction of vocal cords

M. cricoarytenoideus lateralis - adduction of the vocal cords (**phonation**)

M. arytaenoideus - strongest adductor of the vocal cords (**phonation**)

Muscles ensuring tension or relaxation of vocal cords (movement in the cricothyroid joint)

M. cricothyroideus - tension of the vocal cords

M. thyroarytenoideus relaxation of vocal cords

M. vocalis - fine regulation of the vocal cord tension

N. laryngeus sup. (m. cricothyroideus)

N. laryngeus inf - other muscles

Cavitas laryngis:

Vestibulum laryngis

Aditus laryngis – epiglottis

- **plicae aryepiglotticae – tuberculum cuneiforme**

- **tuberculum corniculatum**

- **plica - incisura interarytenoidea**

Plicae vestibulares s. ventriculares - rima vestibuli

Glottis – ventriculus laryngis - sacculus laryngis

Plicae vocales – rima glottidis - pars intermembranacea rimae glottidis

- **pars intercartilaginea rimae glottidis**

The pitch of voice is influenced by the length of vocal cords - lower voice in males (24 mm) than in females (20 mm).

Cavitas infraglottica

Function of the larynx

Both functions of the larynx – breathing and voice production – are associated with the position of vocal folds. During respiration the rima glottidis is open (depending on depth and intensity of breathing) – **respiration position**.

During phonation the vocal folds tighten and adduct – **phonation position**. The rima glottidis is closed in both pars intermembranacea and pars intercartilaginea. The expired air gets through the closed rima glottidis to shake the column of air above vocal folds. The pitch of voice depends on the length, tension and shape of vocal folds. The intensity is influenced by the strength of passing air. The tone obtains its characteristic timbre after its formation in the pharynx, oral and nasal cavities and paranasal sinuses. The change of the voice to the speech takes place in the oral cavity by means of the tongue, teeth, lips and palate.

Indirect laryngoscopy - laryngoscopic mirror

Direct laryngoscopy - laryngoscope.

Cough clears away mucus or foreign body from the lower respiratory tract. It is a short closure of the rima glottidis after a deep inspiration followed by intensive spasmodic expiration. Abdominal muscles participate at the cough too.

TRACHEA

Pars cervicalis and **pars thoracica**

Bifurcatio tracheae (T4) - bronchus principalis dexter et sinister

Carina tracheae

The **isthmus glandulae thyroideae** - in contact with the 2nd and 3rd tracheal cartilages
Vv. thyroideae inf. - below the isthmus.

The sides of the trachea - **lobes of the thyroid gland**.

Paratracheal space - A. carotis com., v. jugularis int. and n. vagus

Oesophagus – posteriorly

N. laryngeus recurrens - in the groove between the trachea and oesophagus.

Nodi lymphatici paratracheales, tracheobronchiales

15 – 20 hyaline cartilages (**cartilagine tracheales**) connected by **ligg. anularia**

Paries membranaceus

Glandulae tracheales

Tracheotomy

The incision is commonly made through the second and third tracheal rings. As the isthmus of the thyroid gland covers the 2nd and 3rd tracheal rings, it is retracted inferiorly (**tracheotomia superior**) or incision is performed through lower tracheal rings (**tracheotomia inferior**).

Tracheostomy, when the duration of endotracheal intubation is expected to be longer than 72 hours.

BRONCHI

Arbor bronchialis

Bronchi principales dexter et sinister (bifurcatio tracheae) - bronchi lobares (3 right and 2 left) - **bronchi segmentales**

LUNG (PULMO)

Basis pulmonis

Apex pulmonis - sulcus arteriae subclaviae and the sulcus costae primae

Facies diaphragmatica

Facies costalis

Facies mediastinalis - hilum pulmonis - radix pulmonis. The craniocaudal order of the root structure is different on the right (bronchus, pulmonary artery and veins) than on the left (artery, bronchus, veins).

The mediastinal surface of the right lung– **sulcus v. cavae sup., sulcus v. azygos, sulcus oesophageus, impressio cardiaca.**

The mediastinal surface of the left lung - **sulcus aorticus, impressio cardiaca, sulcus oesophageus**

Margo inferior, anterior, posterior

Incisura cardiaca - lingula pulmonis sinistri

Fissurae interlobares - fissura obliqua, fissura horizontalis - lobus medius

BRONCHOPULMONARY SEGMENTS (segmenta bronchopulmonalia)

The right lung: segmentum apicale 1, posterius 2, anterius 3 in the superior lobe, segmentum laterale 4 and mediale 5 in the middle lobe, and segmentum apicale (superius) 6, basale mediale 7, basale anterius 8, basale laterale 9, basale posterius 10 in the inferior lobe.

The left lung: segmentum apicoposterius 1+2, segmentum anterius 3, segmentum lingulare superius 4, segmentum lingulare inferius 5 in the superior lobe. Segmentum apicale (superius) 6, segmentum basale mediale 7 that is variable and often combined with segmentum basale anterius 8 into anteromedial basal segment, basale laterale 9, basale posterius 10 in the inferior lobe.

Segmentectomy – lobectomy - pneumonectomy

Bronchioli have no cartilages - **terminal bronchioli - 2-3 bronchioli respiratorii - ductuli alveolares - sacculi alveolares - alveoli**

The whole number of alveoli is 300-400 milion and their surface is 50-80 m².

Borders of the lungs

PLEURA

Pleura visceralis - pleura costalis, pleura diaphragmatica, pleura mediastinalis

Pleura parietalis

Lig. pulmonale

Cavum pleurae

Cupula pleurae

Lig. scalenopleurale, vertebropleurale, costopleurale

Recessus pleurae

Recessus costodiaphragmaticus

Recessus costomediastinalis

Recessus phrenicomediastinalis

Pneumothorax

Borders (lines of reflection) of the parietal pleura

Cupula pleurae

Area interpleuralis sup. s. thymica

Area interpleuralis inferior s. pericardiaca

THYROID GLAND

Lobus, dexter, sinister, isthmus (lobus pyramidalis)

Capsula propria

Fascia externa s. perithyroidea

Folliculi - colloid - thyroglobulin (thyroxin, trijodthyronin)

PARATHYROID GLANDS (GLANDULAE PARATHYROIDEAE)

Parathormone - regulates plasmatic levels of calcium and phosphorus.

THYMUS

Lobus dexter et sinister

Capsula thymi

Lobuli thymi

Cortex, medulla thymi

T-lymphocytes