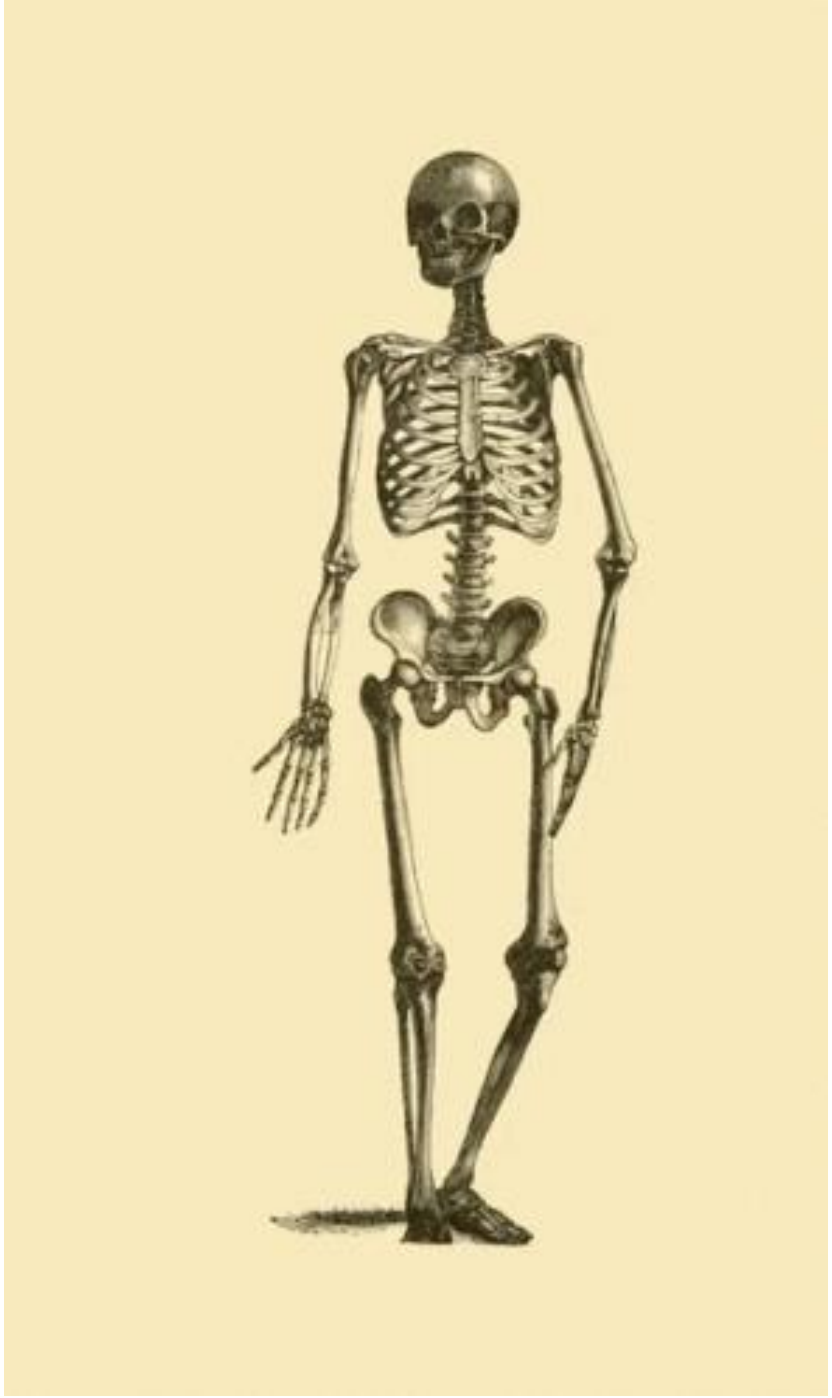
Anatomy first year medical students

Dr Amal Albtoosh

22/2/2021



BRS

BOARD REVIEW SERIES

Gross Anatomy

NINTH EDITION

Nancy L. Halliday
Harold M. Chung

Wolters Kluwer

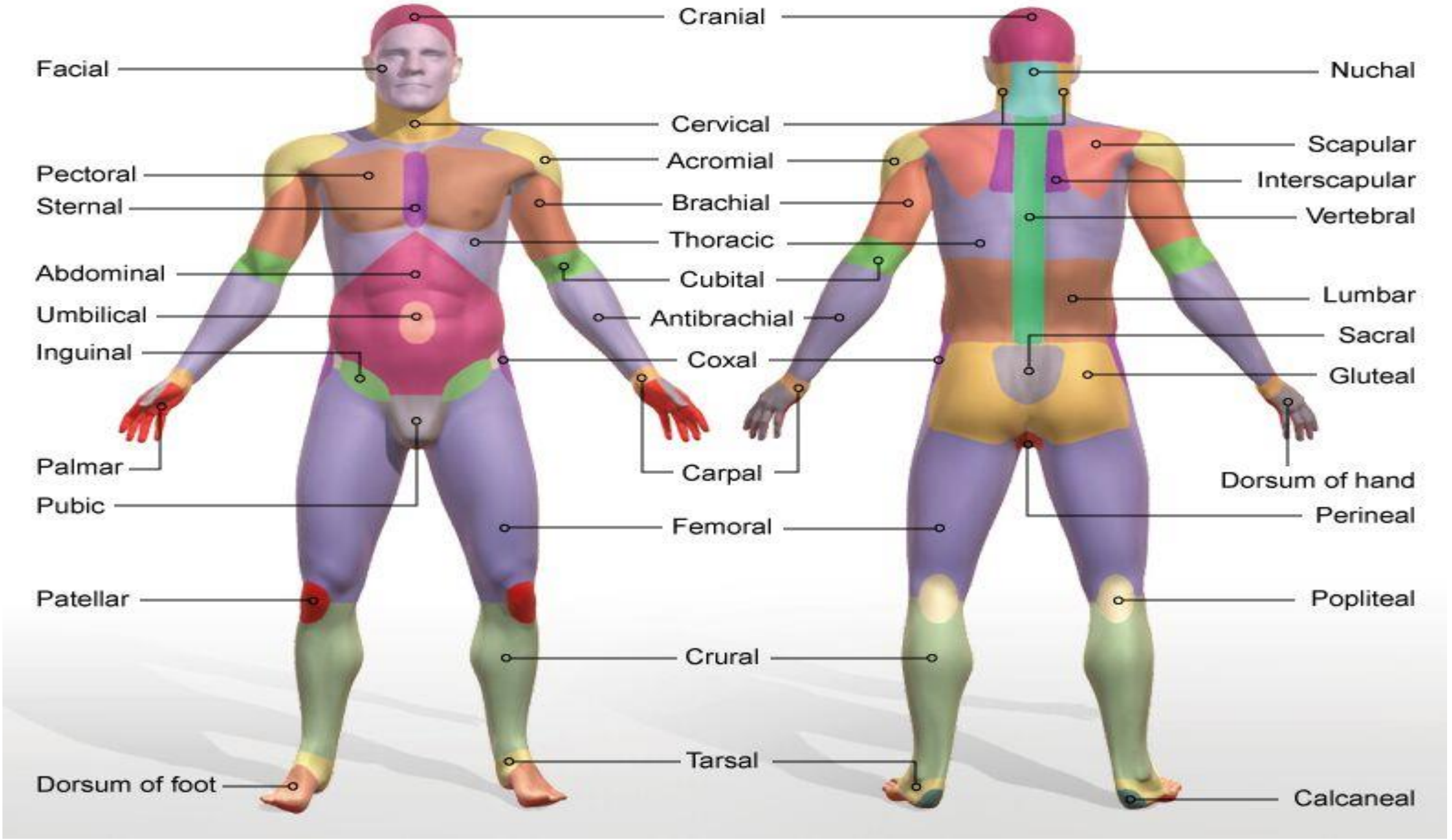
* Gross anatomy is the study of anatomy at the visible or macroscopic level. The counterpart to gross anatomy is the field of histology, which studies microscopic anatomy.
The **word** is derived from the Greek ana-, up; and tome-, a cutting. As might be suspected from its **etymology**, **anatomy** depends heavily on dissection

- Gross anatomy can be approached through the study of body systems, by regions, or through clinically significant anatomic concepts.

- **Systemic anatomy** relates structure to function by organ systems, such as the respiratory, digestive, or reproductive systems.

- **Regional anatomy** is based on regions and deals with all organs and structural and functional relationships in identified parts of the body, such as the thorax and abdomen, with emphasis on skeletal elements, muscles, organs, nerves, and blood vessels.

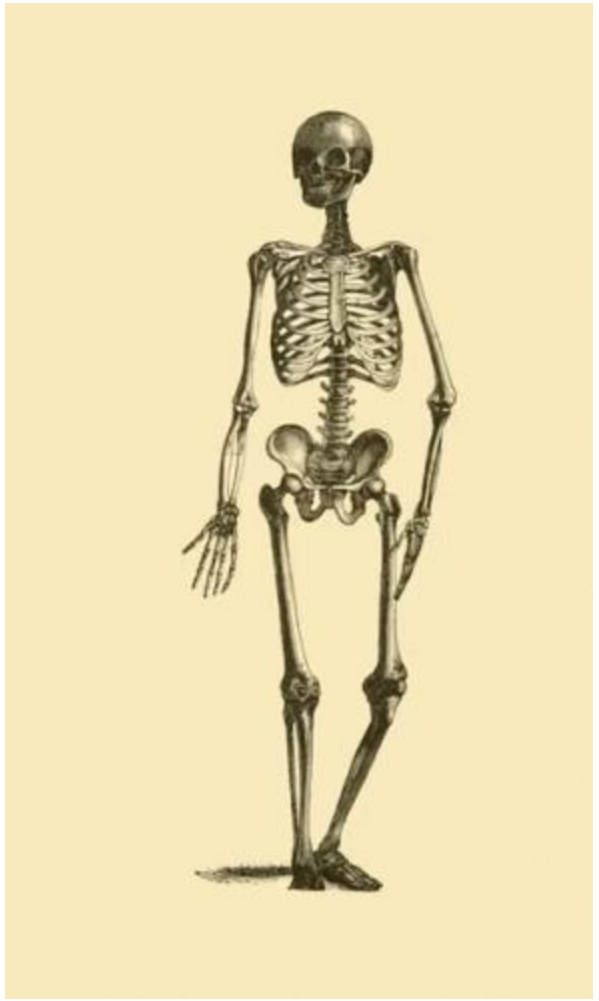
- ✓ Anatomy is best when reinforced by relating it to clinical medicine, and thus **clinical anatomy** emphasizes the practical application of anatomic knowledge to the solution of clinical problems. Long-term, this has a real pertinence to the practice of medicine.


Cranial
Facial
Nuchal
Cervical
Scapular
Acromial
Pectoral
Interscapular
Brachial
Sternal
Vertebral
Thoracic
Abdominal
Cubital
Lumbar
Umbilical
Antibrachial
Sacral
Inguinal
Coxal
Gluteal
Palmar
Carpal
Dorsum of hand
Pubic
Perineal
Femoral
Patellar
Popliteal
Crural
Tarsal
Dorsum of foot
Calcaneal

Skeletal system

- Consists of the **axial skeleton** (bones of the head, vertebral column, ribs, and sternum)

- and the **appendicular skeleton** (bones of the extremities).



BONES

Are classified into:

- ✓ long,
- ✓ short,
- ✓ flat,
- ✓ irregular,
- ✓ and sesamoid bones.

According to their developmental history, they are also categorized into

endochondral

and membranous bones

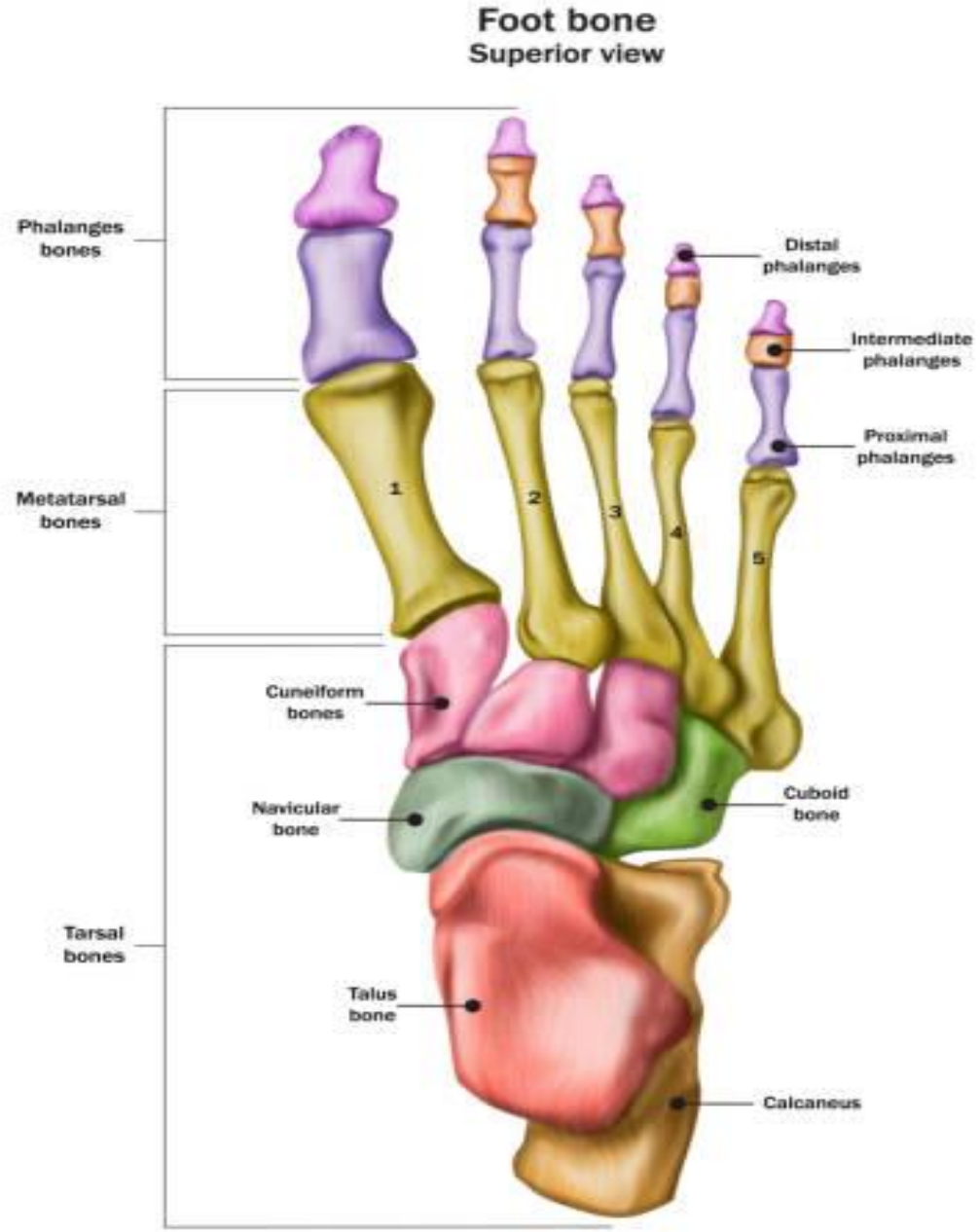
A. Long bones

■ Include the :
humerus,
Radius and ulna,
femur,
tibia, fibula
metacarpals, and phalanges.

Add these bones too:

Clavicle

Metatarsal and phalanges

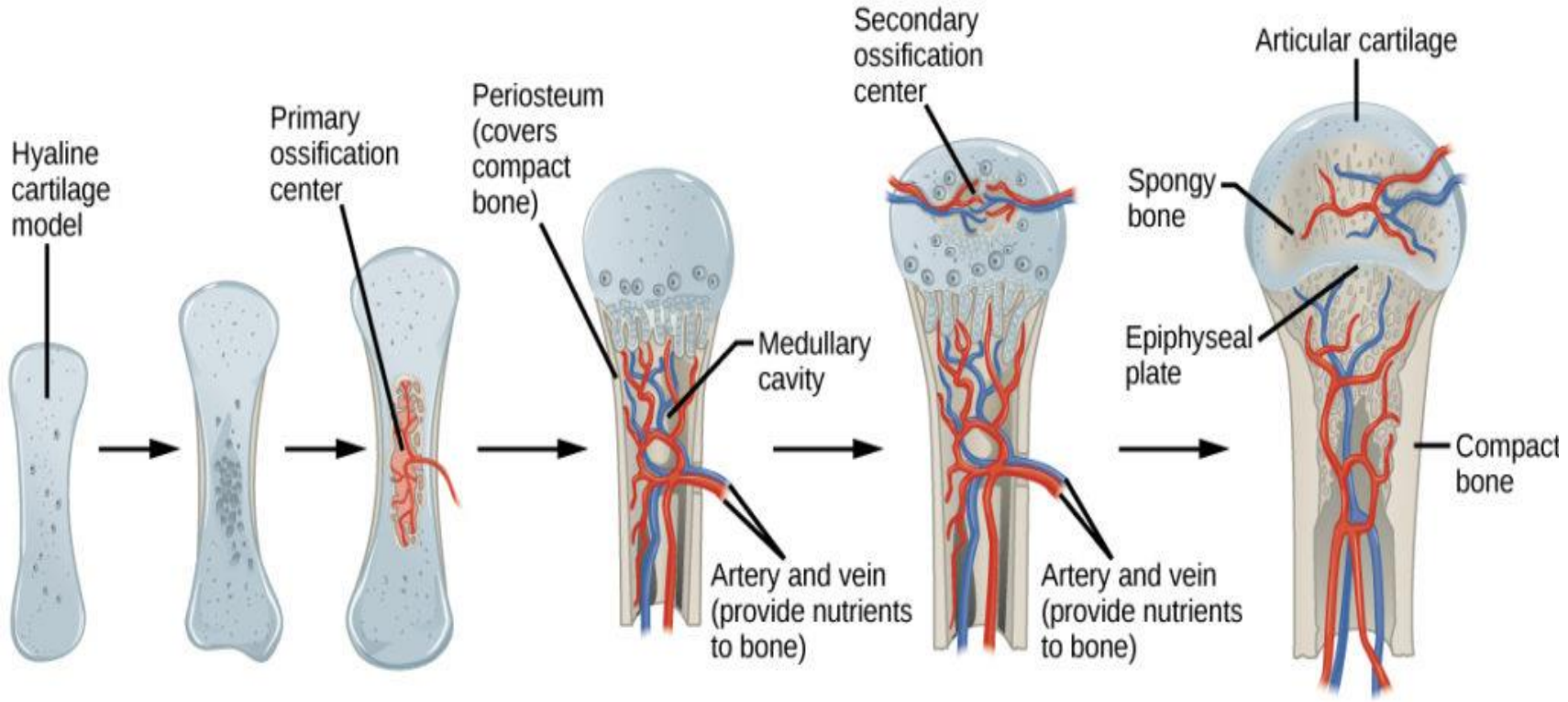

Foot bone
Superior view
Phalanges bones
Metatarsal bones
Tarsal bones
Distal phalanges
Intermediate phalanges
Proximal phalanges
1
2
3
4
5
Cuneiform bones
Navicular bone
Cuboid bone
Talus bone
Calcaneus

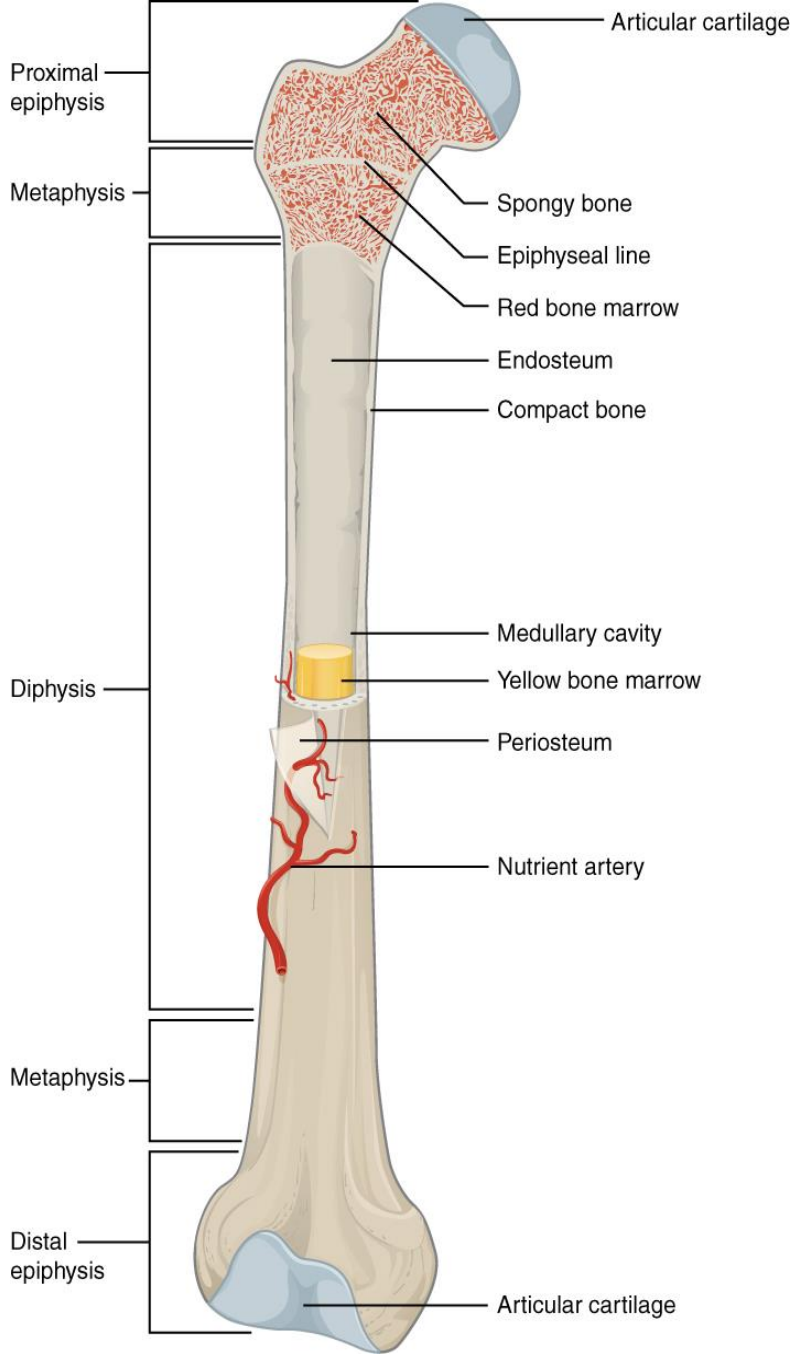
Anterior view of right leg

LONG BONE

Develop by replacement of hyaline cartilage plate (endochondral ossification).

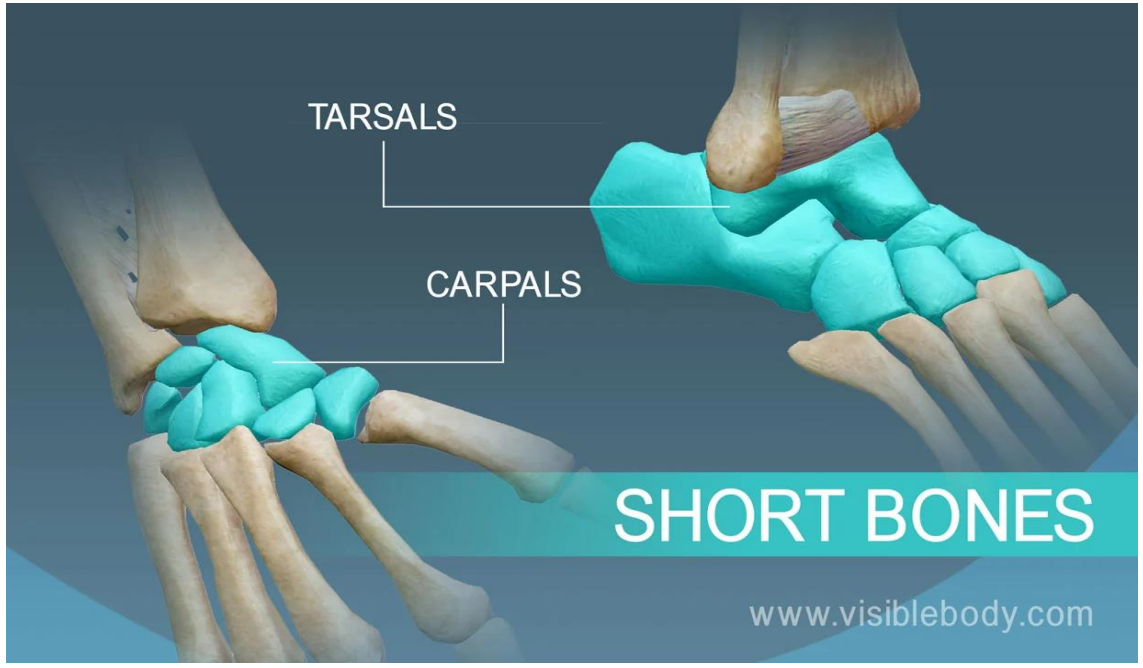
■ Have a shaft (diaphysis) and two ends (epiphyses). The metaphysis is a part of the diaphysisadjacent to the epiphyses.

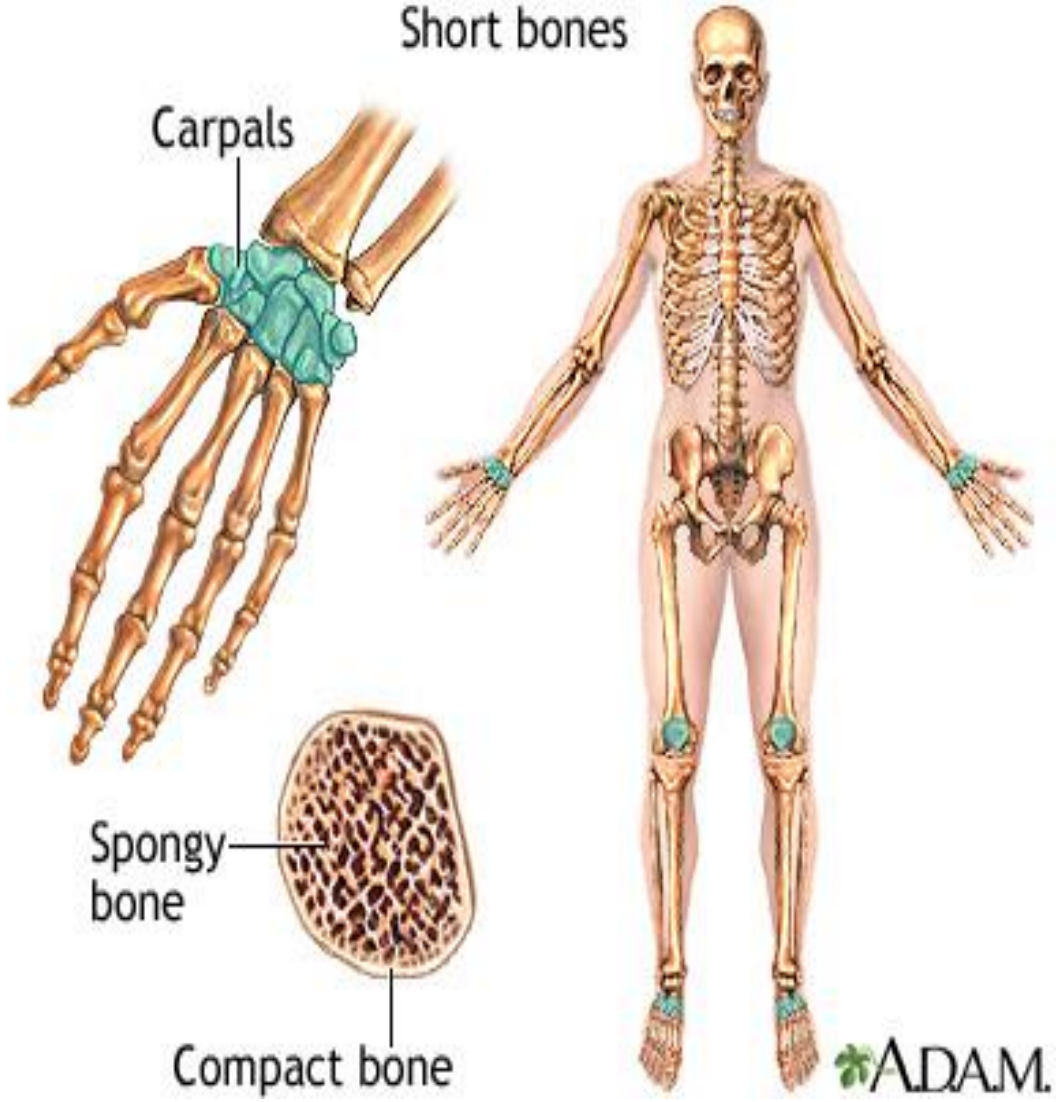




B. Short bones

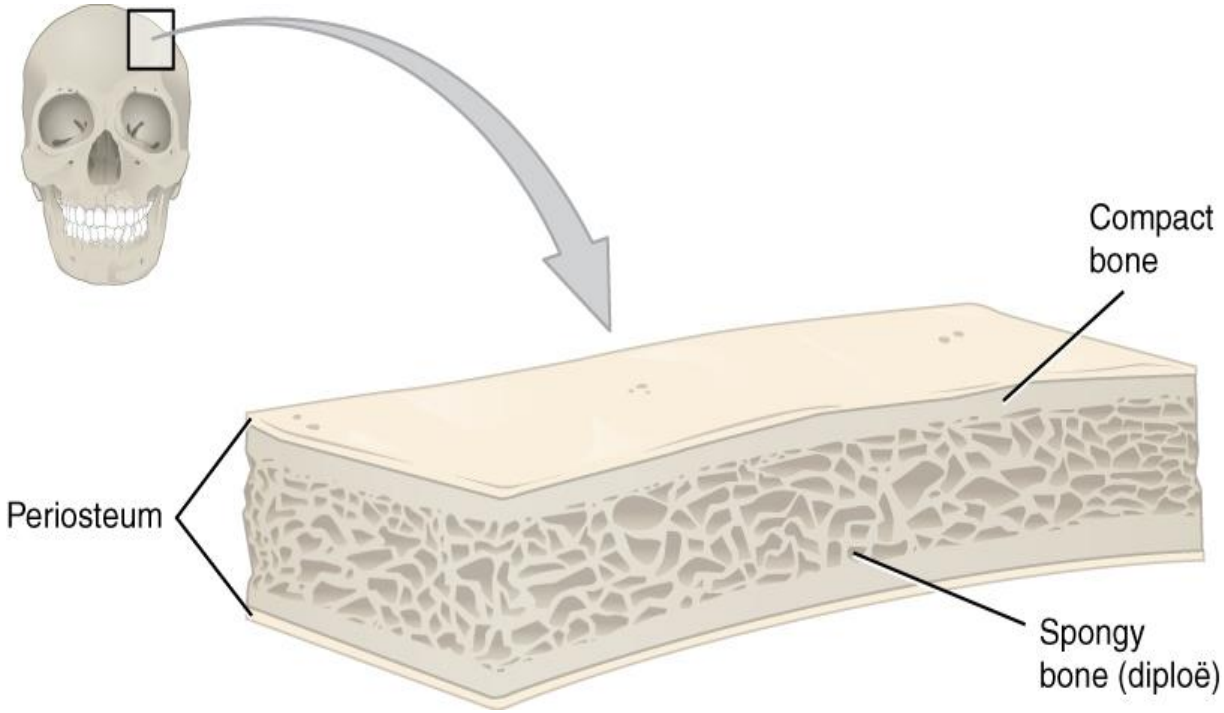
- Include the carpal and tarsal bones and are approximately cuboid shaped.
- Are composed of spongy bone and marrow surrounded by a thin outer layer of compact bone.

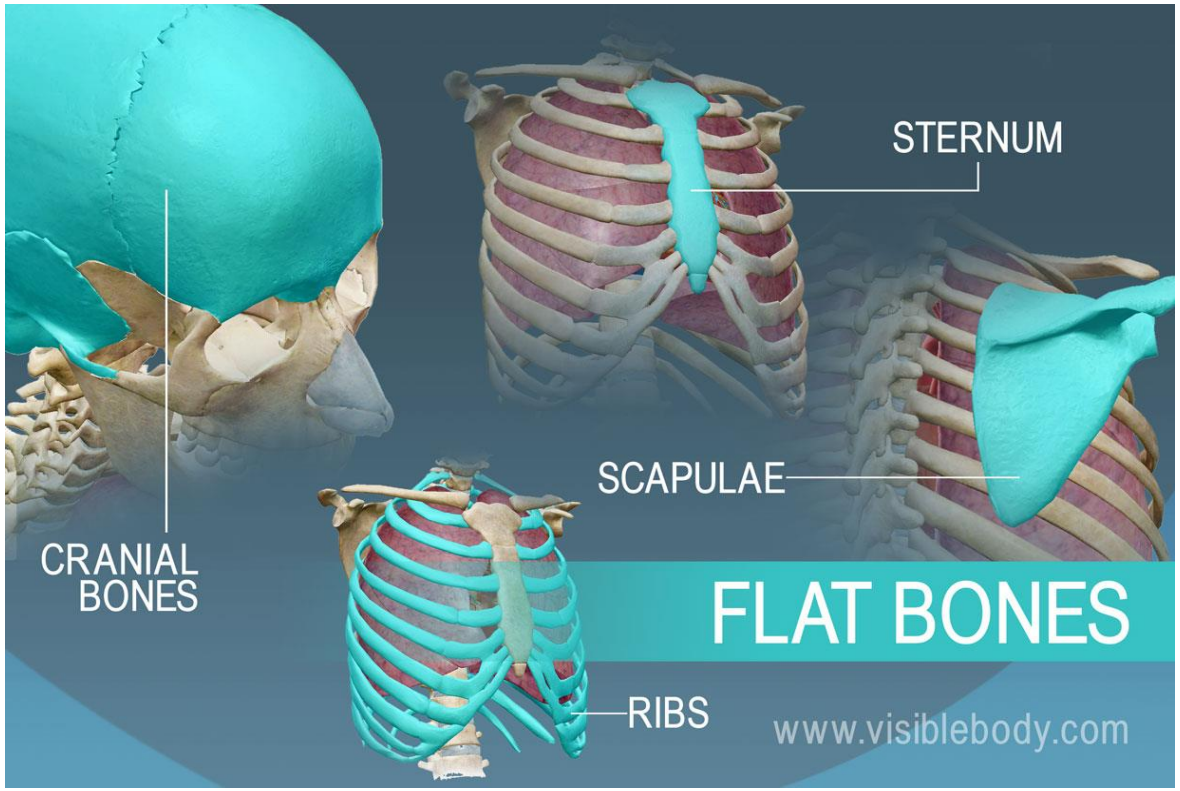




C. flat bones

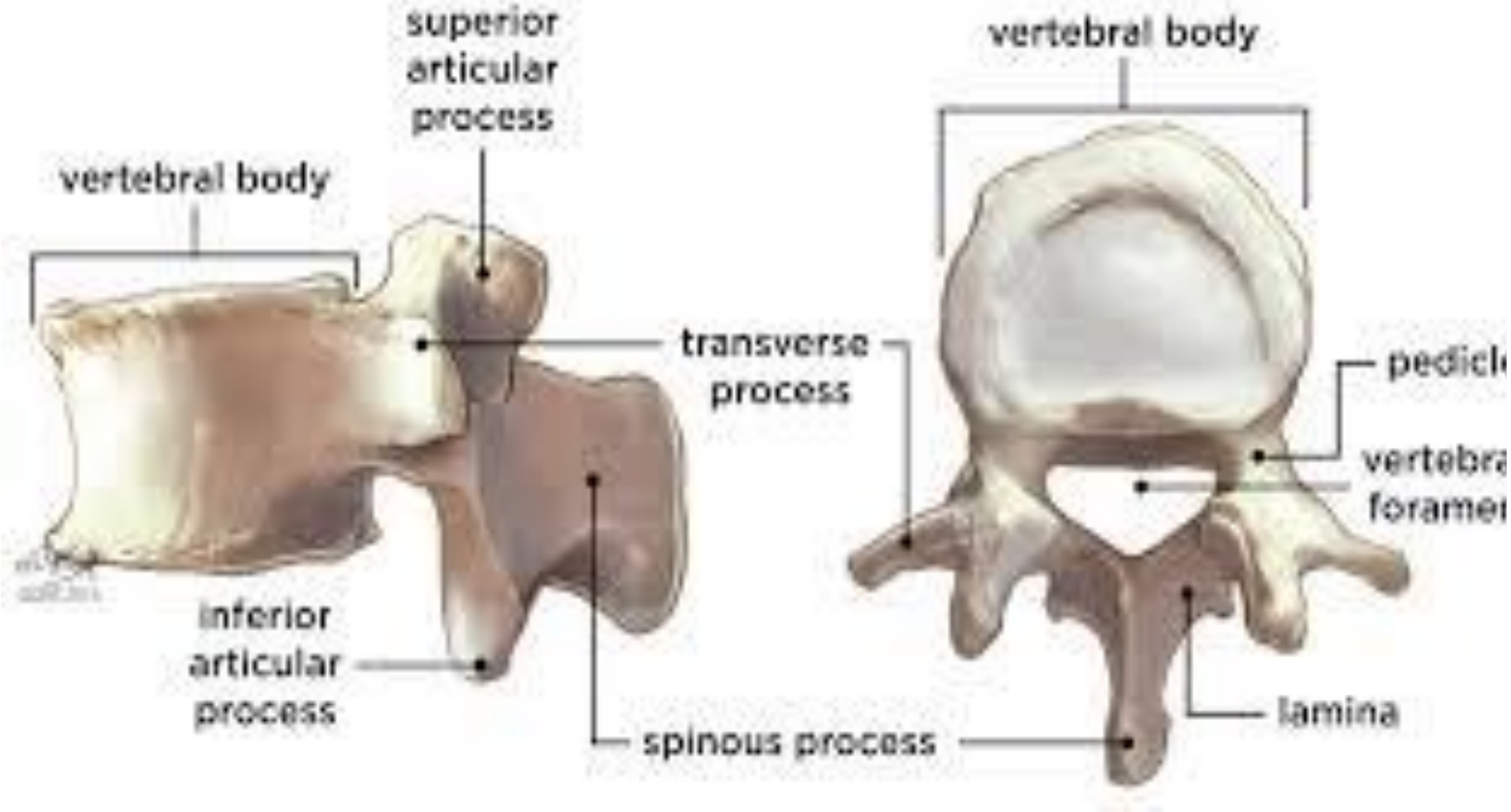
• Include the ribs, sternum, scapulae, and bones of the cranial vault
• Consist of two layers of compact bone enclosing spongy bone with a marrow space (diploie).
• Have articular surfaces that are covered with fibrocartilage and grow by the replacement of connective tissue.

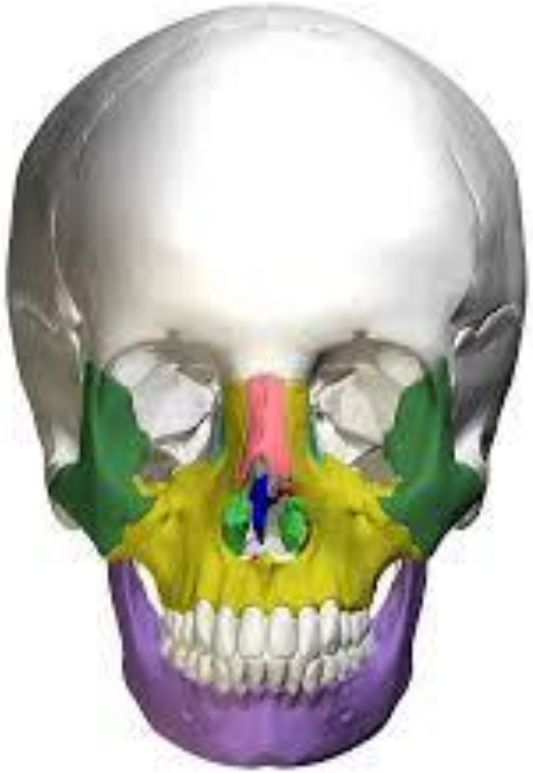


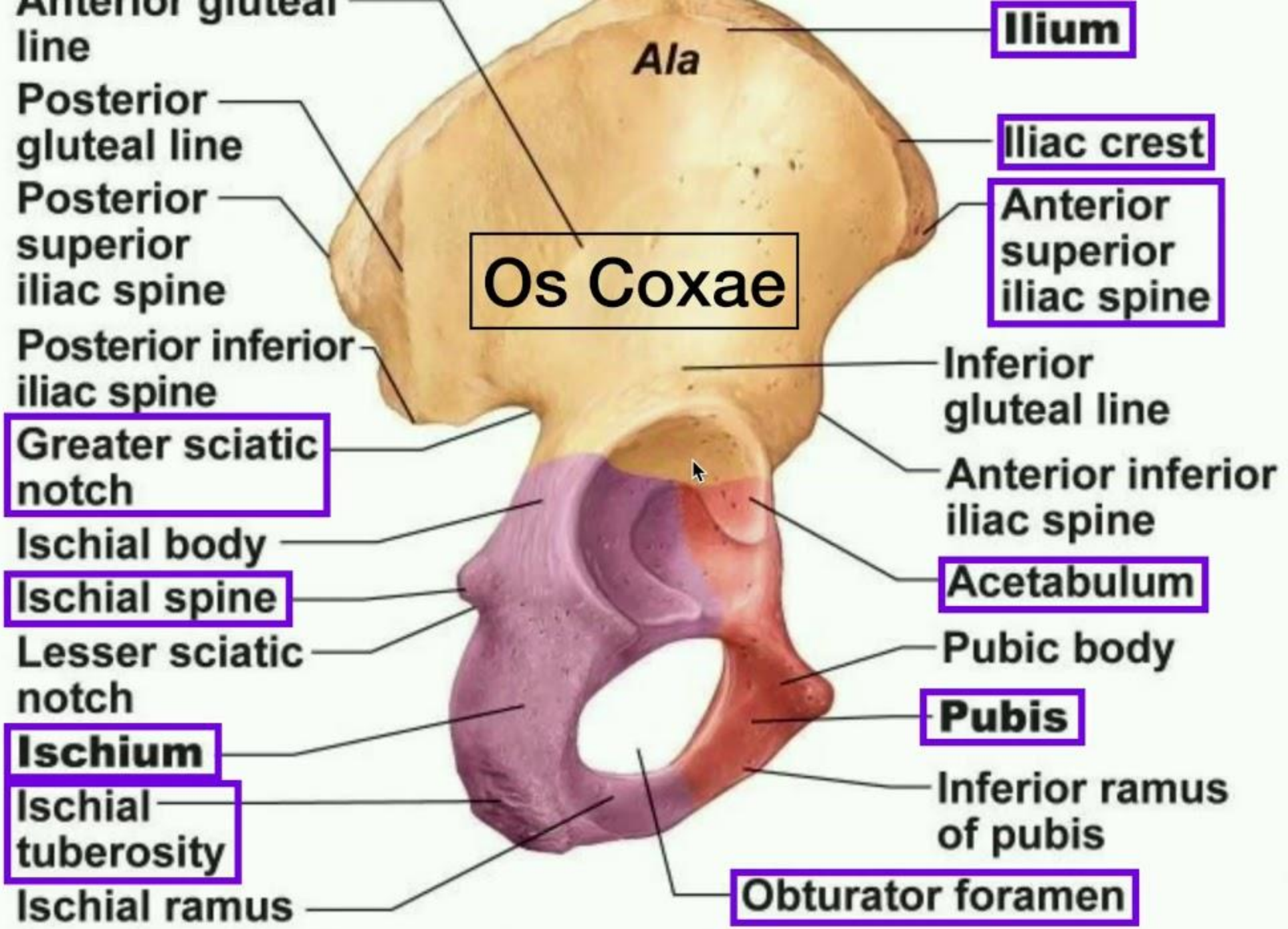


D. Irragular bones

- Include bones of mixed shapes, such as bones of the face, vertebrae, and coxa .
- Contain mostly spongy bone enveloped by a thin outer layer of compact bone.






Anterior gluteal line
Posterior gluteal line
Posterior superior iliac spine
Posterior inferior iliac spine
Greater sciatic notch
Ischial body
Ischial spine
Lesser sciatic notch
Ischium
Ischial tuberosity
Ischial ramus
Ala
Os Coxae
Ilium
Iliac crest
Anterior superior iliac spine
Inferior gluteal line
Anterior inferior iliac spine
Acetabulum
Pubic body
Pubis
Inferior ramus of pubis
Obturator foramen

E. Sesamoid bones

- Develop in certain tendons and reduce friction on the tendon and shift the mechanical advantage,
thus protecting it from excessive wear.

• Are commonly found where certain tendons cross synovial articulations at the ends of long bones
in the limbs, as in the wrist (i.e., pisiform) and the knee (i.e., patella).


SHORT
LONG
FLAT
SESAMOID
IRREGULAR
BONE TYPES
www.visiblebody.com

Regional Classification of Bones

Axial skeleton		Appendicular skeleton			
SKULL		SHOULDER GIRDLES		Pelvic Girdle	
Cranium	8	Clavicle	2	Hip bones	2
Face	14	Scapula	2		
Auditory ossicles	6	Upper limb bones		Lower limb bones	
Hyoid	1	Humerus	2	Femur	2
				Patellae	2
Vertebrae (including sacrum and coccyx)	26	Radius	2	Fibula	2
		Ulna	2	Tibia	2
		Carpals	16	Tarsals	14
Sternum	1	Meta-carpals	10	Meta-tarsals	10
Ribs	24	phalanges	28	Phalanges	28

Total bones' number : 206

Snell, R. (2012). *Clinical anatomy by regions* (9th ed.). Philadelphia, Pa. ; London: Lippincott Williams & Wilkins.

Bone type	characteristics	Example
Long bone	Their length is Greater than their breadth	Found in the limbs (e.g., The humerus, femur, Metacarpals, metatarsals, and phalanges
Short bone	They are roughly Cuboidal in shape	Found in the hand and foot (e.g., The Scaphoid, lunate, talus, and calcaneum).
Flat bone	They are composed of thin layer of bone	✓In the vault of the skull (e.g., The frontal And parietal bones) ✓ The scapulae, although Irregular, are included in this group
Irregular bones	Irregular bones include those not assigned to the previous groups	The bones of the face, the vertebrae, and the Pelvic bones).
Sesamoid bones	Small nodules of bone that are found in certain tendons . The greater part of a sesamoid bone is buried in the tendon.	The largest sesamoid bone is the patella, which is located in the tendon of the quadriceps femoris

II. JOINTS

- Are places of union between two or more bones.

• Are innervated as follows: the nerve supplying a joint also supplies the muscles that move the joint and the skin covering the insertion of such muscles

(Hilton law).

• Are classified on the basis of their structural features into fibrous, cartilaginous, and synovial types.

A. Fibrous joints (synarthroses)

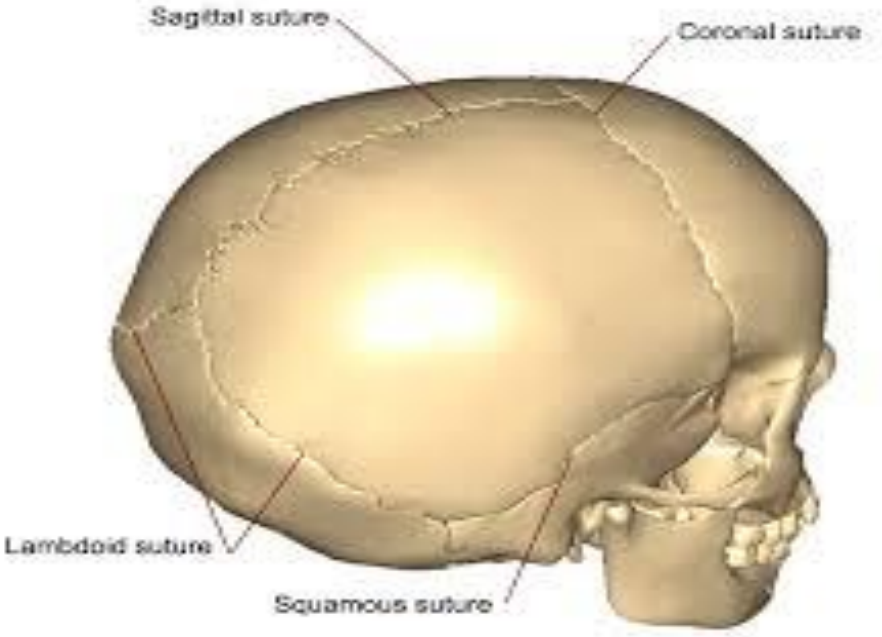
Are joined by fibrous tissue, have no joint cavities, and permit little movement.

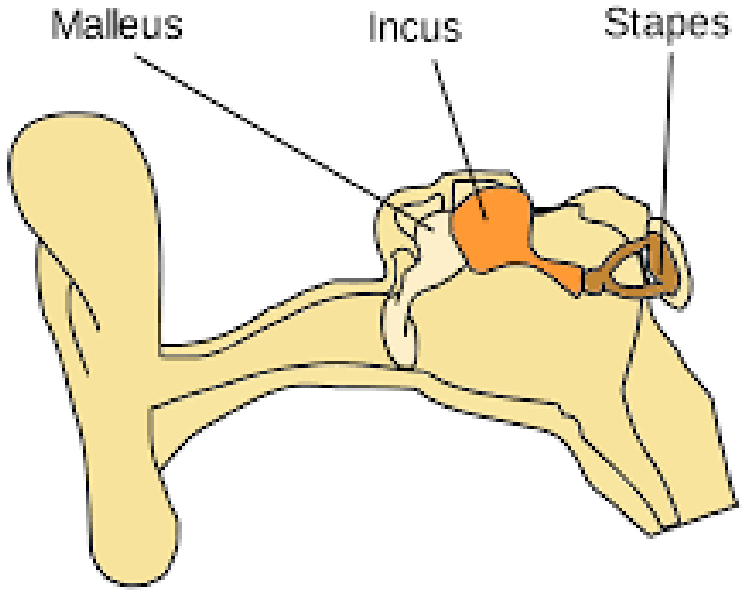
1. Sutures

Are connected by fibrous connective tissue, such as the fibrous continuities between the flat bones of the skull.

2. Syndesmoses

Are connected by dense fibrous connective tissue.
Occur as the inferior tibiofibular syndesmoses
and tympanostapedial syndesmoses
(between the foot plate of the stapes and the oval window in the middle ear).





Auditory ossicles

B. Cartilaginous joints

Are united by cartilage and have no joint cavity.

1. Primary cartilaginous joints (synchondrosas)

Are united by hyaline cartilage and permit little to no movement but allow for growth in length during childhood and adolescence.

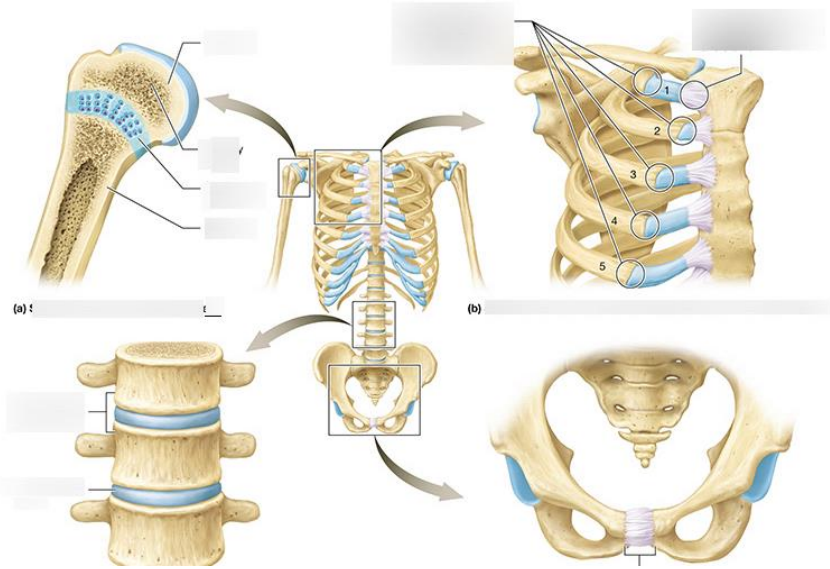
Include epiphyseal cartilage plates (the union between the epiphysis and the diaphysis of a growing bone) and spheno-occipital and manubriosternal synchondroses.

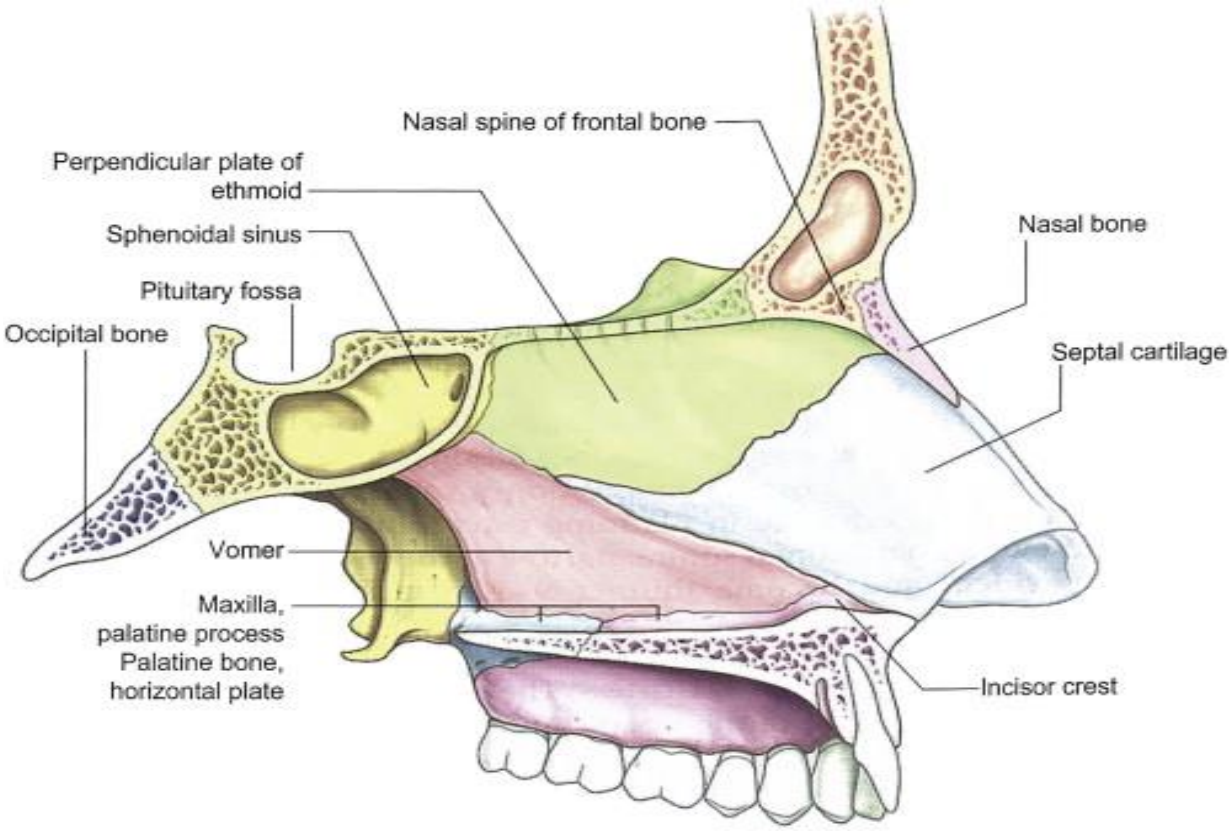
2. Secondary cartilaginous joints (symphyses)

Are joined by fibrocartilage and are slightly movable joints.

Are all located in the median plane and include the pubic symphysis and the intervertebral

disks.





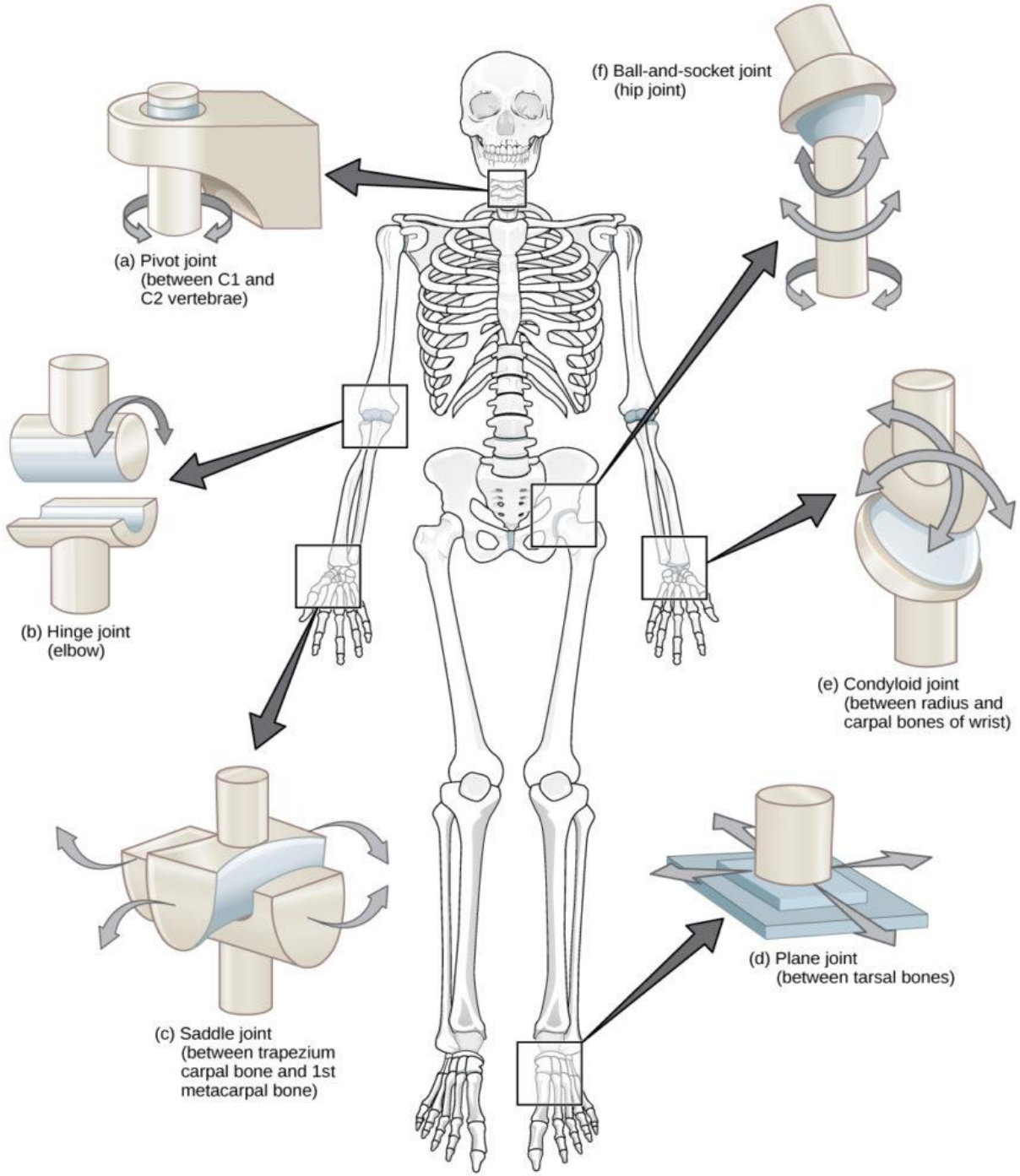
C. Synovial (diarthrodial) joints

❖ Are found between two separate skeletal elements

❖ and permit certain degrees of movement according to the shape of the articulation and/ or the type of movement.

❖ Are characterized by four structural features:

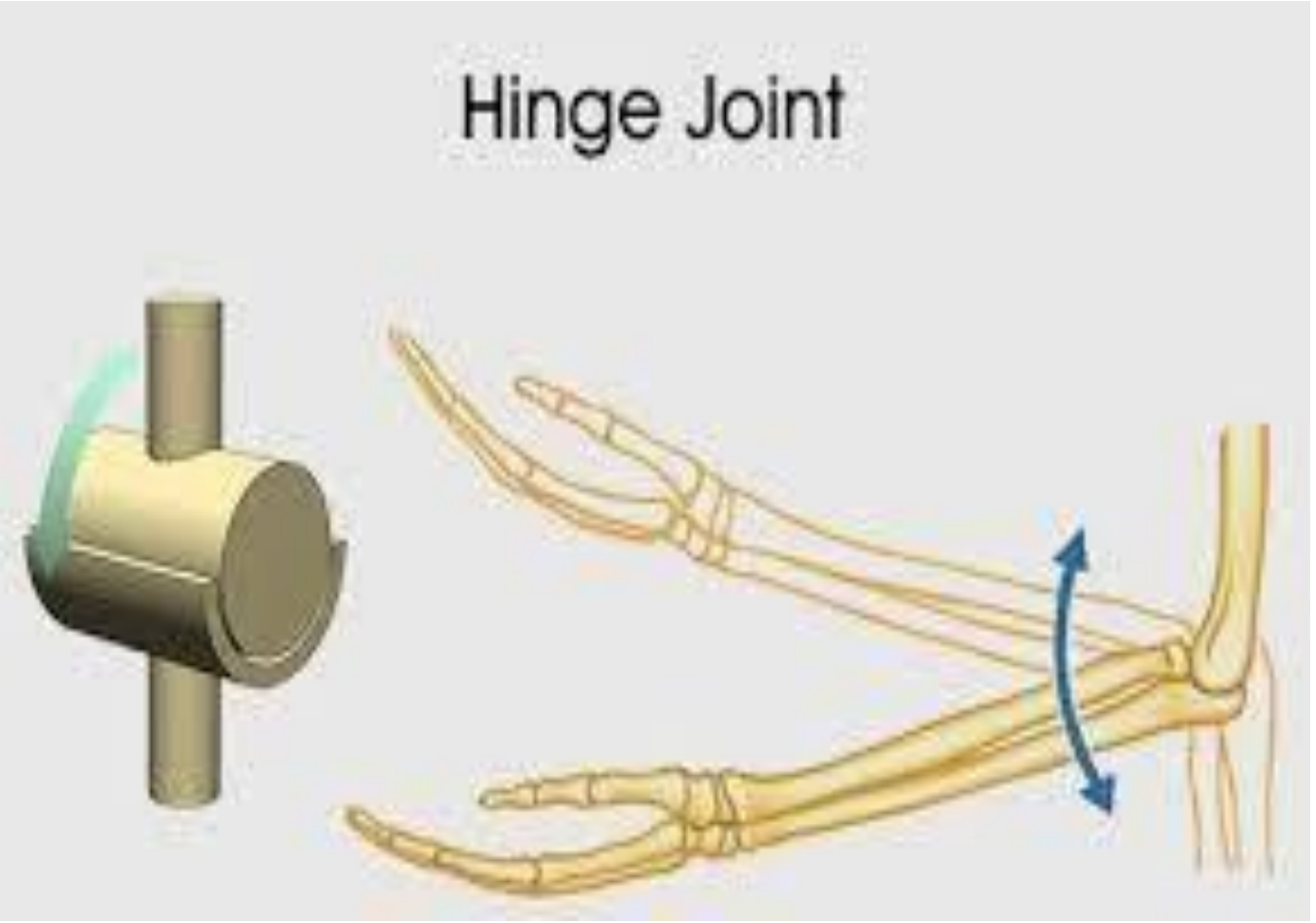
✓ joint cavity or space,
✓ articular (hyaline) cartilage,
✓ synovial membrane, which produces synovial fluid,
✓ and articular capsule.



2. Hinge (ginglymus) joints

Resemble door hinges and allow only flexion and extension.

Occur in the elbow, ankle, and interphalangeal joints.

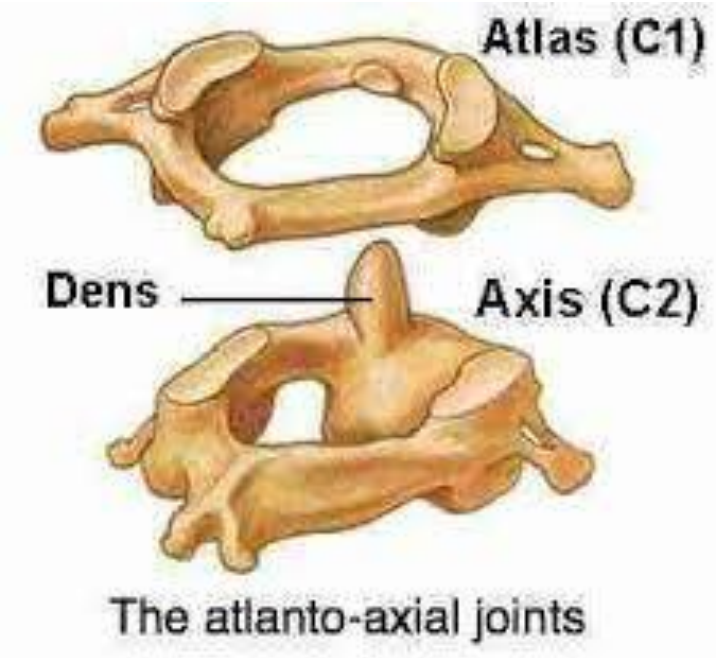


3. Pivot (trochoid) joints

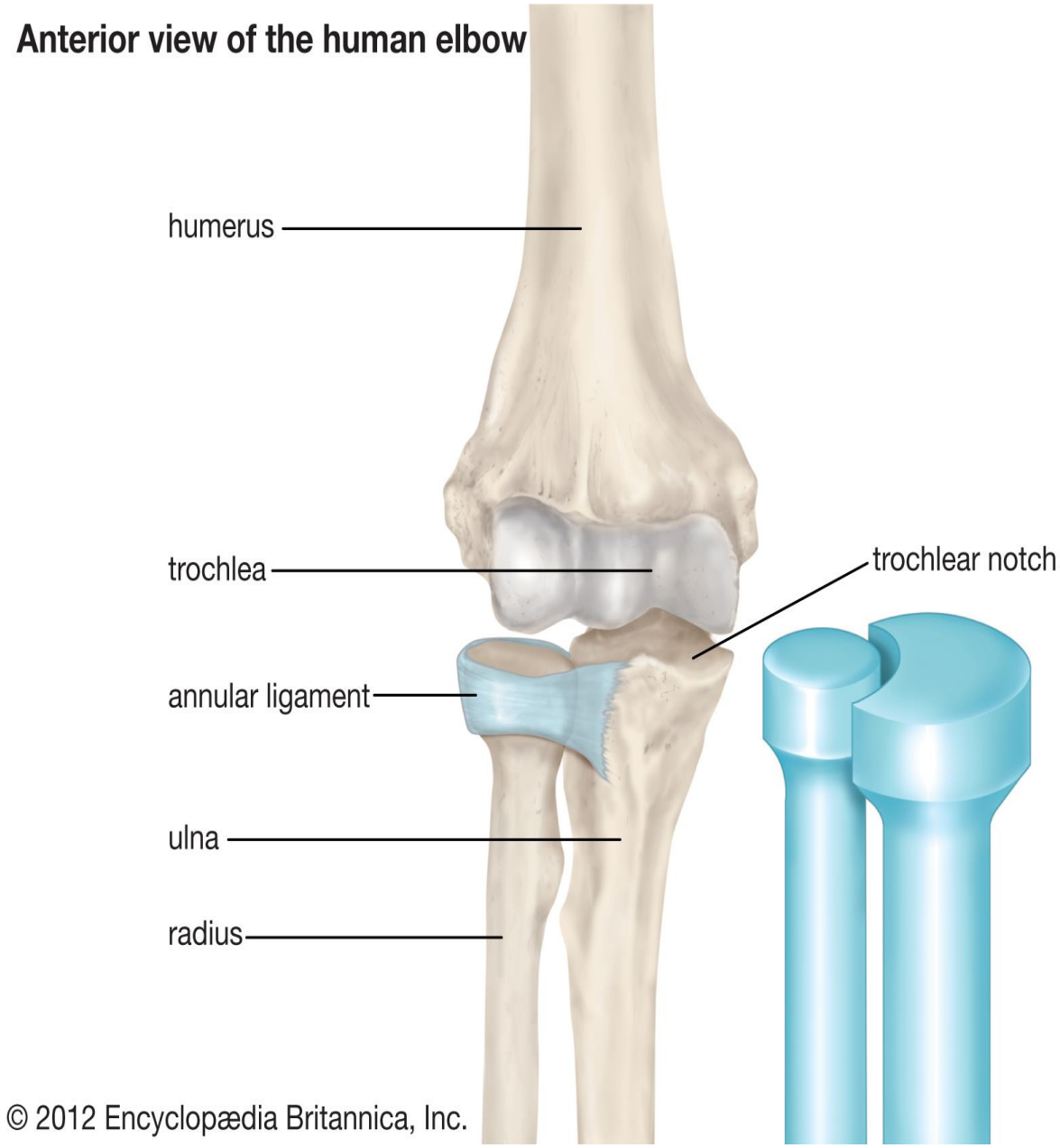
- ❖ Are formed by a central bony pivot turning within a bony ring
- ❖ Allow only rotation

(movement around a single longitudinal axis).

- ❖ Occur in :
- ❖ the superior and inferior radio ulnar joints
- ❖ and in the atlantoaxial joint.

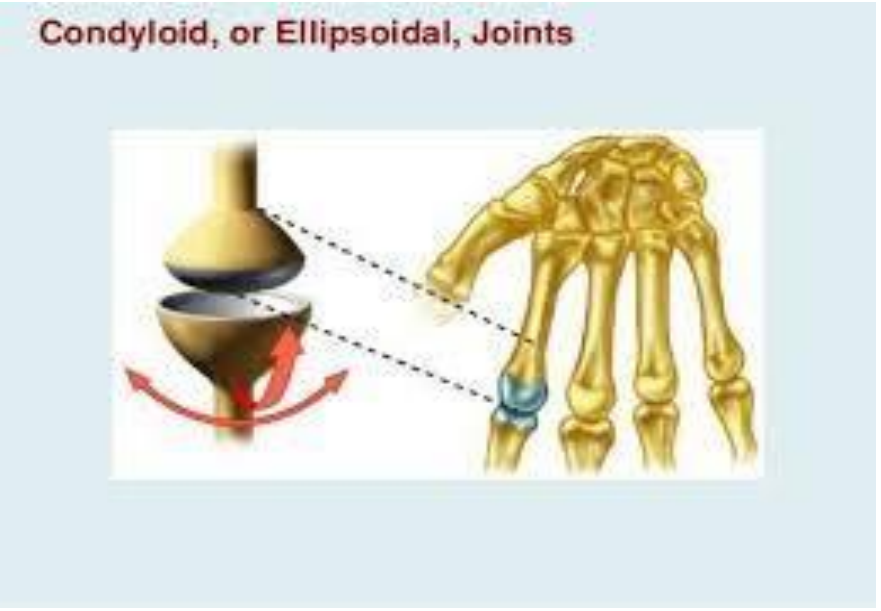


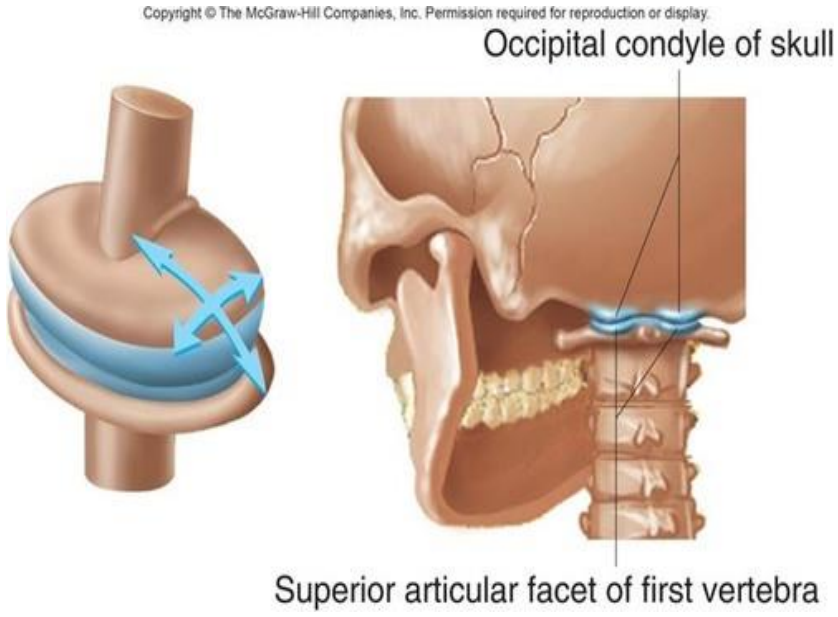
The atlanto-axial joints



4. Condylar (ellipsoidal) joints

- Have two convex condyles articulating with two concave condyles. (The shape of the articulation is ellipsoidal.)
- Allow flexion and extension
- and occur in the wrist (radiocarpal), metacarpophalangeal,
- knee (tibiofemoral),
- and atlanto-occipital joints.





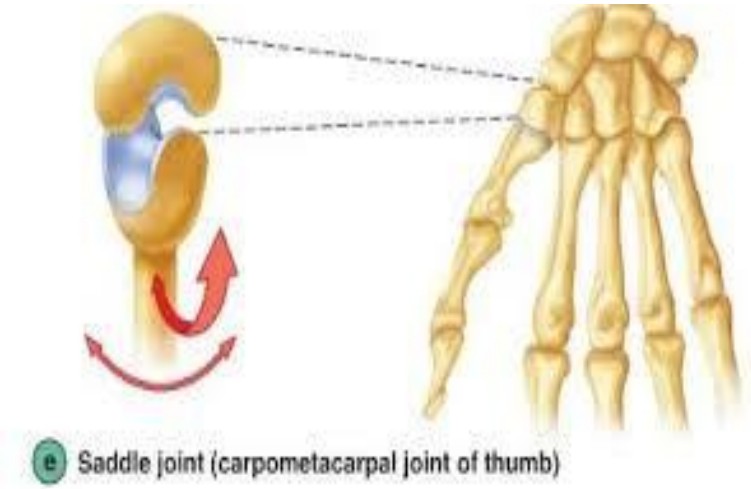
5. Saddle (sellar) joints

Resemble the shape of a horse's saddle

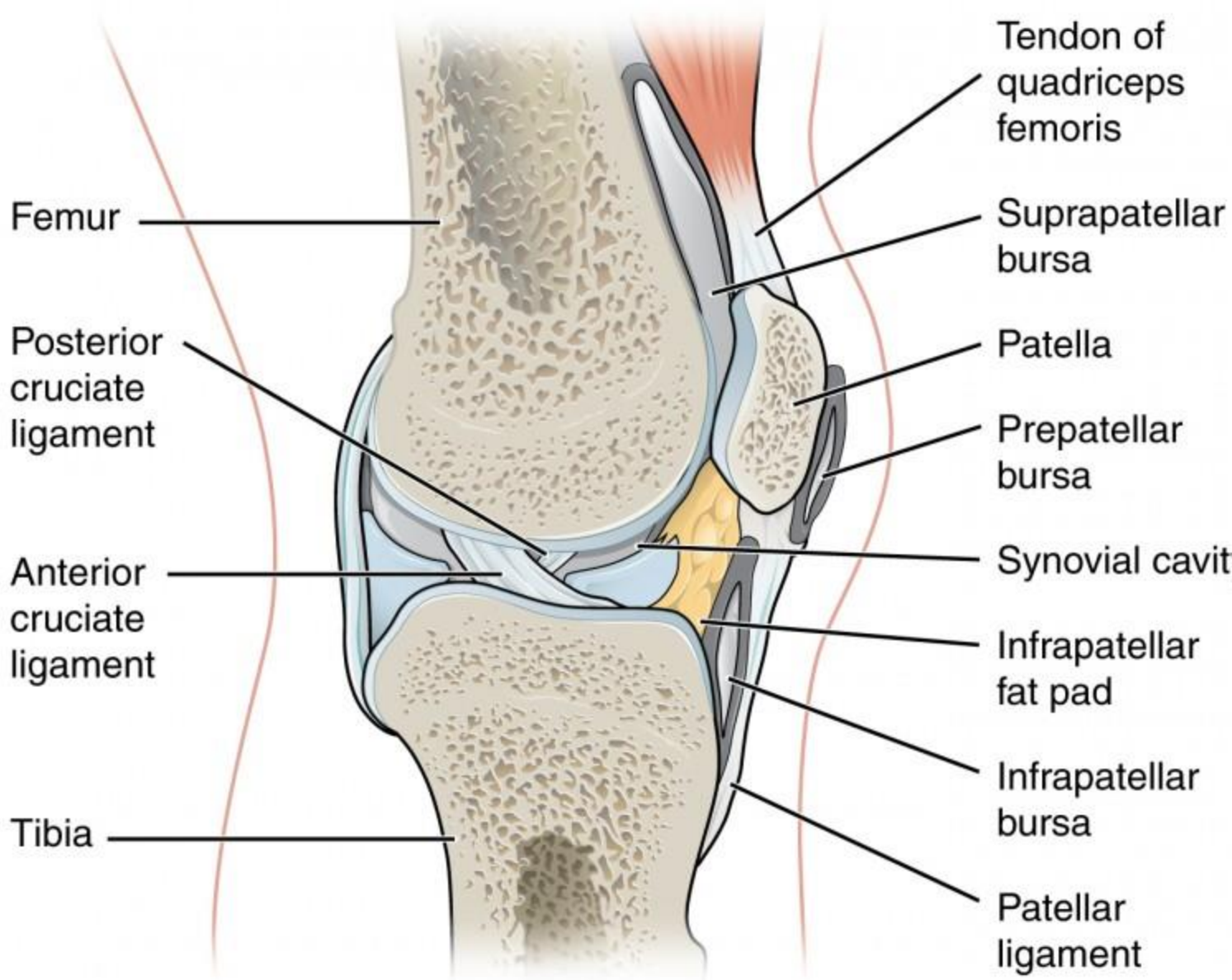
Occur in the carpometacarpal joint of the thumb and between the femur and patella.

Allow:

- flexion/extension,
- abduction/adduction,
- and circumduction, but no axial rotation.

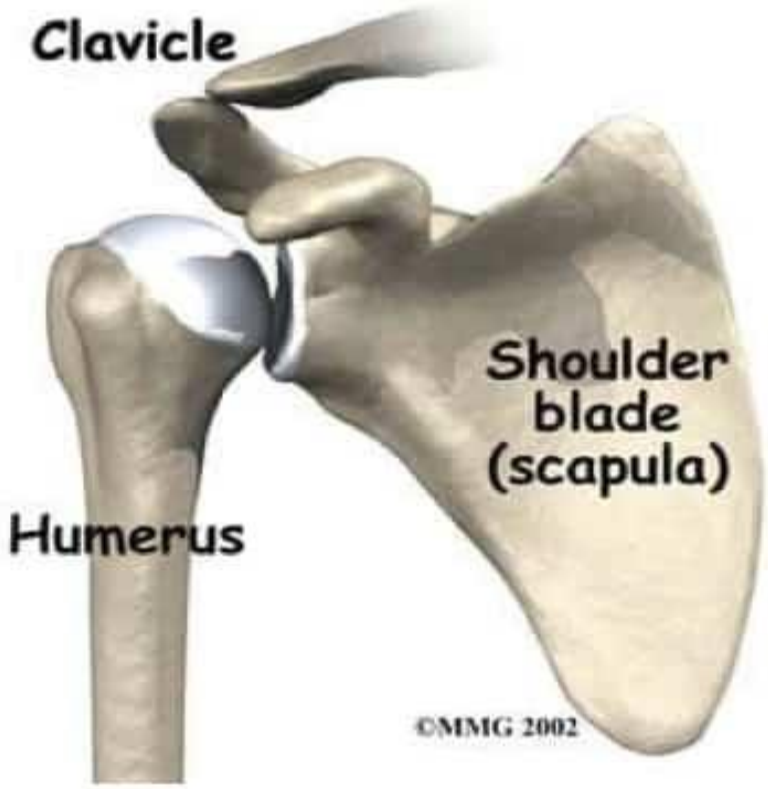


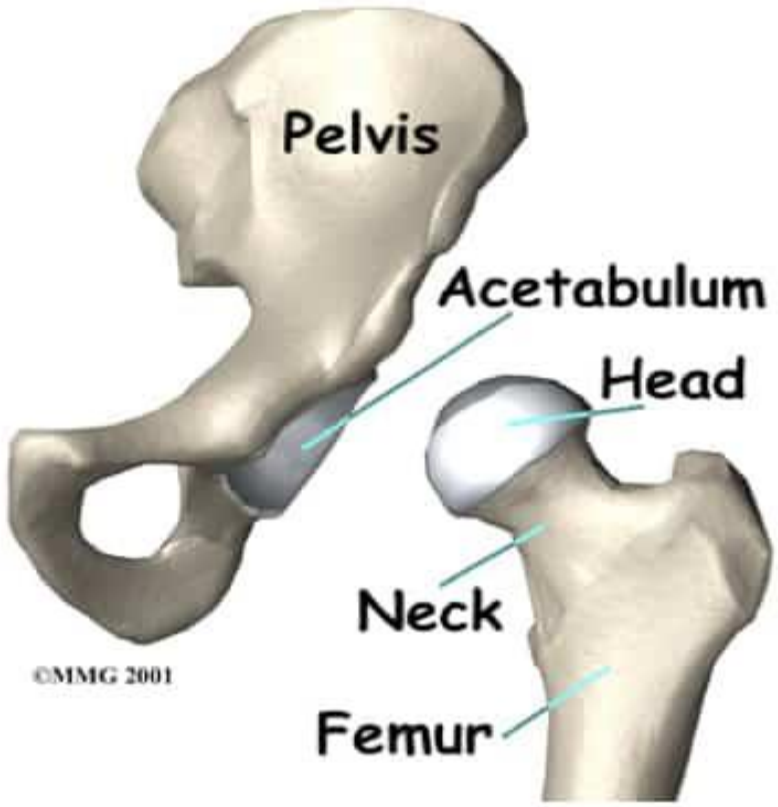
e Saddle joint (carpometacarpal joint of thumb)

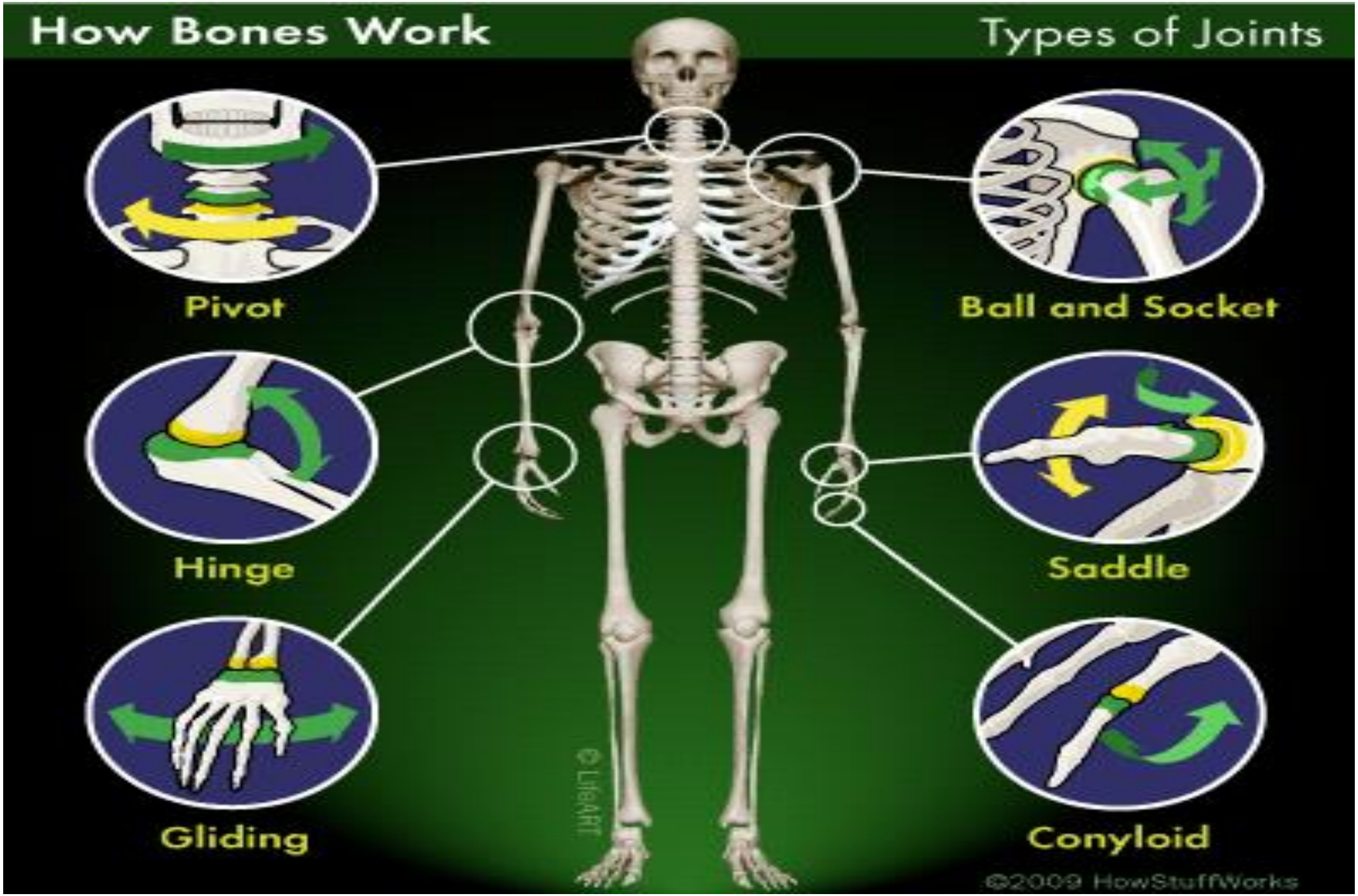


6. Ball-and-socket (spheroidal or cotyloid) joints

Are formed by the reception of a globular (ball-like) head into a cup-shaped cavity and allow movement in many directions.
Allow flexion and extension, abduction and adduction, medial and lateral rotations, and circumduction and occur in the shoulder and hip joints.






How Bones Work
Types of Joints
Pivot
Ball and Socket
Hinge
Saddle
Gliding
Conyloid
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Quiz time

https://forms.gle/wz9WH5cWJMLspYt46