

DPT 2ND SEMESTER (SECTION A)**COURSE TITLE: BIOMECHANICS-I****INSTRUCTOR: AHMED HAYAT****FINAL TERM ASSIGNMENT****MARKS: 50**

1- Enlist functions of the following muscles

Deltoid, Trapezius. Latissimus dorsi, Rhomboids, Levator scapulae, Serratus anterior

Pectoralis major minor, Tere major.

Answer:

MUSCLE NAMES	FUNCTION OF MUSCLES
1.Deltoid	Anterior Fiber: It flexes and medially rotates the arm. Middle Abducts: It the arm from 15 to 90. Posterior Fiber: The function of posterior fiber is extension and lateral rotation of the arm.
2.Trapezius	Upper: The upper trapezius elevates and upward rotates the scapula. Middle: The middle fibers retract the scapula. Lower: The lower fibers of trapezius pulls the medial end of scapula downward depress the medial part of the spine of scapula.
3.Lattismus dorsi	It adducts and extend the arm. It help in medial rotation of the arm. It depresses the shoulder girdle through insertion on the humerus.
4.Rhomboids : Rhomboid major	The function of rhomboid major is to retract the scapula and rotates it to depress the glenoid cvity. It also fixes scapula to the thoracic wall.
5.Rhomboid minor	It retracts and rotates the scapula and fixes it to thoracic wall.

6. Levator scapulae	The function of levator scapulae is to elevate the scapula and tilts its glenoid cavity inferiorly by rotating scapula.
7. Serratus anterior	It protracts the scapula and upwardly rotates the scapula. It helps trapezius.
8. Pectoralis major	It horizontally flexes the shoulder and adduction of shoulder and medial rotation of shoulder.
9. Pectoralis Minor	It protracts the scapula and downwardly rotates the scapula.
10. Teres major	Its function is medial rotation adduction and extension of the shoulder joint.

2- Name all the ligaments of Shoulder joint and their functions

Answer:

Ligaments:

A **ligament** is the fibrous connective tissue that connects the bones to the other bones, is called ligament.

- It is also known as articular ligament, articular larua, fibrous ligament, or true ligament.
- Ligaments in the body include the peritoneal ligament (a fold of peritoneum or other membranes.)

➤ **Ligaments Of Shoulder Joint:**

Following are the ligaments of Shoulder joints;

1. Superior Glenohumeral Ligament:

- It is important in stabilization of Glenohumeral joint in adduction and external rotation.
- They are the main source of stability for the shoulder, holding it in place and preventing it from dislocating anteriorly.

2. Inferior Glenohumeral ligament:

- The inferior glenohumeral ligament (IGHL) is the most important glenohumeral ligament.
- It stabilizes the glenohumeral ligament.
- When the arm is abducted to approximately 90°.

3. Coracohumeral Ligament:

- It provides a tunnel for bicep tendon.
- It resist inferior translation in shouldes.
- It is a broad band which strengthens the upper part of the capsule.

4. Middle Glenohumeral Joint:

- It resist inferior translation in abduction and external rotation.
- It restrains the anterior translation upto 45 degree abduction in external rotation.

5. Coraco Clavicular:

- It resists superior motion.
- It attach the clavical corocoid process of scapula.
- They keep the scapula attach to the clavicle.

6. Transverse Humeral Ligament:

- It holds the tendon of long head of biceps brachii muscle
In the groove between the greater and lesser tubercle on the humerus.

3- Write Individual and combine action of Rotator Cuff muscles

Answer:

➤ **Rotator Cuff Muscles:**

- It is a common name for the group of 4 distinct muscles and their tendons.

➤ **Individuals Actions of Rotator Cuff Muscles:**

1. Supraspinatus:

- It is one of the fourth rotator muscle.
- It is relatively small muscle of the upper back.
- The function of supraspinatus is the abduction of arm
- It also helps in stabilization of the shoulder joint.

2. Infraspinatus:

- It is a thick triangular muscle.
- It occupies the chief part of infraspinatus fossa.
- The function of infraspinatus is it laterally rotates the arm.

3. Subscapularis:

- It medially rotate the arm.
- When the arm is medially rotated, it means that palm is facing back, behind the body.
- It is the largest muscle.

4. Teres minor:

- It is a narrow intrinsic shoulder muscle.
- It contributes to the "rotator cuff" a capsule of muscles and tendons that collectively stabilize the glenohumeral joint.
- It laterally rotates the arm.

➤ **Combine Action Of Rotator Cuff Muscles:**

- The rotator cuff muscles have the following combine actions:
- They help in the rotation of arm.
- They provide support all around except inferiorly.
- Its holds the head of humerus in correct position.
- The head of humerus is dislocated inferiorly as it is not protected inferiorly.
- It provide support to the capsule of shoulder joint.
- Subscapular is support the joint anteriorly, supraspinatus support superiorly, teres minor and infraspinatus support posteriorly.

4- Define Lateral epicondylitis and explain its physiotherapy treatment

Answer:

➤ **Lateral Epicondylitis:**

- It is also known as tennis elbow.
- It is the most common syndrome in the elbow.

➤ **Tendinopathy Injury:**

- It is tendinopathy injury involving the extensor muscles of the forearm. In most cases insertion of carpi radialis brevis is involved.

➤ **Origin:**

- These muscles originates on the lateral epicondylar region of the distal humerus.
- Contractile overloads that chronically stress the tendon near the attachment on the humerus are primary cause of epicondylitis.
- It occurs in upper extremity activities such as computer use, heavy lifting, forceful forearm pronation and supination.
- It involves swelling, or micro damage to the tissues on the lateral side of distal humerus including the tendinous attachment of the extensor tendon.

➤ **Causes:**

- The most common cause of lateral epicondylitis is pain.
- This pain can be produced by palpation on the extensor muscles origin on the lateral epicondyle.
- The pain can radiate upward along the upper arm and downward along the outside of the forearm and to the third and fourth fingers in rare cases.
- Inflammation is also the cause but it is present in the earliest stage.

➤ **Physical Therapy Treatment For Epicondylitis:**

- The first step of treating tennis elbow are reducing inflammation and resting the irritated muscles and tendons.
- Ice and compression may also help reduce inflammation and pain.

1. Rest Given To Arm:

- The first step is to given your arm proper rest and stop participation in sports or other activities.

2. Anti-Inflammatory Medicine:

- Anti-inflammatory medicines is given to patient like aspirin to reduce pain.

3. Physical Therapy:

- Specific exercise will be helpful for strengthening the muscles of forearm.

4. Steroid Injection:

- Steroids such as cortisone are very effective anti-inflammatory medicines.
- Doctor will decide to inject the painful area with steroid to relieve your symptoms.

5. Check Equipment:

- Your doctor will check the equipment if you participate in sports.

6. Extracorporeal Shock Waves Therapy:

The shock wave therapy sends sound waves to the elbow. These sounds produce the body natural healing process.

- The physiotherapist advice the patient for wrist range of motion.
- And to stretch the wrist.
- It also include pronation and supination of forearm.
- They recommend elbow range of motion.
- They give the patient wrist flexion exercise.
- And also wrist extension exercise is given to patient.
- Forearm pronation and supination is recommended

5- Differentiate between type 1 and type 2 muscle fibers

Answer:

➤ **Types Of Muscles Fiber:**

- There are two types of skeletal muscles fiber:

1. **Slow-twitch:** They are type-1 muscles fiber.

2. **Fast-twitch:** They are type-2 muscles fiber.

➤ **Type-1 Muscles Fiber:**

- They are more efficient over long periods of time.
- They are mainly used for postural maintenance such as holding the head upright.
- Slow-twitch or type-1 muscle fiber support long distance endurance activities like marathon running.

➤ **Type-2 Muscles fiber:**

- They are fast twitch, meaning they fire more quickly.
- They are also more powerful than type-1 fibers.
- They are recruited for activities that require more intensity like sprinting, lifting heavy weights.
- These fibers provide major strength, but they also fatigue more easily than type-1 fibers.
- Fast-twitch or type-2 muscle fibers support quick, powerful movements.

Differentiate between Type-1 and Type-2 muscle fiber:

	Type I fibers	Type II a fibers
Contraction time	Slow	Moderately Fast
Resistance to fatigue	High	Fairly high
Activity Used for	Aerobic activity	Long-term anaerobic activity
Maximum duration of use	Hours	Less than 30 minutes
Power produced	Low	Medium
Mitochondrial density	Very High	High
Capillary density	High	Intermediate
Oxidative capacity	High	High
Major storage fuel	Triglycerides	Creatine phosphate, glycogen
Properties	Consumes lactic acid	Produce lactic acid and Creatine phosphate