

FRAME – ANATOMY1

DENTISTRY

ANATOMICAL NOMENCLATURE

OSTEOLOGY

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Basic terms of anatomical nomenclature

- *anatomical position*
- *anatomical planes*: sagittal plane (plana sagittalis, planum medianum); frontal plane (plana frontalis); transverse (horizontal) plane (plana transversalis)
- *axes*: longitudinal (axis longitudinalis); sagittal (axis sagittalis); transversal (axis transversalis)
- *directions*: cranialis, caudalis; superior, inferior; ventralis, dorsalis; anterior, posterior; medianus, medialis, lateralis; dexter, sinister; superficialis, profundus; externus, internus; proximalis, distalis; radialis, ulnaris; tibialis, fibularis; dorsalis, palmaris, plantaris; mesialis, distalis; vestibularis, oralis; palatinalis, lingualis; labialis, buccalis; occlusalis; rostralis

Main parts of human body

- *head* - caput
- *neck* - collum
- *trunk* - truncus: chest (thorax), back (dorsum), belly (abdomen), pelvis (pelvis)
- *upper limb* - membrum superius: arm (brachium), forearm (antebrachium), hand (manus), back of the hand (dorsum manus), palm (palma manus), fingers (digiti manus)
- *lower limb* - membrum inferius: thigh (femur), lower leg (crus), calf (sura), foot (pes), back of the foot (dorsum pedis), sole (planta pedis), fingers (digiti pedis)

OSTEOLOGY_ GENERAL

Basic structure of the bone tissue: fundamental functional unit (osteon); substantia compacta, substantia spongiosa, periosteum, endosteum, cavum medullare, medulla ossium (rubra, flava, grisea), bone architecture (trajectories, bone remodeling)

Classification of bones according to the shape: long bones, short bones, flat bones, irregular bones, pneumatic bones – with examples. In case of long bones description of its parts (proximal epiphysis, diaphysis, distal epiphysis)

Vascularization and innervation of bones: arteriae nutriciae, veins of the bones; innervation of periosteum

OSTEOLOGY_SPECIAL

Skeleton of the trunk

Vertebrae (vertebrae)

- **general vertebral characteristics** (corpus vertebrae, pediculus arcus vertebrae, arcus vertebrae, foramen vertebrae, processus spinosus, processus transversi, processus articulares)
- **specialities of individual vertebral groups:**
 - *vertebrae cervicales*: foramen processus transversi. **Atlas** (arcus anterior et posterior, tuberculum anterius et posterius, fovea dentis, foveae articulares superiores et inferiores, massae laterales atlantis), orientation of atlas. **Axis** (dens axis, facies articularis anterior axis). C6 – tuberculum caroticum; C7 - vertebra prominens
 - *vertebrae thoracicae*: foveae costales, facies costales processus transversi
 - *vertebrae lumbales*: processus costarii, processus accessorii, processus mammilares
 - *vertebrae sacrales*: os sacrum
 - *vertebrae coccygeae*: os coccygis

Sacral bone (os sacrum)

- *basis ossis sacri*: processus articulares superiores, promontorium
- *facies pelvina*: foramina sacralia pelvina, lineae transversae
- *facies dorsalis*: crista sacralis mediana, intermedia et lateralis, foramina sacralia dorsalia, cornua sacralia, hiatus sacralis, apex ossis sacri, canalis sacralis
- *partes laterales ossis sacri*: facies auricularis, tuberositas sacralis

Coccyx bone (os coccygis)

cornua coccygea, apex ossis coccygis

Breast bone (sternum)

- *manubrium sterni*: incisura jugularis; incisurae claviculares; incisurae costales; angulus sterni
- *corpus sterni*: incisurae costales
- *processus xiphoideus* (synchondrosis xiphisternalis)

Ribs (costae)

- costae verae; costae spuriae; costae fluctuantes
- *general characteristic of the rib*: corpus costae (sulcus costae, crista costae, angulus costae); caput costae (facies articularis); collum costae (tuberculum costae, facies articularis tuberculi costae)
- *typical structures of 1. and 2. rib*: 1. rib - sulcus arteriae subclaviae, tuberculum musculi scaleni anterioris et medii; 2. rib - tuberculum musculi scaleni posterioris

Skeleton of upper limb (skeleton membri superioris)

Shoulder blade (scapula)

- *facies dorsalis scapulae*: spina scapulae; acromion; facies articularis; fossa supraspinata; fossa infraspinata
- *facies costalis scapulae*: fossa subscapularis
- *angulus scapulae*: superior, inferior, lateralis (cavitas glenoidalis, tuberculum supraglenoidale, tuberculum infraglenoidale, collum scapulae)
- *margo scapulae*: lateralis; medialis; superior (processus coracoideus scapulae, incisura scapulae)

Collarbone, clavicle (clavicula)

- *corpus claviculae*: extremitas sternalis (facies articularis sternalis); extremitas acromialis (facies articularis acromialis)
- *facies*: superior, inferior

Arm bone (humerus)

- *proximal epiphysis*: caput humeri; collum humeri (anatomicum et chirurgicum); tuberculum majus et minus; sulcus intertubercularis; crista tuberculi majoris et minoris
- *diaphysis*: tuberositas deltoidea; sulcus nervi radialis
- *distal epiphysis*: epicondylus medialis et lateralis; sulcus nervi ulnaris; fossa olecrani; fossa radialis; fossa coronoidea; capitulum humeri; trochlea humeri

Ulna (ulna)

- *proximal epiphysis*: olecranon; processus coronoideus; incisura trochlearis; incisura radialis; tuberositas ulnae
- *diaphysis*: margo interosseus

- *distal epiphysis*: caput ulnae (circumferentia articularis capitis ulnae); processus styloideus

Radius (radius)

- *proximal epiphysis*: caput radii (fovea capitis radii, circumferentia articularis radii); collum radii; tuberositas radii
- *diaphysis*: margo interosseus
- *distal epiphysis*: incisura ulnaris radii; facies articularis carpalis radii; processus styloideus

Carpal bones (ossa carpi)

- proximal row: os scaphoideum (tuberculum ossis scaphoidei); os lunatum; os triquetrum; os pisiforme;
- distal row: os trapezium (tuberculum ossis trapezii); os trapezoideum; os capitatum; os hamatum (hamulus ossis hamati)
- eminentia carpi medialis et lateralis, sulcus carpi

Metacarpal bones (ossa metacarpi)

basis, corpus et caput ossis metacarpi; ossa sesamoidea

Phalanges of hand fingers (phalanges digitorum manus)

- II.-IV. finger: phalanx proximalis, media et distalis; I. prst: phalanx proximalis et distalis
- phalanx proximalis et media: basis, corpus et caput
- phalanx distalis: basic, corpus et trochlea (tuberositas phalangis distalis)

Skeleton of lower limb (skeleton membri inferioris)

hip bone, coxal bone (os coxae)

iliac bone (os ilium); pubic bone (os pubis); sciatic bone (os ischii):

corpus ossis ilii; ala ossis ilii; fossa iliaca; linea arcuata; facies auricularis; linea glutea anterior, posterior et inferior; crista iliaca; spina iliaca anterior superior; spina iliaca anterior inferior; spina iliaca posterior superior; spina iliaca posterior inferior; eminentia iliopubica; incisura ischiadica major; corpus ossis pubis; ramus superior ossis pubis; sulcus obturatorius, pecten ossis pubis, tuberculum pubicum; ramus inferior ossis pubis; facies symphysialis; corpus ossis ischii; ramus ossis ischii; tuber ischiadicum; spina ischiadica; incisura ischiadica minor

Femur, thigh-bone (femur)

- *proximal epiphysis*: caput femoris (fovea capitis femoris)
- *diaphysis*: collum femoris; trochanter major et minor; linea aspera; tuberositas glutea
- *distal epiphysis*: condylus medialis et lateralis; fossa intercondylaris; epicondylus medialis et lateralis; facies patellaris; planum popliteum

Knee-cap (patella) – sesamoid bone, basis patellae, apex patellae, facies articularis patellae

Tibia, shin bone (tibia)

- *proximal epiphysis*: condylus medialis et lateralis (facies articulares superiores, eminentia intercondylaris, tuberculum intercondylare mediale et laterale, area intercondylaris anterior et posterior), facies articularis fibularis
- *diaphysis*: margo anterior, medialis et interosseus, tuberositas tibiae
- *distal epiphysis*: malleolus medialis (facies articularis malleoli medialis), facies articularis inferior tibiae, incisura fibularis

Fibula, calf bone (fibula)

- *proximal epiphysis*: caput fibulae (facies articularis capitis fibulae)
- *diaphysis*: margo interosseus
- *distal epiphysis*: malleolus lateralis (facies articularis malleoli lateralis)

Talus (talus)

- *caput tali* (facies articularis navicularis)
- *collum tali*
- *corpus tali* (trochlea - facies articulares for articulation with tibia and fibula; facies articularis calcanea anterior, media et posterior, sulcus tali; processus posterior tali; processus lateralis tali)

Calcaneus (calcaneus)

facies articularis cuboidea; facies articulares talaris anterior, media et posterior; sulcus calcanei; sustentaculum tali; tuber calcanei

Navicular (os naviculare) – articulation (connection) with surrounding bones

Cuboid bone (os cuboideum) – articulation (connection) with surrounding bones

Cuneiform bones (ossa cuneiformia): os cuneiforme mediale, intermedium et laterale – articulation (connection) with surrounding bones

Metatarsal bones (ossa metatarsi): basis, corpus et caput ossis metatarsi

Phalanges feet fingers (phalanges digitorum pedis)

- II.-IV. finger: phalanx proximalis, media et distalis; I. prst: phalanx proximalis et distalis
- *phalanx proximalis et media:* basis, corpus et caput
- *phalanx distalis:* basic, corpus et trochlea (tuberositas phalangis distalis)

Skull (cranium)

1. Neurocranium (neurocranium)

Occipital bone (os occipitale)

- *pars basilaris*: clivus, tuberculum pharyngeum
- *partes laterales*: condylus occipitalis, fossa condylaris, canalis condylaris, incisura jugularis, canalis nervi hypoglossi
- *squama occipitalis*: protuberantia occipitalis externa; crista occipitalis externa; linea nuchae suprema, superior et inferior; planum nuchale; planum occipitale; fossae cerebrales; fossae cerebellares; sulcus sinus transversi; sulcus sinus sagittalis superioris; protuberantia occipitalis interna; crista occipitalis interna; eminentia cruciformis

Sphenoid bone (os sphenoidale)

- *corpus ossis sphenoidalis*: processus clinoidei posteriores; sella turcica; dorsum sellae; fossa hypophysialis; sulcus chiasmatis; sulcus caroticus; lingula sphenoidalis; rostrum sphenoidale; crista sphenoidalis; sinus sphenoidalis (apertura sinus sphenoidalis)
- *alae minores ossis sphenoidalis*: canalis opticus; processus clinoidei anteriores; fissura orbitalis superior
- *alae majores ossis sphenoidalis*: foramen rotundum, ovale et spinosum; spina ossis sphenoidalis; facies - cerebralis, temporalis, infratemporalis, orbitalis, maxillaris
- *processus pterygoidei ossis sphenoidalis*: lamina medialis et lateralis; fossa pterygoidea, fossa scaphoidea, hamulus pterygoideus, canalis pterygoideus

Frontal bone (os frontale)

- *squama frontalis*: tuber frontale; margo supraorbitalis; incisura /foramen frontale; incisura /foramen supraorbitale; arcus superciliares
- *partes orbitale*: fossa glandulae lacrimalis; fovea trochlearis; foramen ethmoidale anterius et posterius
- *pars nasalis*: sinus frontalis

Parietal bone (os parietale)

foramina parietalia; tubera parietalia; linea temporalis superior et inferior; sulcus sinus sagittalis superioris; sulci arteriae meningae mediae

Temporal bone (os temporale)

- *pars petrosa (os petrosum, pyramis)*

Apex; basis; facies (anterior, posterior, inferior, ventrobasalis); margo (superior, inferior)

- facies anterior pyramidis: impressio trigeminalis; hiatus et sulcus nervi petrosi majoris; hiatus et sulcus nervi petrosi minoris; eminentia arcuata, tegmen tympani
- facies posterior pyramidis: sulcus sinus petrosi superioris et inferioris; porus acusticus internus; meatus acusticus internus; fundus meatus acustici interni (crista transversa, introitus canalis nervi facialis); apertura externa aquaeductus vestibuli; apertura externa canaliculi cochleae; incisura jugularis, sulcus sinus sigmoidei
- facies inferior pyramidis: apertura externa canalis carotici; fossa jugularis (canaliculus mastoideus); fossula petrosa (apertura externa canaliculi tympanici)
- facies ventrobasalis: will be discussed with the structures of the auditory system
- *pars squamosa*: squama ossis temporalis; processus zygomaticus; porus acusticus externus; fossa mandibularis; tuberculum articulare
- *pars mastoidea*: processus mastoideus (antrum mastoideum, celulae mastoideae); incisura mastoidea; sulcus arteriae occipitalis, incisura digastrica
- *pars tympanica*: incisura tympanica; sulcus tympanicus; fissura petrosquamosa (fissura petrotympanica et petrosquamosa); fissura tympanomastoidea
- *processus styloideus* (foramen stylomastoideum)

Cannals in temporal bone

- *Canalis caroticus*: apertura externa canalis carotici, canaliculi caroticotympanici, apertura interna canalis carotici
- *Canalis nervi facialis*: fundus meatus acustici interni (introitus canalis nervi facialis), foramen stylomastoideum
- *Canaliculus chordae tympani*: cavum tympani, fissura petrotympanica
- *Canalis musculotubarius*: septum canalis musculotubarii: semicanalis muscoli tensoris tympani, semicanalis tubae auditivae
- *Canaliculus mastoideus*: fossa jugularis, fissura tympanomastoidea
- *Canaliculus tympanicus*: fossula petrosa, (cavum tympani), hiatus nervi petrosi minoris
- *Aquaeductus vestibuli*: apertura externa aquaeductus vestibuli
- *Canaliculus cochleae*: apertura externa canaliculi cochleae

2. Facial skeleton, viscerocranium (splanchnocranium)

Maxilla, upper jaw (maxilla)

- *corpus maxillae*:
 - facies orbitalis: sulcus et canalis infraorbitalis; canales alveolares
 - facies anterior: foramen infraorbitale; fossa canina; crista infrazygomata; incisura nasalis; spina nasalis anterior
 - facies infratemporalis: tuber maxillae; foramina alveolaria; canales alveolares posteriores
 - facies nasalis: hiatus sinus maxillaris
 - sinus maxillaris (hiatus semilunaris; recessus frontalis, zygomaticus, palatinus et alveolaris)
- *processus frontalis*: crista lacrimalis anterior; crista ethmoidalis; crista conchalis
- *processus zygomaticus*
- *processus alveolaris*: alveoli dentales; septa interalveolaria, septa intraalveolaria (interradicularia); juga alveolaria
- *processus palatinus*: sulci palatini; foramen incisivum; os incisivum; torus palatinus

Nasal bone (os nasale): sutura internasalis

Lacrimal bone (os lacrimale): crista lacrimalis posterior; sulcus lacrimalis

Vomer (vomer): alae vomeris

Inferior nasal turbinate, inferior nasal concha (concha nasalis inferior): processus maxillaris, lacrimalis et ethmoidalis

Zygomatic bone, facial bone (os zygomaticum)

- *corpus ossis zygomatici*: facies orbitalis, facies lateralis, facies temporalis; foramen zygomaticoorbitale (foramen zygomaticofaciale et zygomaticotemporale)
- *processus*: frontalis, maxillaris, temporalis

Palatal bone (os palatinum)

- *lamina horizontalis*: spina nasalis posterior; foramen palatinum majus; foramina palatina minora; processus pyramidalis
- *lamina perpendicularis*: processus orbitalis; processus sphenoidalis; incisura sphenopalatina

Ethmoidal bone (os ethmoidale)

- *lamina perpendicularis*: septum nasi osseum; crista galli; foramen caecum
- *lamina cribrosa*
- *labyrinthus ethmoidalis*: cellulae ethmoidales anteriores, medii et posteriores; bulla ethmoidalis; concha nasalis superior; concha nasalis media (processus uncinatus); facies orbitalis

Mandible, lower jaw (mandibula)

- *corpus mandibulae*: trigonum mandibulae (protuberantia mentalis, tuberculum mentale); spina mentalis; fossae digastricae; processus alveolaris (alveoli dentales, juga alveolaria, septa interalveolaria, septa intraalveolaria, septa interradicularia); trigonum retromolare; linea mylohyoidea; fovea sublingualis; fovea submandibularis; foramen mentale; canalis mandibulae; angulus mandibulae
- *ramus mandibulae*: processus coronoideus (crista temporalis); processus condylaris (caput mandibulae, collum mandibulae, fovea/fossa pterygoidea); incisura mandibulae; linea obliqua; foramen mandibulae; canalis mandibulae; lingula mandibulae; sulcus mylohyoideus; tuberositas masseterica; tuberositas pterygoidea

Hyoid bone, tongue bone (os hyoideum) – corpus; cornua minora; cornua majora

Skull as a whole

- *Description of the plane X-ray picture of the skull* - in sagittal and lateral projection
- *Newborn skull*
 - ratio neurocranium : splanchnocranium
 - narrow fibrous bands between flat bones (instead of sutures), that are spatially enlarged, and forms *fonticuli* (fonticulus major et minor – position, age of obliteration; fonticulus sphenoidalis et mastoideus – position)
- *Cranial cavities* – limitation; anatomical structures; communication (connection) with surrounding cavities
 - basis cranii interna: fossa cranii anterior; fossa cranii media; fossa cranii posterior
 - fossa temporalis; fossa infratemporalis; pterygopalatine fossa
 - orbita; cavitas nasi ossea
 - oral cavity