

Bones and the human skeleton

Introduction

During this lab you will study the structure of a bone and learn to name and identify the major bones of the human skeleton. You will also study the major types of joints – fibrous, cartilaginous, and synovial joints. The knee joint will be closely examined as an example of a synovial joint

Structure of a bone

1. Using a longitudinal section of a long bone identify the two types of bone tissue found in the bone taking note of their location

- Compact bone tissue
- Spongy bone tissue

Look at a slide of ground bone and identify the functional unit of compact bone, the osteon. Note that in spongy bone the bone tissue is not organized into osteons.

The axial skeleton -- the bones of the skull vertebral column and bony thorax

1. Skull

- Cranial bones
 - o Frontal bone
 - o Parietal bones (2)
 - o Temporal bones (2)
 - o Occipital bone
 - o Sphenoid bone
 - o Ethmoid bone
- Facial bones
 - o Maxilla
 - o Mandible
 - o Zygomatic bones (2)*
 - o Lacrimal bones
 - o Palatine bones

2. Vertebral column

- cervical vertebra (7) -- mobile but not very strong structurally
- thoracic vertebra (12) – attachment for ribs
- lumbar vertebra (5) – not very mobile, but very strong – role in support
- sacrum
- coccyx

3. Ribs – 12 pairs

4. Sternum

The appendicular skeleton – bones of the pectoral and pelvic girdle and upper and lower limbs

1. Pectoral girdle – attached lower limb to axial skeleton, point of attachment for muscles that move upper limb; designed for mobility
 - scapula
 - clavicle
2. Upper limb
 - humerus
 - ulna
 - radius
 - hand
 - carpals
 - metacarpals
 - phalanges
3. Pelvic girdle – attaches lower limbs to body, transmits weight of axial skeleton to lower limbs; designed for strength and support
 - coxal bone – iliac, ischial, pubic regions (three fused bones)
4. Lower limb
 - femur
 - patella
 - tibia
 - fibula
 - foot
 - tarsals -- calcaneus
 - metatarsals
 - phalanges

Joints

- three types of joints named depending on material that links articulating bones

1. fibrous joints
 - small, tight connective tissue fibers connect bones
 - between skull bones
 - immovable
2. cartilaginous joints
 - cartilage between connecting bones
 - between ribs and sternum
 - partially movable

3. synovial joints

- fluid-filled joint capsule surrounds articulating bones
- between bones of limbs, between limbs and girdles
- freely movable

Example of synovial joint: knee

- Lateral collateral ligament
- Medial collateral ligament
- Anterior cruciate ligament
- Posterior cruciate ligament