



MED437
KING SAUD UNIVERSITY



Joints

Lecture 11

غيداء آل مصمغ
عبدالرحمن الحيسوني

Revised by

Please check our [Editing File](#).

هذا العمل لا يعني عن المصدر الأساسي للمذاكرة

{ وَمَنْ يَتَوَكَّلْ عَلَى اللَّهِ فَهُوَ حَسْبُهُ }

Objectives

- Define the term “Joint”.
- Describe the classification of 3 types of joints & give an example of each.
- Describe the characteristics of synovial joints.
- Describe the classification of synovial joints & give an example of each.
- List factors maintaining stability of joints.
- Recite “Hilton’s law” for nerve supply of joints.

-
- Text in **BLUE** was found only in the boys’ slides
 - Text in **PINK** was found only in the girls’ slides
 - **Text in RED is considered important**
 - Text in **GREY** is considered extra notes

Definition and classification of joints

Joints

Definition

It is the site where two or more bones meet together

Classification

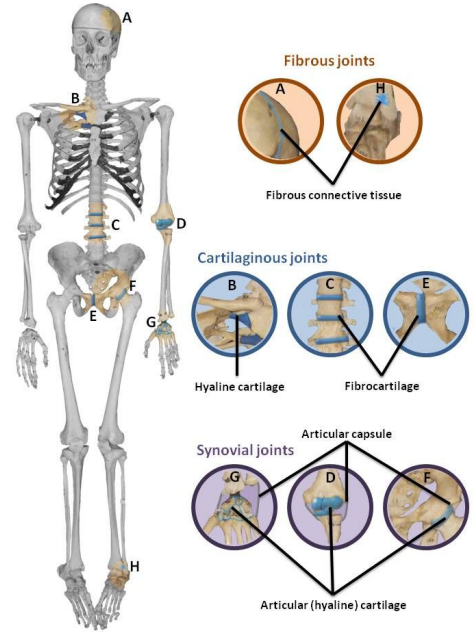
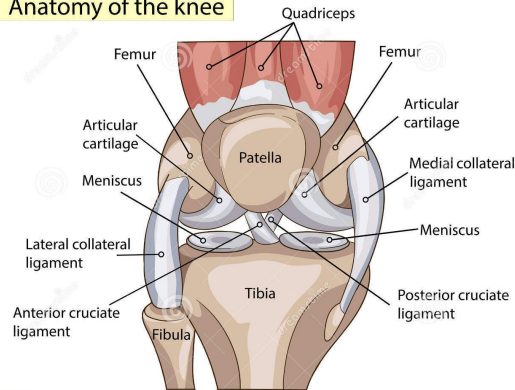
classified according to the tissues that lie between the bones into:

Fibrous

Cartilaginous

Synovial

Anatomy of the knee



فيديو توضيحي



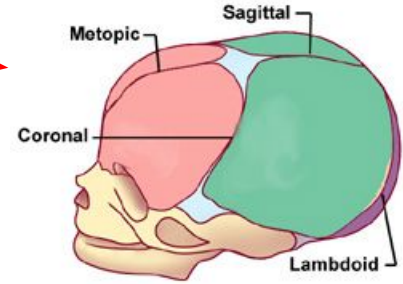
Fibrous Joints

The articulating surfaces are joined by fibrous connective tissue, where no or very mild movement.

Examples

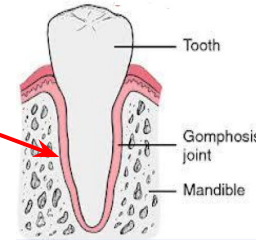
Skull sutures

- No movement, temporary as it ossifies later.
- Ossification → bone



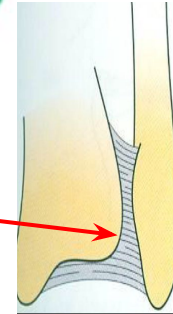
Gomphosis

- dental alveolar joints.
- Between teeth and their socket.



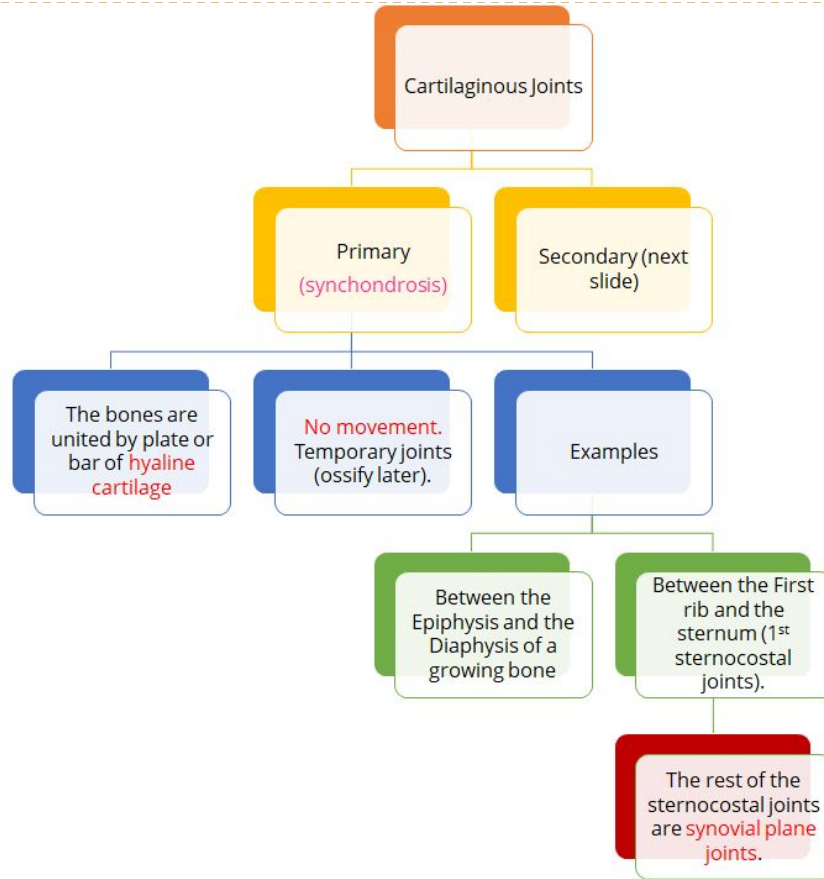
Inferior tibiofibular joints (syndesmosis)

- minimal movement, permanent joints.

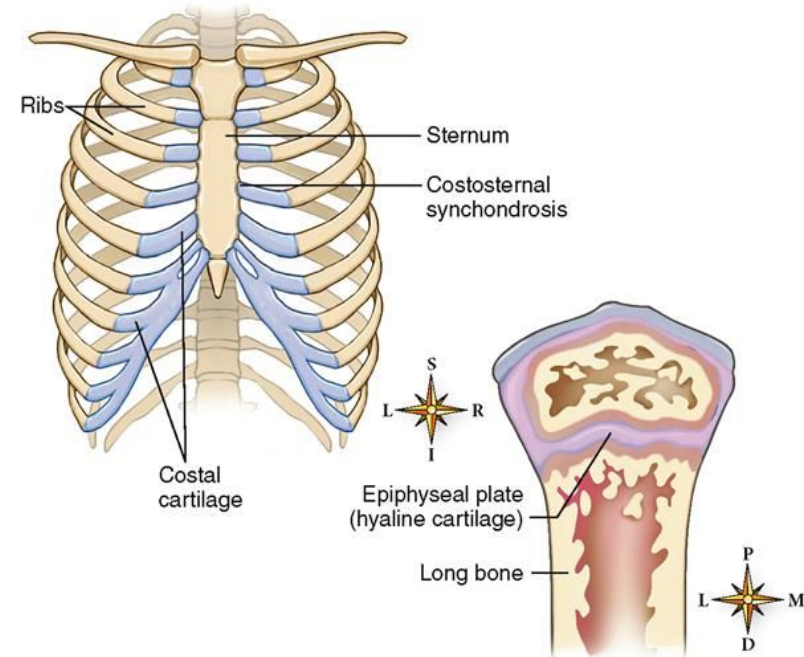


CARTILAGINOUS JOINTS

The two bones are joined by cartilage and is of two types:



SYNCHONDROSES



CARTILAGINOUS JOINTS

Cartilaginous Joints

Primary
(synchondrosis)
(previous slide)

Secondary

The bones are united by a plate of fibrocartilage.

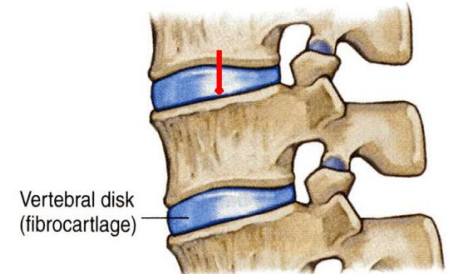
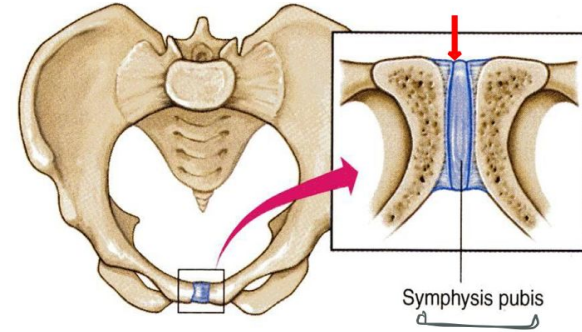
Their articulating surfaces are covered by a thin plate of hyaline cartilage.

Little movement, permanent joints.
They are called **Midline joints**.

Examples:

Joints between the Vertebral Bodies (intervertebral discs)

Symphysis Pubis



Synovial joints

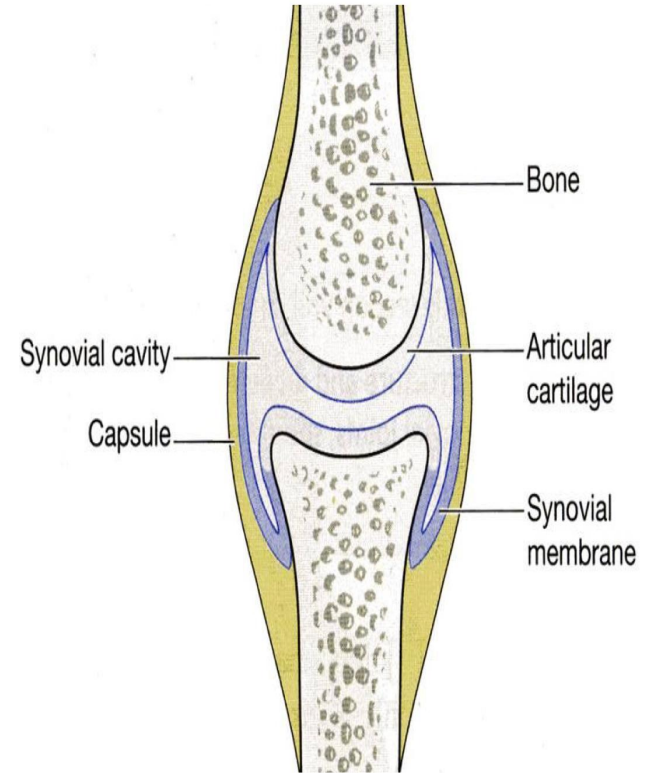
The articular surfaces are covered by a thin layer of **hyaline cartilage** (articular cartilage).

**Freely
movable
joints**

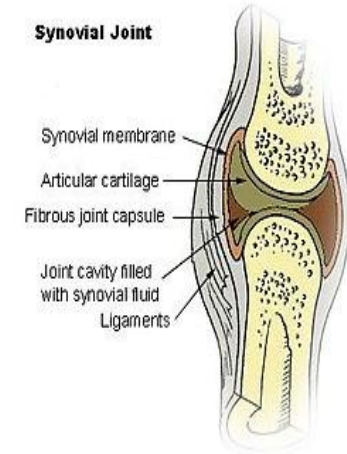
Characteristic features

A **joint cavity** enclosed within the capsule.

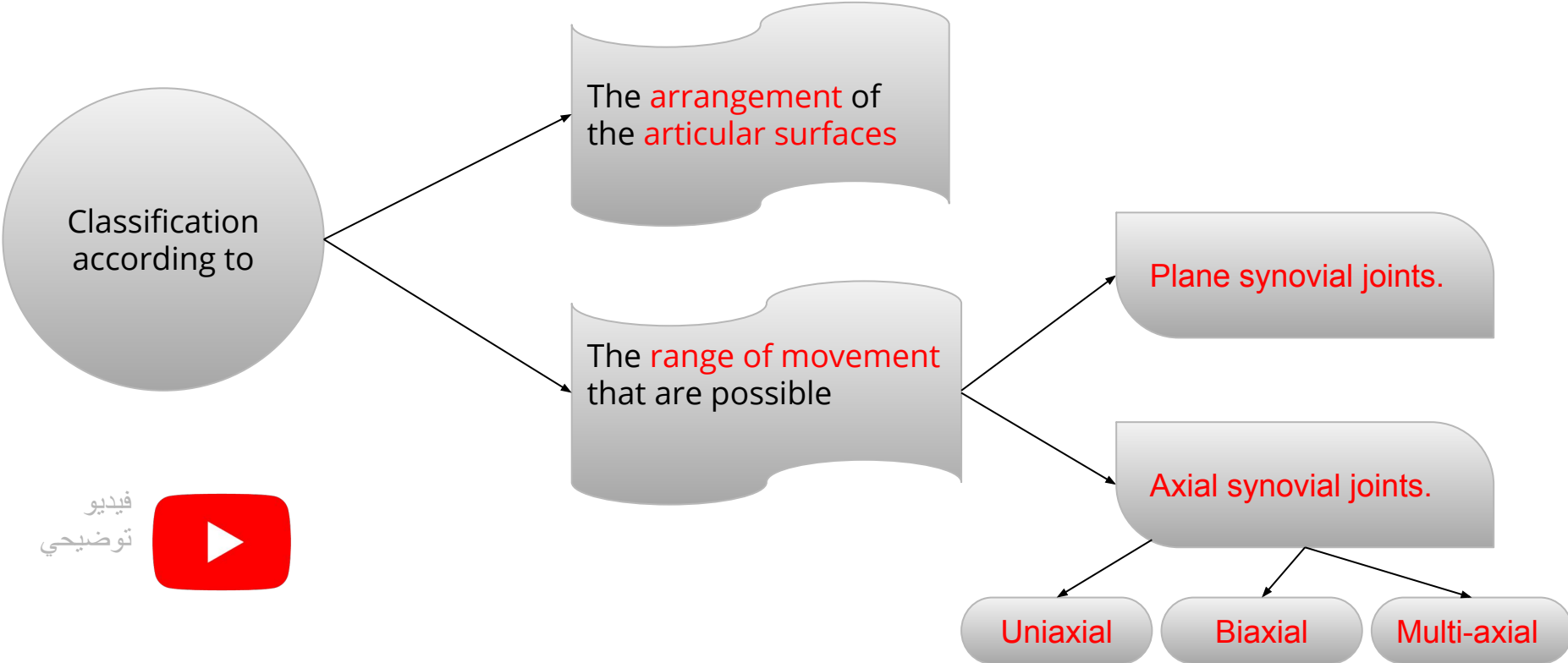
The bones are joined by a **fibrous capsule**, which is attached to the margins of **articular surfaces** and enclosing the joints.



Synovial joints



CLASSIFICATION OF SYNOVIAL JOINTS

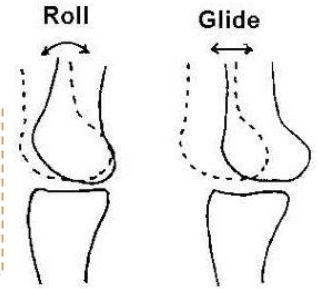


فيديو
توضيحي



Plane synovial joints (gliding joints)

The **articulating surfaces** are **flat**, and the bones slide on one another, producing a **gliding movement**.



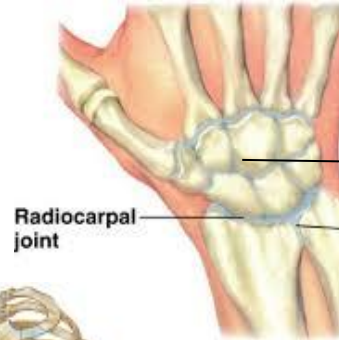
Examples

Intercarpal joint

sternoclavicular joint

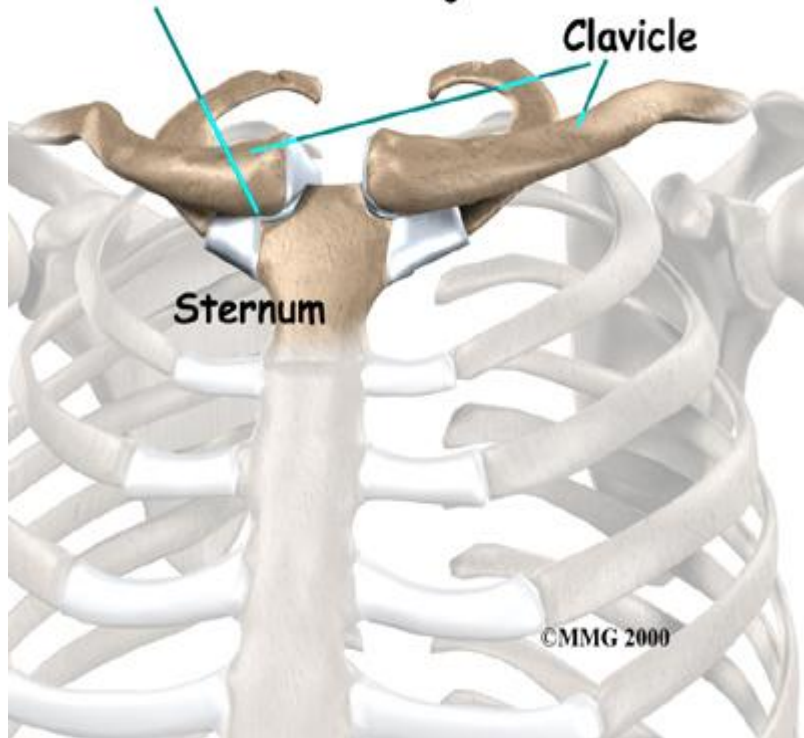
acromioclavicular joint

between the 2nd-7th
sternocostals



Intercarpal
joint

+ Sternoclavicular joint



+ Acromioclavicular joint



Axial synovial joints

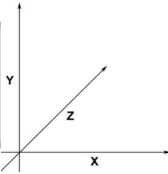
Movements occur **ALONG an AXIS***

*an imaginary line about which a body rotates.

1- **Transverse** (x-axis): flexion & extension occur. ex: elbow.

2- **Longitudinal** (y-axis): rotation occurs. (supination + pronation)

3- **Antero-posterior** (z-axis): abduction & adduction occur.

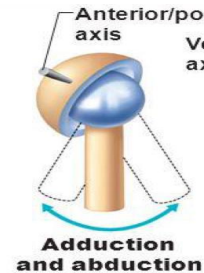
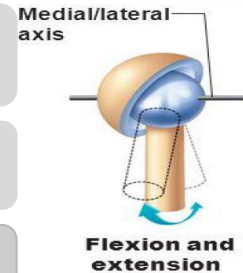


Axial joints are divided into:

1. **Uniaxial**

2. **Biaxial**

3. **Multi-axial (polyaxial).**



Important!!!

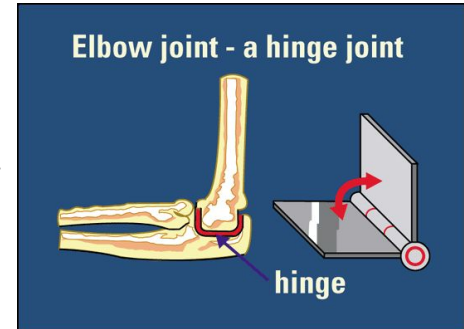
Uniaxial Synovial Joints

Hinge Joint

Axis: Transverse*

Movements: Flexion & Extension
Dorsiflexion & Plantarflexion

Examples: Elbow and ankle joints

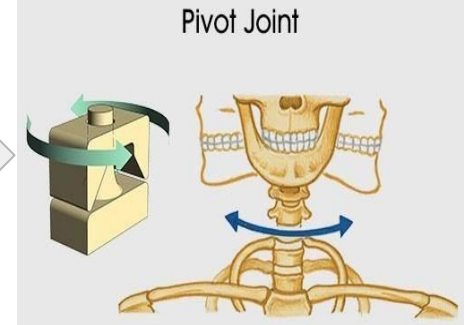


Pivot Joint

Axis: Longitudinal*

Movements: Rotation

Examples: Radio-ulnar & atlanto-axial joints



*Transverse: محور بالعرض يعني راح تكون الموفمنت على فوق وتحت

*Longitudinal: محور طولي يعني راح تكون الموفمنت (يمين ويسار) دوران

Remember: The atlanto-axial joints allows you to say NO (Extensive Rotation)

Biaxial Synovial Joints

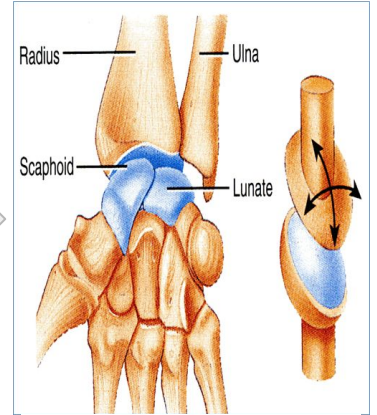
Ellipsoid Joint

- An elliptical **convex** fits into an elliptical **concave** articular surfaces.

Axes: Transverse & Antero-posterior

Movement: Flexion & extension + abduction & adduction **but rotation is impossible**

Example: Wrist Joint



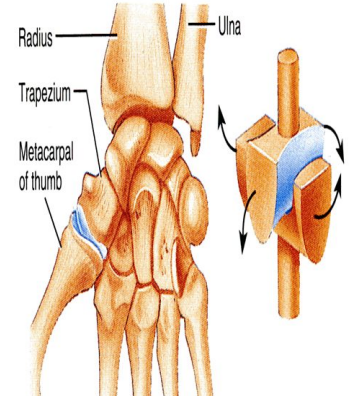
Saddle Joint

- The articular surfaces are reciprocally concavoconvex (resemble a saddle on a horse's back.)

Axis: Transverse & antero-posterior + Longitudinal (limited)

Movement: Like Ellipsoid + **small range of rotation**

Example: Carpometacarpal joint of the thumb



Polyaxial Synovial Joints

Ball and Socket joint

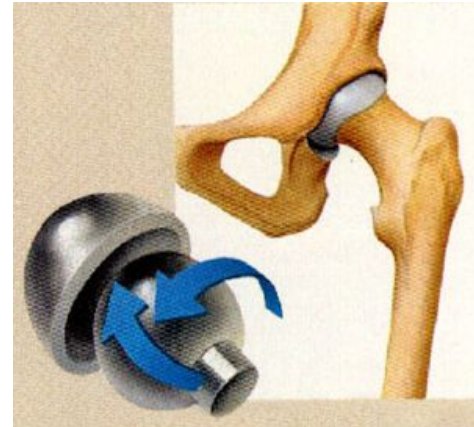
- A ball-shaped head of a bone fits into a socket-like concavity of another

Axis: All axes

Movement: Flexion & extension + abduction & adduction + rotation along a separate axis
(all types of movements)

Examples: the only 2 examples

- **Shoulder** joint
- **Hip** joint



Stability of synovial joint

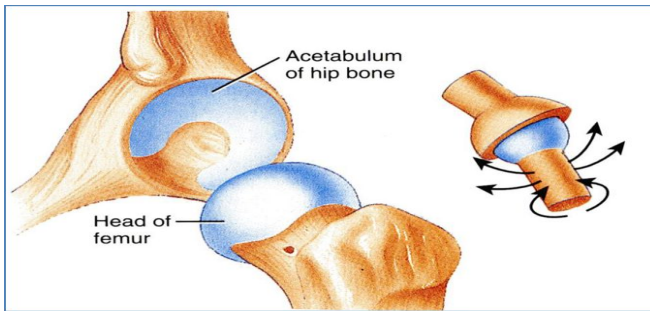
It depends on :

1-The shape of articular surface

-ex: The **ball and socket shape of the hip joint** is a good examples of the importance of bone shape to maintain joint stability.

-The hip joint is more stable than the shoulder joint because the hip has deep concavity that gives more support than the shoulder which is shallowly concave and needs more support into it.-Team436-

-The shape of the bones forming the knee joint has nothing to do for stability.

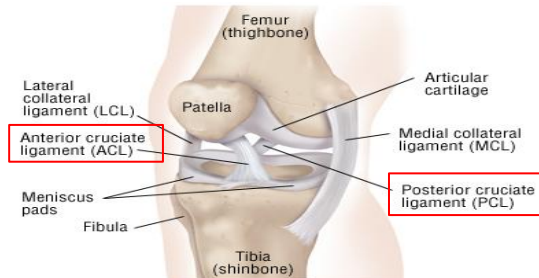


2-Strength of the ligaments

-ex: **cruciate ligaments** of the knee joint

-They prevent excessive movement in a joint.

-Iliofemoral ligament prevents hyperextension in hip joint.



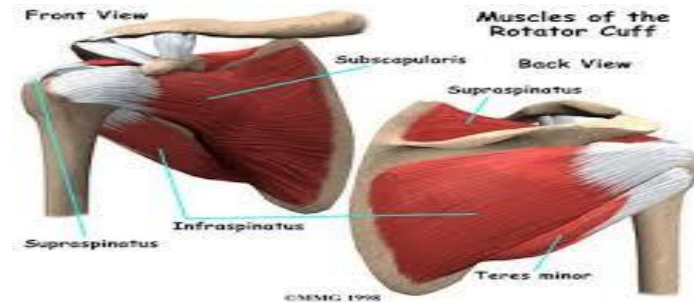
3-Tone of the surroundings muscles

-In most joints, it's the **major factor** controlling stability.

-ex: The short muscles (rotator cuff muscles) around the shoulder joint

-keeps the head of the humerus in the shallow glenoid cavity.

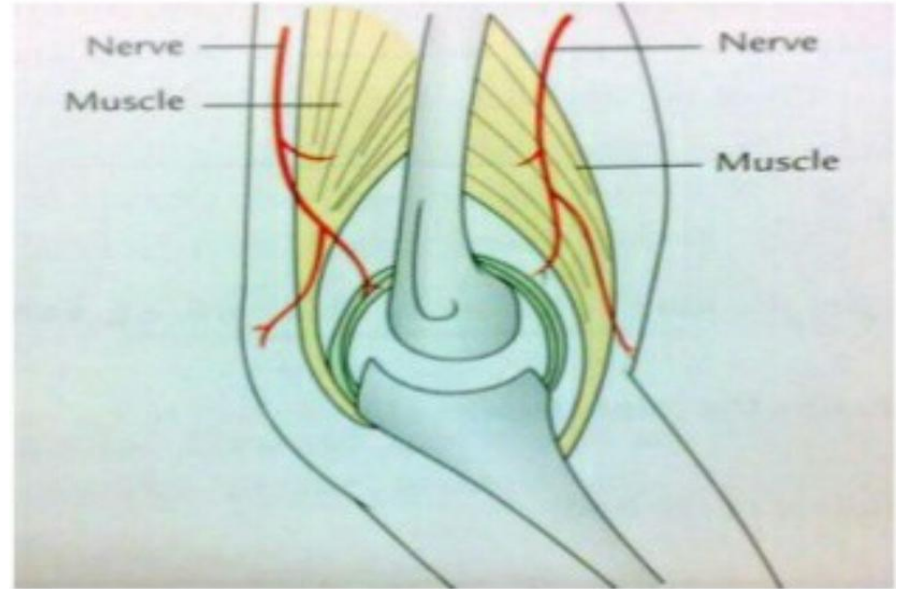
Note: the muscle does not have to be contracted the tone is enough to stabilize the joint. -team436-



Nerve supply of joints

The **capsule** and **ligaments** receive an abundant sensory nerve supply.

HILTON'S LAW: A sensory nerve supplying a joint also supplies the muscles moving that joint and the skin overlying the insertions of these muscles



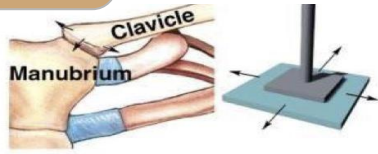
Summary

Table 5.3

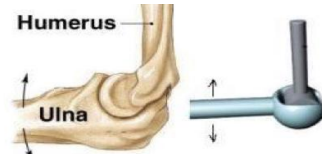
Summary of Joint Classes

Structural class	Structural characteristics	Types		Mobility
Fibrous	Bone ends/parts united by collagenic fibers	Suture (short fibers)		Immobile (synarthrosis)
		Syndesmosis (longer fibers)		Slightly mobile (amphiarthrosis) and immobile
		Gomphosis (periodontal ligament)		Immobile
Cartilaginous	Bone ends/parts united by cartilage	Synchondrosis (hyaline cartilage)		Immobile
		Symphysis (fibrocartilage)		Slightly movable
Synovial	Bone ends/parts covered with articular cartilage and enclosed within an articular capsule lined with synovial membrane	Plane Hinge Pivot	Condylar Saddle Ball and socket	Freely movable (diarthrosis; movements depend on design of joint)

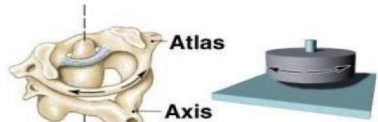
Summary



(a) Gliding joint



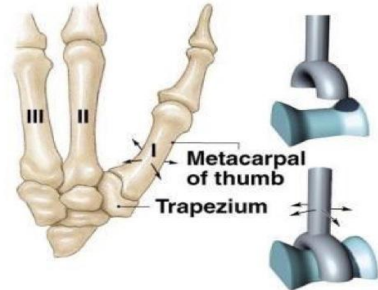
(b) Hinge joint



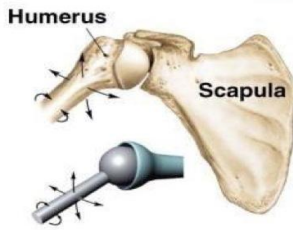
(c) Pivot joint



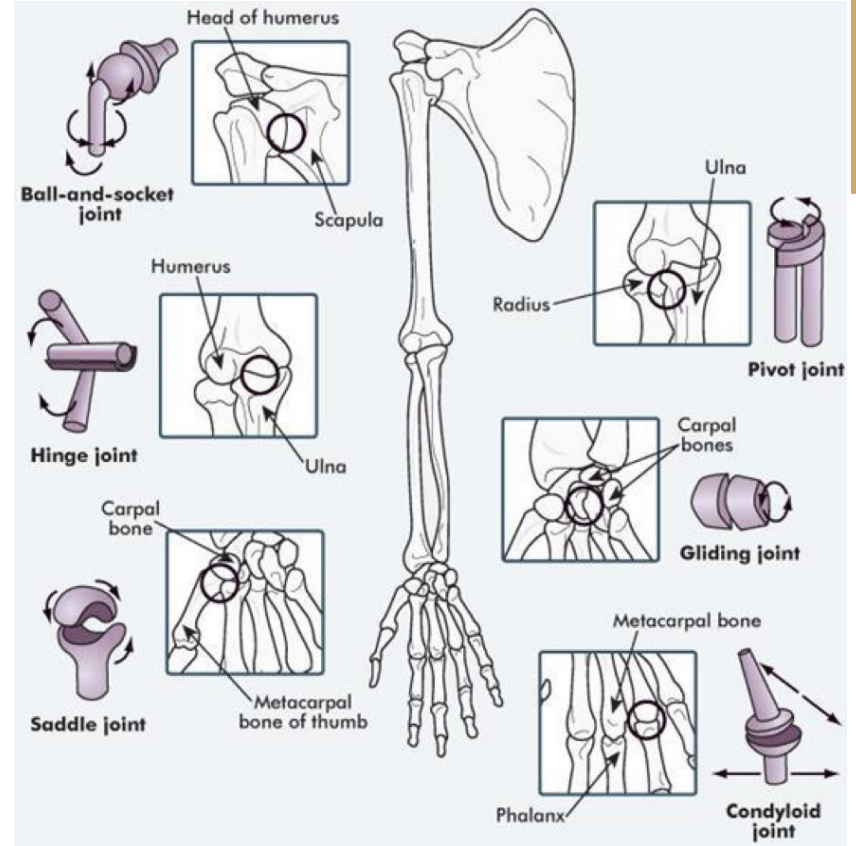
(d) Ellipsoidal joint



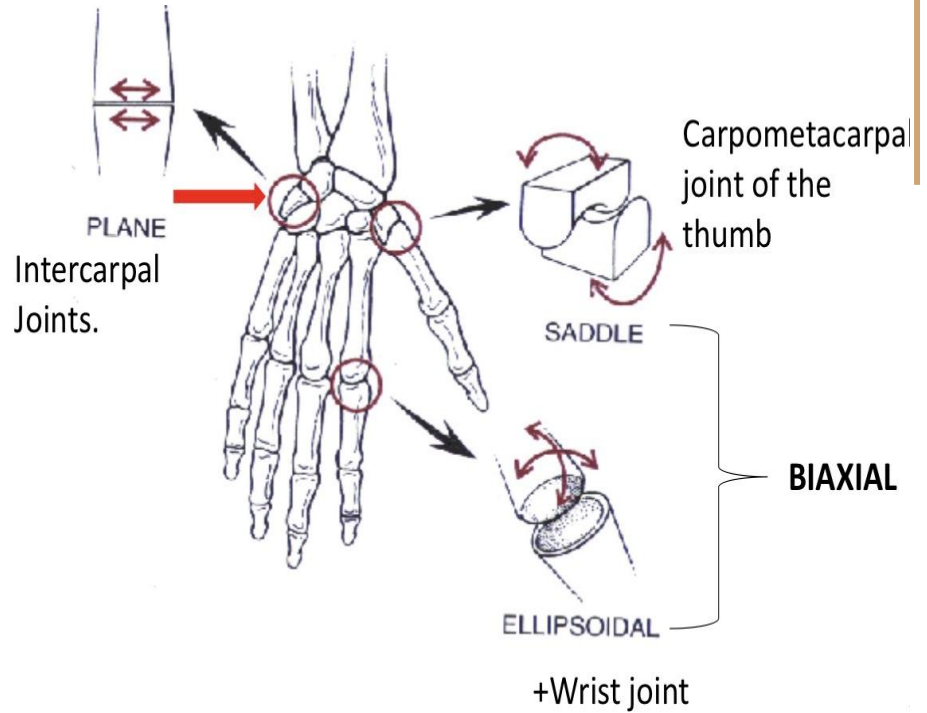
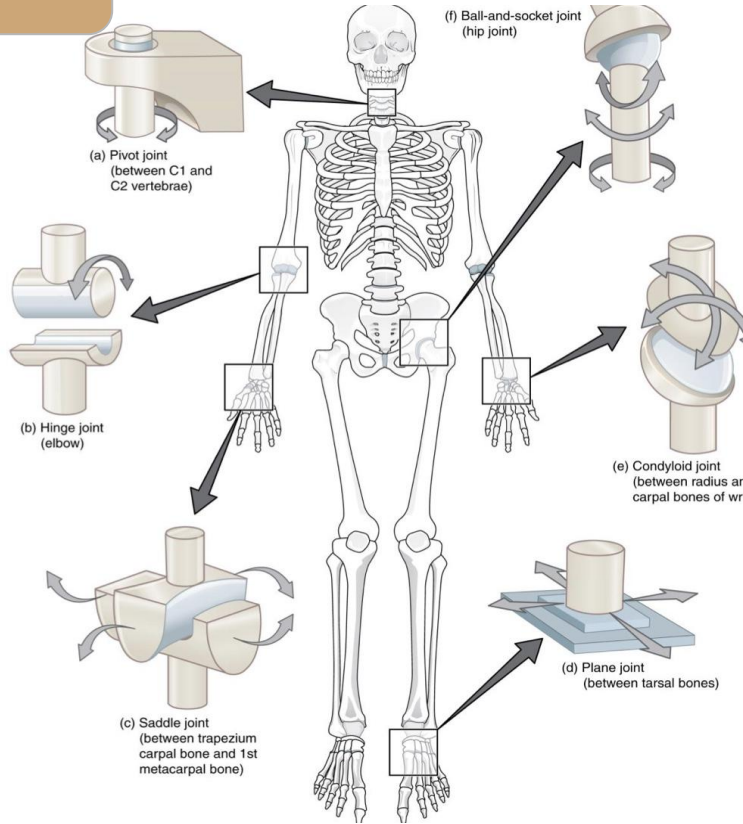
(e) Saddle joint



(f) Ball-and-socket joint



Summary



Questions

1- the intercarpal joints is an example for:

A- axial. B-biaxial. C- poly-axis. D- plane synovial

2- Wrist is an example of a synovial joint known as

A- Hinge synovial joint B- Pivot synovial joint
C- Ellipsoid synovial joint

3- Hilton's law: a sensory nerve supplying a joint also supplies related to that joint

A- the muscles B- the skin.
C- the muscles and the skin D- none of these

4. The type of the 1st sternocostal joint is:

A- Synchondrosis B- Secondary Cartilaginous
C- Synovial joint D- Fibrous joint

5- which one of the following is an example of a fibrous joint:

A- syndesmosis B- epiphyseal plate
C- symphysis pubis. D- intervertebral discs

6- Antero-posterior axis is responsible for:

A- flexion. B- rotation.
C- abduction. D- extension.

Answers: 1)D 2)C 3)C 4)A 5)A 6)C

Team Members

Lamia Abdullah Alkuwaiz (Team Leader)

Rawan Mohammad Alharbi

Abeer Alabduljabbar
Afnan Abdulaziz Almustafa
Ahad Algrain
Alanoud Almansour
Albandari Alshaye
AlFhadah abdullah alsaleem
Arwa Alzahrani
Dana Abdulaziz Alrasheed
Dimah Khalid Alaraifi
Ghada Alhaidari
Ghada Almuhanha
Ghaida Alsanad
Hadeel Khalid Awartani
Haifa Alessa
Khulood Alwehabi
Layan Hassan Alwatban
Lojain Azizalrahman
Lujain Tariq AlZaid

Maha Barakah
Majd Khalid AlBarrak
Norah Alharbi
Nouf Alotaibi
Noura Mohammed Alothaim
Rahaf Turki Alshammari
Reham Alhalabi
Rinad MUSAED Alghoraiby
Sara Alsultan
Shahad Alzahrani
Wafa Alotaibi
Wejdan Fahad Albadrani
Wjdan AlShamry

Faisal Fahad Alsaif (Team Leader)

Abdulaziz Al dukhayel

Fahad Alfaiz
Akram Alfandi
Saad Aloqile
Saleh Almoaiqel
Abdulaziz Alabdulkareem
Abdullah Almeaither
Yazeed Aldossari
Muath Alhumood
Abdulrahman Almotairi

Abdulelah Aldossari
Abdulrahman Alduhayyim
Abdullah AlOmar
Hamdan Aldossari
Mohammed Alomar
Abdulrahman Aldawood
Saud Alghufaily
Hassan Aloraini
Khalid Almutairi

Abdulmajeed
Alwardi
Abdulrahman Alageel
Rayyan Almousa
Sultan Alfuhaid
Ali Alammari
Fahad alshughaihthry
Fayez Ghiyath
Aldarsouni
Mohammed Alquwayfili

Abduljabbar Al-yamani
Sultan Al-nasser
Majed Aljohani
Zeyad Al-khenaizan
Mohammed Nouri
Abdulaziz Al-drgam
Fahad Aldhowaihy
Omar alyabis