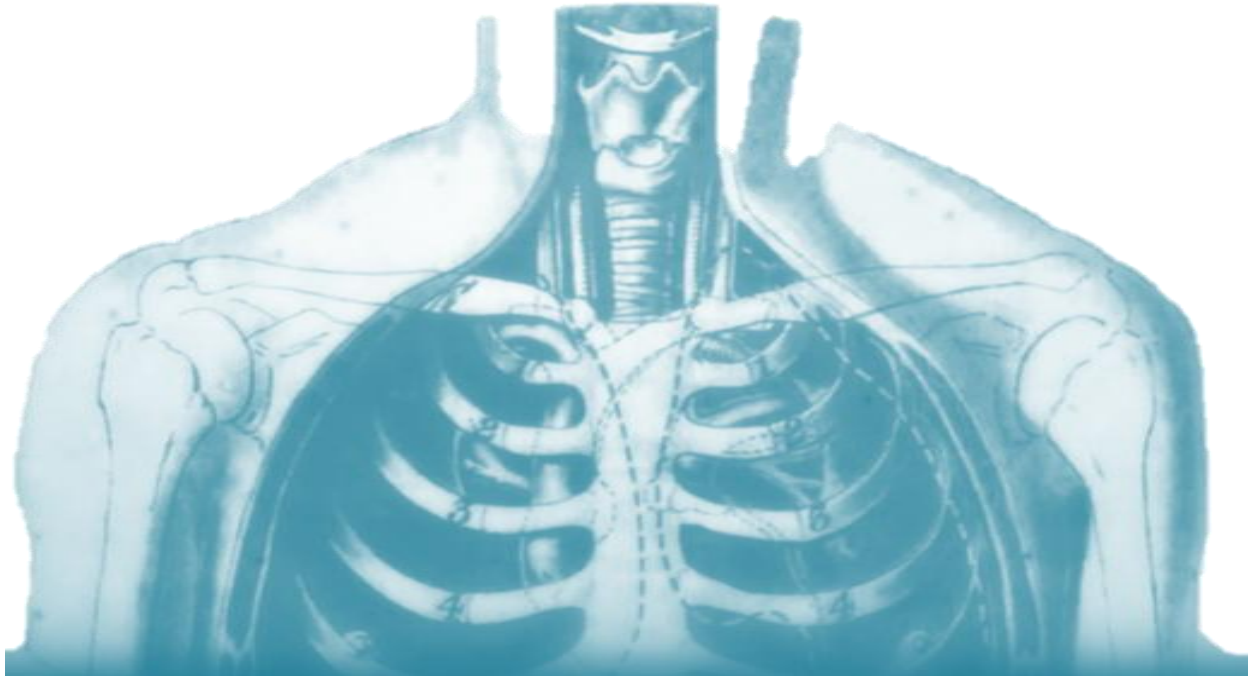




**King Saud University  
College of medicine  
Foundation block**

# Joint



# Objectives

*Define the term "Joint".*

*Describe the classification of the 3 types of joints & give an example of each.*

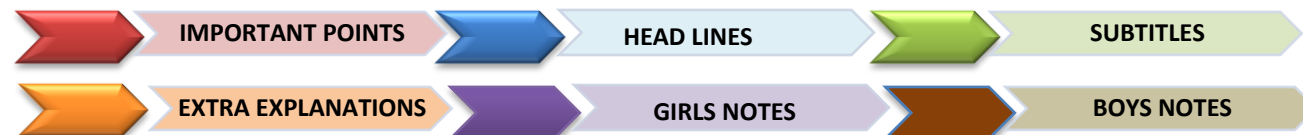
*Describe the characteristics of synovial joints.*

*Describe the classification of synovial joints & give an example of each.*

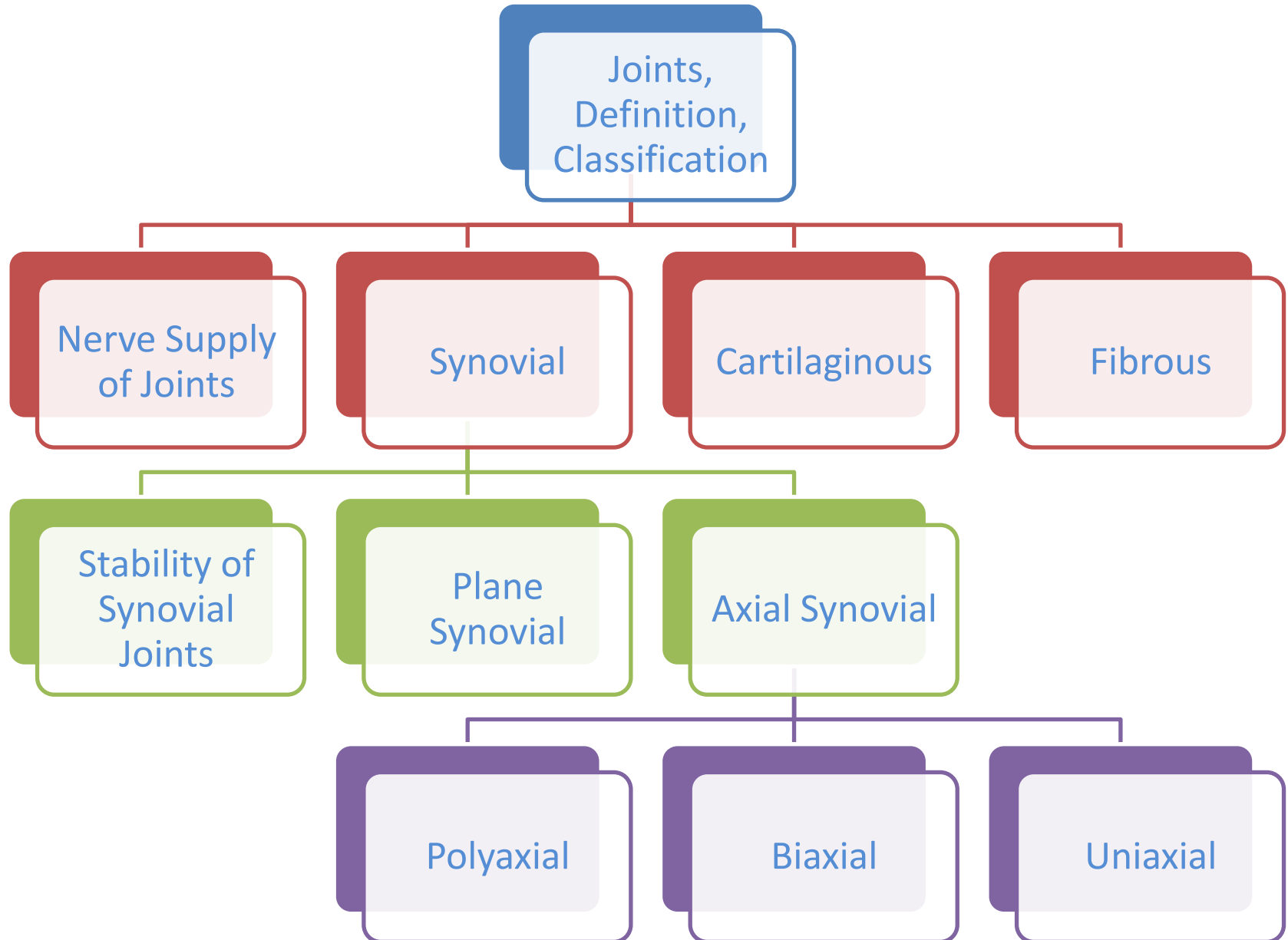
*List factors maintaining stability of joints.*

*Recite "Hilton's law" for nerve supply of joints.*

## COLOR INDEX



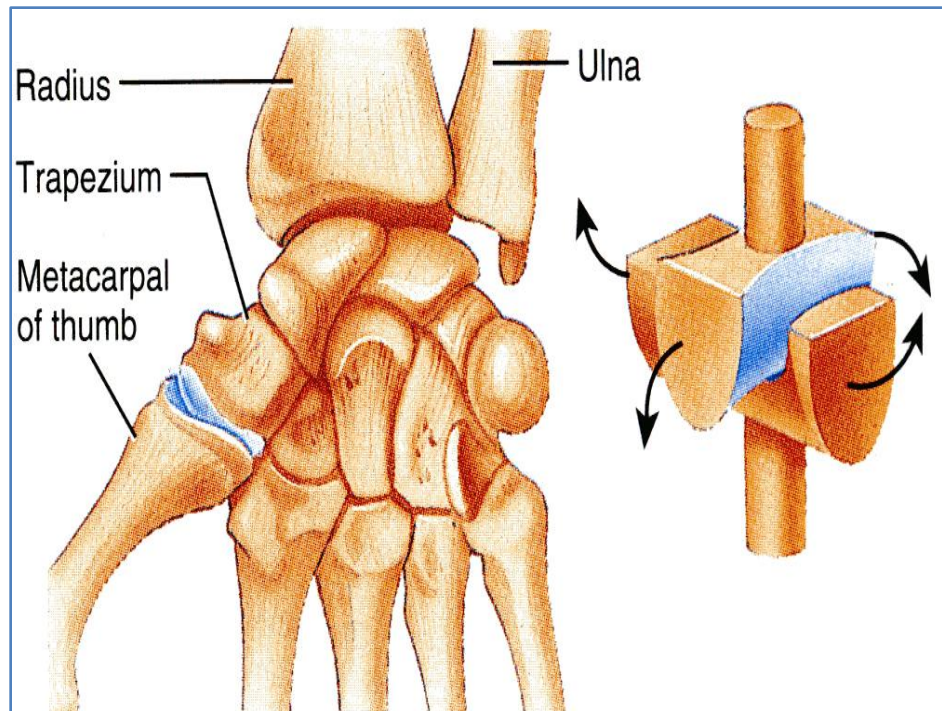
# Mind Map



# Definition

## What is a joint?

- It is the site where two or more bones meet together.
- \*ankle joint is meeting with 3 bones



# Classification

## Joints are classified

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

Fibrous.

Cartilaginous.

It is of 2 types

Primary Cartilaginous  
(Synchondrosis):

Secondary  
Cartilaginous

Synovial.

Plane synovial joints

Axial synovial joints.

# Fibrous Joints

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

## 1- Skull sutures:

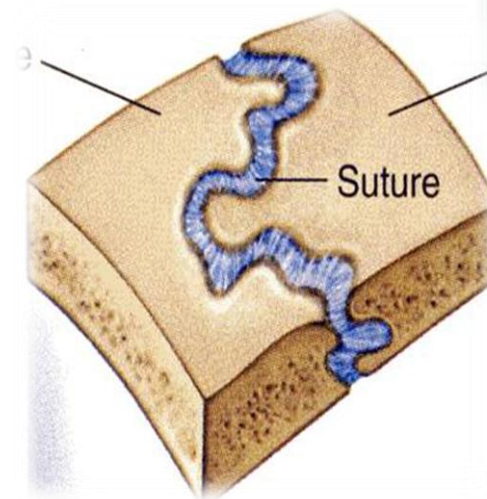
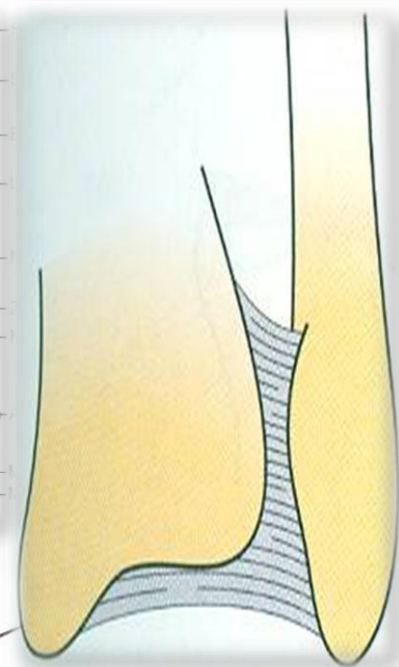
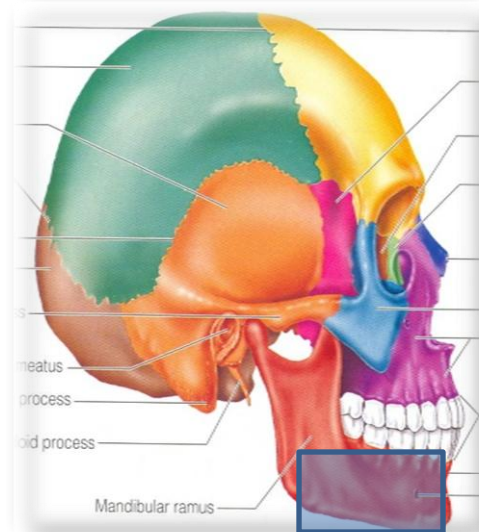
**Temporary** (as they ossify later).

## 2- Inferior tibiofibular joints:

(syndesmosis): minimal movement, permanent joints.

## 3- Gomphoses: dental alveolar joints.

يكون مكانها بين الأسنان وعظمة الفك



# Cartilaginuous Joints

The two bones are joined by cartilage. It is of 2 types:

Primary Cartilaginuous (Synchondrosis **الالتحام الغضروفي**):

Chondrosis : معناها غضروف باللاتيني

The bones are united by a plate or a bar of **hyaline cartilage**.

**No** movement.  
**Temporary** joints (ossify later).

**Examples:**

Between the **Epiphysis** and the **Diaphysis** of a growing bone.

Epiphysis and diaphysis found in **long bones**.  
(**Femur bone**).

Between the First Rib and the Sternum.  
(**1<sup>st</sup> sternocostal joint**).

Secondary Cartilaginuous:

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

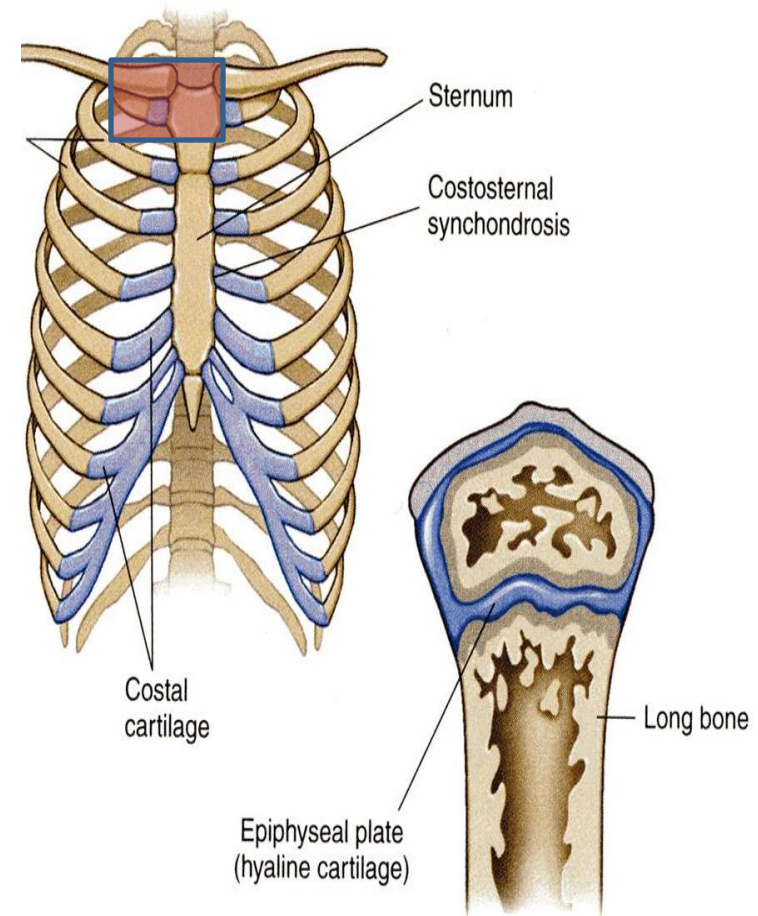
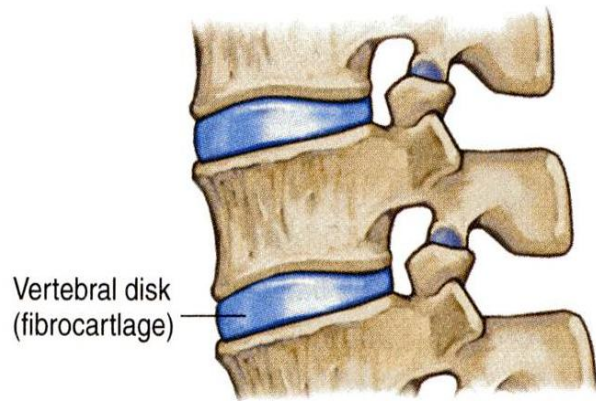
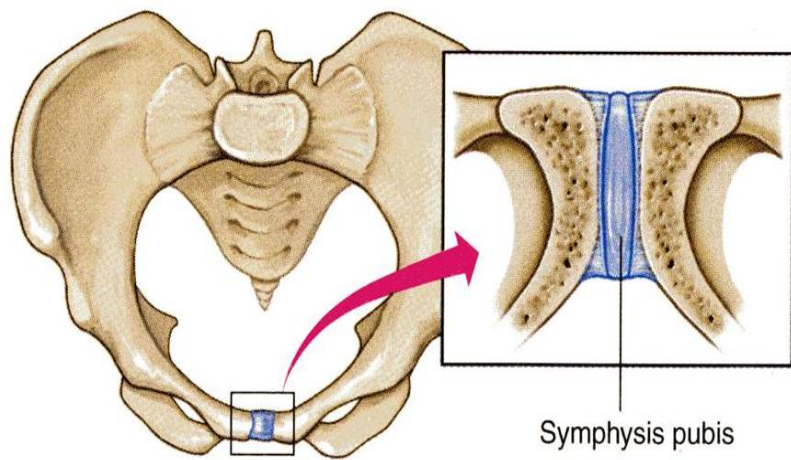
The bones are **united by** a plate of **fibrocartilage**.

**Little** movement.  
**Permanent** joints.

They are called **Midline** joints.

Called midline due to the midsagittal or median plane because all of the joints from this type line up on the midline





**Secondary Cartilaginous Joint**

**Primary Cartilaginous Joint**



# Synovial Joints

## Characteristic features:

**Freely movable** joints.

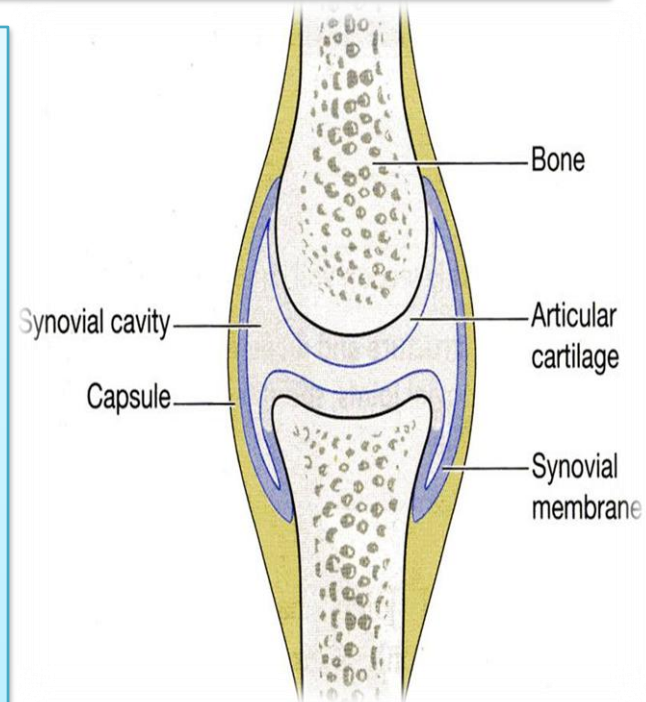
Easy to move

The two bones are joined by a fibrous capsule, which is attached to the margins of articular surfaces & enclosing the joint.

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

غضروف زجاجي

A joint cavity is enclosed within the capsule.



# Synovial Joints

## Synovial membrane:

a thin **vascular membrane** lining the **inner** surface of the capsule.

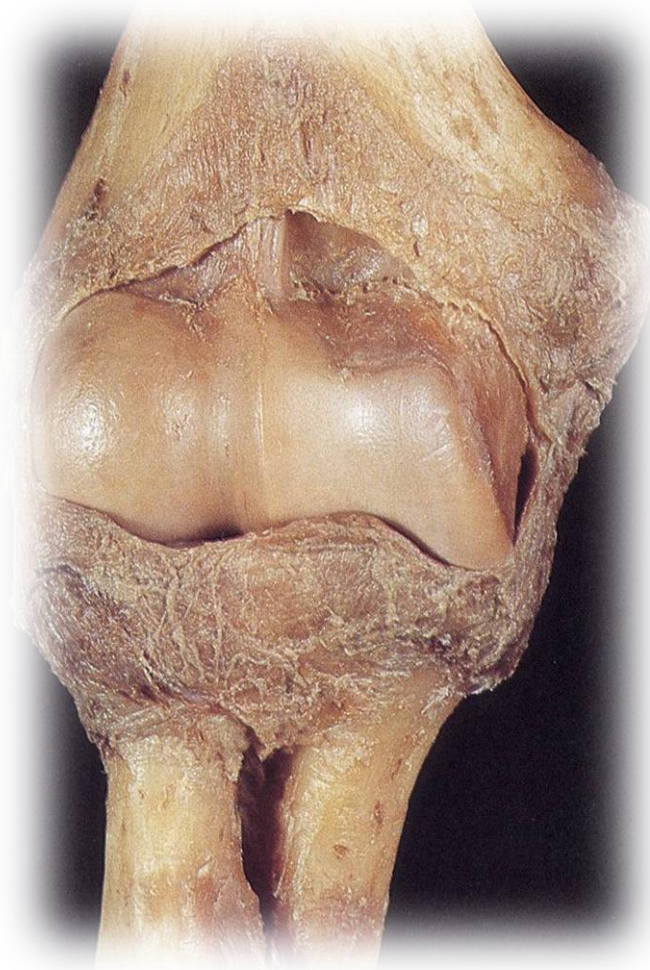
## Synovial fluid:

السائل المسبب للزوجة

a (lubricating fluid) produced by the **synovial membrane** in the joint cavity.

Synovial joints -> capsule -> synovial membrane -> cavity -> synovial fluid

The fluid (minimizes the friction) between the (ar الأسطح المفصالية es).



# Classification of Synovial Joints

**Synovial joints are classified according to:**

The arrangement of the articular surfaces.

The range of movements that are possible

مدى الحركة



So according to the (**range of movement**) synovial joints are classified into:

**Plane** synovial joints.

**Axial** synovial joints.



سيتم دراسة الـ Axial synovial joints بالتفصيل الممل

أما الـ Plane synovial joints ستكون صفحة واحدة

# Plane Synovial Joints

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

حركة انزلاقية أو حركة  
تزلجية

**Examples:**

Intercarpal and intertarsal joints.

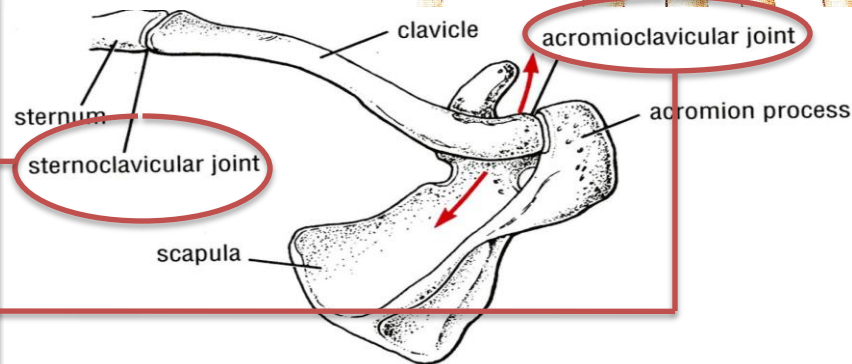
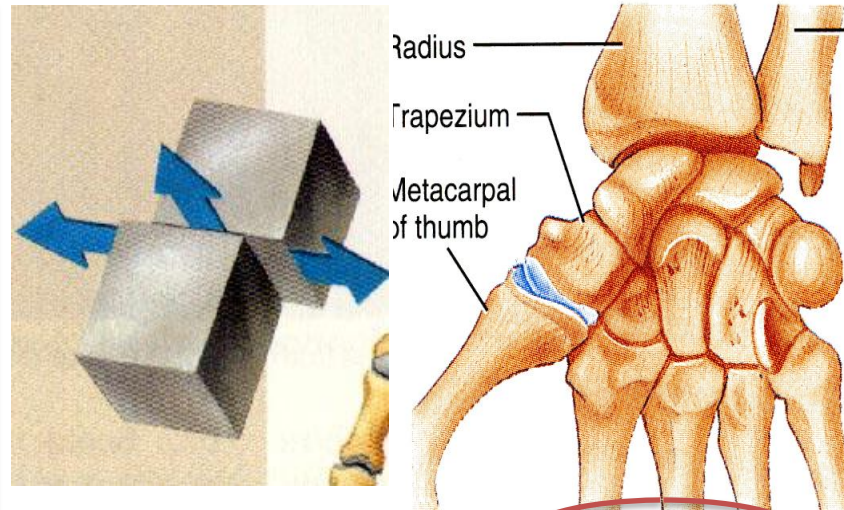
موجودة في اليد

موجودة في القدم

**Sterno**clavicular joints

**Acromio**clavicular joints.

\*there are no convex or concave , and it's plane because they are short bone .





# Axial Synovial Joints

**Movements occur along axes:**

**Transverse: Flexion & Extension.**



\*like the move of the laptop screen

**Longitudinal: Rotation.**



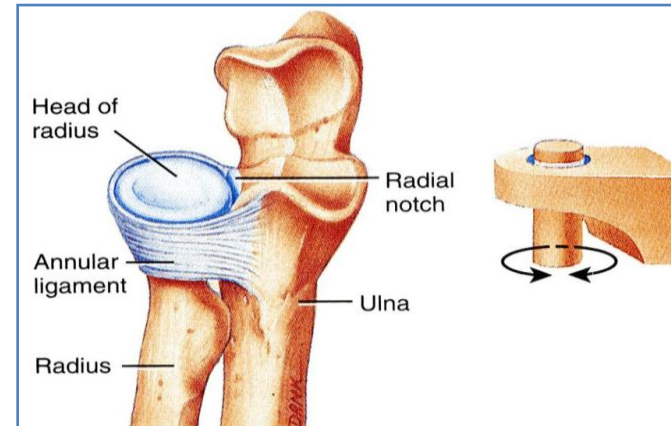
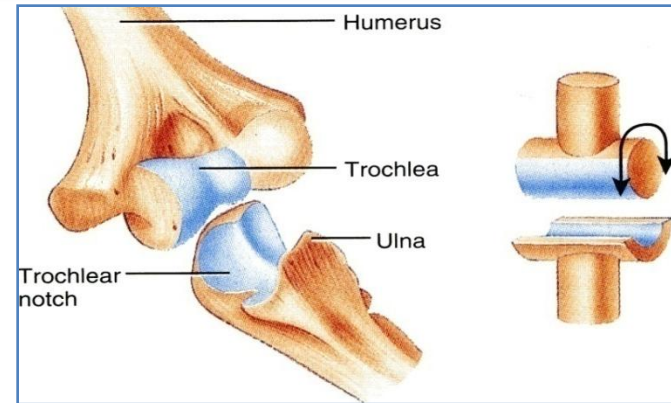
**Antero-posterior: Abduction and Adduction.**

**Axial joints are divided into:**

**Uni**axial.

**Bi**axial.

**Multi**-axial (**Poly**axial).



# Uniaxial Synovial Joints

**Hinge joints :**

**Axis:** Transverse.

**Movements:** Flexion & Extension.

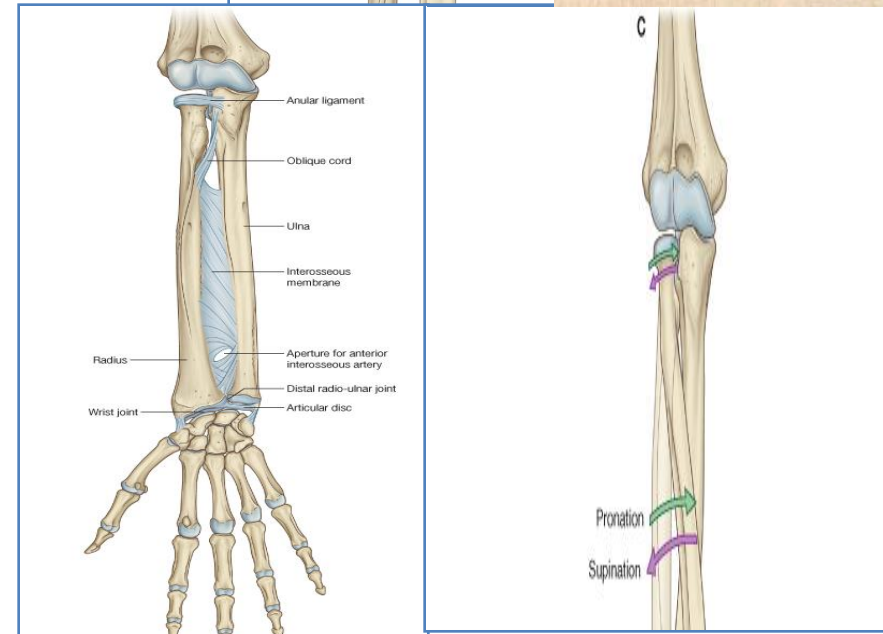
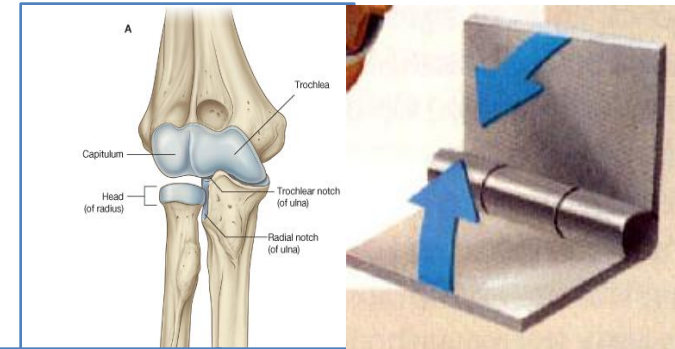
**Example:** Elbow and Ankle joints.

**Pivot :**

**Axis:** Longitudinal.

**Movements:** Rotation.

**Example:** Radio-ulnar joints





# Biaxial Synovial Joints

## Ellipsoid joints:

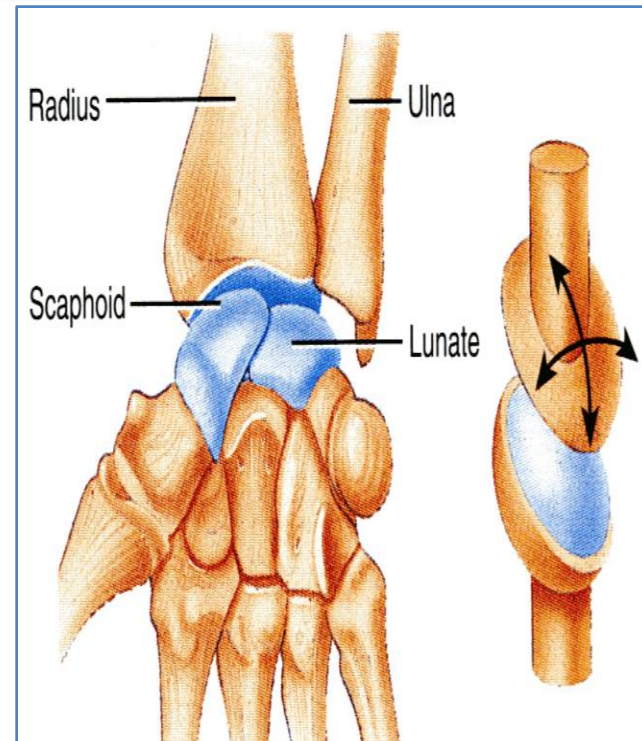
An elliptical **convex** fits into an elliptical **concave** articular surface.

المحدد يدخل مع المقعر

Axis : Transverse & antero-posterior.

Movements : Flexion & Extension +  
abduction & adduction **but rotation is impossible.**

**Example:** Wrist joint.



# Biaxial Synovial Joints

## Saddle joints:

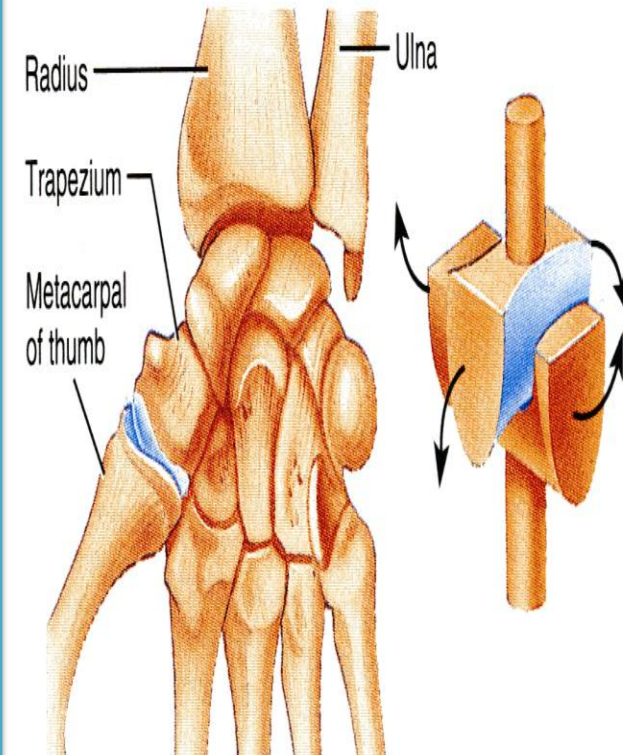
The articular surfaces are reciprocally **concavo-convex**.

They resemble a saddle on a horse's back.

**Movement:** As ellipsoid joints  
(Flexion & Extension + Abduction & Adduction) +  
a small range of rotation.

## Example:

Carpometacarpal joint of the **thumb**.



# Polyaxial Synovial Joints

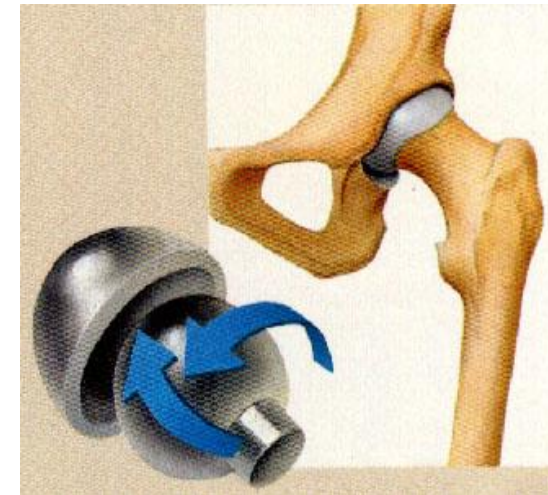
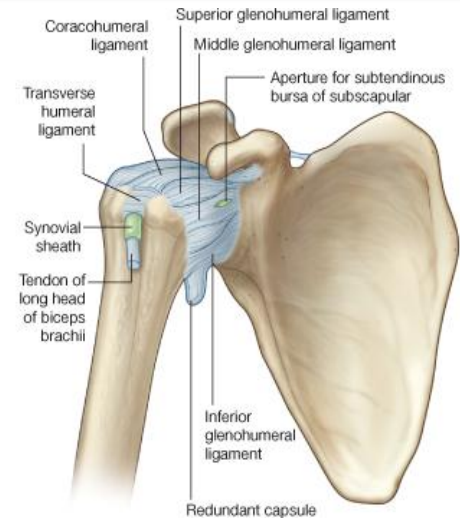
## Ball-and-socket joints:

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

**Movements:** Flexion & Extension + (Abduction & Adduction) + Rotation along a separate axis.

## Examples:

1. **Shoulder** joint.
2. **Hip** joint.

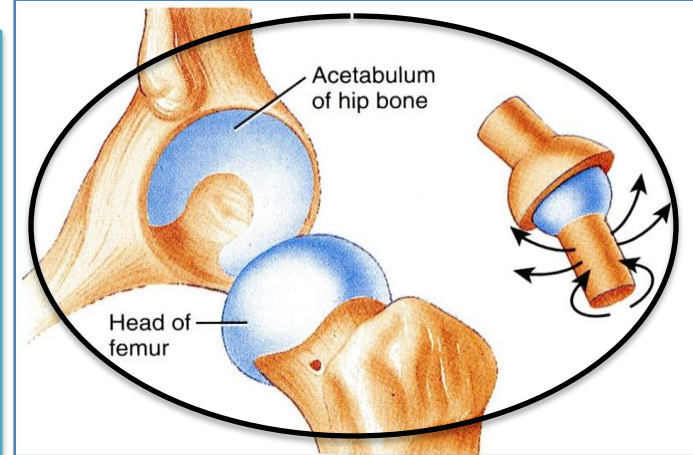


# Stability of Synovial Joints

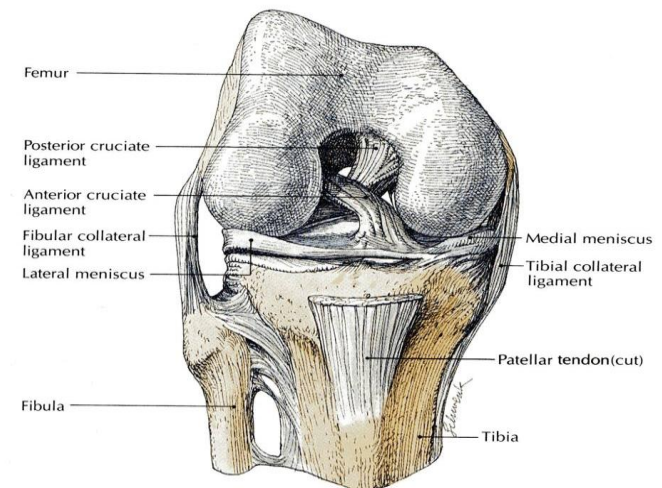
## 1- The shape of articular surfaces:

The ball and socket shape of the **Hip joint** is a good examples of the importance of bone shape to **maintain (joint stability)**.

The shape of the bones forming the **Knee joint** has **nothing** to do for stability.



The Ball and Socket shape.  
شكل التجويف و الكرة.



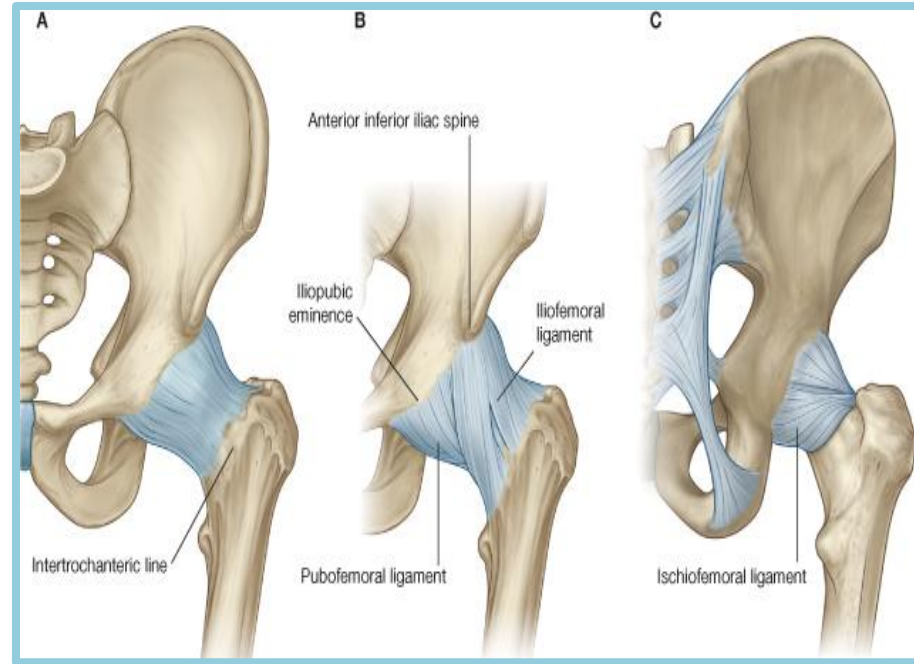
# Stability of Synovial Joints

## 2-Strength of the ligaments:

They prevent **excessive movement** in a joint.

### Example:

cruciate ligaments of the knee joint.





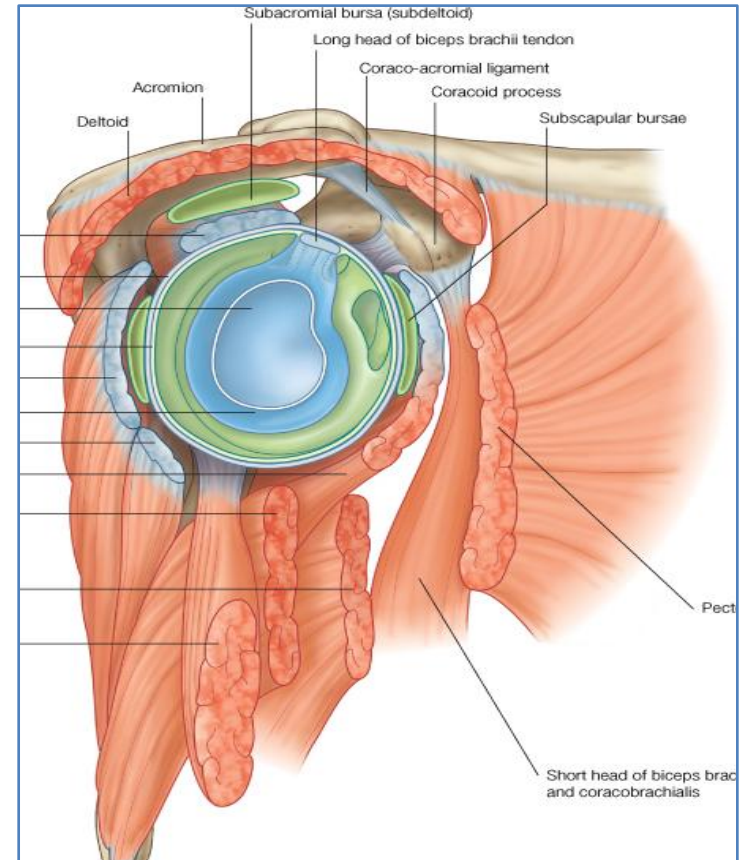
# Stability of Synovial Joints

## 3- Tone of the surrounding muscles:

In most joints, it is the **major factor** controlling stability.

The short muscles around the **shoulder joint** keeps the head of the humerus in the shallow glenoid cavity.

العضلات القصيرة المحيطة بمفصل الكتف  
تساعد على استقرار رأس الهيوميروس في  
الجلينويد كافيته





# 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.”

# Joints

Classifications	Fibrous		Cartilaginous		Synovial					
Types	Temporary	Permanent	Primary (temporary)	Secondary (Permanent)	Plane	Axial				
						Uniaxial		Biaxial		Polyaxial
						Hinge	Pivot	Ellipsoid	Saddle	Ball-and-socket
Bones joined by:	Fibrous Tissue		Hyaline cartilage	Fibrocartilage (and the articulating surfaces are covered by a thin plate of hyaline cartilage)	Fibrous Capsule that encloses the joint					
Movement	×	✓ (little)	×	✓ (little)	✓ (gliding)	Transverse axis	Longitudinal axis	Transverse and antero-posterior		Transverse, longitudinal, and antero-posterior
Location	Sutures of the skull vault	Inferior tibifibular joints	1- Between the Epiphysis and Diaphysis of a growing bone. 2- Between the first rib and the sternum (1st sternocostal joint)	Midline joints: 1- joints between the vertebral bodies (Intervertebral discs) 2- Symphysis Pubis	1- Intercarpal joints 2- Sternoclavicular joints 3- Acromioclavicular joints	Elbow joint	Radio-ulnar joints	Wrest joint	Carpometacarpal joint (rotation of the thumb).	Shoulders and hips

# MCQS QUESTION

**A) Which of the following is a hinge synovial joint?**

1. Shoulder.
2. Elbow.
3. Sternoclavicular.
4. Symphysis pubis.

**B) Which of the following structures connects the bodies of 2 vertebrae together?**

1. Fibrous tissue.
2. Hyaline cartilage
3. Fibrocartilage.
4. Elastic cartilage.

**C) Which of the following is a cartilaginous joint?**

1. Hip.
2. Elbow.
3. Sternoclavicular.
4. Symphysis pubis.

**D) Which of the following is a pivot synovial joint?**

1. Shoulder.
2. Elbow.
3. Sternoclavicular.
4. Radioulnar.

**ANSWER BOX :-**

4 (D)  
4 (C)  
3 (B)  
2 (A)

Classification of  
joints  
time duration  
4:20



Types of  
Synovial Joints  
time duration  
1:23



# HELPFUL VIDEO



**King Saud University  
College of medicine  
Foundation block**

**Done by :-**

Othman Abed,  
Abdulaziz Almsaud  
& Omar Al Mutair  
Sarah alseneidi

**Reviewed By :-**

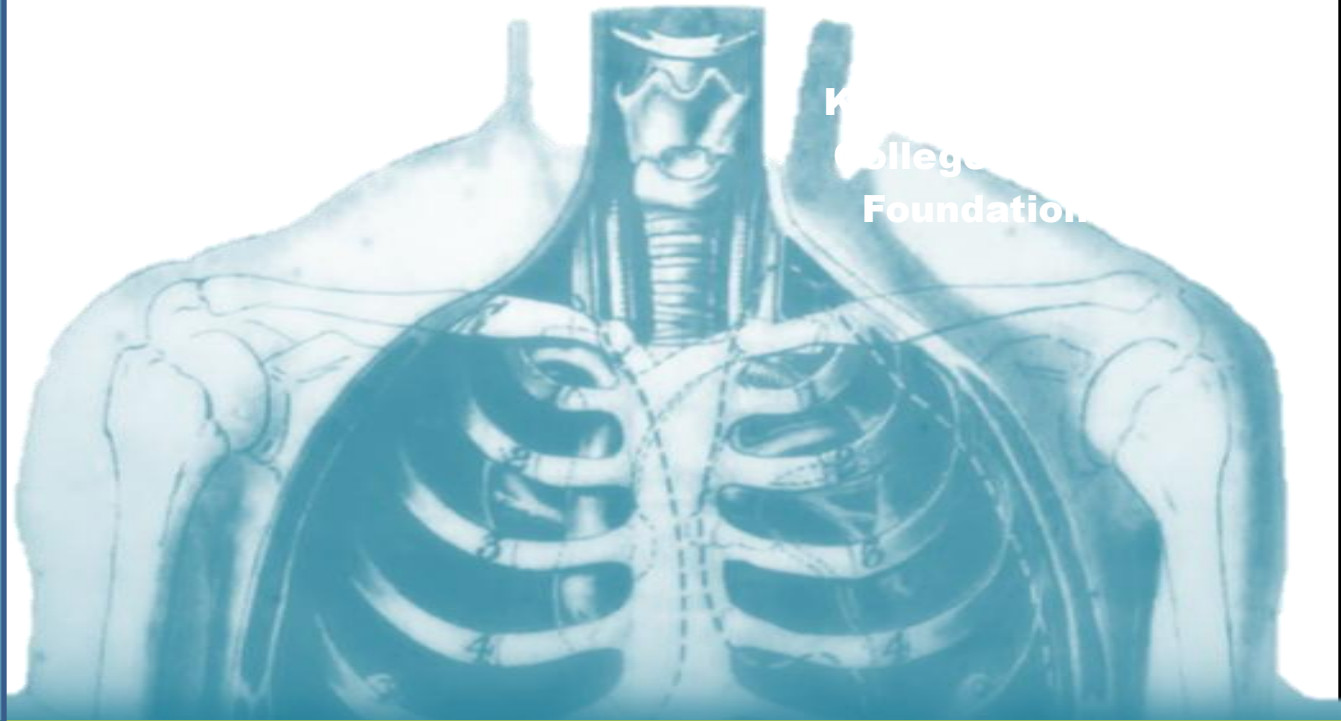
Thamer Alsohaibani  
Sarah alseneidi

**Team Leaders :-**

Omar Almutair &  
Waad Almanie

For any comments or  
suggestions

Please don't hesitate to  
contact us at  
[anatomy433@live.com](mailto:anatomy433@live.com)



# Good luck



**Anatomy Team**

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