# CONTENT

# Joints

Structural and functional classification, types of joints movements and its articulation

Introduction

A point at which parts of an artificial structure are joined.

It is a structure in the human or animal body at which two parts of the skeleton are fitted together.

A joint is the site at which any two or more bones articulate or come together.

* **Structural Classification based on 2 criteria**
* Presence or absence of space between bones called synovial cavity
* Type of connective tissue that binds bones
* Functional Classification based on degree of movement

**1. The structural classification of joints**

**A) Fibrous joints:-** No synovial cavity bones held together by fibrous tissue rich in collagen fibers.

**B) Cartilaginous joints:-** No synovial cavity bones held together by cartilage.

C) Synovial joints:- synovial cavity bones held together by dense irregular connective tissue.

**2.The functional classification of joints**

A)**Synarthrosis** an immovable joint

B)**Amphiarthrosis** a slightly movable joint

C) **Diarthrosis** a freely movable joint

**1.A.Fibrous Joints:**

-The bones forming these joints are linked with tough,fibrous material.Such an arrangement often permits no movement.

-Lack a synovial cavity

-The articulating bones are held very closely together by dense fibrous connective tissue.Eg-coronal suture,Fibrous joints are immovable.

**🡪Three types**

a)Sutures

b)Syndesmoses

c)Gomphoses

**JOINTS (FIBROUS JOINTS)**

**a)Sutures:-**

-A joint where two bony structures are united by thin layer of dense fibrous tissue

-Occur only between bones of the skull

**b) Syndesmoses**

-A joint where two bones are joined by a fibrous connective tissue arranged as bundle (ligament) or sheet (interosseous membrane) .Permits slight movement Greater distance between articulating bones,Distal tibiofibular joint- anterior tibiofibular ligament.

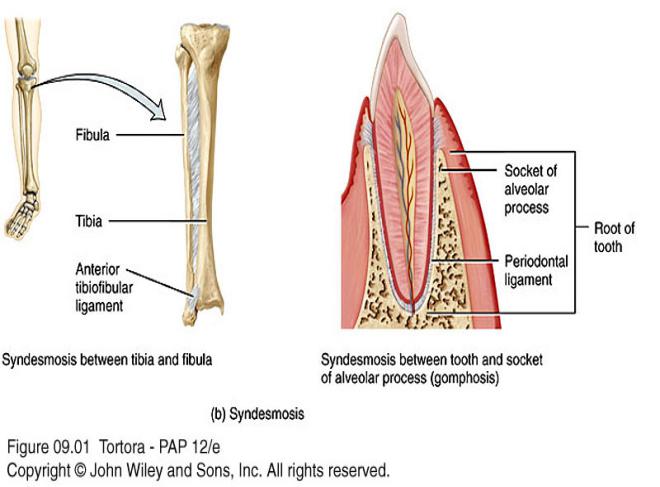
**c) Gomphoses**:

A joint where a bony structure is implanted deep into another bony structure. An example would be the joint between a tooth and the mandible (jaw bone)

Immovable joint,Joint in which a cone-shaped peg fits into a socket

Articulations of the teeth with the sockets of the maxillae and mandible

**TYPES OF FIBROUS JOINTS:-**



**1.B.JOINTS (CARTILAGINOUS JOINTS):-**

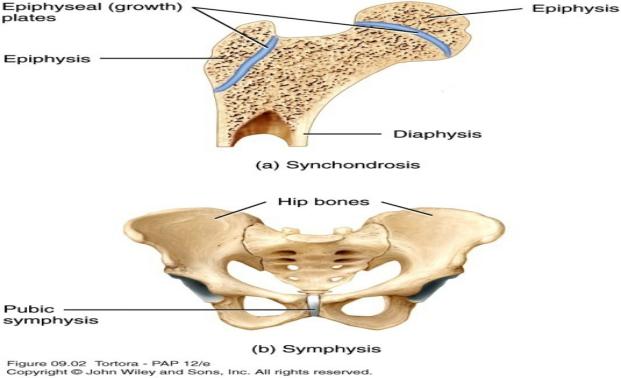
-These joints are formed by a pad of fibrocartilage,a tough material that acts as a shock absorber.

-Lacks a synovial cavity,allows little or no movement,Connected by either cartilage- -Hyaline or fibrocartilage

-Two types of cartilaginous joints

a)Synchondroses

b)Symphyses



**a)Synchondroses**:

-Connecting tissue is hyaline cartilage,

-Epiphyseal (growth) plate,

**b)Symphyses:-**

-Slightly movable joint,Joints where bones are connected by a fibrocartilage

-Example:Pubic symphysis: Between the anterior surfaces of the hip bones

Intervertebral joints between the vertebrae

**1.C.JOINTS (SYNOVIAL JOINTS):-**

🡪Synovial joints are characterized by the presence of a space or capsule between the articulating bones.

**🡪Synovial cavity** allows a joint to be freely movable,bones are covered with layer of hyaline cartilage-Articular cartilage,articular Capsule,a sleeve-like capsule encloses the synovial cavity.

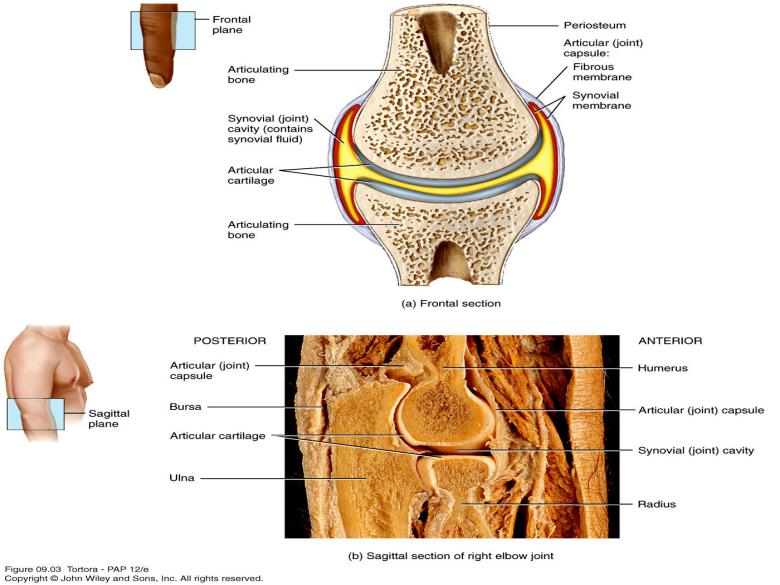
The articular capsule is composed of two layers,an outer fibrous capsule- dense irregular connective tissue,an inner synovial membrane-Areolar connective tissue and 🡪**Synovial Fluid**

The synovial membrane secretes synovial fluid.

**Functions to reduce friction by:**

* Lubricating the joint
* Absorbing shocks
* Supplying oxygen and nutrients to the cartilage.
* Removing carbon dioxide and metabolic wastes from the cartilage.
* Contains phagocytic cells to removes microbes.

**1.C.JOINTS (SYNOVIAL JOINTS)**



**🡪NERVES AND SUPPLY IN JOINTS (SYNOVIAL JOINTS)**

-Nerve ending convey information about pain from the joint to the spinal cord and brain.

-Nerve endings respond to the degree of movement and stretch at a joint.

-Arterial branches from several different arteries merge around a joint before penetrating the articular capsule.

**Bursae and Tendon Sheaths:-**

* **Bursae:-**

Sac-like structures containing fluid similar to synovial fluid,located between tendons, ligaments and bones,Cushion the movement of these body parts,

* **Tendon sheaths:-**

Wrap around tendons,Reduce friction at joints

**1.C.a.TYPES OF MOVEMENTS AT SYNOVIAL JOINTS:-**

-Synovial joints are classified according to the range of movement possible or to the shape of the articulating parts of the bones involved.

-Specific terminology is used to designate the movements that occur at joints

Movements are grouped into four main categories:

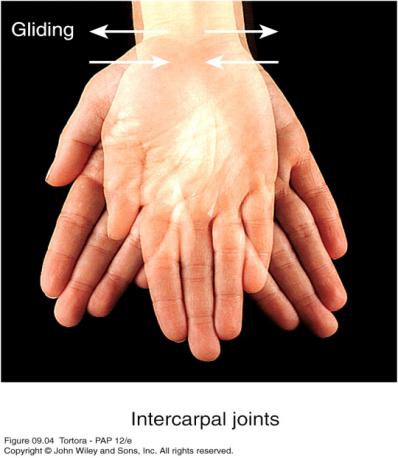
1) Gliding

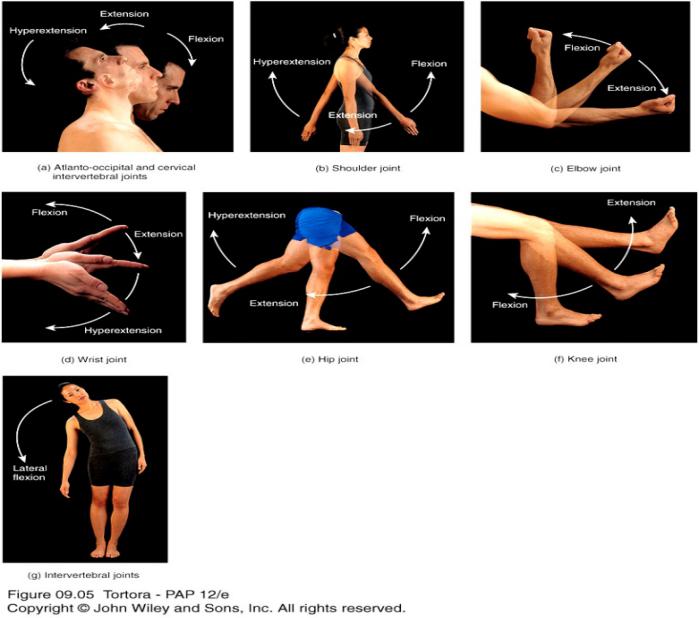
2) Angular movements

3) Rotation

4) Special movements

TYPES OF MOVEMENTS AT SYNOVIAL JOINTS:-





**1)Gliding:-**

-Simple movement back-and-forth and from side-to-side.

-There is no significant alteration of the angle between the bones.

-Limited in range.

-Intercarpal joints.

**2)Angular Movements:-**

-Increase or a decrease in the angle between articulating bones,angular movements include:

* Flexion
* Extension
* Lateral flexion
* Hyperextension
* Abduction
* Adduction
* Circumduction

**a)Flexion:-**

🡪Decrease in the angle between articulating bones.

🡪Bending the trunk forward but occasionally backward.

🡪 Eg-Knee Joint.

**b)Extension:-**

🡪Straightening or bending backward.

🡪Increase in the angle between articulating bones.

🡪Flexion and extension are opposite movements.

**c)Lateral flexion:-**

🡪Movement of the trunk sideways to the right or left at the waist.

**d)Hyperextension:-**

🡪Continuation of extension beyond the normal extension.

🡪Bending the trunk backward.

**e)Abduction:-**

🡪Movement of a bone away from the midline.

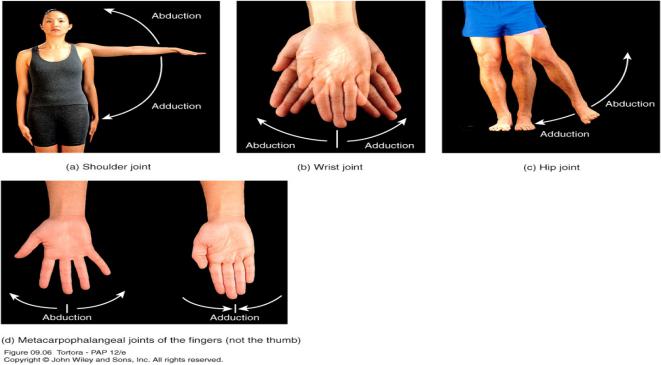
🡪 Moving the humerus laterally at the shoulder joint

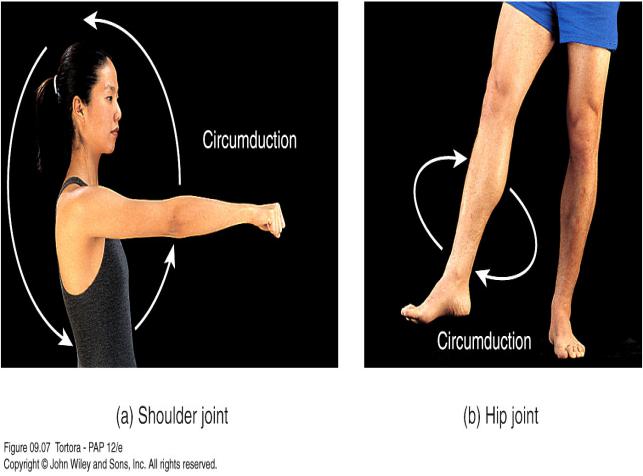
**f)Adduction:-**

🡪Movement of a bone toward the midlineof the body.

🡪Movement that returns body parts to normal position from abduction.

**JOINTS (TYPES OF MOVEMENTS AT SYNOVIAL JOINTS)**





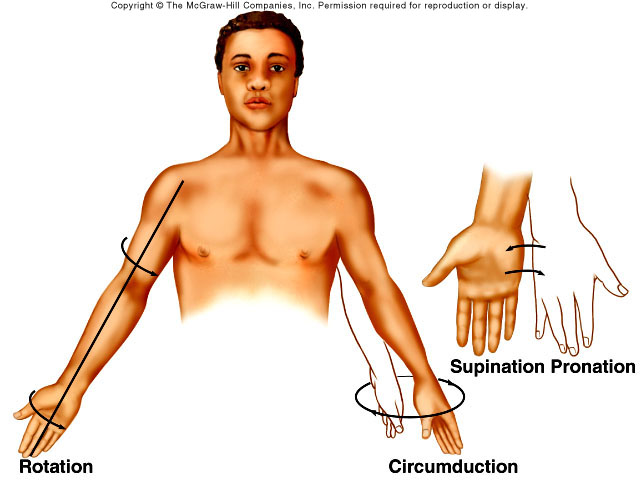
**g)Circumduction:-**

🡪Movement of a limb or digit so that it describes the shape of a cone.

🡪Movement of a body part in a circle.

🡪Moving the humerus in a circle at the shoulder joints.

CIRCUMDUCTION:-



**3)Rotation:-**

🡪Movement round the long axis of a bone.

🡪A bone revolves around its own longitudinal axis.

🡪Turning the head from side to side as when yow shake your head ‘no’.

**4)Special Movements:-**

a)Elevation

b)Depression

c)Protraction

d)Retraction

c)Inversion

d)Eversion

e)Dorsiflexion

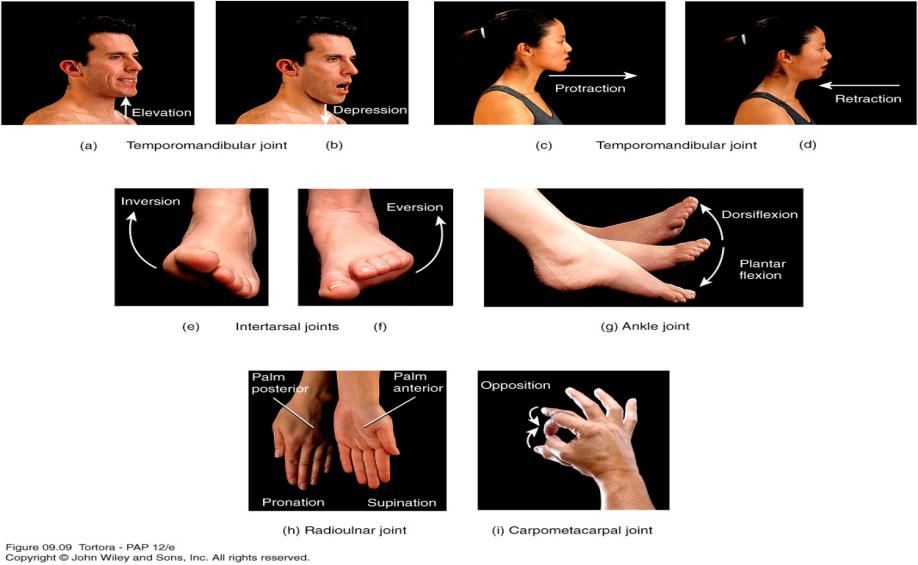
f)Plantar flexion

g)Supination

h)Pronation

i)Opposition

SPECIAL MOVEMENTS:-



**a)Elevation:-**

🡪Upward movement of a part of the body.

🡪Closing the mouth

🡪Its opposing movement is depression

**b)Depression:-**

🡪Downward movement of a part of the body

🡪Opening the mouth.

**c)Protraction:-**

🡪Movement of a part of the body anteriorly

🡪Thrusting the mandible outward

🡪Its opposing movement is retraction

**d)Retraction**:-

🡪Movement of a protracted part of the body back to normal

**e)Inversion:-**

**🡪**Movement of the foot medially

🡪Its opposing movement is eversion

**f)Eversion:-**

🡪Movement of the sole laterally

**g)Dorsiflexion:-**

🡪Bending of the foot at the ankle in an upward direction

🡪Its opposing movement is plantar flexion

**h)Plantar flexion:-**

🡪Bending of the foot at the ankle in a downward direction

**i)Supination:-**

**🡪**Movement of the forearm so that the palm is turned upward

🡪Its opposing movement is pronation

**j)Pronation:-**

**🡪**Movement of the forearm so that the palm is turned downward

**k)Opposition:-**

**🡪**Movement of the thumb in which the thumb moves across the palm to touch the tips of the fingers on the same hand.

**1.C.b.TYPES OF SYNOVIAL JOINTS BASED ON TYPE OF MOVEMENT:-**

🡪Synovial joints are classified based on type of movement

1)Planar

2)Hinge

3)Pivot

4)Condyloid

5)Saddle

6)Ball-and-socket

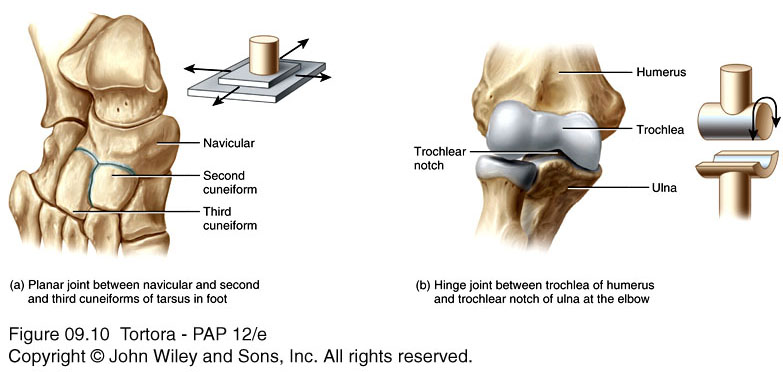
**1)Planar Joints:-**

* Primarily permit back-and-forth and side-to-side movements.
* Articulating surfaces of bone are flat or slightly curved.
* Non axial movements.
* Intercarpal, Intertarsal, sternoclavicular, acromioclavicular, sternocostal, vertebrocostal joints.

**2)Hinge joints:-**

* Produce an opening and closing motion like that of a hinged door.
* The convex surface of one bone fits into concave surface of another bone.
* Monoaxial:Permit only flexion and extension,Knee, elbow, ankle

**PLANAR JOINT AND HINGE JOINT:-**

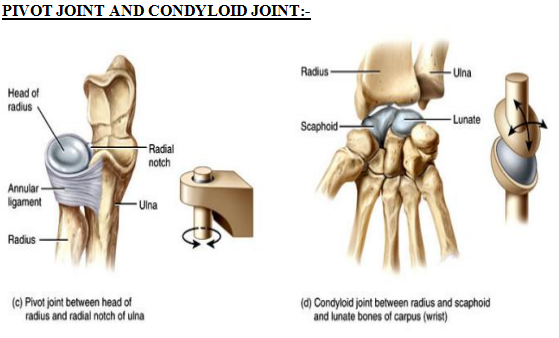


**3)Pivot Joints**

* Surface of one bone articulates with a ring formed partly by another bone and partly by ligament.
* Monoaxial.
* Radioulnar joints that enable the palms to turn anteriorly and posteriorly and atlantoaxial joints

**4)Condyloid Joints**

* The convex oval shaped projection of one bone fits into the oval-shaped depression of another bone.
* Biaxial.
* Wrist and metacarpophalangeal joints.



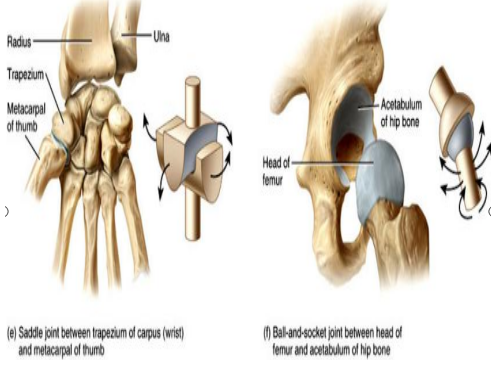
**5)Saddle Joints:**

* Articular surface of one bone is saddle-shaped, and the articular surface of the other bone fits into the “saddle”
* Biaxial:Carpometacarpal joint between trapezium of carpus and matacarpal of thumb

**6)Ball-and-Socket Joints**

* Ball-like surface of one bone fitting into a cuplike depression of another bone
* Multiaxial:Shoulder (Head of humerus fits into glenoid cavity of scapula), hip(head of femur fits into acetabulum of hip bone)

**SADDLE JOINT AND BALL-and-SOCKET JOINT**



**Disorders of Joints**

**a)Osteoporosis:**

**🡪I**n this condition bone density(the amont of bone tissue) is reduced because its deposition does not keep pace with resorption.

**b)Rickets &osteomalacia:**

**🡪**It is inadequate mineralisation of bone usually because of vitamin D deficiency

**c)Arthritis:**

**🡪**Inflammatory joint diseases(RA,Rheumatoid disease):This is chronic progressive inflammatory autoimmune disease mainly affcting peripheral symovial joints.

**d)Osteoarthritis(Osteoarthosis,OA):**

🡪This is a degenerative non-inflammatory disease result in pain and restricted movement of affected joints.

**e)Gout:**

**🡪**This condition is more prevalent in males,it is caused by deposition of sodium urate crystals in joints,tendons provoking an acute inflammatory response.

**QUESTION:-**

**5 MARKS:-**

1.Write the functions of bones.

2.What are joints? Classify joints with examples.

**2 MARKS:-**

1.Difference between cartilage and bone.

2.Functions of bones.

3.Define rickets and gout.