Introduction to Human Anatomy

General Anatomy of Joints

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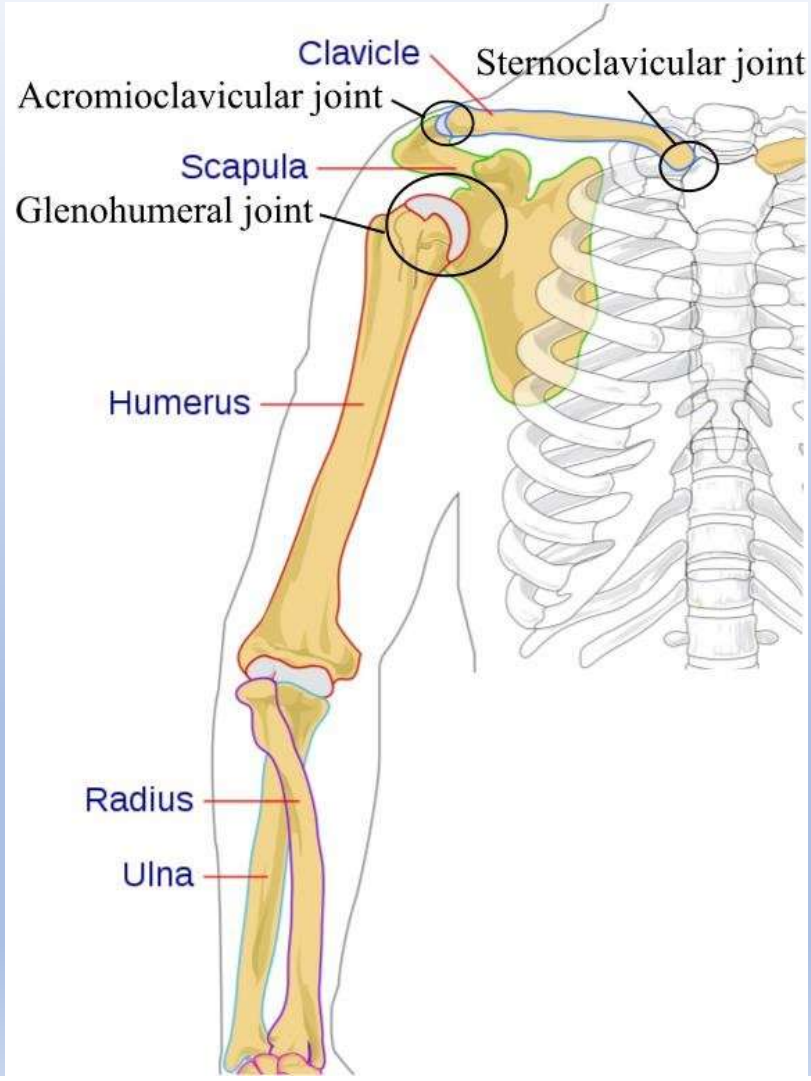
Joints

التعاريف والاتصال

- **Definition:**
  - Articulation between 2 or more bones / cartilages.
  - Site where 2 or more bones / cartilages meet.
  - They may have movement or not.
- **Importance of joints:**
  - Joints are responsible for movements. مسؤولة عن الحركة
  - Weight bearing. تحمل الوزن
  - Stability of skeletal system. ثبات الجهاز الهيكلي
  - Growth of bone. نمو العظم
  - Medicolegal importance. فتقدم في الطب الشرعي

أهمية طبية قانونية



Classifications of Joints

- **Structural:**
  - **Fibrous.**
  - **Cartilaginous.**
  - **Synovial (joints having cavity).**

NB: **Fibrous & cartilaginous joints are called solid joints.**

- **Functional:**
  - **Synarthrosis:** no movement.
  - **Amphiarthrosis:** slight movement.
  - **Diarthrosis:** freely mobile.

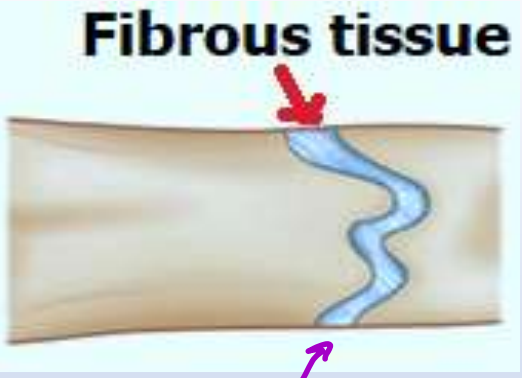
Fibrous Joints (Synarthrosis)

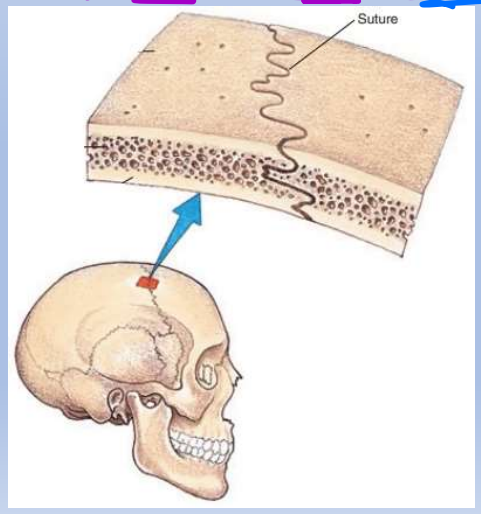
Characters (Features):

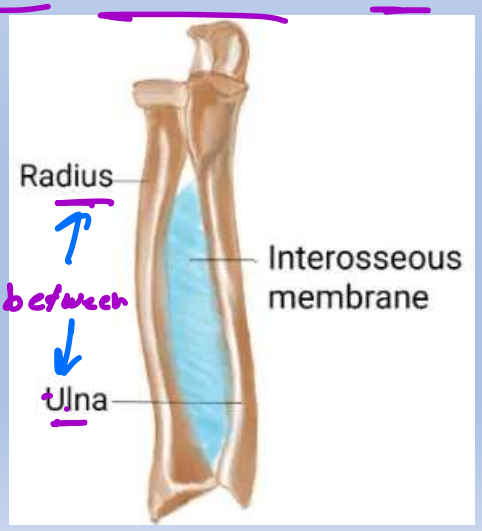
- Articulating bones are connected together by fibrous tissue.
- No or very limited movement.

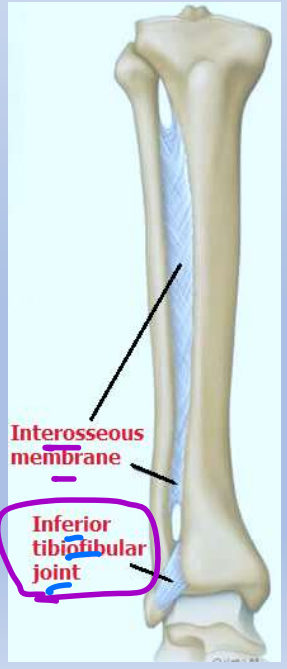
Types:

1. **Sutures:** between bones of skull.
2. **Gomphosis:** between the roots of the teeth their sockets.
3. **Syndesmosis:** inferior tibiofibular joint & interosseous membrane.

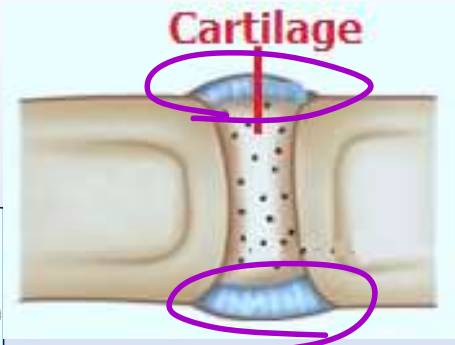






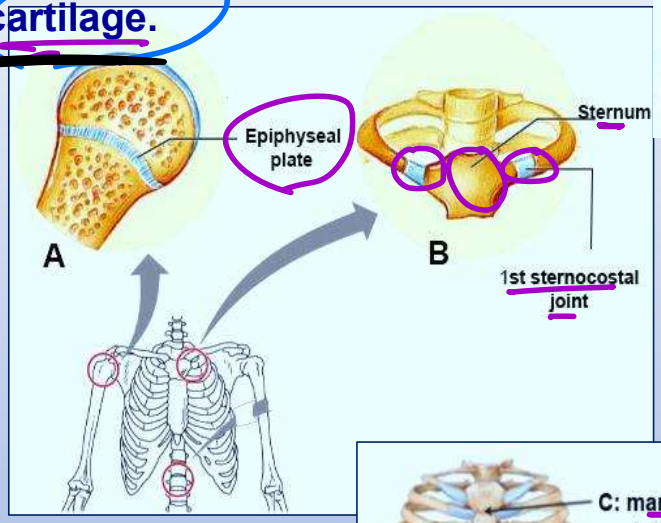


Cartilaginous Joints (amphiarthrosis)



Characters (Features):

- Articulating bones are connected together by cartilage.
- No or slight movement.



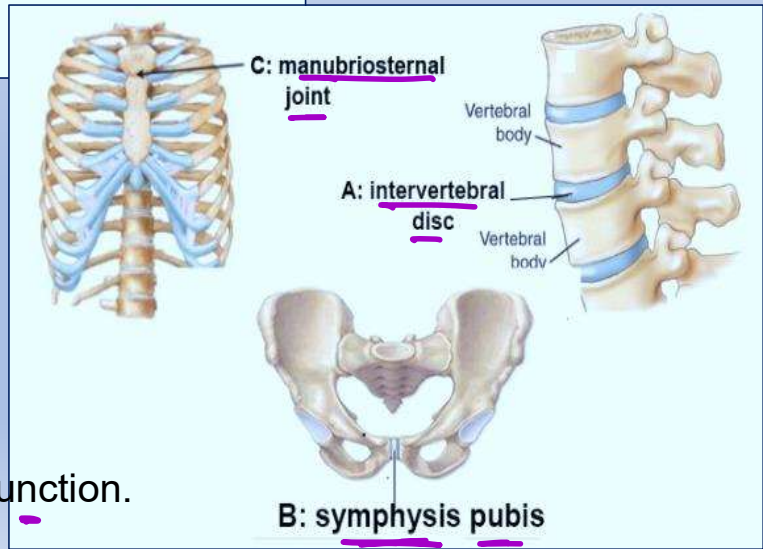
Types:

A. Primary (Synchondrosis):

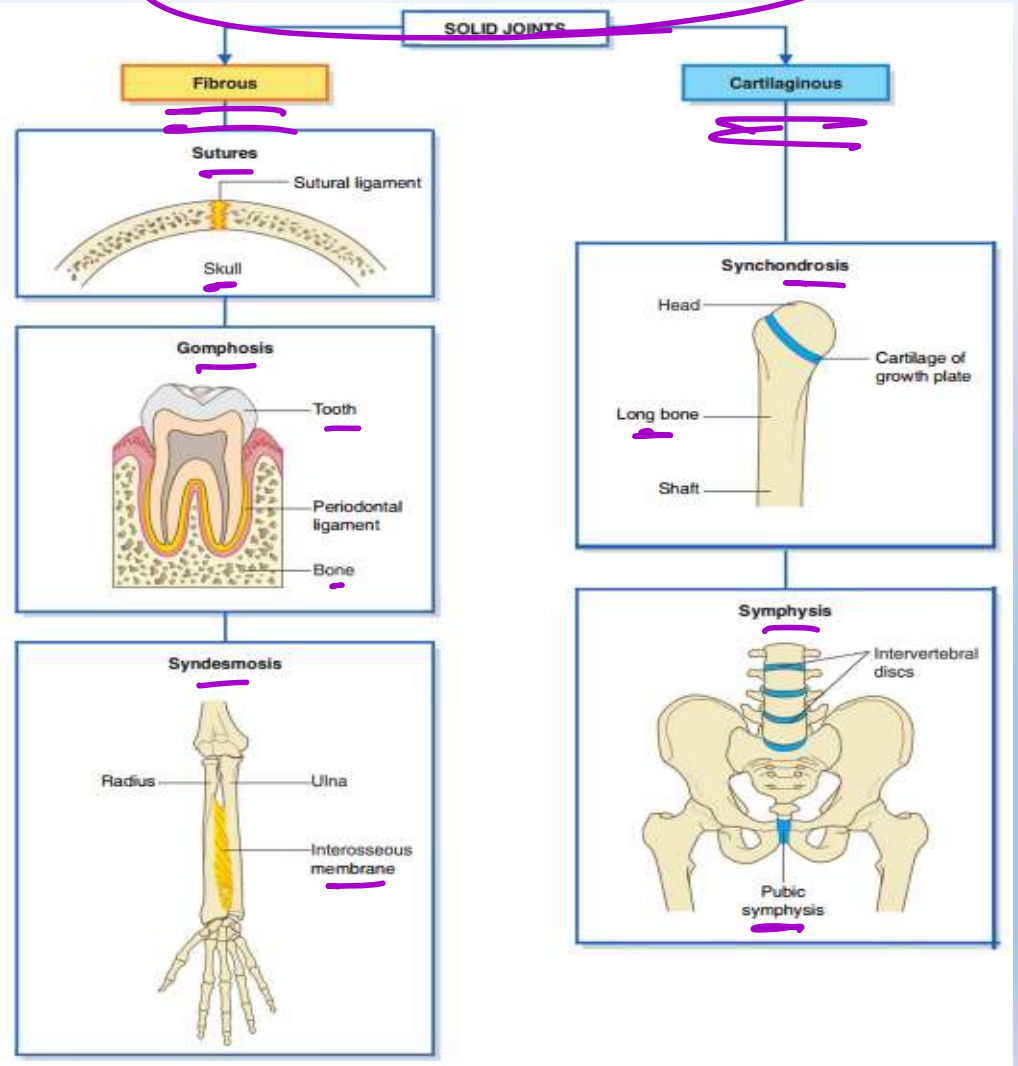
- Bones are connected by hyaline cartilage.
- Ossify by age.
- No movement.
- Examples: epiphysis of long bone & 1st sternocostal joint.

B. Secondary (Symphysis / Midline joints):

- Bones are connected by fibrocartilage.
- Doesn't ossify.
- Slight movement.
- Examples: symphysis pubis, intervertebral disc & manubriosternal junction.



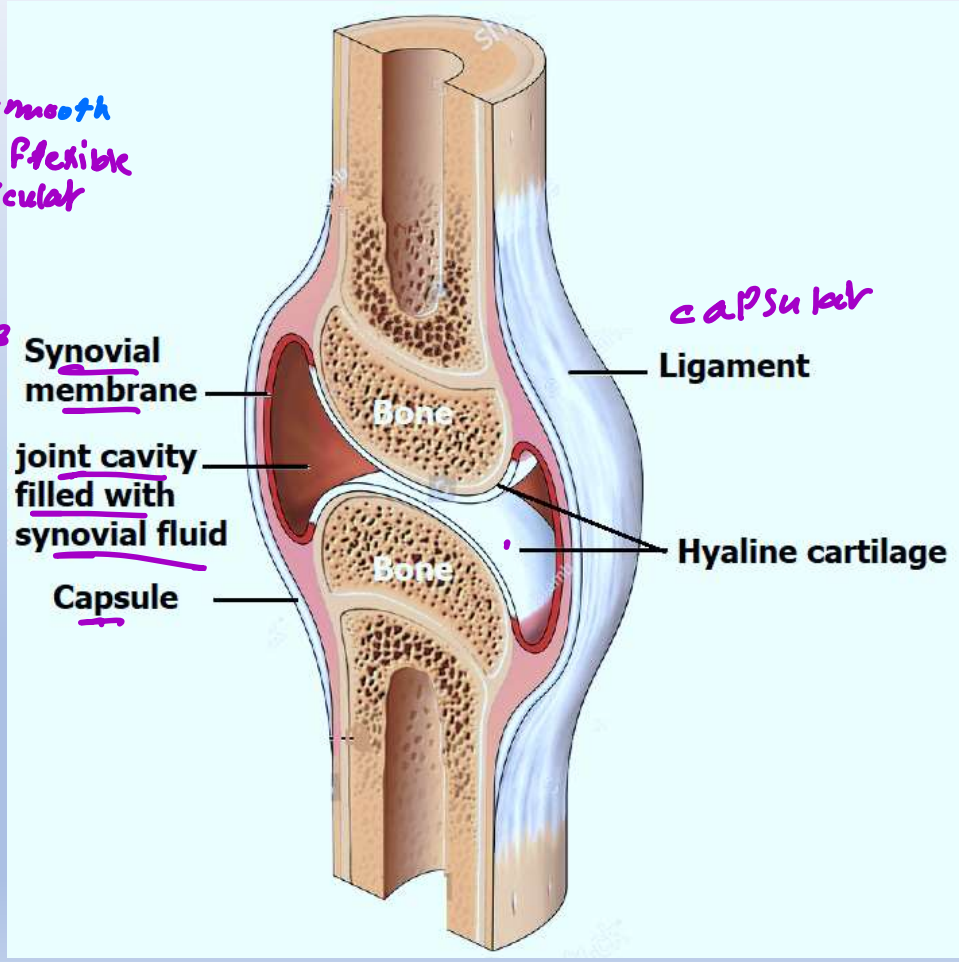
Solid Joints



Synovial Joints (Diarthrosis)

❑ Characters (Features):

- ➢ **Freely mobile.**
- ➢ **Articular surfaces are covered by hyaline cartilage.**
- ➢ **Articulating bones are separated by joint cavity.**
- ➢ **Joint is surrounded by fibrous tissue capsule.**
- ➢ **Capsule is thickened to form capsular ligaments.**
- ➢ **Capsule is strengthened by accessory ligaments.**
- ➢ **Synovial membrane lines the capsule & covers the non-articular parts of the bones.**
- ➢ **Synovial membrane secretes synovial fluid which:**
  - ✓ Provides lubrication and nutrition of articular cartilage.
  - ✓ Allows free movement of the joint.

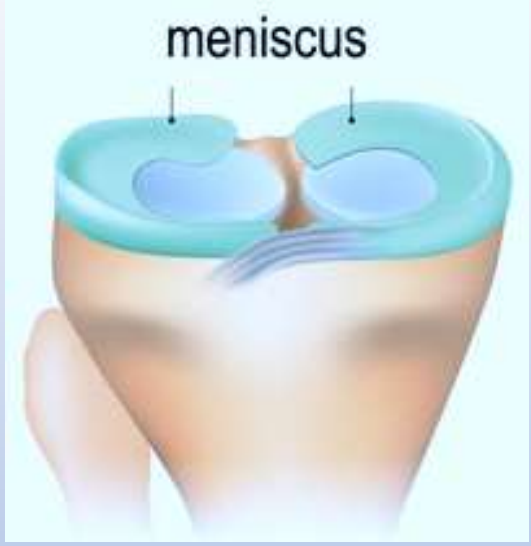


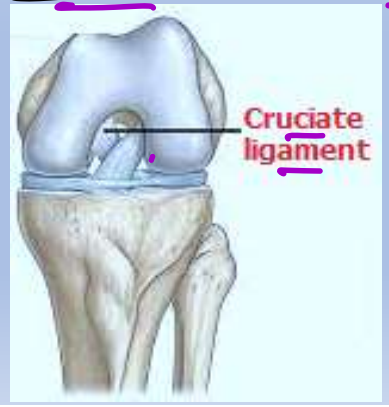
Synovial Joints (Diarthrosis)

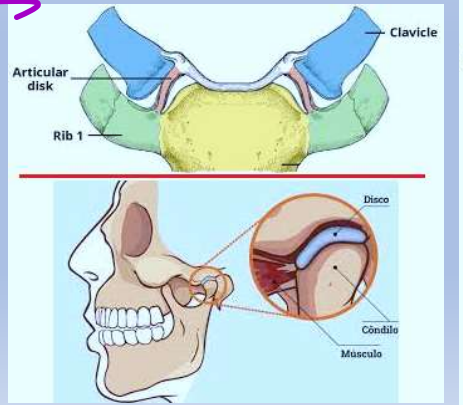
❑ Characters (Features):

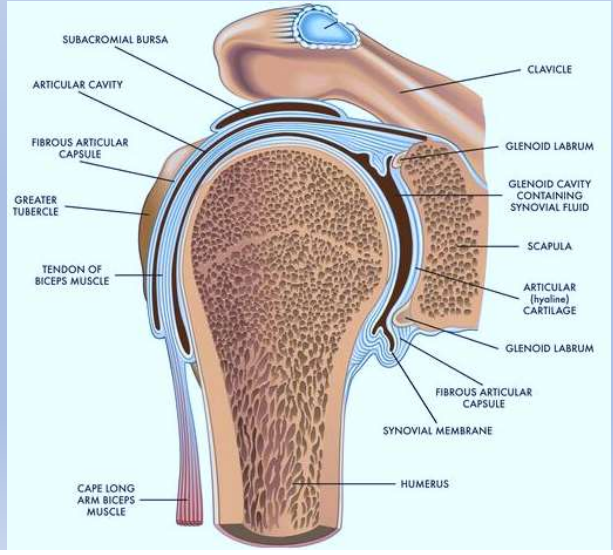
➢ **Synovial joint cavity may contain one or more of the following structures:**

- ❖ **Tendon of muscle:** as long head of biceps in shoulder joint,
- ❖ **Ligament:** as cruciate ligament in the knee.
- ❖ **Cartilaginous structure:**
  1. ✓ **Disc:** as in the temporomandibular & sternoclavicular joints.
  2. ✓ **Labrum:** as in the shoulder & hip joints,
  3. ✓ **Meniscus:** as in the knee joint. C-Shaped







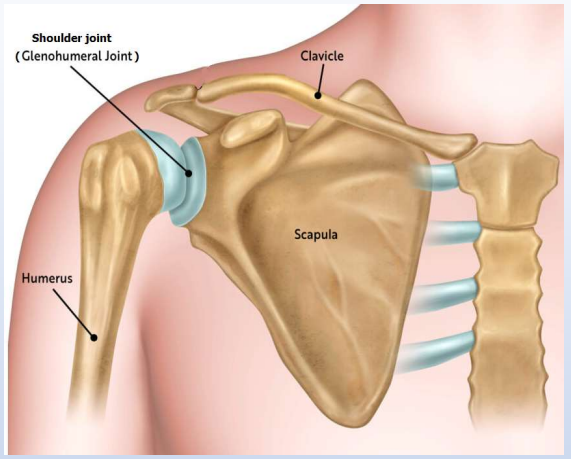


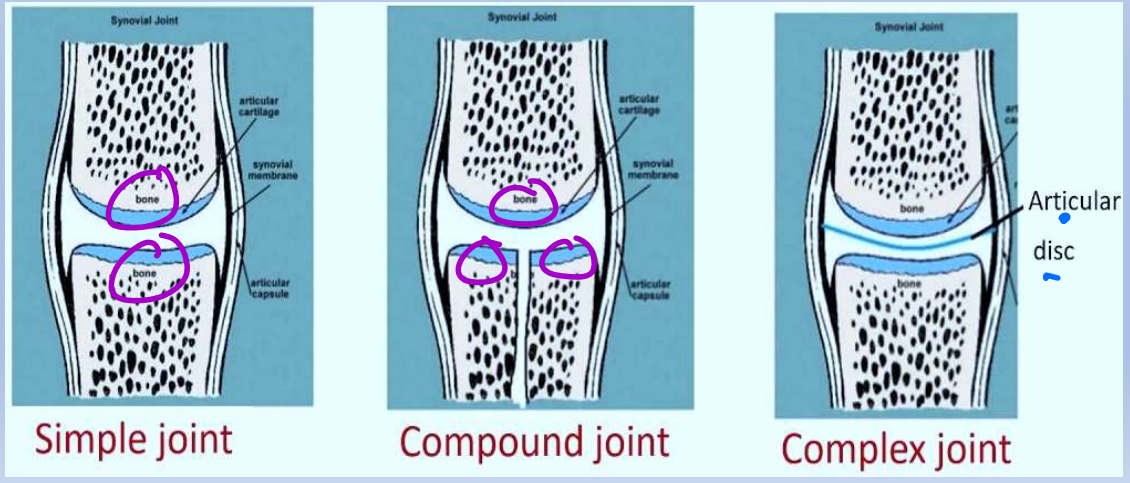
Synovial Joints (Diarthrosis)

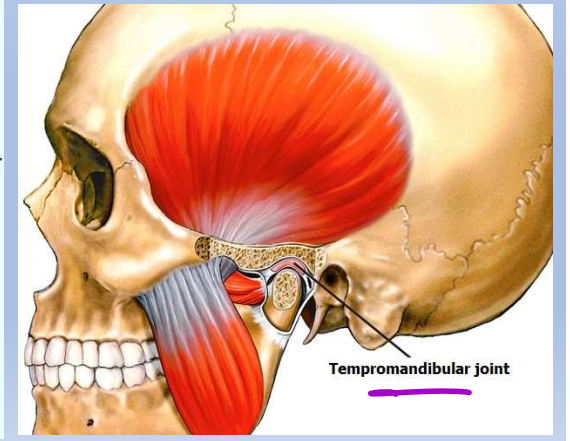
❑ Types (Classifications):

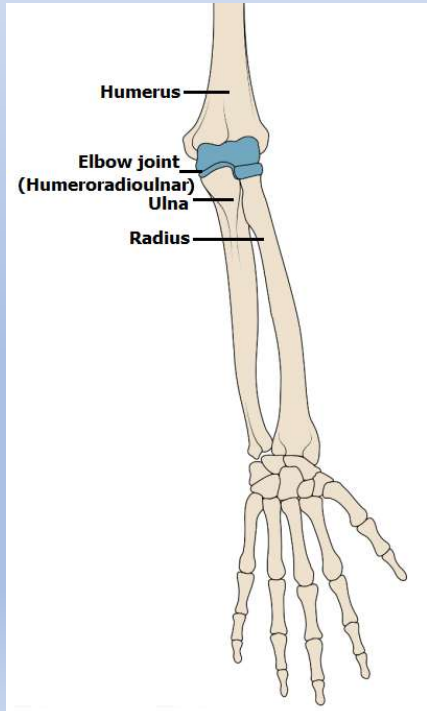
➢ According to the number of articulating bones:

- ❖ **Simple:** articulation of 2 bones (e.g. shoulder).
- ❖ **Compound:** articulation of more than 2 bones (e.g. elbow).
- ❖ **Complex:** has intra-articular disc (e.g. temporomandibular joint).









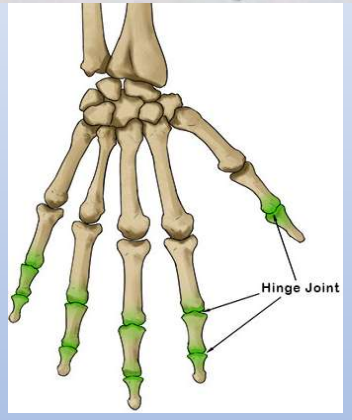
Synovial Joints (Diarthrosis)

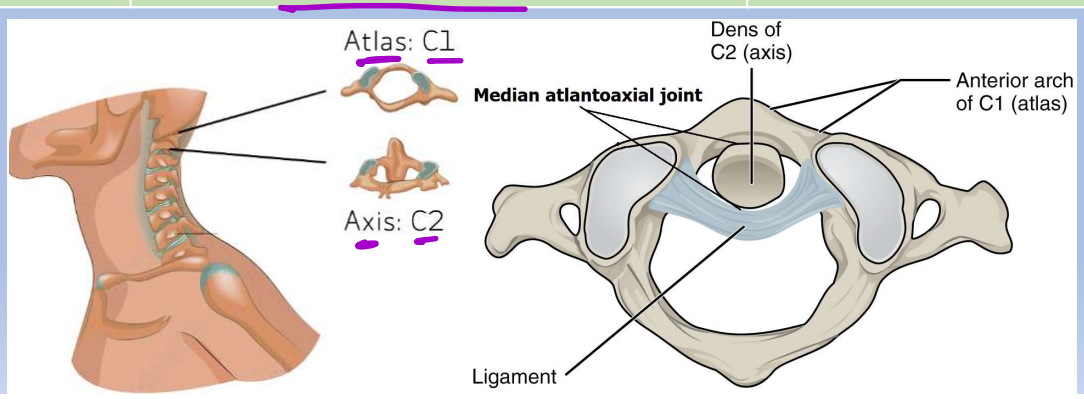
Types (Classifications):

According to the number of axes:

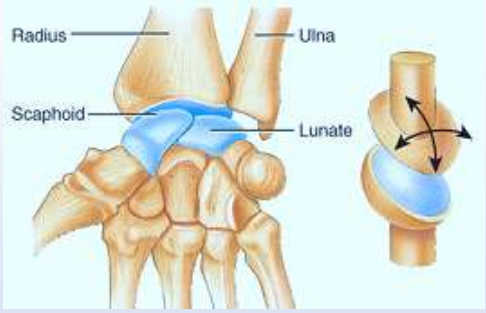
A. Uniaxial: movement occurs around one axis.

	1. Hinge	2. Pivot
Axis:	• Bilateral.	• Vertical.
Movement:	• Flexion and extension.	• Rotation.
Examples:	• Elbow joint. • Interphalangeal joints.	• Superior radioulnar joint. • Median Atlantoaxial joint.





Synovial Joints (Diarthrosis)

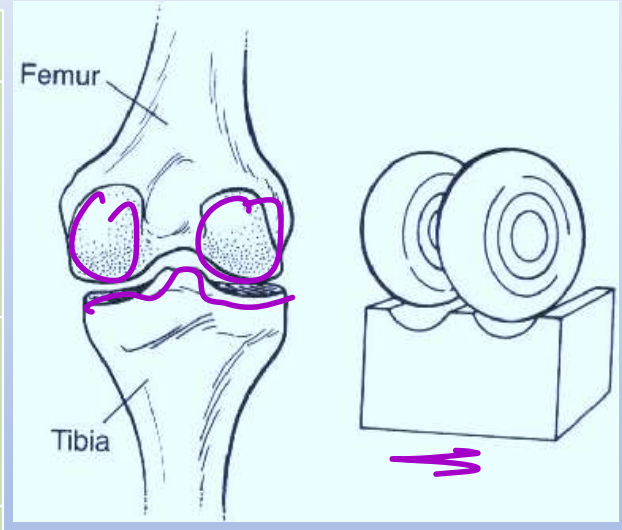


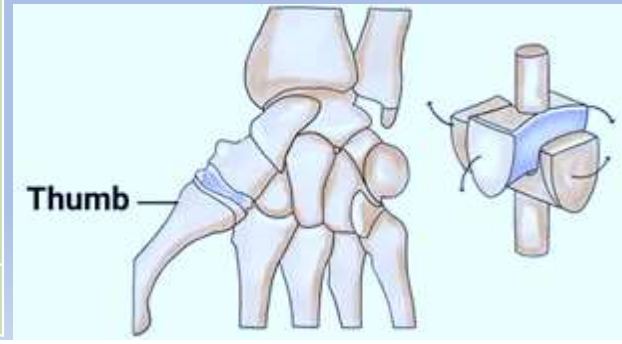
❑ Types (Classifications):

➢ According to the number of axes:

B. Biaxial: movement occurs around 2 axes.

	Axes	Movements	Example
1. Ellipsoid:	Bilateral	• Flexion & Extension.	• Wrist.
	Anteroposterior	• Adduction & Abduction	
2. Bicondylar:	Bilateral	• Flexion & Extension.	• Knee.
	Vertical	• Rotation.	
3. Saddle:	Bilateral	• Flexion & Extension.	• Carpo-metacarpal joint of thumb
	Anteroposterior	• Adduction & Abduction	
NB: Saddle joint permits slight rotation in combination with other movements (Opposition).			





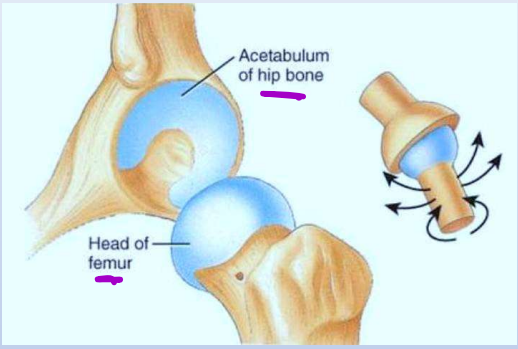
Synovial Joints (Diarthrosis)

❑ Types (Classifications):

➢ According to the number of axes:

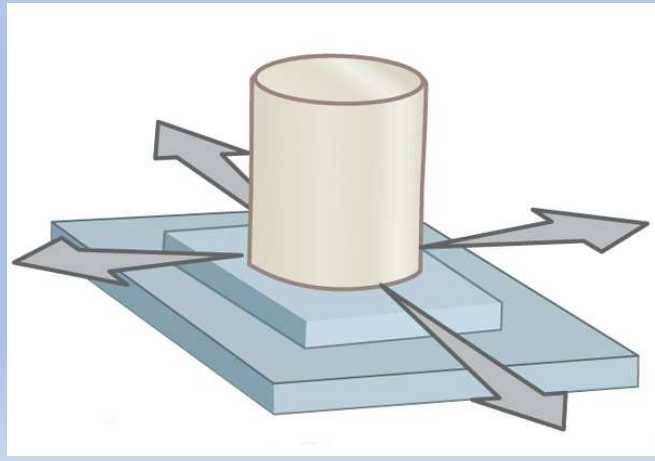
C. Polyaxial (Multiaxial): movement occurs around 3 axes.

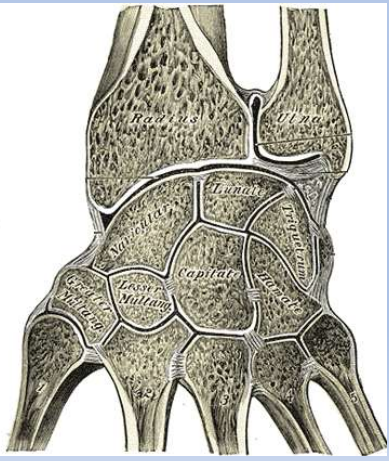
	Axes	Movements	Examples
Ball & socket	Bilateral	• Flexion & Extension.	• Hip joint. • Shoulder joint.
	Anteroposterior	• Abduction & Adduction.	
	Vertical	• Rotation.	



D. Non-axial: permit sliding (gliding) movement.

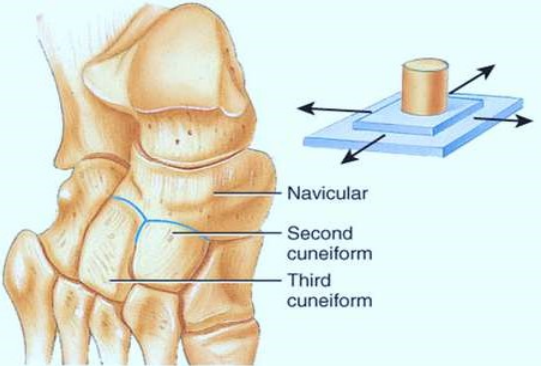
Example: intercarpal & intertarsal joints.

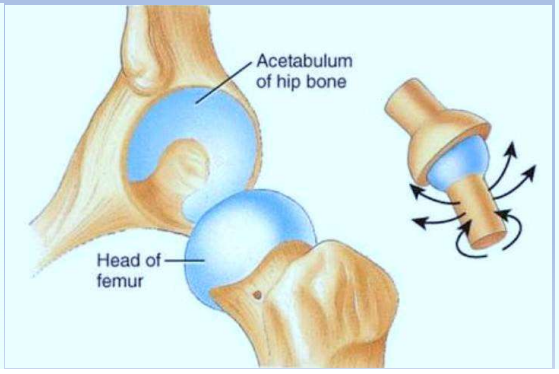


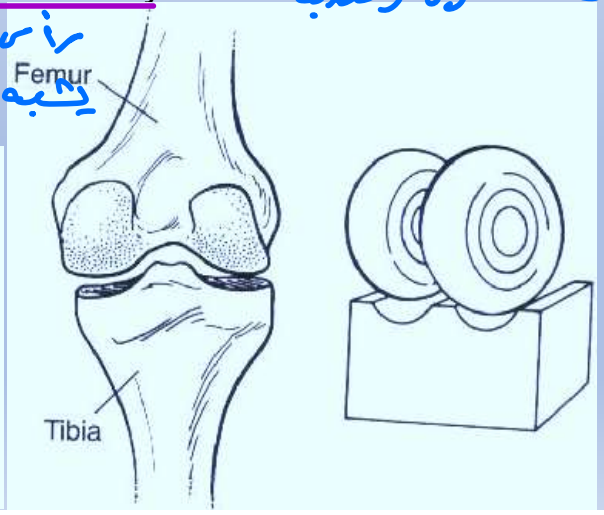


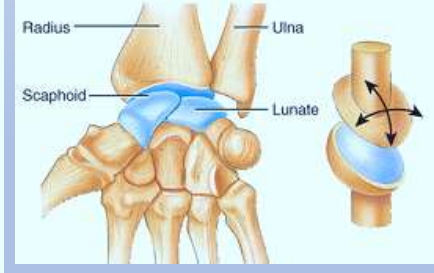
Synovial Joints (Diarthrosis)

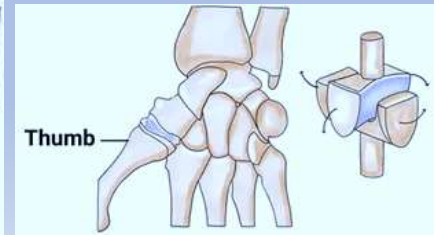
- **Types (Classifications):**
  - **According to shape of articulating bones:**
    - ✓ **Hinge:** like the hinge of a door
    - ✓ **Pivot:** central axis rotates in a ring.
    - ✓ **Ellipsoid:** one convex surface fitting in an elliptical concavity.
    - ✓ **Bicondylar:** two convex surface fitting in two concavities.
    - ✓ **Saddle:** articulating surfaces are alternatively concavo-convex.
    - ✓ **Ball & socket:** rounded head fitting in a cup-shaped concavity.
    - ✓ **Plane:** articular surfaces are flat.



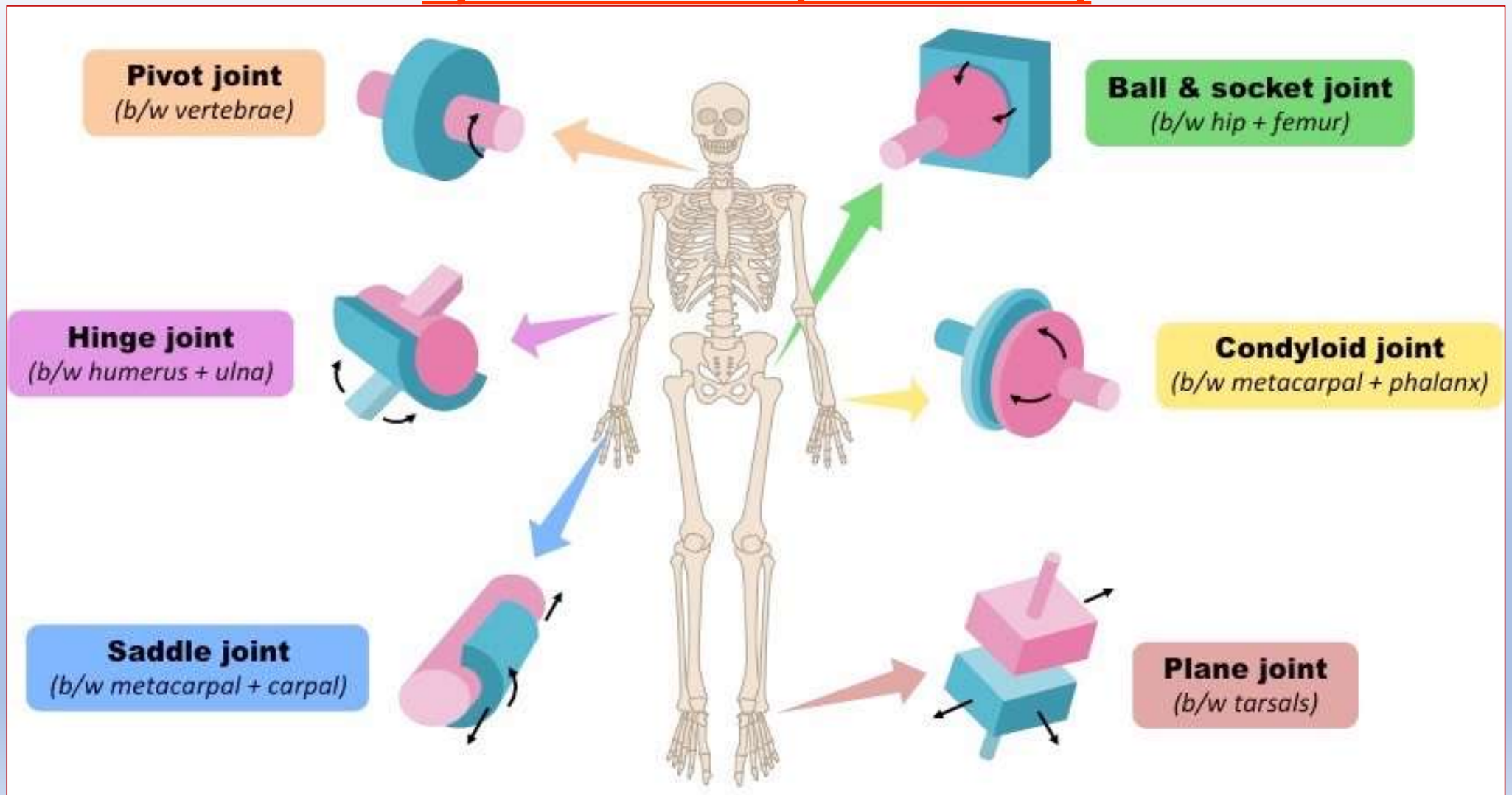








Synovial Joints (Diarthrosis)



Stability of Joints

- **Stability of joints depends on:**
  - Shape, size & arrangement of articulating bones.
  - Tone (Contraction) of the surrounding muscles.
  - Position & strength of the surrounding ligaments.

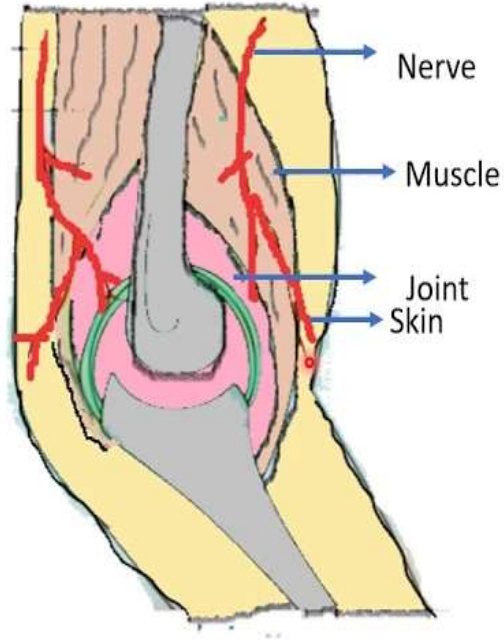
قوة شد (انقباض) العضلات الحيطة

موضع وقوة الأربطة الحيطة

Nerve Supply of Joints (Hilton's Low)

- The sensory nerve supplying a joint also supplies the muscles moving the joint and the overlying skin.

الجلد الذي يغطيه



Thank

YOU!

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الحساب