# CONTENT

# Joints

Structural classification, functional classification joints movements types and their articulation

Introduction

A place where 2 or more articular structure are joined.two parts of the skeleton are joined together in the human or animal body.

* **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 :-**Synovial cavity absent,fibrous tissue rich in collagen fibers are present between the bones to hold together.

 **B) Cartilaginous :-S**ynovial cavity absent , cartilage is present between the bones.

 C) **Synovial** :- synovial cavity is presnt,dense irregular connective tissue is present between the bones.

**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:**

-Tough fibrous material joints will does not permit movements.

-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**:

One bony structure implanted by another called Gomphoses.Example: jaw bone,it is an immovable joint,where cone-shaped peg fits into a socket

**TYPES OF FIBROUS JOINTS:-**



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

-Cartillaginous joints are madeup of a tough material called firocartillage which have property to absor shock.

-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 pubisand intervertebral joints between the vertebrae

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

🡪These are made up of capsule or space in-between articulating ony structures.

**🡪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)**

-The spinal cord and brain receive information aout pain from the joints.

-Degree of movement and stretch at a joint affects Nerve endings response.

-Around a joint arterial branches merge before entering the articular capsule.

 **Bursae and Tendon Sheaths:-**

* **Bursae:-**

Fluid similar to synovial fluid filled in Sac-like structure present in between tendons, ligaments and bones which provide cusion like movements.

* **Tendon sheaths:-**

Wrap around tendons,Reduce friction at joints

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

- According to the range of movement possible or to the shape of the articulating bones synovial joints are classified.

-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.

- Alteration of the bones angle between the bones.

-Limited in range.

-Intercarpal joints.

**2)Angular Movements:-**

Either decrease or increased angle between articulating bones, 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:-**

🡪sideway movement of the trunks at the waist to the right or left.

**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.

🡪From abduction.returning the body parts to normal position.

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





**g)Circumduction:-**

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

🡪Body movement part in a circle.

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

CIRCUMDUCTION:-



**3)Rotation:-**

🡪Long axis movement of a bone.

🡪 Own longitudinal axis one movement.

🡪 Side to side turning after shaking head.

**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:-**

🡪Body part upper movement.

🡪Closing the mouth

🡪Its opposing movement is depression

**b)Depression:-**

🡪Downward body part movement

🡪Opening the mouth.

**c)Protraction:-**

🡪Movement of a part of the body anteriorly

🡪Thrusting the mandible outward

🡪Its opposing movement is retraction

**d)Retraction**:-

🡪Body back to normal from protraction

**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:-**

**🡪** upward movement of palm

🡪Its opposing movement is pronation

**j)Pronation:-**

**🡪**Forearm**/** 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.
* flat or slightly curved bones.
* Non axial movements.
* Intercarpal, Intertarsal, sternoclavicular, acromioclavicular, sternocostal, vertebrocostal joints.

**2)Hinge joints:-**

* Hinged door opening and closing motio .
* concave surface fits into convex surface of 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.
* anteriorly turn of palm by radioulnar joint and posteriorly turn by 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:**

* saddle-shaped 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:**

**🡪**Reduced bone density 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.