

2011 Lecture Summary – Exam Notes

1. Cartilage

Cartilage is **avascular**.

- **Chondroblasts** → produce cartilage.
- **Chondrocytes** → maintain cartilage and secrete extracellular matrix.

Types

- **Hyaline cartilage** → most common; precursor for bone; found in larynx/trachea and articular surfaces.
- **Elastic cartilage** → highly flexible; e.g. epiglottis.
- **Fibrocartilage** → strong shock absorber; e.g. intervertebral discs and pubic symphysis.

Growth

- **Appositional growth** → increases **width/thickness**.
 - **Interstitial growth** → increases **length**.
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2. Bone

Bone cells

- **Osteoblasts** → build bone
- **Osteocytes** → maintain bone
- **Osteoclasts** → break down/resorb bone

Unlike cartilage, bone is **vascular**.

Bone formation

Intramembranous ossification

- Bone develops directly within a membrane.
- Mainly **flat bones of skull + part of clavicle**.

Endochondral ossification

- Starts with a **cartilage model**, which is progressively replaced by bone.
- Produces most of the remaining skeleton.

Bone growth

Longitudinal growth occurs at the **epiphyseal growth plate**, between the epiphysis and diaphysis. Growth stops when the plate ossifies.

Axial vs appendicular skeleton

Axial: skull, vertebral column, ribs, sternum, hyoid, auditory ossicles.

Appendicular: upper/lower limbs + pectoral and pelvic girdles.

Bone shapes

- Long → femur, humerus, radius, tibia
- Short → carpals/tarsals
- Flat → ribs, sternum
- Sesamoid → **patella**

Fracture repair

Remember the sequence:

Haematoma → soft callus → hard/bony callus → remodelling into lamellar bone

3. Joints

Functional classification:

- **Synarthrosis** → immobile
- **Amphiarthrosis** → slightly mobile
- **Diarthrosis** → freely mobile

Structural classification:

- **Fibrous**
- **Cartilaginous**
- **Synovial**

Synovial joint types

Know:

- Plane/gliding
- Hinge
- Pivot
- Condylloid
- Saddle
- Ball-and-socket

Examples:

- Shoulder → **ball-and-socket**
- Hip → **ball-and-socket**
- Knee → mainly **hinge**
- Ankle → **hinge**
- Distal radioulnar → **pivot**
- Wrist → **condyloid**
- 1st carpometacarpal/thumb → **saddle**

Key principle: stability and mobility have an **inverse relationship**. The highly mobile shoulder sacrifices stability.

4. Muscle Types

	Skeletal	Cardiac	Smooth
Striated	Yes	Yes	No
Control	Voluntary	Involuntary	Involuntary
Nuclei	Multiple	1–2	Single
Shape	Long fibres	Branched	Spindle
Special feature	Motor units	Intercalated discs	Lines hollow organs

Motor units

- **Small motor units** → fine, precise movements, e.g. fingers.
- **Large motor units** → powerful movements, e.g. thigh.

Skeletal muscle fibre types

Slow oxidative (SO)

- Many capillaries
- Fatigue resistant
- Endurance/posture

Fast glycolytic (FG)

- Fewer capillaries
- Powerful, fast contraction
- Fatigues rapidly
- Weightlifting/power

Fast oxidative-glycolytic (FOG)

- Intermediate

