Vertebral column

- Cervical (C): Lordosis
- Thoracic (T): Kyphosis (rib)
- Lumbar (L): Lordosis
- Sacral (S) (pelvic bone)
- Coccyx (Cx)
  - Intervertebral joints
Vertebra (Spine)

- Vertebral Body; Vertebral foramen (canal)
- Vertebral Arch: Pedicle, Lamina, Process
- Vertebral notch: superior, inferior (intervertebral foramen)

**Parts:**
- Spinous process (1)
- Transverse process (2)
- Articular processes (4)
- Vertebral arch
- Vertebral body

**Functions:**
- Muscle attachment and movement
- Restriction of movement
- Protection of spinal cord
- Support of body weight
Vertebra (Spine)

- Vertebral Body; Vertebral foramen (canal)
- Vertebral Arch: Pedicle, Lamina, Process
- Vertebral notch: superior, inferior (intervertebral foramen)
Vertebral foramen (canal) and spinal cord
Intervertebral foramen and spinal nerves
Vertebral foramen (canal)

- Vertebal canal
- Posterior aspect of epiphyseal rim
- Pedicle
- Lamina
- Compact bone
- Spongy bone
- Foramen/canal for basivertebral vein
- Inferior vertebral "end plate"
- Nucleus pulposus
- Anulus fibrosis
- IV disc
- Superior vertebral "end plate"

- Anterior longitudinal ligament
- Posterior longitudinal ligament
- Intervertebral foramen
- Ligamentum flavum
Vertebral process

- Spinous process, Transverse process
- Articular process (facet): superior, inferior
Intervertebral joints

- Hyaline cartilage
- Intervertebral disc: Annulus fibrosus + Nucleus pulposus
Cervical vertebrae

- Typical vertebrae (C3-C6)
- C1: atlas, C2: axis
Cervical vertebrae: Typical (C3-C6)

- small body; large, triangular canal; arch
- **Transverse process**: end as post. & ant. tubercle; foramen transversarium
- **Articular process**: sup. & inf.; sup. facet
- **Short, bifid spinous process**: attachment of ligamentum nuchae
Ligamentum nuchae
C1: atlas

- Sup. articular facet; with occipital condyle
- No body; No spinous proc.; Lateral mass: ant., & post. arch
- Long transverse proc.
C2: axis

- Dens (odontoid proc)
- Sup. articular facet; Inf. articular facet
- Body, pedicle; Spinous proc.; Transverse proc.
Assembling of C1 and C2

- Anterior
- Transverse ligament of atlas
- Lateral mass

Vertebræ- 17
C7 vertebra

- Large, long spinous process
- Caudal end of lig. nuchae as a landmark
- No vertebral a. through transverse foramen
Vertebral artery in transverse foramen

- Through transverse foramen of C1-6; but no C7 (only for accessory vertebral v.)
- Vascular insufficiency during forceful rotation of vertebral column
Thoracic vertebrae: “typical” [T2~T10(9-11)] 1/2

- Body: larger than C-vertebrae; round canal
- Upper and lower surfaces: parallel to each other
- Spinous proc.: directly posteriorly
- Vertical articular facets: sup. facet faces posteriorly
Thoracic vertebrae: “typical” [T2~T10(9-11)] 2/2

- Articular facets for ribs
  - With rib head: sup. & inf. costal demifacet at upper & lower border of body
  - With tubercle of rib: costal facet on trans. proc.
Vertebra and rib

- Superior costotransverse ligament
- Joint capsule
- Rib
- Disc
- Intra-articular ligament
- Vertebral body

- Joint with vertebral body
- Costotransverse joint
- Costotransverse ligament
- Lateral costotransverse ligament

Anterior
Vertebra T1

- Upper surface of body: saddle-shaped
- Intermediate between C and T
- Triangular canal
- Rib1 contact T1 body only
Vertebra T11-T12

- Single rib articular facet; no rib articular facet on trans. proc.
- T12: intermediate between T and L
- Sup. articular facet: resembles T-vertebrae
- Inf. articular facet: resembles L-vertebrae
Lumbar vertebrae: typical L1-L4

- Massive body; Small, triangular canal
- Short, square spinous proc.; sup. facet: faces medially
Lumbar vertebra: L5

- body: deeper anteriorly than posteriorly; lordosis
- Short massive transverse proc.; attached by ilio-lumbar lig
Sacrum and Coccyx: Sacrum

- Sacrum (5)
- Transfer body weight from vertebrae to pelvis
Sacrum: ant. surface

- Ala of sacrum
- Promontory
- Sacro-iliac joint: articular surface
- 4 ant. sacral foramina: S1-4 ant. primary rami
Sacrum: post. surface

- Sacral hiatus
- Median sacral crest
- Intermediate sacral crest
- Lateral sacral crest
- Post. sacral foramina
Coccyx

- Formed by 3-5 fused vertebrae

*Gray 2-21*

- Coccygeal cornu
- Posterior view

- Lateral part
- Superior articular process
- Ala (wing)
- Promontory
- Sacral part of pelvic brim (linea terminalis)
- Anterior (pelvic) sacral foramina
- Transverse ridges (lines)
- Apex of sacrum
- Transverse process of coccyx
- Pelvic surface
Comparison of vertebrae

CERVICAL VERTEBRAE

Superior lip

Inferior lip

Gutter for nerve

“Articular column”

Thoracic Vertebrae

For tubercle of rib

Facet for head of rib

Lumbar Vertebrae

Mamillary

Accessory

Transverse
Intervertebral disc

- between bodies, cartilaginous joint
- Annulus fibrous (fibrocartilage) + nucleus pulposus
Herniation of intervertebral disc (HIVD)
Lig. between adjacent vertebrae

- body
  - Ant. Longitudinal lig.
  - Post. Longitudinal lig.
- lamina
  - Ligamentum flavum
- Spinous proc
  - Interspinous lig.
  - Supraspinous lig.: ligamentum nuchae of cervical region
Interspinous ligament

Left lateral view (partially sectioned)

- Anterior longitudinal ligament
- Lumbar vertebral body
- Intervertebral disc
- Anterior longitudinal ligament
- Posterior longitudinal ligament
- Superior articular process
- Transverse process
- Spinous process
- Ligamentum flavum
- Interspinous ligament
- Supraspinous ligament
- Intervertebral foramen
- Inferior articular process
- Capsule of zygapophyseal joint (partially opened)

Posterior vertebral segments
Review on Vertebrae

- Common features of vertebrae
  - Characters of C, T, L, S vertebrae
  - Typical vs. Atypical vertebrae for different levels