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SSEH1101

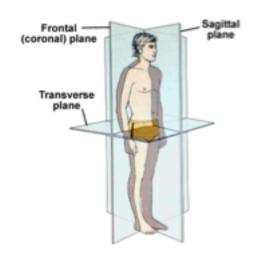
The Musculoskeletal System & Movement – Bone Structure & Formation Lecture 1

Skeletal System Function

- Support
- Protect
- Locomotion
- Production of red blood cells

Types of Bones

- Long bone (humerus, femur)
- Short bone (carpals of wrist)
- Flat bone (bones in skull)
- Irregular bone (vertebrae)



Bone Formation

Flat Bone

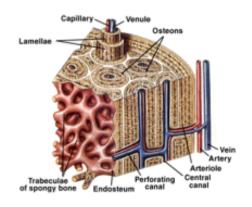
• Formed in one stage – direct ossification

Short & Irregular Bone

• Formed in indirect ossification when a cartilage model is created, gradually dissolved and then replaced by bone

Long Bone

Also formed by indirect ossification, but in a multi-stage process





Bone Composition

- 60-70% minerals (calcium phosphate & calcium carbonate), these resist compression
- 30-40% collagen, to resist tension
- Also a ground substance called APATITE

Bone Composition & Ageing

- The 1:2 ration of organic material: inorganic salts provides our skeleton with certain mechanical characteristics.
- At birth the ration is 1:1, providing elasticity in youth
- In the elderly the ration becomes 1:7, causing frailty and brittleness

Evolution

- Evolution has called for long bones to be able to
- Support weight
- Preform speedy movements
- These are often conflicting roles for bone structure

Bone Structure

The two conflicting roles of weight support, yet lightness in construction are met by: tubular constructions of compact bone in the shaft; light, cancellous bone at the ends; efficient arrangement of struts and ties in cancellous bone to minimise weight.