Chapter 5: Skeletal System

Skeletal System

- Includes joints, cartilage and ligaments.
- Two divisions:
  - Axial skeleton: bones of the longitudinal axis of the body
  - Appendicular skeleton: bones of limbs and girdles.

Types of Osseous Tissue

- Compact bone - dense and looks smooth and homogenous
- Spongy bone - composed of small, needlelike pieces of bone and open space
  - See p. 114

Functions of the Skeleton

1. **Support** – provides the internal framework of body
2. **Protection** – protects soft organs (cranium, rib cage)
3. **Movement** – bones act as levers; muscles attach to bone by tendon & pull bones into position
4. **Storage** – fats & minerals (Ca & P)
5. **Blood Cell Formation** – occurs within the bone marrow

Classification of Bones

- Adult skeleton contains 206 bones.
- Classified according to shape into 4 groups:
  - Long
  - Short
  - Flat
  - Irregular

Objectives

1. Identify the subdivisions of the skeleton as axial or appendicular.
2. List the functions of the skeletal system.
3. Name and identify the four types of bone.
4. Identify the major anatomical areas of a long bone.
CLASSIFICATION OF BONES

1. LONG – longer than they are wide
   - Central shaft with a head at each end
   - Femur, tibia, fibula, metatarsals, humerus, ulna, radius, metacarpals

2. SHORT – cube shaped
   - Carpals (wrist) and tarsals (ankle)

3. IRREGULAR – no particular pattern
   - Vertebrae, hip, scapula

4. FLAT – thin, flat or slightly curved
   - Cranium, sternum, ribs

Structure of a Long Bone

- Gross anatomy – what you can see
- Microscopic anatomy – what needs to be magnified (covered in next powerpoint)

Gross Anatomy: p. 114 fig 5.2 a, b, c

DIAPHYSIS (shaft)
- Makes up most of length
- Composed mostly of compact bone
- Covered with fibrous called periosteum
- Periosteum connected to compact bone by Sharpey’s fibers

Classifications of Bone

- Long bones are longer than they are wide, with a central shaft and heads at each end. Examples include the femur, tibia, fibula, metatarsals, humerus, ulna, radius, and metacarpals.
- Short bones are cube-shaped and include the carpals (wrist) and tarsals (ankle).
- Irregular bones have no particular pattern and include vertebrae, hips, and scapulae.
- Flat bones are thin, flat, or slightly curved and include the cranium, sternum, and ribs.

Gross Anatomy:
- The diaphysis (shaft) makes up most of the bone’s length and is composed mostly of compact bone. It is covered with fibrous connective tissue called periosteum.
- The periosteum is connected to the compact bone by Sharpey’s fibers, which increase the bone’s strength.
**EPHYYSIS**
- Proximal & distal ends
- Primarily spongy bone inside a thin layer of compact bone
- External surface covered by articular cartilage – hyaline (provides slippery surface)
- Epiphyseal plate – growth plate
- Epiphyseal line – thin line that is remnant of growth plate

**MEDULLARY CAVITY**
- Cavity within bone shaft
- **Endosteum** – ct lining of cavity
- Contains marrow
- **Yellow marrow** – adipose tissue; in most long bones; increases into adulthood
- **Red marrow** – blood cell formation; more abundant in children; in adults confined to flat bone and epiphyses of long bone

**BONE MARKINGS**
- **PROJECTIONS OR PROCESSES** – structures that grow out of the bone for the attachment of muscles, tendons & ligaments or to form a joint
- **DEPRESSIONS OR CAVITIES** – indentations in bone for the passage of nerves & blood vessels

**Projections for muscle attachment:**
- **Tuberosity** – large, rounded rough projection
- **Tubercle** – smaller, rounded rough projection

**Growth plate examples**
- **Trochanter** – irregular processes; femur
- **Epicondyle (1,2)** – raised area above condyle (3)

- **Crest** – prominent narrow ridge
- **Line** – less prominent ridge
- **Spine** – sharp, slender process

**Projections that form joints:**

- **Head** – bony expansion that rests on a neck (constricted area on bone)
- **Condyle** – large rounded projections

**Depressions**

- **Meatus** – canal – like passage
- **Foramen** – round or oval opening
- **Sinus** – air filled cavity

- **Facet (1)** – small smooth area
- **Ramus** – arm-like bar

- **Fossa** – shallow like basin
- **Groove** – furrow
- **Fissure** – slitlike opening