

## Midterm Lab Assignment

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Section: b

Topic: Write brief note on the joints of upper limb.

- Answer: 1. Joints of Upper limb
- 2. Contents • Introduction • Types of joints • Movements • Clinical correlation
- 3. Kinds of joints • A site where two or more bones come together, whether or not movement occurs between them, is called a joint. • Exception is..... • Joints are classified according to the tissues that lie between the bones: fibrous joints, cartilaginous joints, and synovial joints.
- 4. Fibrous Joints • The articulating surfaces of the bones are joined by fibrous tissue • and thus very little movement is possible. • Ex:- The sutures of the vault of the skull and the inferior tibiofibular joints .
- 5. Cartilaginous joints • cartilaginous joints can be divided into two types: primary and secondary. • primary cartilaginous joint is one in which the bones are united by a plate or bar of hyaline cartilage. • Thus, the union between the epiphysis and the diaphysis of a growing bone and that between the first rib and the manubrium sterni are examples of such a joint. No movement is possible. • A secondary cartilaginous joint is one in which the bones are united by a plate of fibrocartilage and the articular surfaces of the bones are covered by a thin layer of hyaline cartilage • Examples are the joints between the vertebral bodies and the symphysis pubis. A small amount of movement is possible.
- 6. Synovial Joints • The articular surfaces of the bones are covered by a thin layer of hyaline cartilage separated by a joint cavity • This arrangement permits a great degree of freedom of movement • The cavity of the joint is lined by synovial membrane, which extends from the margins of one articular surface to those of the other. • The synovial membrane is protected on the outside by a tough fibrous membrane referred to as the capsule of the joint • The articular surfaces are lubricated by a viscous fluid called synovial fluid, which is produced by the synovial membrane
- 7. • Fatty pads are found in some synovial joints lying between the synovial membrane and the fibrous capsule or bone. Examples are found in the hip • The degree of movement in a synovial joint is limited by the shape of the bones participating in the joint the coming together of adjacent anatomic structures and the presence of fibrous ligaments uniting the bones
- 8. • Synovial joints can be classified according to the arrangement of the articular surfaces and the types of movement that are possible • Plane joints: In plane joints, the apposed

articular surfaces are flat and this permits the bones to slide on one another. Examples :- sternoclavicular and acromioclavicular joints • Hinge joints: Hinge joints resemble the hinge on a door, so that flexion and extension movements are possible. Examples :- elbow, knee, and ankle joints • Pivot joints: In pivot joints, a central bony pivot is surrounded by ligamentous ring and rotation is the only movement possible. The atlantoaxial and superior radioulnar joints are good examples.

- [9.](#) • **Condyloid joints:** Condyloid joints have two distinct convex surfaces that articulate with two concave surfaces. The movements of flexion, extension, abduction, and adduction are possible together with a small amount of rotation. • The metacarpophalangeal joints or knuckle joints are good examples • **Ellipsoid joints:** In ellipsoid joints, an elliptical convex articular surface fits into an elliptical concave articular surface. The movements of flexion, extension, abduction, and adduction can take place, but rotation is impossible. The wrist joint is a good example
- [10.](#) • **Saddle joints:** In saddle joints, the articular surfaces are reciprocally concavoconvex and resemble a saddle on a horse's back. • These joints permit flexion, extension, abduction, adduction, and rotation. Example:- carpometacarpal joint of the thumb • **Ball-and-socket joints:** In ball-and-socket joints, a ball-shaped head of one bone fits into a socketlike concavity of another • This arrangement permits free movements, including flexion, extension, abduction, adduction, medial rotation, lateral rotation, and circumduction • The shoulder and hip joints are good examples of this type of joint
- [11.](#) **Stability of Joints** • The stability of a joint depends on three main factors: • the shape, size, and arrangement of the articular surfaces • the ligaments • Tone of the muscles around the joint.
- [12.](#) **Types** • Acromio-clavicular joint • Sterno-clavicular joint • Shoulder joint • Elbow joint • Radio-ulnar joints • Wrist joint • Intercarpal and Midcarpal joints • Carpo-metacarpal joints • Metacarpo-phalangeal joint
- [13.](#) **Acromioclavicular Joint** • **Articulation:** This occurs between the acromion of the scapula and the lateral end of the clavicle • **Type:** Synovial plane joint • **Ligaments:** Superior and inferior acromioclavicular ligaments reinforce the capsule; from the capsule, a wedge-shaped fibrocartilaginous disc projects into the joint cavity from above • **Accessory ligament:** The very strong coracoclavicular ligament extends from the coracoid process to the undersurface of the clavicle • **Synovial membrane:** This lines the capsule and is attached to the margins of the cartilage covering the articular surfaces. • **Nerve supply:** The suprascapular nerve • **Movements:-**A gliding movement takes place when the scapula rotates or when the clavicle is elevated or depressed
- [14.](#) • **Important Relations** • Anteriorly: The deltoid muscle • Posteriorly: The trapezius muscle • Superiorly: The skin CC:-shoulder separation
- [15.](#) **Sternoclavicular Joint** • **Articulation:** This occurs between the sternal end of the clavicle, the manubrium sterni, and the first costal cartilage • **Type:** Synovial double-plane joint/ compound syn jt of saddle variety • **Capsule:** This surrounds the joint and is attached to the margins of the articular surfaces. • **Ligaments:** The capsule is reinforced in front of and behind the joint by the strong sternoclavicular ligaments. • Its circumference is attached to the interior of the capsule, but it is also strongly attached to the superior margin of the

- articular surface of the clavicle above and to the first costal cartilage below. • Articular disc: This flat fibrocartilaginous disc lies within the joint and divides the joint's interior into two compartments • Accessory ligament: The costoclavicular ligament is a strong ligament that runs from the junction of the first rib with the first costal cartilage to the inferior surface of the sternal end of the clavicle • Synovial membrane: This lines the capsule and is attached to the margins of the cartilage covering the articular surfaces. • Nerve supply: The supraclavicular nerve and the nerve to the subclavius muscle • Movements:- Forward and backward movement of the clavicle takes place in the medial compartment. Elevation and depression of the
- [16.](#) Important Relations • Anteriorly: The skin and some fibers of the sternocleidomastoid and pectoralis major muscles • Posteriorly: The sternohyoid muscle; on the right, the brachiocephalic artery; on the left, the left brachiocephalic vein and the left common carotid artery CC:- Dislocation is very rare
  - [17.](#) Shoulder Joint • Articulation: This occurs between the rounded head of the humerus and the shallow, pear-shaped glenoid cavity of the scapula • the glenoid cavity is deepened by the presence of a fibrocartilaginous rim called the glenoid labrum • Type: Synovial ball-and-socket joint • Capsule: This surrounds the joint and is attached medially to the margin of the glenoid cavity outside the labrum; laterally it is attached to the anatomic neck of the humerus • The capsule is thin and lax, allowing a wide range of movement. It is strengthened by fibrous slips from the tendons of the subscapularis, supraspinatus, infraspinatus, and teres minor muscles (the rotator cuff muscles). • Ligaments: The glenohumeral ligaments are three weak bands of fibrous tissue that strengthen the front of the capsule. • The transverse humeral ligament strengthens the capsule and bridges the gap between the two tuberosities • The coracohumeral ligament strengthens the capsule above and stretches from the root of the coracoid process to the greater tuberosity of the humerus
  - [18.](#) • Accessory ligaments: The coracoacromial ligament extends between the coracoid process and the acromion. Its function is to protect the superior aspect of the joint • Synovial membrane: This lines the capsule and is attached to the margins of the cartilage covering the articular surfaces • extends through the anterior wall of the capsule to form the subscapularis bursa beneath the subscapularis muscle • Nerve supply: The axillary and suprascapular nerves
  - [19.](#) Movements • The shoulder joint has a wide range of movement, and the stability of the joint has been sacrificed to permit this • The strength of the joint depends on the tone of the short rotator cuff muscles that cross in front, above, and behind the joints • When the joint is abducted, the lower surface of the head of the humerus is supported by the long head of the triceps, which bows downward because of its length and gives little actual support to the humerus • In addition, the inferior part of the capsule is the weakest area.
  - [20.](#) Important Relations • Anteriorly: The subscapularis muscle and the axillary vessels and brachial plexus • Posteriorly: The infraspinatus and teres minor muscles • Superiorly: The supraspinatus muscle, subacromial bursa, coracoacromial ligament, and deltoid muscle • Inferiorly: The long head of the triceps muscle, the axillary nerve, and the posterior circumflex humeral vessels
  - [21.](#) Elbow Joint • Articulation: This occurs between the trochlea and capitulum of the

- humerus and the trochlear notch of the ulna and the head of the radius • Type: compound Synovial hinge joint • Capsule: • Anteriorly it is attached above to the humerus along the upper margins of the coronoid and radial fossae and to the front of the medial and lateral epicondyles and below to the margin of the coronoid process of the ulna and to the annular ligament, which surrounds the head of the radius • Posteriorly it is attached above to the margins of the olecranon fossa of the humerus and below to the upper margin and sides of the olecranon process of the ulna and to the annular ligament.
- [22.](#) • Ligaments: The lateral ligament triangular and is attached by its apex to the lateral epicondyle of the humerus and by its base to the upper margin of the annular ligament. • The medial ligament is also triangular and consists principally of three strong bands: • the anterior band, which passes from the medial epicondyle of the humerus to the medial margin of the coronoid process; • the posterior band, which passes from the medial epicondyle of the humerus to the medial side of the olecranon; • and the transverse band, which passes between the ulnar attachments of the two preceding bands. • Synovial membrane: This lines the capsule and covers fatty pads in the floors of the coronoid, radial, and olecranon fossae; it is continuous below with the synovial membrane of the proximal radioulnar joint • Nerve supply: Branches from the median, ulnar, musculocutaneous, and radial nerves • The elbow joint is capable of flexion and
  - [23.](#) • It should be noted that the long axis of the extended forearm lies at an angle to the long axis of the arm. • This angle, which opens laterally, is called the carrying angle and is about 170° in the male and 167° in the female • The angle disappears when the elbow joint is fully flexed.
  - [24.](#) Important Relations • Anteriorly: The brachialis, the tendon of the biceps, the median nerve, and the brachial artery • Posteriorly: The triceps muscle, a small bursa intervening • Medially: The ulnar nerve passes behind the medial epicondyle and crosses the medial ligament of the joint. • Laterally: The common extensor tendon and the supinator. CC:- supracondylar fracture, Student's elbow, Tennis elbow, Golfer's elbow.
  - [25.](#) Proximal Radioulnar Joint • Articulation: Between the circumference of the head of the radius and the annular ligament and the radial notch on the ulna • Type: Synovial pivot joint • Capsule: The capsule encloses the joint and is continuous with that of the elbow joint. • Ligament: The annular ligament is attached to the anterior and posterior margins of the radial notch on the ulna and forms a collar around the head of the radius It is continuous above with the capsule of the elbow joint. It is not attached to the radius. • Synovial membrane: This is continuous above with that of the elbow joint. Below it is attached to the inferior margin of the articular surface of the radius and the lower margin of the radial notch of the ulna. • Nerve supply: Branches of the median, ulnar, musculocutaneous, and radial nerves
  - [26.](#) Movements • Pronation and supination of the forearm • Important Relations • Anteriorly: Supinator muscle and the radial nerve • Posteriorly: Supinator muscle and the common extensor tendon
  - [27.](#) Distal Radioulnar Joint • Articulation: Between the rounded head of the ulna and the ulnar notch on the radius • Type: Synovial pivot joint • Capsule: The capsule encloses the joint but is deficient superiorly. • Ligaments: Weak anterior and posterior ligaments strengthen the capsule. • Articular disc: This is triangular and composed of fibrocartilage. It

- is attached by its apex to the lateral side of the base of the styloid process of the ulna and by its base to the lower border of the ulnar notch of the radius. It shuts off the distal radioulnar joint from the wrist and strongly unites the radius to the ulna. • Synovial membrane: This lines the capsule passing from the edge of one articular surface to that of the other. • Nerve supply: Anterior interosseous nerve and the deep branch of the radial nerve
- [28.](#) Wrist Joint (Radiocarpal Joint) • Articulation: Between the distal end of the radius and the articular disc above and the scaphoid, lunate, and triquetral bones below • The proximal articular surface forms an ellipsoid concave surface, which is adapted to the distal ellipsoid convex surface. • Type: Synovial ellipsoid joint • Capsule: The capsule encloses the joint and is attached above to the distal ends of the radius and ulna and below to the proximal row of carpal bones. • Ligaments: Anterior and posterior ligaments strengthen the capsule • medial ligament is attached to the styloid process of the ulna and to the triquetral bone • The lateral ligament is attached to the styloid process of the radius and to the scaphoid bone • Synovial membrane: This lines the capsule and is attached to the margins of the articular surfaces. The joint cavity does not communicate with that of the distal radioulnar joint or with the joint cavities of the intercarpal joints • Nerve supply: Anterior interosseous nerve and the deep branch of the radial nerve
  - [29.](#) • The following movements are possible: flexion, extension, abduction, adduction, and circumduction • Rotation is not possible because the articular surfaces are ellipsoid shaped. The lack of rotation is compensated for by the movements of pronation and supination of the forearm.
  - [30.](#) Inter-carpal joints • Type: Synovial plane joints • Ligaments: The bones are united by strong anterior, posterior, and interosseous ligaments. • Carpometacarpal and Intermetacarpal Joints • The carpometacarpal and intermetacarpal joints are synovial plane joints possessing anterior, posterior, and interosseous ligaments. • They have a common joint cavity. A small amount of gliding movement is possible • Metacarpophalangeal Joints • Type: Synovial condyloid joints • Ligaments: The collateral ligaments are cordlike bands present on each side of the joints • Interphalangeal Joints • Interphalangeal joints are synovial hinge joints that have a structure similar to that of the metacarpophalangeal joints
  - [31.](#) • 1st carpo-metacarpal joint /thumb • Saddle joint b/w Trapezium and 1st metacarpal bone • Palmer and dorsal carpometacarpal ligaments • Movements, Flexion, extension, add, abd, opp Carpo-metacarpal joint
  - [32.](#) Inter-phalangeal joint