Final-Term Assignment

Course Title: Biomechanics And Ergonomics I

DPT 2nd semester section B

Instructor: Dr. M .Shahzeb khan (PT)

Marks: 50

Note:

- **Attempt all questions, all questions carry equal marks.**
- **Answer Briefly and to the point, avoid un-necessary details**

NAME : ASIF KHAN ID : 16810 DPT 2ND SECTION B

Q1: (A) What is Humeroulnar Joint? Explain different movements at HU joint.

Answer No1(A):

The humeroulnar joint, is a piece of the elbow-joint or the Olecron Joint, between the ulna and humerus bones is the straightforward pivot joint, which takes into account developments of flexion, expansion and circumduction.

MOVEMENTS:

The Humero-Ulnar Joint is the intersection of trochlear indent of the ulna and the trochlea of the humerus. Inferable from the obliquity of the trochlea of the humerus, this development doesn't occur in the antero-back plane of the body of the humerus. At the point when the lower arm is expanded and supinated, the pivot of the arm and lower arm are not in a similar line; the arm shapes an insensitive edge with the lower arm. During flexion, in any case, the lower arm and the hand will in general methodology the center line of the body, and subsequently empower the hand to be handily conveyed to the face. The precise adjustment of the trochlea of the humerus, with its prominences and miseries, to the semilunar score of the ulna, forestalls any horizontal development. Flexion is delivered by the activity of the Biceps brachii and Brachialis, helped by the Brachioradialis, with a little commitment from the muscles emerging from the average epicondyle of the humerus. Expansion is delivered by the Triceps brachii and AnconC&us, with a small commitment from the muscles emerging from the horizontal epicondyle of the humerus, for example, the Extensor digitorum communis.

(B) What is Humeroradial joint? Explain different movements at this joint.

AnswerNo1(B):

The humeroradial joint is the piece of the elbow joint where the capitulum of the humerus expresses with the fovea on the leader of the span.

MOVEMENTS:

The elbow is included three bones: the humerus (upper arm bone), and the ulna and span (the two bones of the lower arm). Three joints interface these bones: the humeroulnar, humeroradial, and radioulnar joints.The humerus expresses with the two bones in the lower arm, the ulna and range. The two joints connecting these bones—the humeroulnar and humeroradial joints—are pivot joints and are equipped for flexion and expansion of the elbow.

Flexion includes the development of the hand and lower arm toward the shoulder by means of revolution around the joint. Augmentation at the humeroulnar joint is something contrary to flexion and is the development of the hand and lower arm away from the shoulder. As should be obvious in the delineation, the situation of the arm at the shoulder changes what the development resembles (while the past meanings of the developments hold).

The third joint dynamic at the elbow is that between the two bones of the lower arm, the sweep and ulna. The enunciation of the two bones—the radioulnar joint—pivots in two headings and encourages pronation and supination of the lower arm and hand. Pronation is the internal pivot of the lower arm and hand, finding the palm of the hand down (thumb toward the body). Supination is the outward turn of the lower arm and hand, finding the palm up (thumb away from the body).

(C) What is carrying angle? Why it is important.

Answer No1(C):

At the point when your arms are held out at your sides and your palms are looking ahead, your lower arm and hands ought to ordinarily be around 5 to 15 degrees from your body. This is the typical "conveying point" of the elbow. This

point permits your lower arms to clear your hips when you swing your arms, for example, during walking.It is likewise significant when conveying objects.

Certain cracks of the elbow can build the conveying edge of the elbow, making the arms stick out a lot from the body. This is called an over the top conveying edge.

In the event that the edge is diminished with the goal that the arm highlights the body, it is known as a "gunstock deformation."

Since the conveying edge changes from individual to individual, it is imperative to contrast one elbow and the other while assessing an issue with the conveying point.

Q2: (A) What is Wrist complex? Explain joints, contribution and ROM of wrist complex

Answer No2(A):

Wrist complex: Any lose of capacity in the upper appendage at any portion convert into lessened capacity of it's most distal joint the head and wrist.

The wrist complex comprise of two compound joints.

1: RADIO CARPAL JOINTS: The radio carpal joints is made out of the span and the radioulnar plate, with the scaphoid (S), lunate (L),and the triquetrum (Tq).

2: MIDACARPAL JOINT: It is made out of the scaphoid, lunate and triquetrum with the trapezium (Tp), the trapezoid (Tz) the capitat and the hamat.

JOINTS OF WRIST COMPLEX:

- Joint proximal to the wrist complex serves to expand the situation of turn in space to build the level of opportunity accessible to the hand.

- Shoulder fills in as a unique base of help.

- Elbow permit the hand to approach are expand away from the body.

- The front arm change the methodology of the hand to a contemptible.

Commitment OF WRIST COMPLEX: The significant commitment of wrist complex;

1. To control length-pressure relationship in the multi articular hand muscles

2. Allow fine change of grasp.

3. The wrist muscle gives off an impression of being intended for parity and control.

4. The change in the length-pressure relationship that happen at the wrist can't be supplanted by compensatory development of the shoulder , elbow, front arm (radio ulnar joint).

Scope OF MOTION OF WRIST COMPLEX:

- The wrist complex is biaxial movement of expansion/flexion

- Ulnar deviation/Radial deviation

- Pronation/supination may discovered particularly at the radiocarpal joint.

- Normal go are

- 65 to 85 of flexion,

- 60 to 85 of augmentation,

- 15 to 21 of outspread deviation,

- 20 to 45 of ulnar deviation.

(B) What is carpal Tunnel syndrome?

Answer No2(B):

CARPAL TUNNEL SYNDROME:

- When the median nerve become compressed with in the carpal tunnel a neuropathy known as carpal tunnel syndrome(CTS). Proposed that the proximal edge of the TCL (transverse carpal ligaments). Is the most common site for wrist flexion induced median nerve compression.

- When the TCL is cut to release median nerve compression, the carpal arch may widen.

Q3: (A) Write down definitions of Muscle Twitch, summation and Refractory period.

Answer No3(A):

Muscle Twitch:

Muscle jerking is additionally called muscle fasciculation. Jerking includes little muscle compressions in the body.

Your muscles are comprised of strands that your nerves control. Incitement or harm to a nerve may make your muscle filaments jerk. Most muscle jerks go unnoticed and aren't cause for concern.

Summation:

The blend of constrained delivered by various piece of the human body is called summation.

In principle, power summation happens when all body parts act all the while by and by, the most grounded and least body parts around the focal point of gravity (e.g: trunk and thighs) move first, trailed by the more vulnerable, lighter and quicker furthest points.

Refractory Period:

A period immediately following stimulation during which a nerve or muscle is unresponsive to further stimulation

(B) Explain Types of Muscle contraction with example in your own words

Answer No3(B):

Types of muscle compression:

1. Isometric: A solid compression where the length of the muscle doesn't change.

2. Isotonic: A solid constriction where the length of the muscle changes.

3. Eccentric: An isotonic constrictions where the muscle fortify.

4. Concentric: An isotonic constrictions where the muscle abbreviates.

(C) In Grade III muscle strain why we can't feel pain?

Answer No3(C

Because there occur complete break of muscles and ligaments or the muscle stomach separate's in 2 sections .

Q4: (A) What is difference between cranial and spinal nerve? How ventral and dorsal ramus form from ventral and dorsal root?

Answer No4 (A):

Cranial nerves

Nerves emerging or terminating

from the brain

There are 12 pairs of cranial nerves.

Designated by serial number and names.

Can be sensory, motor or mixed.

Concerned mainly with the activities associated with head and neck.

Spinal nerves:

Nerves emerging or terminating from spinal cord is spinal nerves.

There are 31 pairs of spinal nerve.

Named according to their location on the spinal cord.

Purely mixed.

Concerned with all the body parts below the neck.

(B) What is difference between Neuropraxia, Axonotmesis and Neurotmesis?

Answer No4(B):

Neuropraxia:

Neuropraxia is a kind of fringe nerve injury, and is known as the mildest type of nerve injury. It is named a transient conduction square of engine or tangible capacity without nerve degeneration, in spite of the fact that loss of engine work is the most widely recognized finding. In instances of neuropraxia, autonomic capacity is safeguarded. Patients are typically ready to completely recoup inside a time of weeks to months.

Axonotmesis:

A second-degree injury (axonotmesis) is a nerve fiber injury in which the distal filaments experience wallerian degeneration, however the endoneurial tubes stay open and in congruity. Recuperation is finished, happens at a pace of 1 mm/day, and might be trailed by a propelling Tinel's sign.

Neurotmesis:

Neurotmesis is characterized as a physical issue where the nerve is totally isolated. This outcomes in complete loss of motion, the resultant decay of muscles innervated by the nerve, and all out sedation of the nerve's cutaneous dispersion. Physical assessment may uncover a delicate mass, a neuroma, at the distal stump of the cut away nerve. Clinicians ought to accept that a neurological brokenness referable to a nerve injury coming about because of a cut is a neurotmetic injury, except if there is proof in actuality.

Q5: (A) What is Wolf's Law?

Answer No5 (A): You may think about your bones as not moving or evolving a lot, particularly once you're finished developing. Be that as it may, they're more powerful than you might suspect. They adjust and change throughout your life through a procedure called bone redesigning. During bone rebuilding,

specific bone cells called osteoclasts ingest old or harmed bone tissue, which incorporates things like calcium and collagen. After the osteoclasts finish their work, another sort of cell called an osteoblast stores new bone tissue where the old tissue used to be.

In the late nineteenth century, German specialist Julius Wolff portrayed bone rebuilding and how it identifies with the pressure put on bones. As indicated by Wolff, bones will adjust as per the requests put on them. This idea is known as Wolff's law. For instance, if your activity expects you to play out a specific capacity, for example, lifting substantial items, your bones will adjust and fortify after some time to all the more likely help this errand. In like manner, on the off chance that you don't put any requests on a bone, the bone tissue will debilitate after some time.

Wolff's Law can be applied to an assortment of things, including active recuperation and the treatment of osteoporosis and bone breaks.

(B) How fracture repair? Explain different stages of fracture repair

Answer No5 (B):

bone fracture repair:

- When you experience a bone break (also known as a fracture), it’s important that the bone can heal properly in its original position.
- There are several treatments for a broken bone, and the one a doctor recommends is based upon several factors. These include how severe the break is and where it is.

While some bones can heal by wearing a cast, others may require more invasive treatments, such as bone fracture repair.

Bone fracture repair is a surgery to fix a broken bone using metal screws, pins, rods, or plates to hold the bone in place. It's also known as open reduction and internal fixation (ORIF) surgery.

STAGES OF FRACTURE REPAIR:

A fractured or broken bone undergoes repair through four stages:

1. Hematoma formation: Blood vessels in the broken bone tear and haemorrhage, resulting in the formation of clotted blood, or a hematoma, at the site of the break. The severed blood vessels at the broken ends of the bone are sealed by the clotting process. Bone cells deprived of nutrients begin to die.
2. Bone generation: Within days of the fracture, capillaries grow into the hematoma, while phagocytic cells begin to clear away the dead cells. Though fragments of the blood clot may remain, fibroblasts and osteoblasts enter the area and begin to reform bone. Fibroblasts produce collagen fibres that connect the broken bone ends, while osteoblasts start to form spongy bone. The repair tissue between the broken bone ends, the fibro cartilaginous callus, is composed of both hyaline and fibrocartilage. Some bone spicules may also appear at this point.
3. Bony callous formation: The fibro cartilaginous callus is converted into a bony callus of spongy bone. It takes about two months for the broken bone ends to be firmly joined together after the fracture. This is similar to the endochondral formation of bone when cartilage becomes ossified; osteoblasts, osteoclasts, and bone matrix are present.
4. Bone remodelling: The bony callus is then remodelled by osteoclasts and osteoblasts, with excess material on the exterior of the bone and within the medullary cavity being removed. Compact bone is added to create bone tissue that is similar to the original, unbroken bone. This remodelling can take many months; the bone may remain uneven for years.