

Introduction to osteology

Skeleton of the spine and thorax

THE BASIC STRUCTURE OF THE BONE TISSUE

- **bone** is **connective tissue**, white, tough but flexible
 - It develops as activity of ***osteoblasts***, which produce **primary bone mass** and then they change in the ***osteocytes***
- a) **osteocytes** – located in cavities (**lacuna**) within the primary bone mass
- b) **Primary bone mass**– contains organic component (**ossein**) and anorganic component (**calcium phosphate**)

We know two forms of bone tissue

a) Compact bone (**substantia compacta**)

b) Spongy bone (**substantia spongiosa**)

Compact bone

- 1 – Haversovs lamells**
- 2 – intersected lamells**
- 3 – superficial lamells**
- 4 – spongy bone**

- H – osteon**
- 1 – osteocyte**
- 2 – lacuna**
- 3 – canaliculus osseus**
- 4 – Haversian canal**

OSTEON

The spongy bone

- Substantia spongiosa
- Substantia compacta
- Skull - diploe

PERIOSTEUM

a) Fibrous layer(external)

b) Cambious layer (internal) – rich sensory innervation

1 – periost

2 – Sharpey fibres

3 – vessels

4 – endost

BONE MARROW

Medulla ossium rubra – red bone marrow
(active hematopoietic tissue)

Medulla ossium flava – yellow bone marrow

Medulla ossium gelatinosa – grey bone marrow

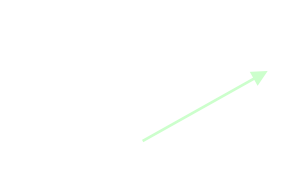
TYPES OF BONES

Long bones

Middle section (diaphysis)

**Ends (epiphysis) proximal
and distal**

Medullar cavity



Short bones

(various shapes)

- 1) On the surface - **corticalis**
- 2) Inside - **substantia spongiosa**

Flat bones

1) Compact bone has two layers:

lamina externa and interna and between them,
there is **spongy bone – diploe**

Sesamoidal bones

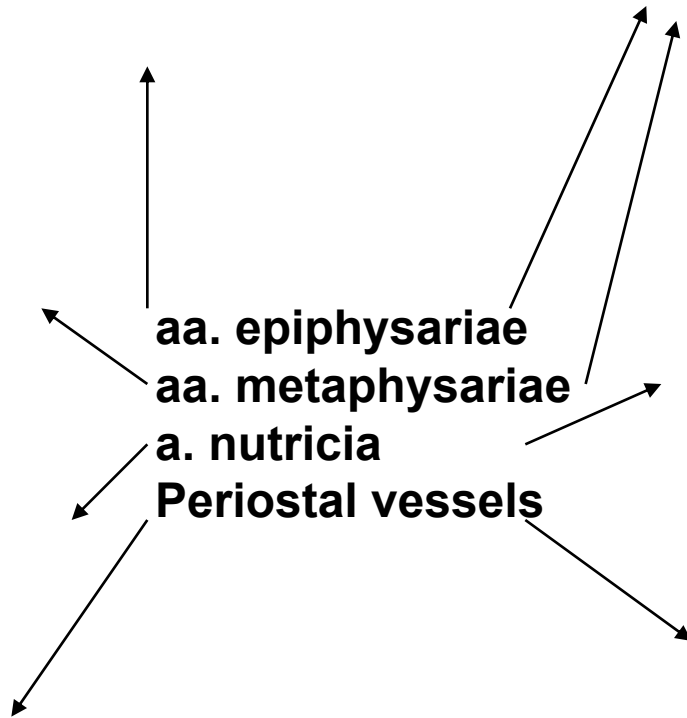
In some muscle ligaments

Pneumatized bones

BONE VESSELS

- The most important bone vessels come through periosteum via **Volkman channels**

Blood supply of the long bone



X-RAY PICTURES

4,5 years

7 years

11 years

14 years

COLUMNNA VERTEBRALIS - SPINE

- During development: **33-34 vertebrae**
- After fusion: **24 vertebrae**

Vertebrae

7 cervical

12 thoracic

5 lumbar

4-5 sacral- os sacrum

4-5 coccygeal- os coccygis

VERTEBRA

corpus vertebrae

facies terminalis superior et inferior

arcus vertebrae

pediculus arcus vertebrae

lamina arcus vertebrae

foramen vertebrale

incisura vertebralis

processus

processus articulares

processus transversi

processus spinosus

CERVICAL VERTEBRAE

- **uncus corporis vertebrae**
- **processus transversus - tubercula anteriora et posteriora, foramina processus transversi**
- **oval body**
- **Triangular foramen vertebrale**
- **cleft processus spinosus**
- **processus articulares – in oblique plane**

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

ATLAS - C1

- **arcus anterior**
tuberculum anterior
fovea dentis
- **arcus posterior**
tuberculum posterior
sulcus a. vertebralis
- **massae laterales**
processus transversi
foramina pr. transversi

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

AXIS - C2

- **dens axis (original body of atlas)**- apex dentis
- facies articularis anterior et posterior
- os odontoideum

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

C6- TUBERCULUM CAROTICUM

VERTEBRA PROMINENS- C7

VERTEBRAE THORACICAE

- **corpus:** foveae costales - superiores, inferiores
- **processus transversus** 1.-10.Th: fovea costalis pr. transversi
- **processus articulares:** in frontal plane
- **Th4 – 9:** impressio aortica

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

VERTEBRAE LUMBALIS

- **processus costarii**
- **processus accessorius**- more caudally
- **processus mamillaris**- more cranially
- **processus articulares**- in sagittal plane
- **processus spinosi**- flat plate
- **Sacralization of last lumbar vertebra**

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

OS SACRUM

- **facies dorsalis**- crista- mediana, medialis, lateralis
- **facies auricularis**- partes laterales ossis sacri
- **facies pelvina**- lineae transversae
- **foramina sacralia**- dorsalia, pelvina
- **canalis sacralis**- hiatus sacralis- cornua sacralia
- **basis ossis sacri**
- **apex ossis sacri**
- Lumbalization of sacral vertebra

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

OS COCCYGIS

- **cornua ossis coccygis=**
processus transversi Co1
- **apex coccygis**

Corpus vertebrae

Processus articulares

Processus transversus

VÝVOJ OBRATLŮ

Corpus vertebrae

Arcus vertebrae

Processus articulares

Processus transversus

Processus spinosus

Costa

COSTAE - RIBS

- 12 pairs of ribs:
- **costae verae**: 7 pairs, true ribs
- **costae spuriae**: 8th-10th pair, false ribs
- **costae fluctuantes (liberae)** : 11th and 12th pair- free ribs
- length- from 1st to 8th increases, the smallest: 1st and 12th, the largest 6th – 9th

RIB

os costae + cartilago:

- **caput costae, crista**
- **collum costae**
- **tuberculum costae**
- **corpus costae**
- **crista costae**
- **sulcus costae**
- **angulus costae**

Facies articularis capitis costae

Facies articularis tuberculi costae

COSTA PRIMA

- sulcus arterie subclaviae
- (sulcus venae subclaviae)
- tuberculum m. scaleni anterioris
- úpon pro m. scalenus medius
- odstup m. subclavius

COSTA SECUNDA/second rib

- tuberculum m. scaleni posterioris
- tuberositas m. serrati anterioris

STERNUM

- **sternebrae**
- **manubrium sterni**- incisura-jugularis, clavicularis and places for connection with cartilages of the first pair of ribs
- **angulus sterni**
- **corpus**- incisurae costales
- **processus xiphoideus**

X-RAY of cervical spine

X-RAY of thoracic spine

X-RAY of lumbar spine

Thank you for your attention!

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