

## **DPT 2<sup>ND</sup> SEMESTER (SECTION A)**

**COURSE TITLE: BIOMECHANICS-I**

**INSTRUCTOR: AHMED HAYAT**

**FINAL TERM ASSIGNMENT**

**MARKS: 50**

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## Q1 Enlist function of the following

**Deltoid, Trapezius, Latissimus dorsi, Rhomboids, Levator scapulae, Serratus anterior Pectoralis major minor, Tere major.**

**Answer:**

**Deltoid** :The anterior deltoid attaches at the collarbone and allows you to flex your shoulder joint and rotate the shoulder inner. The middle deltoid and posterior deltoid attach at different parts of your shoulder blade. The middle deltoid attaches to the shoulder blade and allows you abduct your **arm**.

### **Trapezius**

#### **Trapezius Muscle: Function**

The function of the trapezius muscle depends on which section of the muscle is working. The functions of this muscle include:

Section of Trapezius	Function of the Section of Muscle
Upper	Raises the <b>scapula</b> (shoulder blades), which is the motion of shrugging the shoulders. Spreads the neck, which is the motion of snaking the neck straight back
Middle	Adducts the scapula, which is the motion of retreating or theft the shoulder blades together
Lower	Lowers or depresses the scapula

### **Latissimus dorsi**

Adduct and extends arm. Reduces the shoulder girdle via insertion on the humerus

### **Rhomboids**

The main action of the rhomboid muscles is scapular withdrawal around the scapulothoracic joint. Scapular withdrawal is a simultaneous sliding of the scapula superiorly and medially along the stem.

### **Levator scapulae**

The **levator scapulae functions** to elevate the **scapula** and slope the glenoid cavity inferiorly by revolving the **scapula** downward. If the **scapula** is fixed, a reduction of the **levator scapulae** leads to the lateral flexion of the cervical vertebral column to the side and stabilizes the vertebral column during rotation

**Serratus anterior:** The contraction of the whole **serratus anterior** leads to a anterolateral movement of the scapula along the ribs. Due to the pull of the inferior part at the lower scapula, the shoulder joint is shifted superiorly. This shifting now enables to lift the arm above 90° (elevation).

### **Pectoralis major minor**

It makes up the bulk of the chest muscles and lies underneath the breast. Under the **Pectoralis major** is the **Pectoralis minor**, a thin, triangular muscle. The **Pectoralis major's** primary **functions** are flexion, adduction, and internal rotation of the humerus.

### **Teres major**

The main function of teres major is to produce the movements of the humerus at the glenohumeral joint; it pulls the anterior surface of the humerus medially towards the trunk (inward rotation). Also, it can extend the arm from the flexed position.

## **Q 2 Name all the ligaments of Shoulder joint and their functions**

**Answer:** Name of the shoulder joint ligament

- 1 Acromioclavicular ligament
- 2 Coracoclavicular ligament
- 3 Sternoclavicular ligament

Function of the shoulder joint

### **1. Acromioclavicular ligament**

The **Acromioclavicular ligament** serves to strengthen the **joint** capsule and helps as the primary restraint to posterior translation and posterior axial rotation at the **AC joint**.

**2. Coracoclavicular ligament** ;The **function of the coracoclavicular ligament** is to allow complex shoulder movement deprived of separation of the scapula from the clavicle. Major muscles that cause movement around these structures include the serratus anterior, trapezius, teres major, rhomboid major, rhomboid minor, and triceps brachii (long head)

**3. Sternoclavicular ligament:** It is a **ligament** that covers from the posterior aspect of the sternal end of the clavicle to the posterosuperior manubrium. The anterior **sternoclavicular ligament** also stabilizes the **SC joint** and prohibits extreme superior displacement.

### **Q3 write individual and combine action of the rotator cuff muscle**

**Answer:** The rotator cuff is a group of four muscles that grip your upper arm in place in your shoulder. It helps you make all the motion of your arm and shoulder.

#### **Individual action of the rotator cuff muscle**

##### **1. Supraspinatus .**

Supraspinatus is the main muscle responsible for lateral rotation of your arm away from the centerline of your body.

##### **2 Infraspinatus :**

The main action of the Infraspinatus is to externally rotate the humerus and stabilize the shoulder joint.

##### **3 Teres minor:**

Teres minor primarily produces external rotation of the shoulder joint.

It assists in adduction and extension of the shoulder.

When the humerus is stabilized, abducts the inferior angle of the scapula.

##### **4 Subcapularis:**

**Action:** Internally rotates and adducts humerus; stabilizes shoulder.

#### **Combine action and rotator cuff muscle**

In addition to stabilizing the glenohumeral joint and controlling humeral head translation, the rotator cuff muscle also perform multiple functions, including abduction, internal rotation, and external rotation of the shoulder.

### **Q4. Define Lateral Epicondylitis and explain its physiotherapy treatment.**

**Answer:** Lateral epicondylitis, commonly known as “tennis elbow,” is a painful condition involving the tendons that attach to the bone on the outside (lateral) part of the elbow. Tendons transmit a muscle’s force to the bone. The muscle involved in this condition, the extensor carpi radialis braves, helps to straighten and stabilize the wrist.

With lateral epicondylitis, there is degeneration of the tendon’s attachment, weakening the anchor site and placing greater stress on the area. This can lead to pain associated with activities in which this muscle is active, such as lifting, gripping and/or grasping. Sports such

as tennis are commonly associated with this, but the problem can occur with many different activities.

## **Physiotherapy treatment for Lateral Epicondylitis**

If your elbow pain is affecting your activity and is persisting, Physiotherapy can help you to manage pain and improve your strength and flexibility. You should carry on with the exercises overleaf for at least 6–8 weeks after the pain disappears to help prevent symptoms returning.

### **Simple exercises**

#### **Wrist turn**

Bend your elbow at a right angle and hold out your hand, palm up.

Turn your wrist slowly so that your palm is now facing down.

Hold for 5 seconds, and then slowly release.

Do 3 sets of 10 repetitions.

#### **Wrist turn with weight**

Repeat the exercise while holding a light weight (e.g. a tin of beans).

#### **Wrist lift (palm up)**

Bend your elbow at a right angle.

Hold a light weight (e.g. a tin of beans), palm up.

Bend your wrist slowly towards you.

Hold for 5 seconds, and then slowly release.

Do 3 sets of 10 repetitions.

#### **Elbow bend**

Stand up straight and lower your arm to one side.

Bend your arm slowly upwards so your hand is touching your shoulder.

Hold for 15–30 seconds.

Repeat 10 times.

## **Wrist flex**

Keeping your arm straight in front with your palm facing down, gently bend your wrist down.

Use the opposite hand to press the stretching hand back towards your body and hold for 15–30 seconds.

Straighten your wrist.

Gently bend the stretching hand backwards and use the opposite hand to pull the fingers back.

Hold for 15–30 seconds. Do 3 sets with each wrist

## **Q5 Differentiate between type 1 and type 2 muscle fibers**

### **Answer:**

Slow-twitch (type 1) muscle fiber support long distance endurance activities like marathon running while fast-twitch(type 2) muscle fiber support quick powerful movement such as sprinting

Type 1	Type 2
Slow oxidative fiber	Fast glycolytic fibers
Red in colour	White in colour
Contain large number of mitochondria	Contain low number of mitochondria
Endurance type active	Strength type active
Store oxygen	Not oxygen
Twitch speed low	high
Lipid high	low
Glycogen low	high
Diameter small	high

Capillary density high	Slow
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