

CHAPTER # 13

SUPPORT AND MOVEMENTS

Q1. Define movement? Write names of the types of movement.**Ans: Movement:**

"Movement" is a general term meaning the act of changing place or position by entire body or by its parts.

Types of Movement:

There are two types of movements

- i. Movements of body parts
- ii. Locomotion

Locomotion is the movement of an animal as a whole from one place to another.

Q2. What do you meant by exoskeleton?**Ans: Exoskeleton:**

The skeletal system of some invertebrates e.g. arthropods, is on the outside of the body and is called exoskeleton.

Q3. Write briefly about skeleton system and its role?**Ans: Skeleton:**

Skeletal system or skeleton is defined as the framework of hard, articulated structures that provide physical support, attachment for skeletal muscles, and protection for the bodies of animals.

Endoskeleton:

Like other vertebrates, the human skeleton is on the inside of body and is called endoskeleton. In the living body, the skeleton is very much alive. Bones and cartilages are made of living cells and also have nerves and blood vessels in them. They grow and have the ability to repair themselves.

Role of the Skeletal System in the Body:

- i. The skeletal system has many roles in the body
- ii. The skeleton supports the body against the pull of gravity. The large bones of the lower limbs support the trunk when standing.
- iii. The skeleton also protects the soft body parts. The fused bones of the cranium surround the brain to protect it from injury. Vertebrae surround and protect the spinal cord, and bones of the rib cage help protect the heart and lungs.
- iv. Bones work together with muscles as simple mechanical lever systems to produce body movement.
- v. Bones are also important for providing electrolytes such as calcium to the body and producing some of the cells that make up blood.
- vi. The bones of the ear canal are important for sound transduction

Q4. What is the role of skeleton system in support and movement?

Ans: See Q #2 from exercise (Short Questions)

Recalling

Cartilage and bone are types of connective tissue in air connective tissues contain collagen fibers in a matrix.

Recalling

Tendons and ligaments are other connective tissues that contain tightly packed collagen fibers

Interesting Information

Babies are born with about 300 soft bones. Some of these bones later fuse together, so that the adult skeleton has 206 hard bones.

Q5. Different between cartilage and bone.

Ans: See Q #1 from exercise (Short Questions).

Q6. Write briefly about cartilage.

Ans: Cartilage:

Cartilage is a dense clear blue-white firm connective tissue (but less strong than bone). The cells of cartilage are called chondrocytes. Each chondrocyte lies in a fluid space called lacuna present in the matrix of cartilage. The matrix of cartilage contains also collagen fibres. Blood vessels do not enter cartilage.

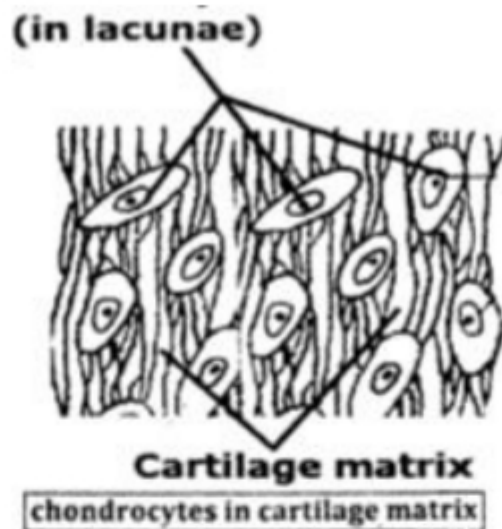
Types of Cartilage:

There are three types of cartilage.

i. Hyaline cartilage:

Hyaline cartilage is strong yet flexible is found covering the ends of the long bones, in the nose, larynx, trachea and bronchial tubes

Chondrocytes



ii. Elastic cartilage:

Elastic cartilage is similar in structure to hyaline cartilage. It is also quite strong but has elasticity due to a network of elastic fibers in addition to collagen fibers it is found in epiglottis, pinna etc.

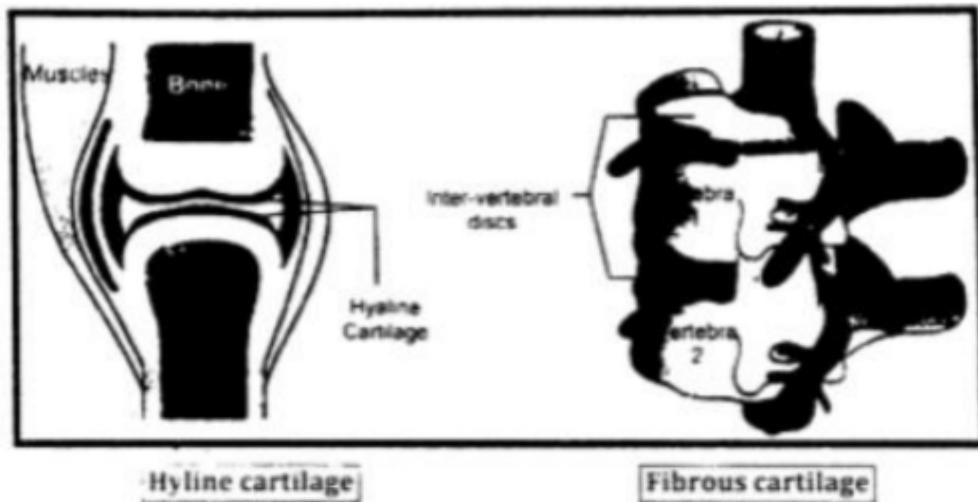
iii. Fibrous cartilage:

Fibrous cartilage is very tough and less flexible due to large number of thick collagen tubers present in knitted form. It is found in intervertebral discs.

Q7. Describe the role of bones in human skeletal system.

Ans: Role of Bones:

Bone is the hardest connective tissue in body Bones not only move support and protect the various parts of body but also produce red and white blood cells and store minerals



Components of a bone:

i. Compact bone:

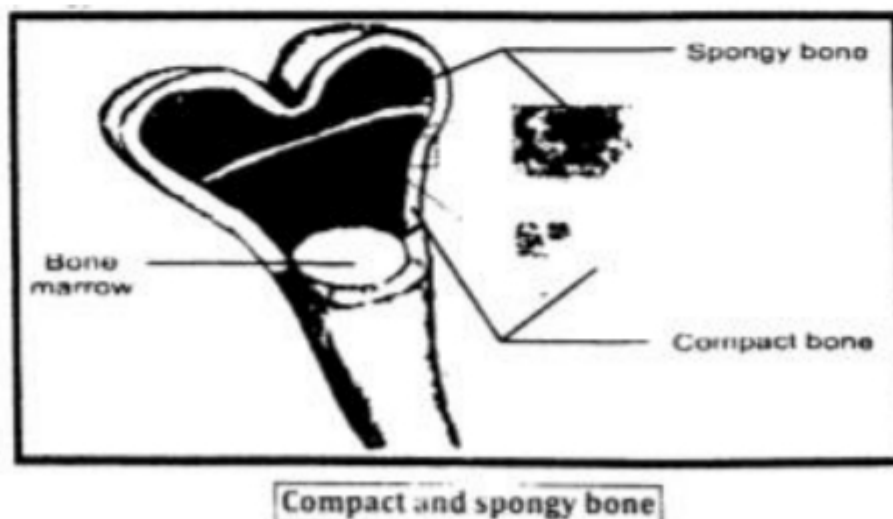
The hard-outer layer of a bone is called compact bone.

ii. Spongy bone:

The interior of bone is soft and porous it is called spongy bone

iii. Bone marrow:

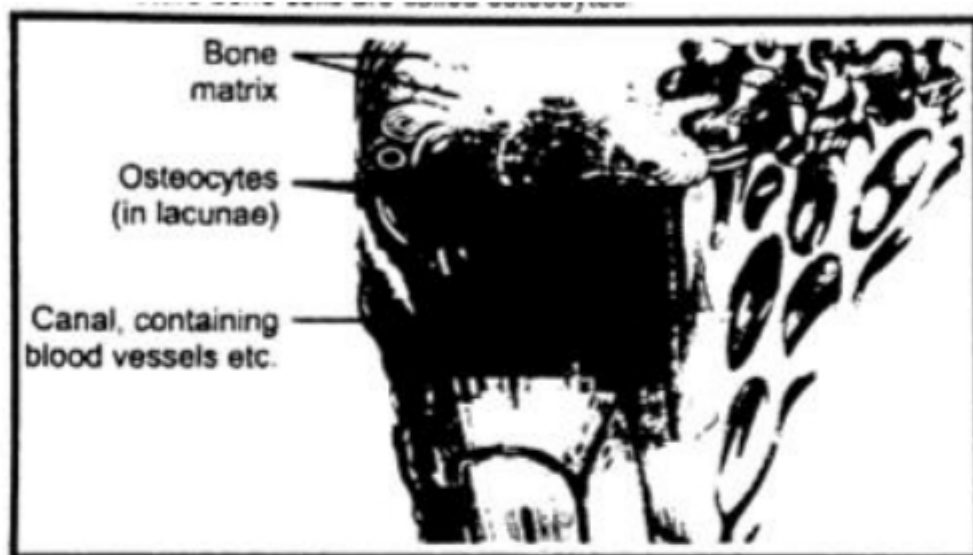
Spongy bone contains blood vessels and bone marrow



Like cartilage. The matrix of bone also contains collagen. But it also contains minerals e.g. calcium and phosphate. Cartilage contains a single type of cell. On the other hand, bones contain different type of cell

Osteocytes:

The mature bone cells are called osteocytes



The internal structure of bone

Interesting Information**Painting from Vesalius Book:**

Andreas Vesalius (1514-1564) is honored for developing modern anatomical studies. Vesalius was born in Brussels, Belgium. He made many discoveries in anatomy based on studies made by dissection of human dead bodies. His book contained the most accurate depictions of the whole skeleton and muscles of the human body.

Q8. What are the main components of the axial skeleton and the appendicular skeleton of human?

Ans: See Q# 1 from exercise (Understanding the concepts)

Q9. Name the longest bone in human body?

Ans: The thigh bone is the longest bone in our body

Q10. Name the smallest bone in human body?

Ans: The smallest bone in the body is in our ear and is called the stirrup bone (stapes)

Do you know?

The upper jaw is fixed with the skull and is composed of two bones. The lower jaw is mobile and articulates with the skull. In lower vertebrates the lower jaw is made up of more than one bone while in mammals. It is made of single bone. During evolution mammals modified the lower jaw bones and incorporated four of them into the middle ear in the form of malleus and incus in both ears. This adaptation proved beneficial for mammals. Lower jaw with single bone is stronger and the malleus and incus also improve hearing.

Q11. Describe the types of joints and give examples.

Ans: See Q#2 from exercise (Understanding the concepts)

Q12. The neck joint between vertebral column and head allows movements side to side, Can you think what would have happened if it were a ball-and-socket joint?

Ans: Ball-and-socket joints allow movement in all directions. In such situation we can rotate neck in all directions

Q13. What are ligaments and tendons? What function do they perform?

Ans: See Q# 3 from exercise (Understanding the concepts)

Q14. Briefly explain Muscles and their Movement.

Ans: Muscles and Movement:

When bones move at joints, they produce movements. The movements in bones are brought about by the contractions of skeletal muscles, which are attached with them by tendons

Role of skeletal muscles:

The role of skeletal muscles is as follows

One end of a skeletal muscle is always attached with some immovable bone.

Origin:

The end of a skeletal muscle attached with some immovable bone. This end of muscle is called the origin.

Insertion:

Other end of muscle is attached with a moveable bone and is called the insertion. When a muscle is stimulated by a nerve impulse, it contracts to become shorter and thicker. Due to this contraction, it pulls the moveable bone (at insertion)

Interesting Information

It is important to remember that muscles can only pull or contract, not push.

Most activities in our body like standing, walking, running, playing etc require combined action of several muscles.

Q15. Explain antagonism in muscle action selecting biceps and triceps as example.

Ans: See Q# 4 from exercise (Understanding the concepts)

Q16. Which point of attachment is pulled when a muscle contracts?

Ans: Insertion.

Q17. Aquatic animals need less skeletal supports than land animals of similar size propose an explanation for this fact.

Ans: Because the water supports the weight of the aquatic animal more than on land Therefore, aquatic animals need less skeletal supports than land animals of similar size.

Q18. Briefly describe the disorders of skeletal system.

Ans: Disorders of skeletal system:

The following disorders of skeletal system are important

Osteoporosis:

Osteoporosis is a bone disease in adults, especially in old people. It is more common in old women

In osteoporosis, there is a decrease in the density of bones due to loss of calcium and phosphorus

Causes:

It may be due to malnutrition (lack of proteins and Vitamin C) lack of physical activities or deficiency of estrogen hormone in old age. there is decreased secretion of growth hormones and it also leads to decreased deposition of minerals in bone matrix.

Arthritis:

Arthritis means "inflammation in joints. It is also very common in old age and in women. It is characterized by pain and stiffness in joints (particularly in the weight bearing joints e.g. hip joint, ankle joint etc.)

Treatment:

The treatment of arthritis includes painkiller and anti-inflammatory medicines

Types of Arthritis:

There are many types of arthritis, for example:

i. Osteo-arthritis:

It is due to degeneration in the cartilage present at joints or due to decreased lubricant production at joints. In this arthritis fusion of the bones at joint may occur and joints may become totally immovable

ii. Rheumatoid arthritis:

It involves the inflammation of the membranes at joints Its symptoms include fatigue, low-grade fever, pain and stiffness in joints

iii. Gout:

It is characterized by the accumulation of uric acid crystals in moveable joints. It generally attacks the toe joints

Q19. Write down the function of estrogen.

Ans: Function of estrogen:

It is one of the functions of estrogen to deposit minerals in bones. When the reproduction cycle stops in females, not enough estrogen is secreted.

ClassNotes

