Paper: Biomechanics

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Q1:-(A) what is biomechanics and ergonomics ?

Biomechanics:-

The term biomechanics combines the prefix bio,means "life" with the field of mechanics which is the study of the action of forces.

OR

Biomechanics is the science of movement of a living body , including how muscles ,tendons, and ligaments work together to produce movement.

Ergonomics:-

Ergonomics is the science and practice of designing jobs or work places to match the capabilities and limitations of the human body.

- *It is the way to move the work easier.*

(B)why we study biomechanics and ergonomics in physical therapy?

Physical therapy is a specialized branch of medical that are related to the exercise therapy . exercise trophy and electrotropy to treat your movement of related pain. Biomechanics have an important role in the physiotherapy through the study of biomechanics we can treat the patient know about it's the movement of the body . it can show the muscle ligament and the joint show its position .therefore ,we study biomechanics and ergonomics in physiotherapy –

Q2:- (A)what is shoulder complex ?Elaborate it

- ***Shoulder complex:-***

  Shoulder complex is composed of the clavicle ,scapula ,and humerus ,is an intricately designed combination of three joints that links the upper extremity to the thorax.

  The articular structure of the shoulder complex are designed primarily for mobility,allowing us to move and position the hand through a wide range of space.

Glenuhumeral joint:

Sternoclavicular joint:

Acromioclavicular joint:

Scapulothoracic joint:

- ***Glenuhumeral joint:***

Glenuhumeral joint is a ball and socket joint present between the Humerus and scapula it connect the upper limb it is major joint.

- ***Sternoclavicular joint:-***
  The sternoclavicular joint is synovial joint present between the manubrium of the sternum and clavicle bone.
- ***Acromioclavicular joint :***

Acromioclavicular joint is a joint of the lop of the shoulder it is a junction between the acromion and the clavicle it is a plane synovial joint.

- ***Scapulothoracic joint :***
  Not through synovial joint . scapulothoracic is an the articulation between the posterior – lateral wall of the thorax and the anterior surface of the scapula –
  (B) What makes shoulder joint most mobile?
  Glenuhumeral ligament (superior,middle and inferior) the joint capsule is formed by this group of ligament connecting the humerus to the glenoid fossa. They are the main source of stability for the shoulder, holding it in place and preventing it from dislocating anteriorly.
  (C)How normal position of scapula and humerus aid in stability of shoulder joint ?
  The scapula and humerus move in 1:2 ratio when arm is abducted 180 degree , 60 degree occurs by rotation of scapula,and 120 degree by rotation of humerus at the shoulder joint . Normally,the scapula rests at a position on the posterior thorax approximately 2inches from the middline between the second through seventh ribs scapula extend from the level of T2 spinous process T7 or T9spinous process depending on the size of scapula medial border is about 6cm lateral to the spine.
  Glenuhumeral stability is the ability to maintain the head centered in the glenoid fossa .Glenuhumeral instability is the inability to maintain the humeral head centered in the glenoid fossa .glenohumeral apprehension is the sense of impending instability in certain glenohumeral position.

  (D)What is osteo and Arthrokinamatics?Explain it with example
- ***Osteokinamatics:-***

It is the gross movement that happens between two bones .This happens because our bones surface articulate at the joint .

Osteokinamatics motion would be abduction of the humerus at of the glenohumeral joint .

Example:

- ***Flexion/extent ion***
- ***Abduction/adduction***
- ***Internal/external rotation***

Arthrokinamatics:-

It is the small movement happening at the joint surface .Arthrokinamatics movement typically consist of rolls ,glides/slide and spins.while the arthrokinamatics movement is simultaneously occuring and moving the head of the humerus inferiorly via a glide/slide .

Example:-

When you raise your arm up,as if to ask a question yours humerus is moving uppward .The head of your humurus has to roll downward into the glenoid cavity to allow for this movement

*Q3(A)**How supraspinatus muscle different from other SITS muscle in GH stabilization ?***

Supraspinatus is the smallest of the four muscles which comprise the rotator cuff of the shoulder joint specifically in the supraspinatus fossa. It aducts of arm from 0 to 15degree.

- *The action line of the supraspinatus muscle, unlike the action line of the other three rotator cuff muscle ,has a superior translatory component.*
- *Supraspinatus has down movement which is capable of producing full range in GH adduction while simultaneously stabilizing the joint.*

While SITS are also refereed to as the SITS muscle ,with reference to the first letter of their name supraspinatus ,infraspinatus ,Teres minor and sub scapularis respectively . The muscle arise from the scapula and connects to the head of the humerus forming a cuff around the GH joint –

(B)Explain how scapula movement is necessary for normal range of motion of shoulder joint ?

The scapula moves around a dorso-ventral axis,resulting in a rotation in the frontal plane.The scapula on the thorax contribute to

elevation (flexion and abduction)

of the humerus by uppwardly rotating the glenoid fossa 50 to60 degree from its resting position .

The scapula is important bone in the function of the shoulder joint .it engages in 6type of motion ,which allow full functioning upper extremity movement including.

- *Elevation*
- *Depression*
- *Anterior /posterior tilt*
- *Internal/external .*

And

- *Upward/down ward rotation*

The scapulothoracic articulum is one of the least congruent joint in the body .No actual bony articulation exists between the scapula and thorax .

The scapula plays an important role in stabilizing to the other bones involved in the rhythm of shoulder motion .Many muscles are located in the area of the shoulder girdle, including rotator cuff muscles ,nerve networks such as the brachial plexus,and upper arm muscles -