1.03 Understand the functions and disorders of the skeletal system
Bellringer

The process of blood cell formation in the red bone marrow of bones is called:

a. Erythrocytopenia
b. Hemolysis
c. hemopoiesis
d. Leukoblastosis

Albert complains of pain in his big toe. Upon examination, the doctor noted that Albert’s big toe was tender and swollen. Albert was diagnosed with:

a. bursitis
b. gout
c. rheumatoid arthritis
d. tendonitis
1.03 Understand the functions and disorders of the skeletal system

**Essential Standards:**

- What are the functions of the skeletal system?
- What are some disorders of the skeletal system?
- How are skeletal disorders treated?
- How does the skeletal system relate to the body’s systems of support and movement?
Functions of the skeletal system:

- Support
- Protects
- Allows movement and anchorage of muscles
- Provides mineral storage
- Is the site for hemopoiesis
Functions of the Skeletal System

- Hemopoiesis – the red marrow of the bone is the site of blood cell formation. Red marrow is found in long bones, sternum and ilia.
Functions of the Skeletal System

- Calcium and phosphorus are stored in the skeletal system

In cases of inadequate nutrition, the body is able to draw upon these reserves.

1.03 Understand the functions and disorders of the skeletal system
Functions of the Skeletal System

Types of movement:

- **Flexion** – act of bringing two bones closer together
- **Extension** – act of increasing the angle between two bones (results in straightening motion)
- **Abduction** – movement of an extremity away from the midline
- **Adduction** – movement toward the midline
- **Circumduction** – includes flexion, extension, abduction and adduction
Functions of the Skeletal System

- Types of movement (continued):
  - Pronation - rotation of the hand and forearm so that the palm faces downwards
  - Supination - to turn or rotate (the hand or forearm) so that the palm faces up
  - Rotation - a form of movement in which a bone moves around a central axis without undergoing any displacement from this axis
Functions of the Skeletal System

- Skeletal system protects the soft and delicate internal organs.
  - Cranium protects the brain, the inner ear and parts of the eye. The ribs and sternum protect the heart and lungs. The vertebral column encases and protects the spinal cord.

1.03 Understand the functions and disorders of the skeletal system
The skeletal system supports body structures and provides shape to the body.
Bellringer

Which skeletal system disorder is best described as having an exaggerated curve of the upper back (hunchback):

a. Kyphosis
b. Lordosis
c. Rickets
d. Scoliosis

Anna is post-menopausal and estrogen deficient. These symptoms indicate that Anna has:

a. osteocyte
b. osteomalacia
c. osteomyelitis
d. osteoporosis
1.03 Understand the functions and disorders of the skeletal system
Disorders of the Skeletal System

- Arthritis

- Define the term based on the meaning of its parts.
  [arthr/o] it is
Disorders of the Skeletal System

- Arthritis
  - Osteoarthritis vs Rheumatoid arthritis
Disorders of the Skeletal System

- Arthritis
  - Osteoarthritis
    - Is a degenerative joint disease
    - Treatment includes:
      - Drugs (NSAIDS, Celebrex, etc.)
      - Acupuncture
      - Nutrition supplements
      - Physical or occupational therapy
      - Hip and knee replacement (arthroplasty)

1.03 Understand the functions and disorders of the skeletal system
Arthritis

- Rheumatoid arthritis – is a chronic auto-immune disease which affects the connective tissue and joints

- Characteristics of rheumatoid arthritis:
  - Swollen and painful joints
  - Joint deformity and stiffness
  - Muscle atrophy
Gout

- Is a joint disorder characterized by an acute inflammation commonly affecting the big toe but may affect other joints as well. The pain and swelling is the body’s response to the accumulation of uric acid crystals in the affected joint.
- Treatment is with NSAIDS.
Osteoporosis

- Is a porous bone disease and is characterized by low bone mass and structural deterioration of bone tissue.

- Oste/o por/ous osis

- What household object does osteoporosis remind you of?
Osteoporosis

- Explain two reasons why this woman gets shorter as she ages.
  - Loss of bone mass
  - Collapsed vertebrae

1.03 Understand the functions and disorders of the skeletal system
Osteoporosis

- Treatment is aimed at preventing or slowing the process.
  - Calcium supplements, increase calcium in the diet and exercise. Postmenopausal women may take estrogen to help maintain bone mass.

1.03 Understand the functions and disorders of the skeletal system
Rickets

- Bones become soft, due to lack of calcification, causing deformities such as bowlegs. It is usually seen in children and is caused by a lack of vitamin D.
Rickets

Treatment includes:

- Sufficient quantities of calcium and vitamin D
- Exposure to sunshine

Presently, there seems to be an increase in the number of cases of rickets. Doctors think this is due to an increase in breast feeding (breast milk does not contain a lot of Vit. D) or the over of sunscreens
Disorders of the Skeletal System

- Abnormal spinal curvatures

  - Kyphosis (hunchback)
  - Lordosis (swayback)
  - Scoliosis (side-to-side)

1.03 Understand the functions and disorders of the skeletal system
1.03 Understand the functions and disorders of the skeletal system
Dislocation

- Occurs when a bone is displaced from its proper position in a joint.
  - Subluxation – is an incomplete or partial dislocation.
Skeletal System Trauma

- Trauma
  - Fractures – break in a bone

1.03 Understand the functions and disorders of the skeletal system
Trauma

Treatment of a fracture can include:

- Closed reduction – cast or splint
- Open reduction – surgical intervention (wires, screws)
- Traction – pulling force to hold bones in place

1.03 Understand the functions and disorders of the skeletal system
Fractures

- Closed or simple – bone is broken but does not pierce through the skin

1.03 Understand the functions and disorders of the skeletal system
Fractures

- Open or compound- broken bone pierces and protrudes through the skin. Is the most serious due to the possibility of infection.
Fractures

Comminuted – bone is splintered or broken into many pieces that can become embedded in the surrounding tissue.
Fractures

- Greenstick — bone is partly bent but it never completely breaks. This is the simplest type of fracture.
Fractures

Fracture sites related to osteoporosis

Fractures are common in these sites due to falls.
Sprains

- Is an injury to a joint caused by any sudden or unusual motion.
  - Symptoms: rapid swelling and acute pain.
  - Treatment: NSAIDS