The Skeletal System

Chapter 15

Functions of Your Skeletal System

- Allows movement
- Provides support for your body
- Protects internal organs
- Storage space for minerals – calcium and phosphorus
- Produce red and white blood cells in the red bone marrow

Structure of the Skeletal System

- 206 bones
- Axial Skeleton – includes 80 bones of the skull, the sternum, the ribs, and the vertebrae
- Appendicular Skeleton – the 126 bones of the shoulders, arms, hands, hips, legs, and feet

Axial

- The bones of the skull protect the brain and form the shape of the face.
- 12 pairs of ribs protect the lungs and the heart.
- 33 vertebrae make up your spine and protect the spinal cord.

Appendicular

- Provides movement.

Types of Bones

- Long bones
- Short bones
- Flat bones
- Irregular bones

Long Bones

- Shafts of a long bone are called diaphysis.
- Inner cavity of diaphysis contains yellow marrow that stores fat.
- Ends of long bones are called epiphysis.
- Epiphysis are made of spongy bone tissue and form joints with other bones. Muscles attach to the epiphysis. The inner part of the epiphysis contains red marrow→produces red blood cells and most of the white blood cells.

Short Bones

- Example: tarsals, metatarsals, carpals, and metacarpals
- Over half of the small bones in the body are in the hands and feet.

Flat Bones

- Examples: ribs, skull, scapula, & sternum
- Thin, flat shape and are used for protection.

Irregular Bones

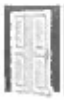
- Example: vertebrae or facial bones
- Does not have a shape like the other types of bones.

- Framework is made up of bone and cartilage, a strong, flexible material that provides a smooth surface that makes movement at a joint smooth – nose, ears, connects ribs to the sternum, cushion between vertebrae

- Baby's skeleton is mostly cartilage until ossification, the process by which bone is formed, renewed, and repaired

- Periosteum – tough membrane that surrounds the outer surface of the bone – have blood vessels that branch into the bone – nourishes bone and produces bone cells – osteoblasts, bone forming cells that are important in bone growth and repair
- Stapes is the smallest bone in the body.
- Femur is the longest bone in the body.

Joints



- **Where two bones meet – most allow movement**
- **Immovable joints – skull bones**
- **Ball-and-socket joints – most range of movement – example: hip or shoulder**
- **Hinge joints – movement back and forth in one plane – example: knee, elbow, ankle, & fingers**
- **Pivot joints – one bone rotates around another bone – example: head rotating on your spine**
- **Gliding joints – bones slide over one another – example: hand and foot → ellipsoidal joints have an oval-shaped part that fits into a curved space**

Also at Joints

- **Ligaments** – a band of fibrous, slightly elastic connective tissue that attaches bone to bone.
- **Tendons** – a fibrous cord that attaches muscle to bones.

Care of the Skeletal System

- Eat a diet high in calcium and phosphorus.
- Eat a diet high in Vitamins A and D – these vitamins utilize calcium and phosphorus in bone formation – vitamin D is produced in the skin with exposure to UV rays from sunlight
- Regular physical activity – lifting weight increases bone mass
- Wear protective gear → helmet

Problems of the Skeletal System

- **Bone fracture - break in the bone**
  - **closed fracture (simple fracture) – broken bone does not stick out of the skin**
  - **open fracture (compound fracture) – broken bone sticks out of the skin**
  - **complete fracture – bone is broken in two or more fragments**
    - **transverse fracture – fracture is completely across bone**
    - **comminuted fracture – shatters into more than two pieces**
  - **incomplete fracture – bone is not broke completely across**
  - **Hairline fracture – incomplete and the bone does not separate**

Problems of the Skeletal System

- **Scoliosis** – lateral, or side-to-side, curvature of the spine – usually develops in teen years – can be treated with exercise, a special brace, or surgery – if left untreated serious back problems may develop during adult years
- **Osteoporosis** – progressive loss of bone tissue occurs due to loss of calcium in the bone – bones are weak and can break easily – back may become hunched – affect older females – exercise and diet high in calcium

Problems of the Skeletal System

- **Osteomyelitis** – inflammation of the soft inner surface of the bones – caused by bacteria – treatment: antibiotics and surg
- **Sprain** - the most common injury to a joint – sprain, tissue around the joint is twisted or receives too much pressure (ligaments are stretched and torn) – discoloration of the skin→blood vessels are injured – usually heal by themselves

Problems of the Skeletal System

- **Dislocation** - another injury to a joint – bone slips from its normal position due to torn ligaments – doctor sets back in place and immobilizes it until ligaments heal
- **Torn cartilage** – serious joint injury that can result from a sharp blow or severe twisting of a joint – treatment: arthroscopic surgery

Problems of the Skeletal System

- **Bursitis** – bursa in a joint becomes inflamed and suffer from pain & swelling – bursa is a fluid-filled sac that helps reduce friction at joints - common in the shoulder and the knee – may result from an injury or infection from overuse – treatment: rest the joint
- **Bunion** – painful swelling of the bursa in the first joint of the big toe – cause is tight or high-heeled shoes – treatment: exercise or surgery
- **Arthritis** – inflammation of the joints – affects all ages – painful and restricts movement – osteoarthritis is the most common type

Repetitive Motion Injury

- Damage to tissues caused by prolonged, repeated movements
  - **Carpal tunnel syndrome** – swollen ligaments and tendons in the wrist cause numbness, a burning or tingling sensation in the thumb and forefinger, pain and weakness in the hand
    - Treatment includes wearing a splint to reduce wrist movements, medication to reduce swelling, and surgery