SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai

DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE TECHNOLOGY

COURSE NAME: Anatomy

UNIT II – Bones

TOPIC: Anatomy of Bone and its Classification

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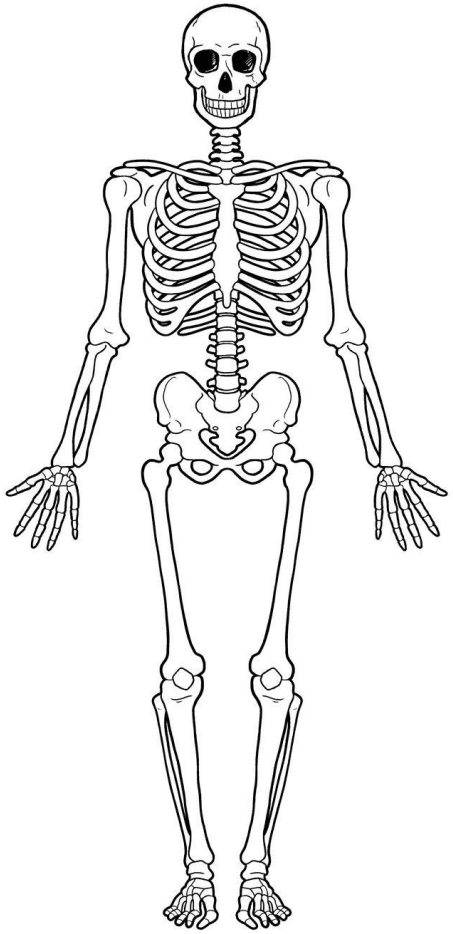
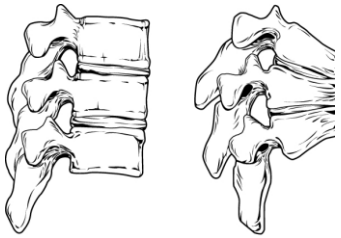
Empathize: Understanding the Importance of Bone Anatomy

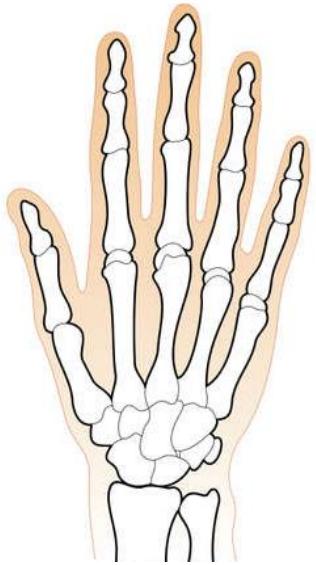
- Bone anatomy is crucial for healthcare professionals, athletes, and students.
- Bones provide support, protection, movement, and mineral storage.
- **Common challenges:** Visualizing complex bone structures, understanding clinical relevance, and remembering classifications.



Define: What is Bone Anatomy?

Bone anatomy is the study of bone structure, classification, and function.

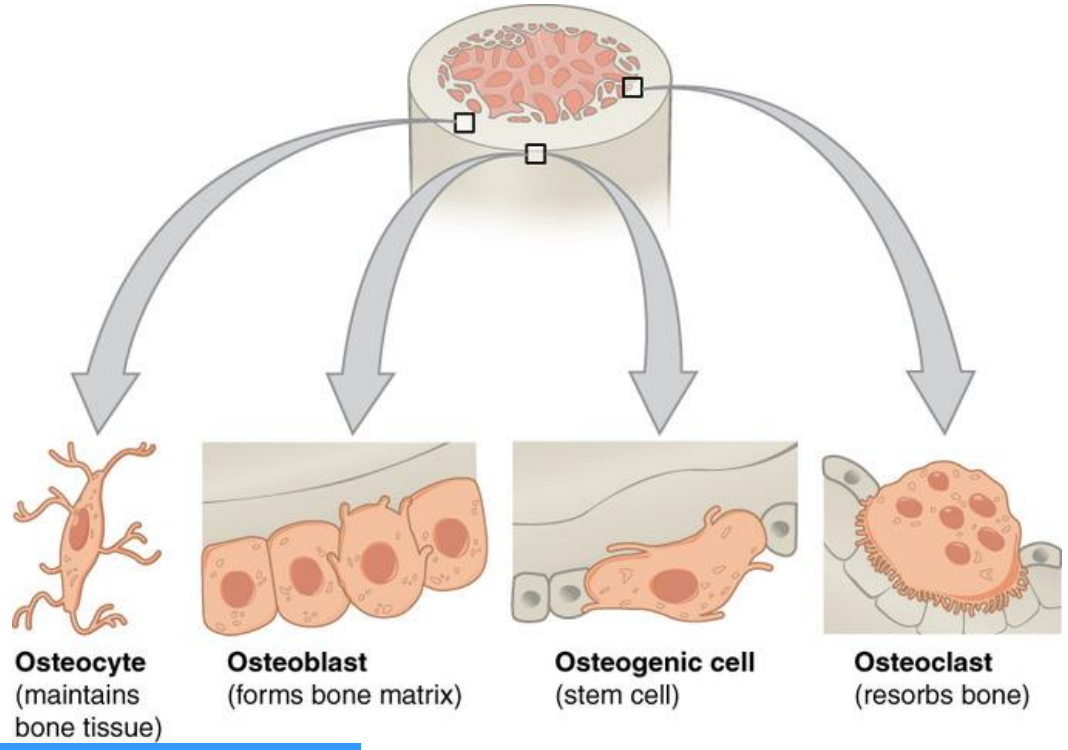




Bone	Functions
Long bones	Support weight and enable movement.
Short bones	Provide stability and limited motion.
Flat bones	Protect organs & provide muscle attachment.
Irregular	Protect organs and allow movement.
Sesamoid	Protect tendons and improve muscle action.

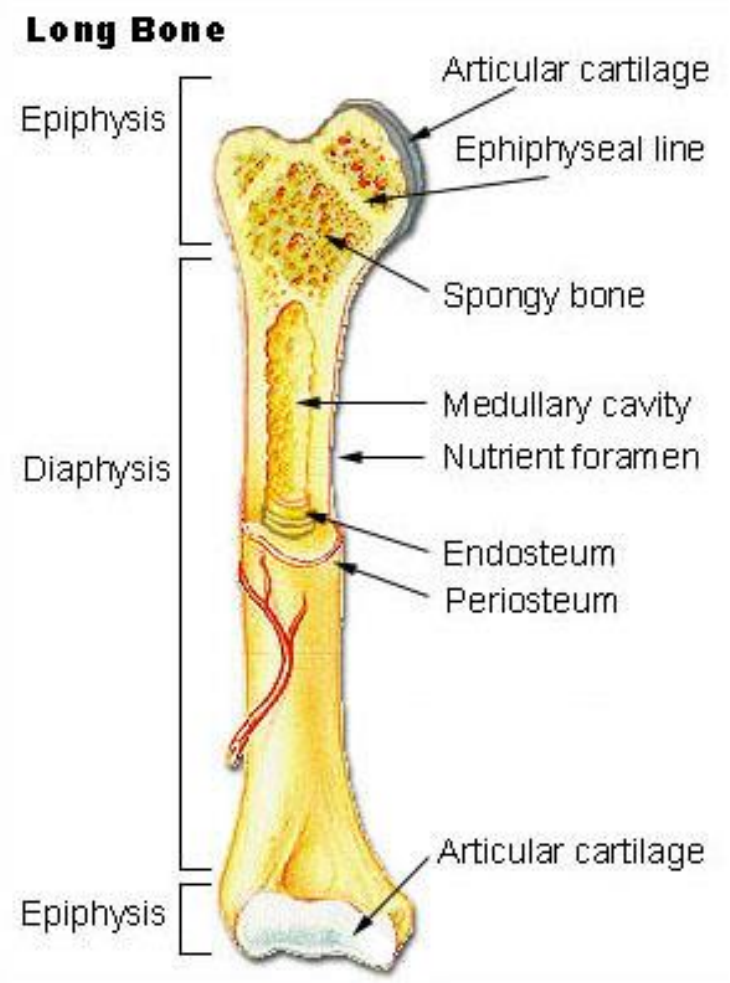
Ideate: Brainstorming Bone Structure Concepts

- **Gross anatomy:** Diaphysis (shaft), epiphysis (ends), metaphysis (growth zone), medullary cavity.
- **Microscopic anatomy:** Osteons (Haversian systems), lamellae, lacunae, canaliculi, central canal.
- **Bone tissue types:** Compact (cortical) bone and spongy (trabecular/cancellous) bone.
- **Bone cells:** Osteoblasts (bone formation), osteocytes (maintenance), osteoclasts (resorption)



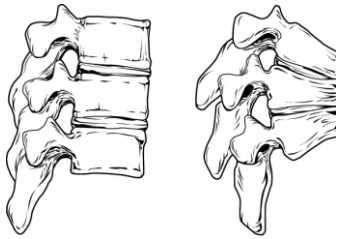
Prototype: Building a Model of a Long Bone

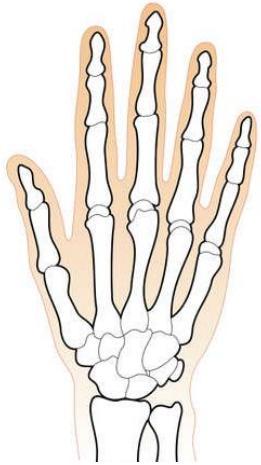
- **Diaphysis:** Thick, compact bone forming the shaft; contains medullary cavity filled with yellow marrow.
- **Epiphysis:** Ends of bone, mainly spongy bone covered by thin compact bone; contains red marrow for haematopoiesis
- **Metaphysis:** Region between diaphysis and epiphysis
- **Periosteum:** Outer membrane covering bone; contains blood vessels and nerves.



Test: Exploring Bone Classification and Functions

Bone	Example	Functions
Long bones	Femur, tibia, Humerus	Function as levers for movement.
Short bones	Carpals, tarsals	Provide stability and support.
Flat bones	Skull, ribs, sternum	Protect organs and provide muscle attachment.
Irregular	Vertebrae, facial bones	Protect organs and allow movement.
Sesamoid	Patella	Protect tendons and improve muscle action.

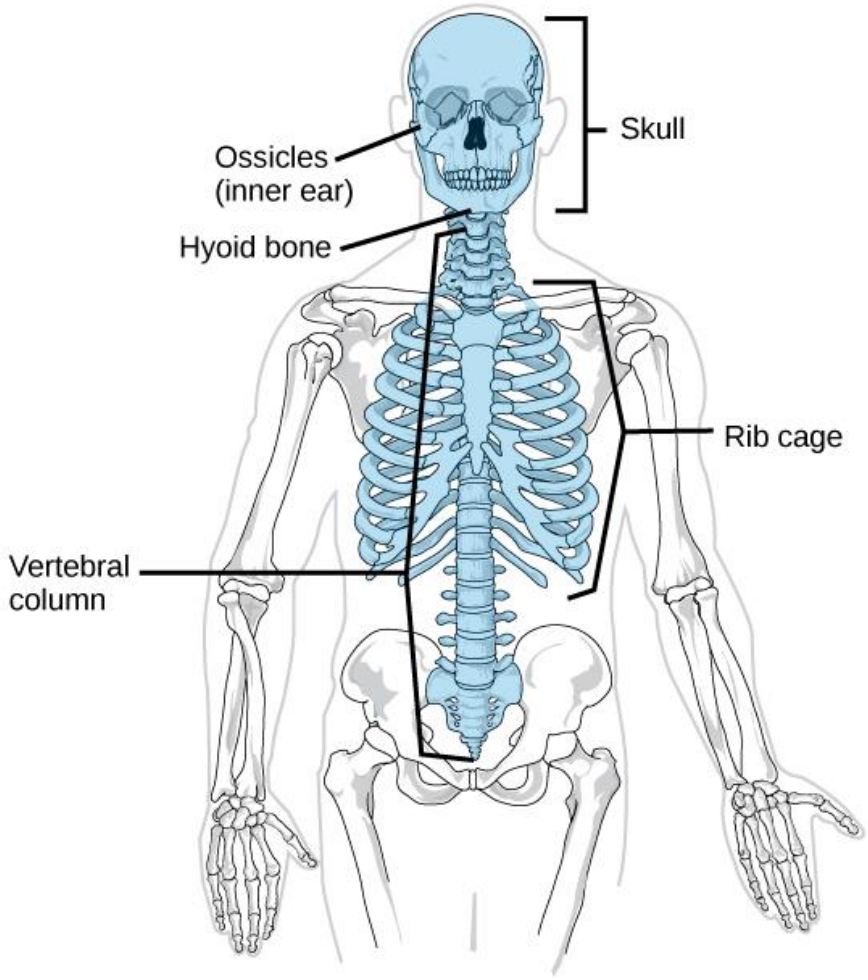




Classification by Region

Axial skeleton:

- Cranial Bone – Skull Bone (8) & Facial Bone (14)
- Vertebral Bone – Cervical (7), Thoracic (12), Lumbar (5), Sacral (1), Coccyx (1)
- Sternal Bone (1)
- Auditory Ossicles (3)

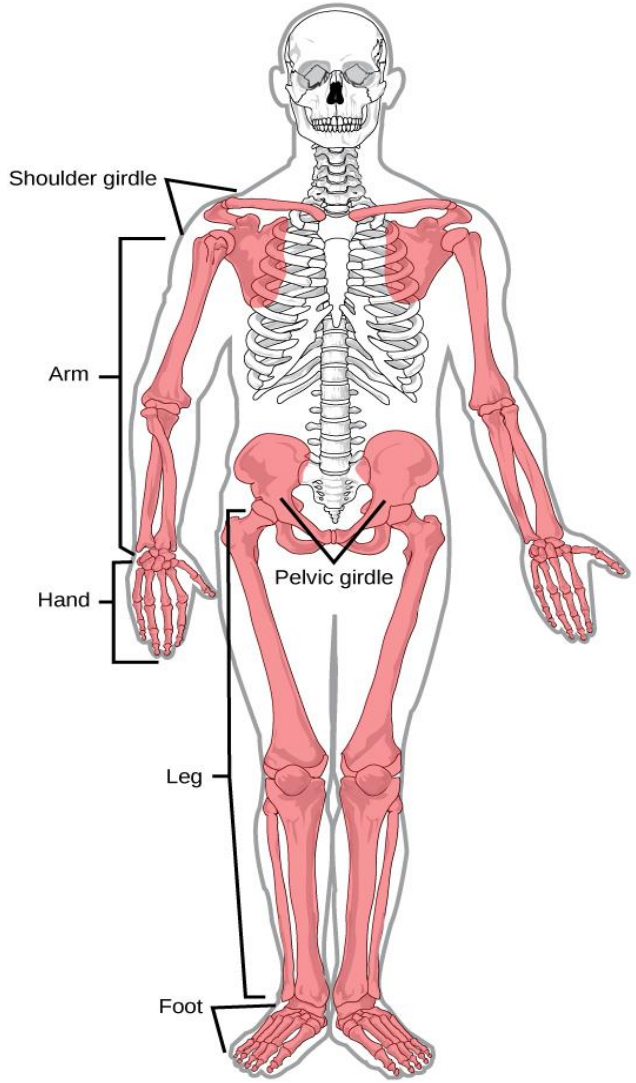


Classification by Region

Appendicular Region

- **Pectoral Girdle** – Shoulder Blade (2), Clavicle (2)
- Pelvic Girdle - Coxal, innominate, or hip bones (2)

Upper Extremity	Lower Extremity
Humerus (2)	Femur (2)
Radius (2)	Tibia (2)
Ulna (2)	Fibula (2)
Carpals (16)	Patella (2)
Metacarpals (10)	Tarsals (14)
Phalanges (28)	Metatarsals (10)
	Phalanges (28)

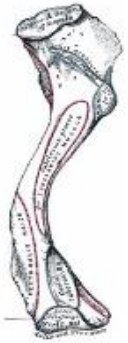


Classification by Structure

- **Compact (dense) bone:** Hard, outer layer of bone.
- **Spongy (cancellous) bone:** Inner, porous layer.
- **Membranous bones:** Formed directly from mesenchyme.
- **Cartilaginous bones:** Formed from cartilage.
- **Membro-cartilaginous bones:** Formed from both membrane and cartilage.

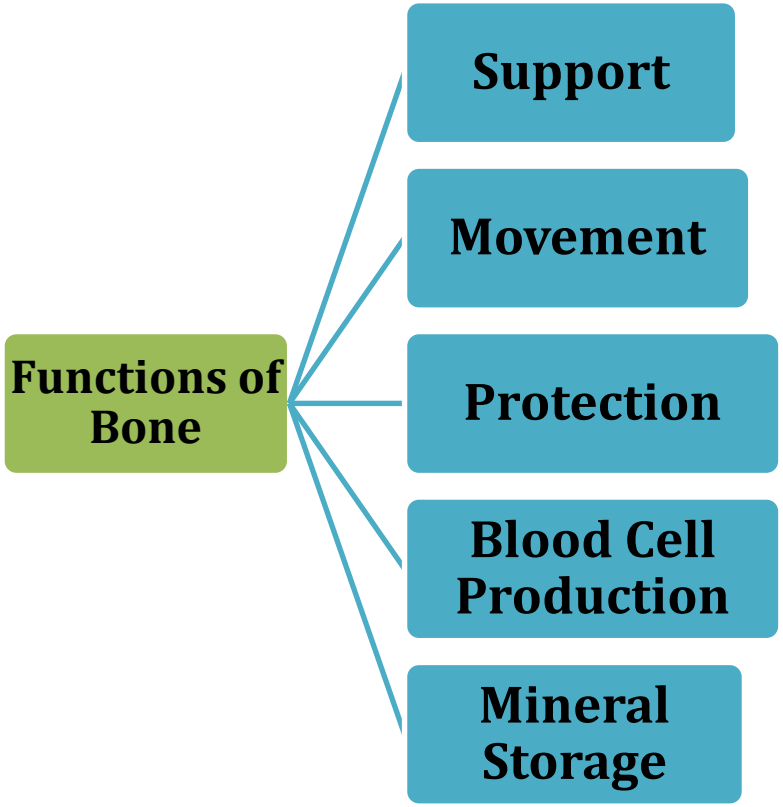
Membranous Bones

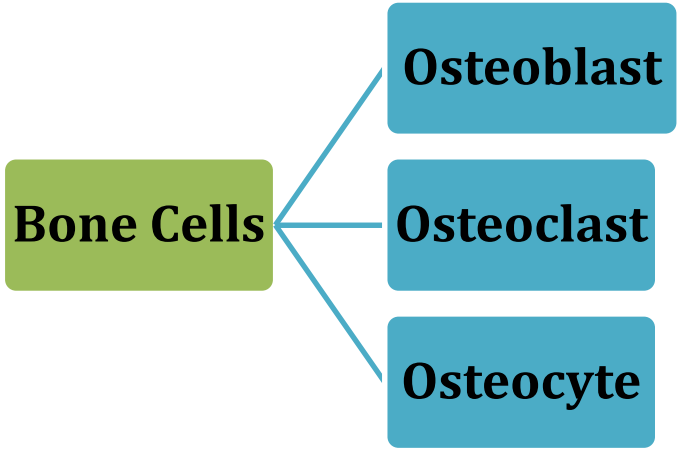
Cartilaginous Bones

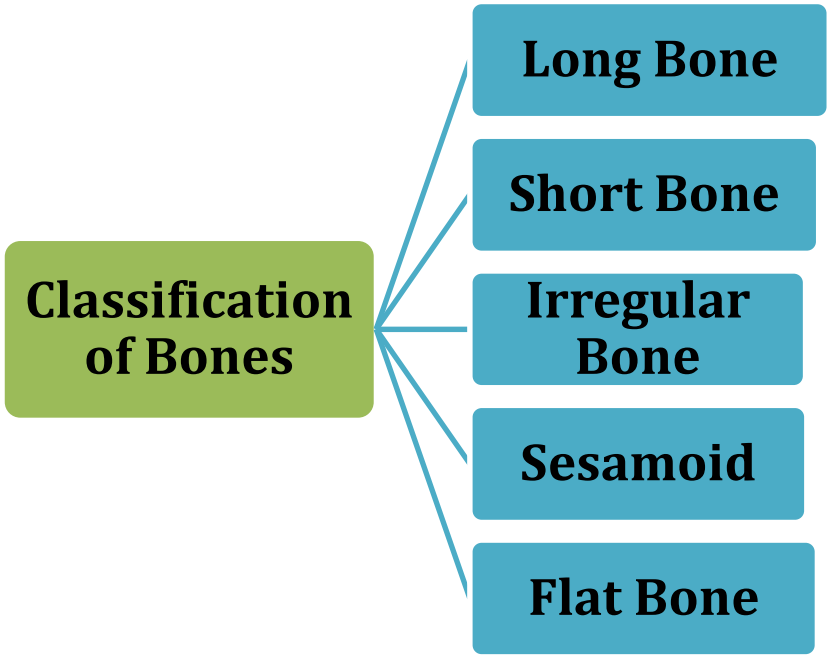


Membrocartilaginous Bones

Summary


Functions of Bone
Support
Movement
Protection
Blood Cell Production
Mineral Storage


Bone Cells
Osteoblast
Osteoclast
Osteocyte


Classification of Bones
Long Bone
Short Bone
Irregular Bone
Sesamoid
Flat Bone

References

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THANK YOU