

CLASS - 8

DATE - 21.10.2024

SUBJECT - BIOLOGY

TEACHER - Nidhi Rana

CHAPTER - 12 Skeleton - Movement and Locomotion

The following lesson is of Class - 8 for the subject of Biology, Topic - Types of Joints and muscles which is covered in Chapter - 12 Skeleton - Movement and Locomotion starting on Page no 117 of your text book titled - Concise Biology Selina Publication and is being submitted to you on 21.10.2024

JOINT - The place where two or more bones meet is called joint. Joints allow movement to take place. Bones are held together at a joint by ligaments. Joints are of 3 types -

- i) Immovable or fixed joint
- ii) Partially movable joint
- iii) Freely movable joint

Please refer to Fig 1 (a)

IMMOVABLE JOINT These joints allow no movement. For example bones of skull are interlocked with each other, hence bones of cranium are examples of having immovable joints between them.

PARTIALLY MOVABLE JOINT A limited degree of movement or we can say very little movement occurs between the bones having partially movable joint. Example -

- i) Joint between sternum and ribs.
- ii) Joint between adjacent vertebrae in backbone

FREELY MOVABLE JOINT These joints allow free movement in various directions. Thus various degrees of movement are possible between two bones forming the joint. 4 Types of movable joints are

- | | |
|------------------|---------------------------|
| i) Gliding joint | iii) Hinge joint |
| ii) Pivot joint | iv) Ball and socket joint |

GLIDING JOINT In this joint the bones slide over each other to some extent Eg-

- (i) between tarsal bones in the ankle.
- (ii) between carpal bones in the wrist

PIVOT JOINT Such joints allow rotation only. It is because of this joint that the head is able to turn from side to side. Here one bone is rotated over a pivot like end of another bone. Eg- Skull is rotated on the upper end of the axis vertebra.

HINGE JOINT allows movement in one direction only, like those of a door hinge. Thus these joints allow restricted movement in one plane only. They are capable of bearing heavy load. Eg. Elbow joint between upper and lower arm. Knee joint between thigh and lower leg. Joint between bones of fingers and toes.

BALL AND SOCKET JOINT In this joint the rounded head (like a ball) of one bone fits into a cup shaped cavity (socket) formed by the other bone. This allows movement in all directions. Eg. :

- i) Shoulder joint - head of humerus fits into a socket i.e. glenoid cavity of shoulder girdle.
- ii) Hip joint - head of femur fits into deep socket i.e. acetabulum of the hip girdle.

Fig 1a Joints

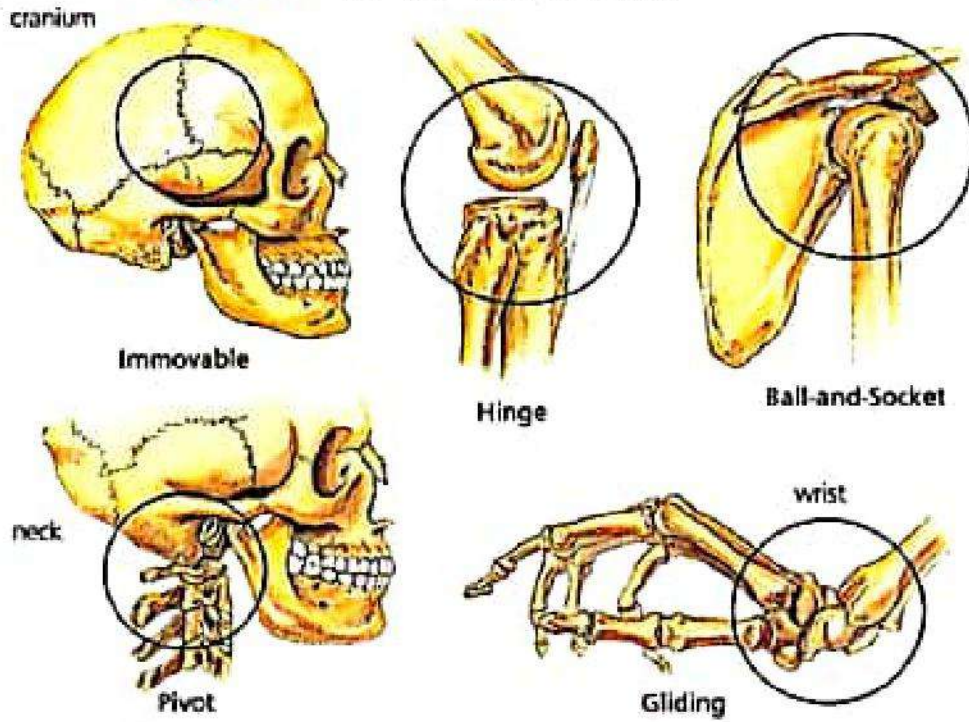
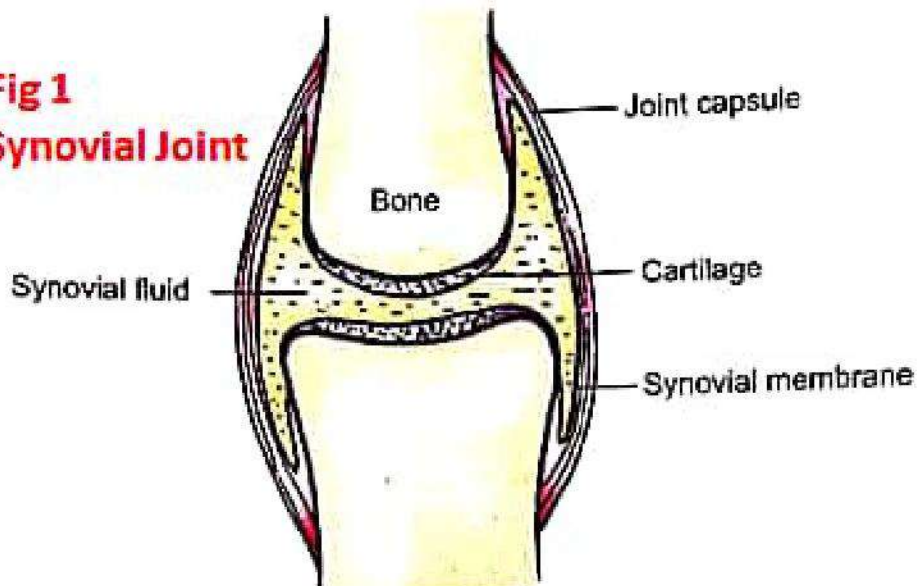


Fig 1
Synovial Joint



Triceps contract, biceps relax

Biceps contract, triceps relax

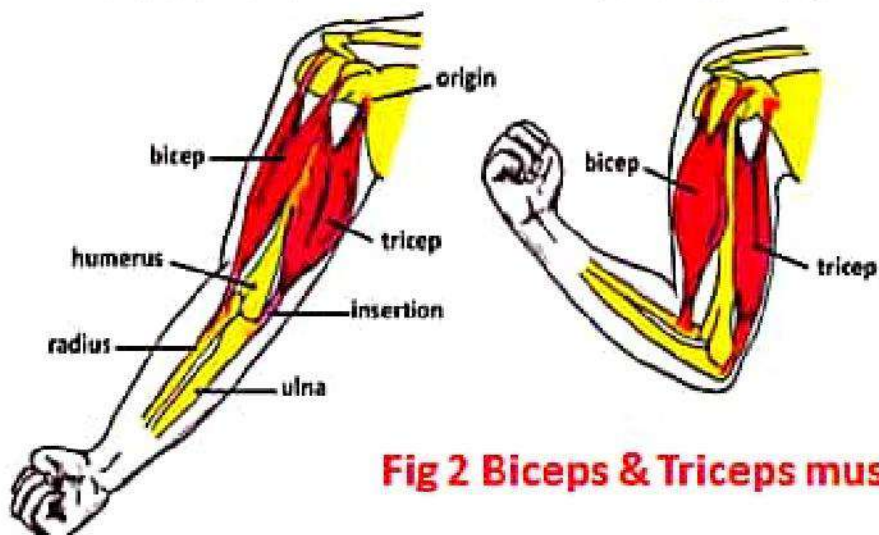


Fig 2 Biceps & Triceps muscles

SYNOVIAL JOINTS Freely movable joints like shoulder and knee joint which allow considerable degree of movement are also called synovial joints. In such joints the articular surfaces of the adjoining bones are covered with a thin layer of cartilage. A small space is left in between the two bones called the synovial cavity. Synovial cavity is lined with a thin synovial membrane. The synovial membrane in turn is enclosed by a fibrous capsule which provides protection to synovial joints. Further the bones of synovial joint are held in position by strong ligaments which help to keep bones in place and prevent their dislocation in normal movement. Between the bones and enclosed by the synovial membrane is synovial cavity, which contains a thick fluid called the synovial fluid secreted by the synovial membrane. Synovial fluid acts as a lubricant to reduce friction between the bones. Thus serves as a cushion between the bones. **Fig 1**

Now before going further let us take a short break. Answer the following questions during the break.

- Q1. Name the kind of joint present between the bones in the skull.
- Q2. Name the kind of joint which allows movement only in one direction.
- Q3. Name the fluid present between the bones of a joint that reduces friction between the bones.

Now you may pause the lesson for 3 mins. Break is over children Listen to the correct answers.

Ans1) Joint in skull - Immovable joint

Ans2) Hinge joint allows movement in one direction

Ans3) Synovial fluid present between the bones helps to reduce friction between bones.

MUSCLES cover the skeletal framework and give shape to the body parts. Muscles help to provide the means of movements in the body and help to maintain body posture while sitting, standing or walking. Muscles are long bundles of contractile tissues i.e. they can contract and relax. Muscles cannot lengthen.

Each muscle has two ends - a fixed end where muscle originates and a movable end which pulls some other bone or body part. This movable end is drawn out to form a tendon which is attached to a bone. Hence when this muscle contracts, it pulls the bone at the movable end. Fig 2.

ANTAGONISTIC MUSCLE are those muscles that bring about opposite movements of the parts concerned. For example the biceps or flexor muscles which are present in the upper arm contract and at the same time triceps or extensor muscles relax. This helps to bend your elbow or bend the lower arm over the upper arm. Refer to Fig 2.

Straightening or extension of the lower arm is brought about by the contraction of triceps or extensor muscles and simultaneous relaxation of biceps muscle. Thus biceps and triceps work in opposite to each other and are

ANTAGONISTIC MUSCLES Fig 2

KINDS OF MUSCLES - muscles are of 3 types -

- i **VOLUNTARY** muscles are under control of our will and usually attached to skeletal system.
Eg muscles in arms, legs etc.
- ii **INVOLUNTARY MUSCLES** are not controlled by our will. and are present in internal organs
Eg muscles of gut - oesophagus, stomach, intestine
- iii **CARDIAC MUSCLES** are present in the heart
They work through out life without tiring
Various muscles coordinate with each other to bring about various kinds of movements.

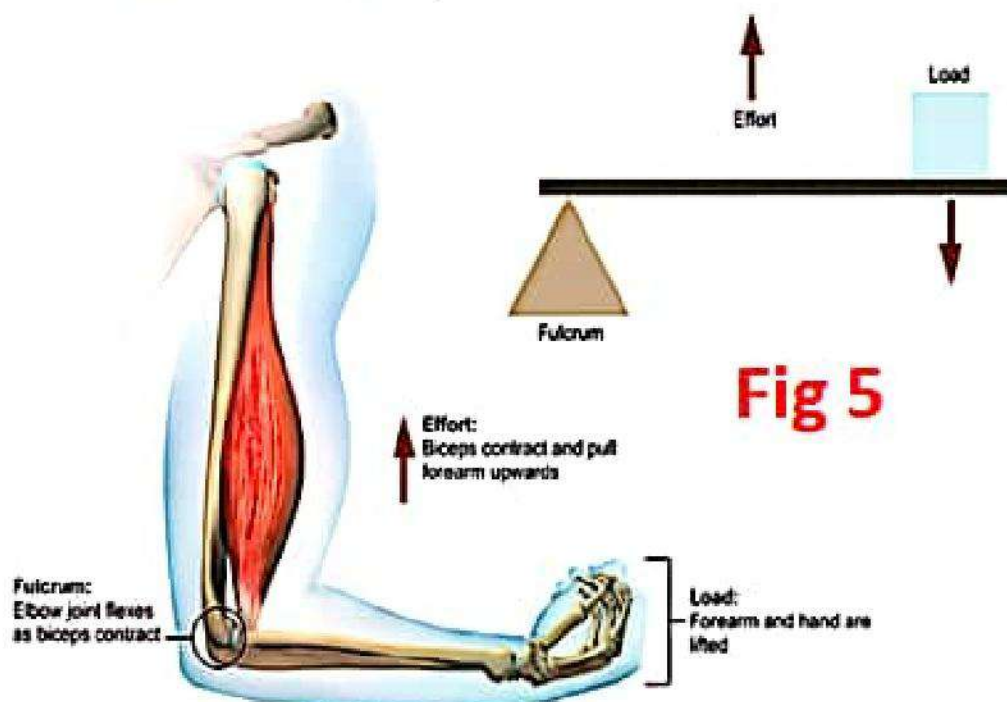
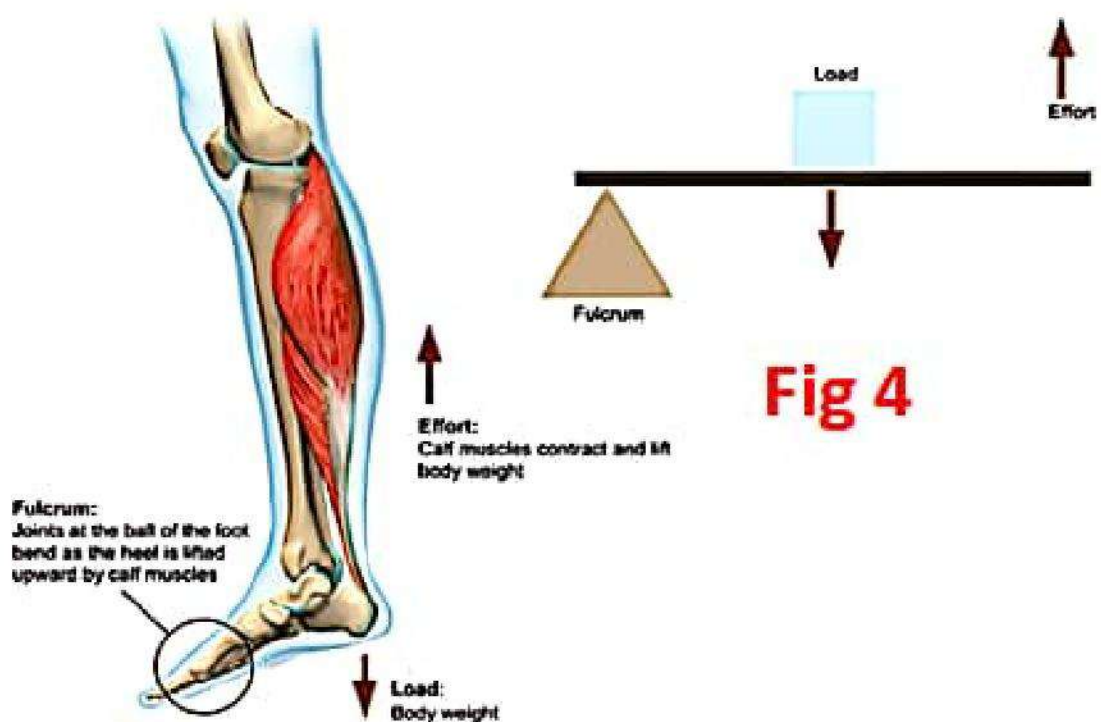
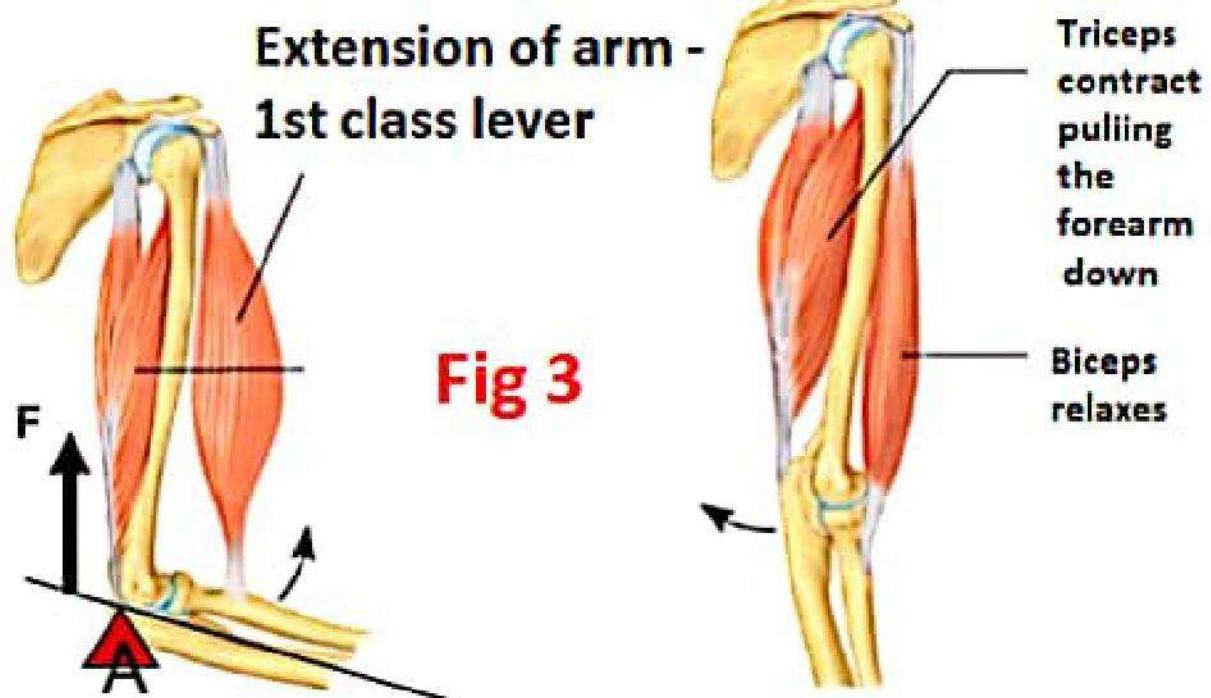
LEVER MECHANISMS Human skeleton provides examples of all 3 kinds of levers. Movements of different body parts are made easier due to lever actions provided by specific positioning of bones in the skeleton

1st ORDER LEVER with fulcrum in the centre
Extension of arm [i.e straightening of an arm after bending] is an example of 1st order lever
Here elbow is the fulcrum, load is the lower arm and effort is provided by Triceps

Please refer to Fig - 3

2nd ORDER LEVER with weight in the centre
Lifting up of heel is an example of 2nd order lever where the calf muscles (gastrocnemius muscles) supply an upward effort, the weight of the body acting as a downward load and the toes of the foot acting as the fulcrum

Please refer to Fig 4



3rd ORDER LEVER with effort in the centre
Flexion or bending of an arm is an example of 3rd order lever. because the biceps pulls on the forearm between the elbow joint (i.e. fulcrum) and the lower arm.

Please refer to fig 5

This finishes with the chapter 12 Children
Kindly go through the chapter as discussed in the notes carefully. and with reference to the detailed explanation you are required to answer the following home assignment questions in your notebooks.

HOME ASSIGNMENT

Q.1 Answer the following Review questions given at the end of the chapter

C Short Answer type

Q.No 2, 4 and 5

D Long Answer type

Q.No 2 and 3

Q2 Draw a well labelled diagram of Synovial Joint

THANK YOU