

UNIT 2- SUPPORT SYSTEMS

Skeletal System

Lecture Notes

BASIC FUNCTIONS OF THE SKELETAL SYSTEM

- A. Hematopoiesis (Hemopoiesis)
 - 1. The process of producing blood cells in the red bone marrow.

- B. Provides structure for the body
 - 1. Provide a rigid framework that supports the soft tissues of the body and maintains the body's shape.

- C. Movement Facilitation
 - 1. Bones serve as levers to convert muscular contraction to movement.
 - 2. Serves as a point of attachment for ligaments, tendons, and muscles.

- D. Mineral Storage
 - 1. Bones store calcium in bone matrix.
 - a. It is essential that normal calcium intake be maintained because calcium provides many critical physiological functions in the body. For example, every time a muscle contracts calcium is required. If calcium intake is not adequate, calcium can be acquired from the bones. Therefore, maintaining proper calcium intake helps to assure strong bones.

BASIC BONES OF THE SKELETON

- A. Cranium
 - The cranium or the skull encloses and protects the brain.
 - 1. Frontal (1)
 - Forms the forehead
 - 2. Parietal (2)
 - Forms the greater portion of the sides and roof of the cranial cavity.
 - 3. Occipital (1)
 - Forms the posterior (back) part of the cranium.
 - 4. Temporal (2)
 - Forms the sides of the cranium
 - 5. Mandible (1)
 - The lower jaw bone; the only moveable bone in the skull.
 - 6. Maxillae (1)
 - The upper jaw bone.

- B. The Vertebral Column
 - The vertebral column encloses and protects the spinal cord.
 - 1. Cervical Vertebrae (7)
 - Vertebrae of the neck

2. Thoracic Vertebrae (12)
Vertebrae to which ribs attach
 3. Lumbar Vertebrae (5)
Large, weight-bearing vertebrae of the lower back
 4. Sacral Vertebrae (5)
Fused vertebrae which articulate with the pelvic bones
 5. Coccygeal Vertebrae (Coccyx) (4)
Four fused vertebrae that form the tailbone.
- C. The Bones of the Thoracic Cavity
The bones of the thoracic cavity enclose and protect the heart and lungs.
1. Sternum
The breast bone
 2. Ribs
12 pairs attached to the thoracic vertebrae
- D. Bones of the Upper Extremities
1. Humerus (upper arm bone)
 2. Radius (thumb side of lower arm)
 3. Ulna (medial to radius; lower arm)
 4. Carpals (wrist bones)
 5. Metacarpals (hand bones)
 6. Phalanges (fingers)
- E. Bones of the Pelvis
1. Ilium (hip bones)
 2. Ischium (butt bone)
 3. Pubis (the bone of the pubic region)
- F. Bones of the Lower Extremities
1. Femur (thigh bone)
 2. Patella (knee cap)
 3. Tibia (shin)
 4. Fibula (small bone of the lower leg)
 5. Tarsals (bones of the hind foot)
 6. Metatarsals (bones of the forefoot)
 7. Phalanges (toes)

ARTICULATIONS

- A. Definition of Articulation
Any location where 2 bones meet.
- B. Types and locations of joints
1. Many joints are freely movable joints including the shoulder, elbow, wrist, hip, knee, etc
 2. Some joints allow little to no movement such as the sutures of the skull.

LIGAMENTS

1. Ligaments attach bone to bones. Therefore, they provide much of the support for our freely movable joints.

02.04 DESCRIBE THE DISEASES AND DISORDERS OF THE SKELETAL SYSTEM

A. Fractures

-A fracture is any break in a bone.

-A severe fracture in which one of the bone fragments is forced through the skin is called an open fracture.

- A fracture that does not involve a wound is called a closed fracture.

-Signs and symptoms include pain upon palpation at the site of the fracture, and pain upon movement of the area that is injured.

-They are caused by stress on a bone that is greater than the bone can withstand

-They are treated with immobilization for 6 -8 weeks in most cases

-Compound fractures are usually treated with surgery in which plates, rods, and screws are used to fix the bones in place so healing can occur.

B. Scoliosis

-Scoliosis is the abnormal lateral curvature of the spine (vertebral column) resulting in an S-shaped appearance.

-Signs and symptoms include one hip or one shoulder higher than the other, back pain, and muscle spasms

-The cause is an imbalance of muscles where the muscles on one side of the spine are too tight and those on the other side are very weak so the spine is pulled toward the tight side.

- It can also be caused by a leg length discrepancy.

- Treatment includes bracing, physical therapy to strengthen the weak muscles and stretching the tight muscles, placing a lift in the short leg, or surgery to physically straighten the spine with the use of a rod to keep the spine straight.

C. Osteoarthritis

-Osteoarthritis is a type of arthritis caused by the destruction of cartilage from the joints. This is the most common form of arthritis.

-It develops from normal wear and tear on the joints but may be aggravated by obesity or injury to a joint that is not properly cared for.

-The first symptoms of arthritis are vague and include joint soreness, aching, stiffness, and swelling.

-As the disease progresses bones spurs may develop at the affected site which increases pain and leads to loss of range of motion.

-Treatment involves the use of analgesics to relieve pain, use of steroids to reduce inflammation, and possibly, surgical replacement of the joint.

D. Sprain

- The stretching or tearing of a ligament
- 1st Degree
 - o The tissues are stretched causing micro-tearing of the tissue
- 2nd Degree
 - o A partial tear of a ligament
- 3rd Degree
 - o A complete rupture of a ligament
- Signs & Symptoms include pain, swelling, joint laxity and instability
- Treatment is Rest, Ice, Compression, Elevation (RICE)