

Name: Nasira gul

ID:16102

Department:DPT 2nd semester section B

Paper:biomechanics

Submitted to:Sir shahzeb

Question-1:

Part-A

Biomechanics:

Meaning:

It is the combination of two words bio which means life and mechanics

Which is the study of action of forces both external and internal.

Definition:

The study of mechanical laws relating to the movement and structure

Of living organisms.

Ergonomics:

Meaning:

It is the combination of two words ergo means work and nomos means

Natural laws.

Definition:

- It is the study of how people work in their environment.
- An applied science concerned with the arranging things and designing them which people use so that the people and things interact with each other safely and efficiently.

Part-B

Importance of biomechanics and ergomechanics in physiotherapy:

Biomechanics:

We study biomechanics in physiotherapy because in humans it can help to understand impairments and diseases and increase the athletic performance. And for understanding the work of the human body.

- It determines how to prevent injury for better understanding of both joint function and dysfunction.
- To understand the musculoskeletal system.

Ergomechanics:

It applies information about human behavior limitations and abilities and other characteristics to the designs of machines and jobs and tasks for effective use.

- When ergo mechanics principles are applied to the environment many workplace injuries may be avoided and work performance can be improved.
- It can make the employee more comfortable and increase the productivity.

Question -2:

Part-A

Shoulder complex:

It consists of the following 6 joints,

- Glenohumeral joint:

It is present between the glenoid fossa of the scapula and the head

Of the humer.

Movements:

- Lateral rotation
- Medial rotation
- Adduction
- Abduction
- Flexion
- Extension

- **Acromioclavicular joint:**

It is present between the acromion process of the scapula and the clavicle

Movements:

- Upward and downward rotation
- Anterior and posterior tilting
- Internal and external rotation
- **Sternoclavicular:**

It is present between the manubrium of the sternum and the clavicle

- **Movements:**

- Elevation
- Depression
- Protraction
- Retraction

- **Scapulo thoracic:**

It is not a true joint it is made when scapula articulates with the thorax

- **Subacromial joint.**

Part -B

Mobility of shoulder joint:

- It is also called glenohumeral joint.
- It is formed by the glenoid fossa of the scapula
And the humeral head.
- It is ball and socket type of joint.
- As the glenoid fossa is very small as compared to the humeral head
So a rim of cartilage is present called glenoid labrum which holds them
together.
- So because of that the joint capsule is very loose that gives a little
interface of the humerus and scapula it is the most mobile joint of the
body.

Part D:

- **Osteokinematics:**

- **Meaning:**

- It is the combination of two words osteo means bone and kinematics means
motion or movements.

- So it is the bone movement.

- **Definition:**

- It is the movement that happens around the joint.
- It is the gross movement that happens between two bones.

- **Movements:**

- Flexion
- Extension
- Adduction
- Abduction

- **Arthokinematics:**

- **Meaning:**

- It is also the combination of two words arthro means joint and kinematics
means motion.

- It is the joint movement.

- **Definition:**

- Movements that happen around the joint surface.
- It is a small movement.
- It consists of rolls, slides, and spins.

Example:

When we pull our arms up our humerus also moves up so the head of the humerus rolls down in the glenoid fossa to allow the movement so the osteokinematic motion is abduction of the humerus at the glenohumeral joint while the orthokinematic movements occur simultaneously moving the head of the humerus inferiorly through glides.

Part -c:

Answer:

- The normal position of the scapula provides a stable base due to which the humeral head attached to the glenoid fossa and glenohumeral mobility occurs.
- The scapular muscle must position the glenoid so that the effective movement occurs.
- At the scapula, rotator cuff muscles are present which help in the stability of the shoulder joint.
- The supraspinatus muscle compresses the humeral head into the glenoid fossa to prevent it from dislocation.
- If any dysfunction occurs at the scapular muscle, it fails to perform its stabilization function.
- The interaction between the scapula and the humerus is very important for the normal function of the shoulder.
- When there is a change in the normal position of the scapula in relation to the humerus, this can cause scapular dyskinesia.
- The glenoid labrum in the glenoid fossa helps in the stability of the shoulder joint by holding the humeral head.
- The ligaments of the humerus also play an important role in stability.

Question -3:

Part-A:

Importance of supraspinatus muscle in GH joint stabilization:

- It originates from the supraspinous fossa of scapula.
- It is one of the most important rotator cuff muscles.
- It provides joint stability.
- It resists the gravitational force which acts on the shoulder joint to pull the weight of the upper limb downward.
- The other rotator cuff muscles also help in stability but they do internal and external rotation.
- This muscle stabilizes the shoulder joint and prevents superior dislocation.
- It helps in the abduction of the shoulder joint in cooperation with the deltoid muscle when the arm is in an adducted position.

Part -B:

- Any movement at the scapula causes the shoulder joint to move.
- Most of the shoulder movement is because of scapulohumeral movement.

- **Movements of scapula:**

- Elevation

- Depression

- Adduction

- Abduction

- The full range of normal motion of shoulder joint is the combination of scapulohumeral and glenohumeral joint.

- If any of one above joint either glenohumeral or scapulohumeral if their movement disturbs either due to diseases or due to muscle stiffness the shoulder joint movements also disturbs

- Because the shoulder joint movement is depend the movements of both the joint.

