The Skeletal System

Skull, Vertebral Column and Girdles

Pages 27 - 29
Figure 7.1a

(a) Anterior view

- **Skull**
  - Facial bones

- **Thoracic cage** (ribs and sternum)
  - Clavicle
  - Scapula
  - Sternum
  - Rib
  - Humerus
  - Vertebra
  - Radius
  - Ulna
  - Carpals

- **Vertebral column**
  - Sacrum

- **Lower limb**
  - Femur
  - Patella
  - Tibia
  - Fibula
  - Tarsals
  - Metatarsals
  - Phalanges
Functions of the Skull

- Support
- Movement
- Protection
The Skull

- 22 bones, 2 groups
  1. Cranial bones (8)
    - Enclose the brain in the cranial cavity
    - Provide sites of attachment for head and neck muscles
    - Provide support
The Skull

2. Facial bones (14 bones)
   - Framework of face
   - Cavities for special sense organs of sight, taste, and smell
   - Openings for air and food passage
   - Sites of attachment for teeth and muscles of facial expression
Bones of cranium (cranial vault)

- Lambdoid suture
- Coronal suture
- Squamous suture

Facial bones

(a) Cranial and facial divisions of the skull
(a) Anterior view

Figure 7.4a
Coronal suture

Parietal bone

Temporal bone

Lambdoid suture

Squamous suture

Occipital bone

Zygomatic process

Occipitomastoid suture

External acoustic meatus

Mastoid process

Styloid process

Mandibular condyle

Mandibular notch

Mandibular ramus

Mandibular angle

Frontal bone

Sphenoid bone (greater wing)

Ethmoid bone

Lacrimal bone

Nasal bone

Zygomatic bone

Maxilla

Alveolar margins

Mandible

Mental foramen

Coronoid process

(a) External anatomy of the right side of the skull
Cranial Bones

- Frontal bone
- Parietal bones (2)
- Occipital bone
- Temporal bones (2)
- Sphenoid bone
- Ethmoid bone
Facial Bones

- Mandible
- Maxillary bones (maxillae) (2)
- Zygomatic bones (2)
- Nasal bones (2)
- Lacrimal bones (2)
- Palatine bones (2)
- Vomer
- Inferior nasal conchae (2)
Sutures

• Immovable joints
  • Become more complex with age

• Fontanelles
  • Soft regions of connective tissue holding bones together at birth
    • Permits
      • Brain growth
      • Entry into birth canal
  • Normally replaced by bone by about 1 year of age
Foramina

- Allow passage of blood vessels and nerves
- About 85 named openings (foramina, canals, fissures)
- Largest is the foramen magnum
Hypophyseal fossa of sella turcica

Temporal bone

Parietal bone

Occipital bone

(a) Superior view of the skull, calvaria removed

Figure 7.7a
Sinuses

• Lined with mucous membranes and ciliated epithelium
• Cavities in skull bones
  • Frontal sinus
  • Sphenoidal sinus
  • Maxillary sinus
  • Ethmoid air cells
Paranasal Sinuses

(a) Anterior aspect

(b) Medial aspect
Sinuses

- Sinusitis
- Paranasal sinuses
  - Lighten the skull
  - Resonation chambers for the voice
Hyoid bone

Not technically part of the skull

Suspended by muscles and ligaments

Greater horn

Lesser horn

Body
Vertebral Column

- Structure
  - Vertebrae (26 bones)
  - Intervertebral discs

- Functions
  - Protection
  - Support
  - Movement
Figure 7.18

- Posterior
- Lamina
- Transverse process
- Superior articular process and facet
- Pedicle
- Vertebral arch
- Spinous process
- Vertebral foramen
- Body (centrum)
- Anterior
Median section of three vertebrae, illustrating the composition of the discs and the ligaments.
Spina Bifida

Spina bifida occulta  Meningocele  Myelomeningocele
Vertebral Column

- Curvatures
  - Increase the resilience and flexibility of the spine
    - 2 posteriorly concave curvatures
      - Cervical and lumbar
    - 2 posteriorly convex curvatures
      - Thoracic and sacral
Figure 7.16

Cervical curvature (concave) 7 vertebrae, C₁–C₇

Thoracic curvature (convex) 12 vertebrae, T₁–T₁₂

Lumbar curvature (concave) 5 vertebrae, L₁–L₅

Sacral curvature (convex) 5 fused vertebrae sacrum

Coccyx 4 fused vertebrae

Anterior view Right lateral view
Vertebral Column

- Abnormal spine curvatures
  - Scoliosis (abnormal lateral curve)
  - Kyphosis (hunchback)
  - Lordosis (swayback)
Questions?