

Health

Careers

Today

CHAPTER 13

SKELETAL SYSTEM

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Health

Structure and Function

- Functions of the skeletal system
 - Provides shape and support
 - Protects internal organs
 - Stores minerals and fat
 - Produces blood cells and platelets
 - Assists in movement

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Types of Bones

- Axial skeleton
 - Includes the 80 bones of the head and trunk
- Appendicular skeleton
 - Includes the 126 bones of the pelvis, shoulders, arms, and legs

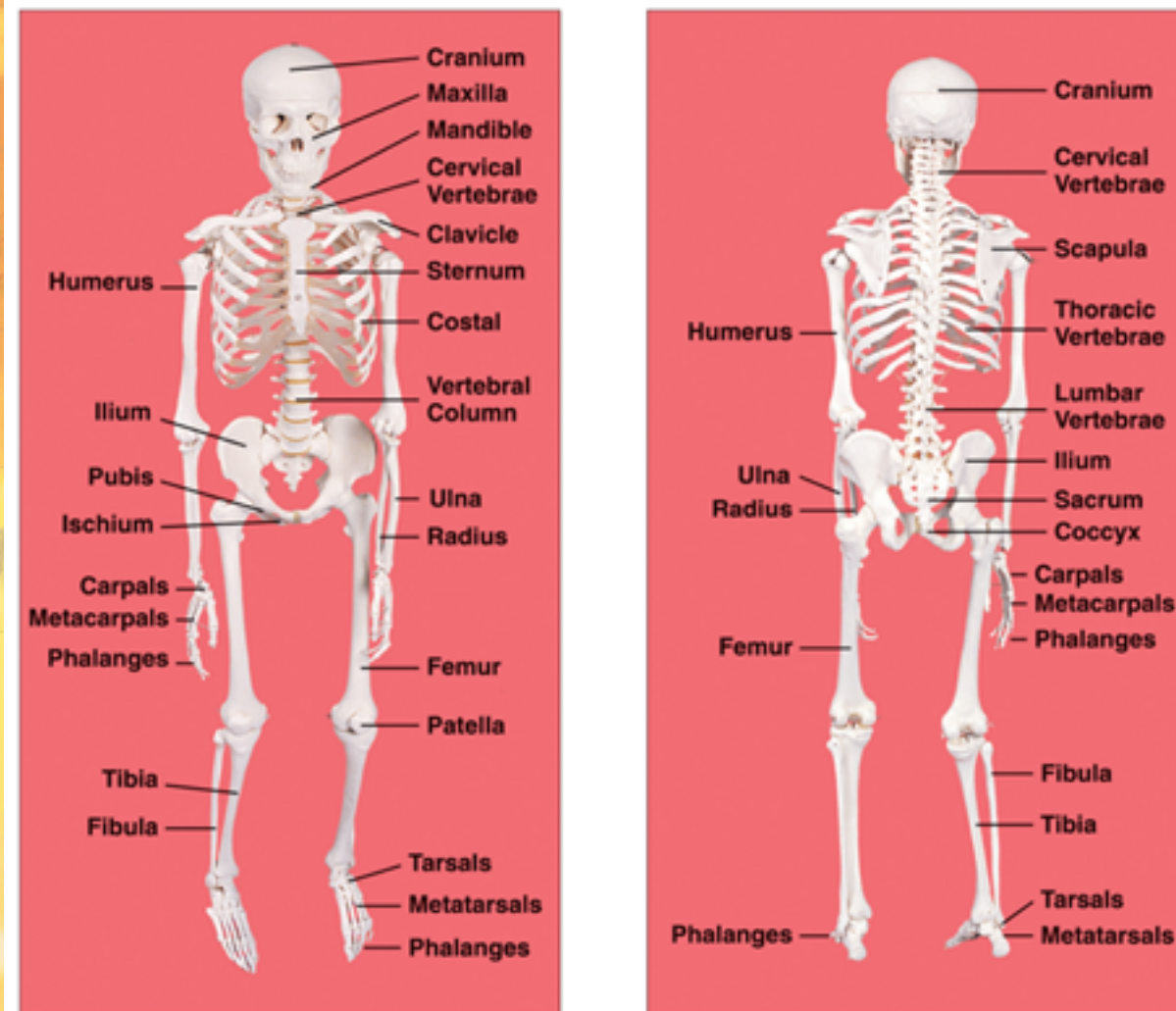
Table 13-1 Bones of the Body

DO NOT COPY, BUT KNOW

Table 13-1 Bones of the Body

Part of Skeleton	Body Part	Body Part Division	Names of Bones
Axial skeleton	Skull (28)	Cranium (8)	Frontal (1), parietal (2), temporal (2), occipital (1), sphenoid (1), ethmoid (1)
		Face (14)	Nasal (2), maxillary (2), zygomatic (2), mandible (1), lacrimal (2), palatine (2), inferior concha (2), vomer (1)
		Ear bones (6)	Maleus (2), incus (2), stapes (2)
	Hyoid (1)		
	Spinal column (26)	Cervical vertebrae (7), thoracic vertebrae (12), lumbar vertebrae (5), sacrum (1), coccyx (1)	
	Sternum and ribs (25)	Sternum (1), true ribs (14), false ribs (10)	
Appendicular skeleton	Upper extremities (64)	Clavicle (2), scapula (2), humerus (2), radius (2), ulna (2), carpals (16), metacarpals (10), phalanges (28)	
	Lower extremities (62)	Coxal bones (2), femur (2), patella (2), tibia (2), fibula (2), tarsals (14), metatarsals (10), phalanges (28)	

Figure 13-1 Common Skeletal Bones



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Table 13-2 Bones by Shapes YOU SHOULD KNOW

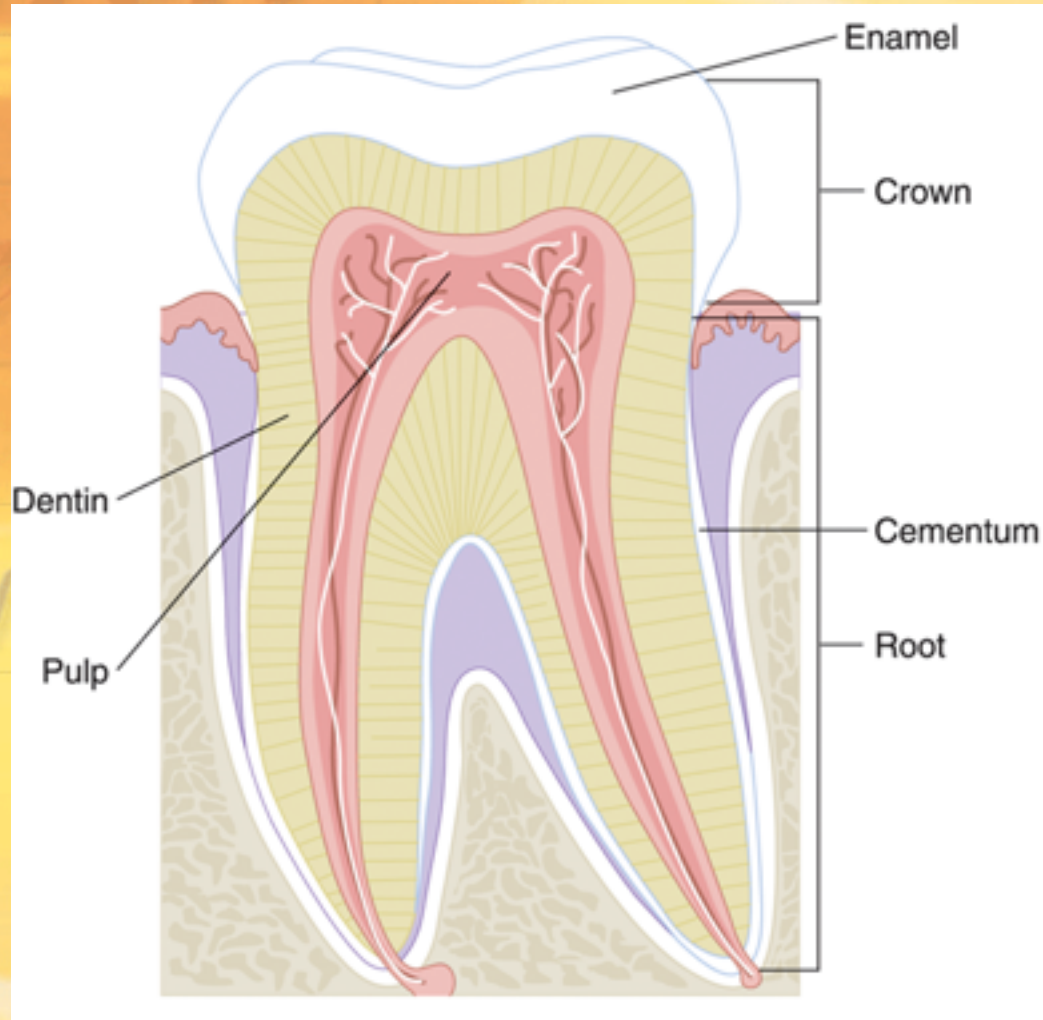
Table 13-2 Bones by Shape

Shape of Bone	Examples
Long	Femur, humerus, radius, ulna, tibia, fibula
Short	Tarsal, carpal, metatarsal, metacarpal
Flat	Cranium, costal, scapula, sternum
Irregular	Vertebrae, mandible, ilium, ossicle, patella

Parts of Teeth

- The crown is the white section above the gum
- The root is below the gum
- Enamel, the hardest substance in the body, covers the crown
- Cementum is the hard, bonelike substance covering the root
- Dentin is located between the enamel and the pulp
- The pulp is the soft living portion of the tooth, containing the nerves and blood vessels

Figure 13-5 Parts of a Tooth YOU SHOULD KNOW



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Table 13-3 Types of Teeth YOU SHOULD KNOW

Table 13-3 Teeth Types

Type of Tooth	Number	Function	Location	Description
Incisor	8	Cuts food	Front of mouth (central or lateral)	Broad, sharp edge
Cuspid (canines or eyeteeth)	4	Tears food	At angles of lips	Longest in mouth
Bicuspid (premolar)	8	Pulverizes or grinds food	Between cuspids and molars	Flat
Molar	12*	Grinds food	Back of mouth	Largest, strongest

*The third molar is called the "wisdom" tooth. It does not appear in every individual.

Thorax

- Thorax includes:
 - Ribs
 - Seven pairs of “true” ribs, five pairs of “false” ribs, and two pairs of “floating” ribs
 - Sternum
 - Vertebral bones
 - Protect the lungs and heart

Vertebral Column

- Consists of five parts (total of 26 vertebrae)
 - Cervical vertebrae (7 vertebrae)
 - Thoracic vertebrae (12 vertebrae)
 - Lumbar vertebrae (5 vertebrae)
 - Sacrum
 - Coccyx
- Curvature gives it strength and flexibility
- Cartilage between vertebrae cushions bones and allows movement

Bone Markings

- Four major types of bone markings
 - Projections bulge from a bone and attach to muscles, ligaments, and tendons
 - Openings are holes or spaces in bones
 - Depressions include openings and cavities in bone
 - Ridges are lines on a bone surface

Health

Joints

- Two or more bones join together at a joint
- Three types of joints
 - Immovable (synarthrosis)
 - Slightly movable (amphiarthrosis)
 - Freely movable (diarthrosis)

Assessment Techniques

- Bone x-rays
- Bone marrow aspiration
- Bone marrow biopsy
- Radionuclide bone scan
- Computed axial tomography (CAT)
- Magnetic resonance imaging (MRI)
- Bone densitometry

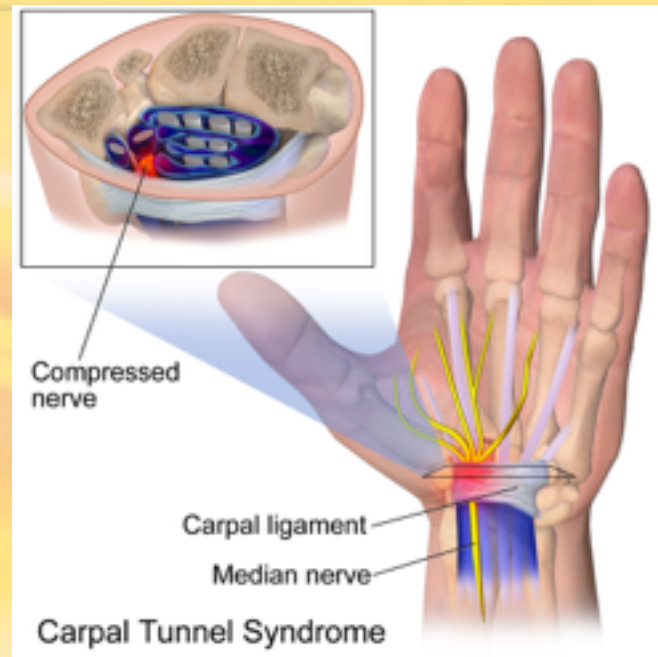
Disorders of the Skeletal System

- Ankylosing spondylitis
 - A hereditary chronic spinal disease
- Arthritis
 - A group of disorders evidenced by inflammation of a joint, pain and stiffness during movement
- Avulsion fracture
 - Occurs when a ligament or tendon pulls off part of a bone during an injury
- Bursitis
 - Inflammation of the sac around a joint that is caused by trauma or irritation



Disorders of the Skeletal System (continued)

- Caries
 - Also called cavities, it is the major cause of tooth loss
- Carpal tunnel syndrome
 - A disorder caused by pressure on the median nerve of the wrist due to repetitive use or trauma
- Degenerative joint disease
 - Also called osteoarthritis, usually associated with aging; it is the most common form of arthritis



Osteoarthritis



Healthy knee joint

Hypertrophy and spurring of bone and erosion of cartilage

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To

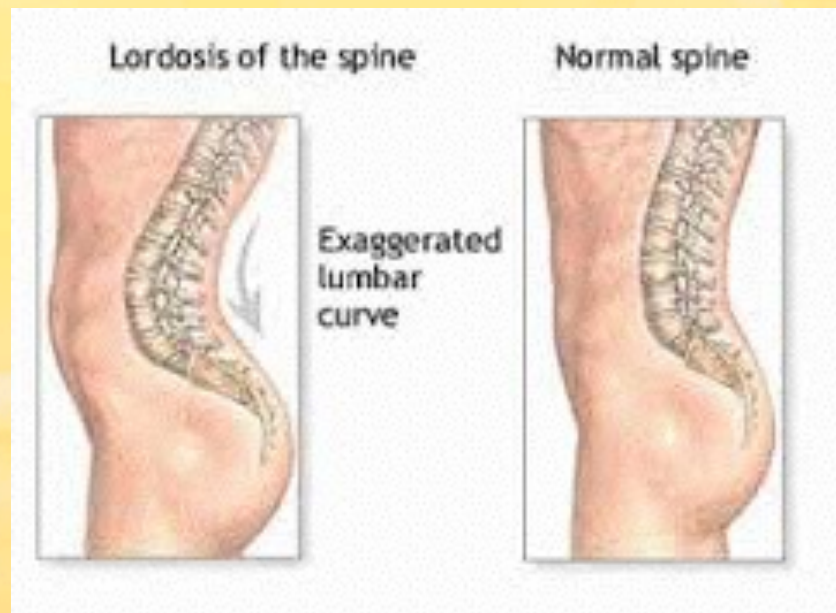
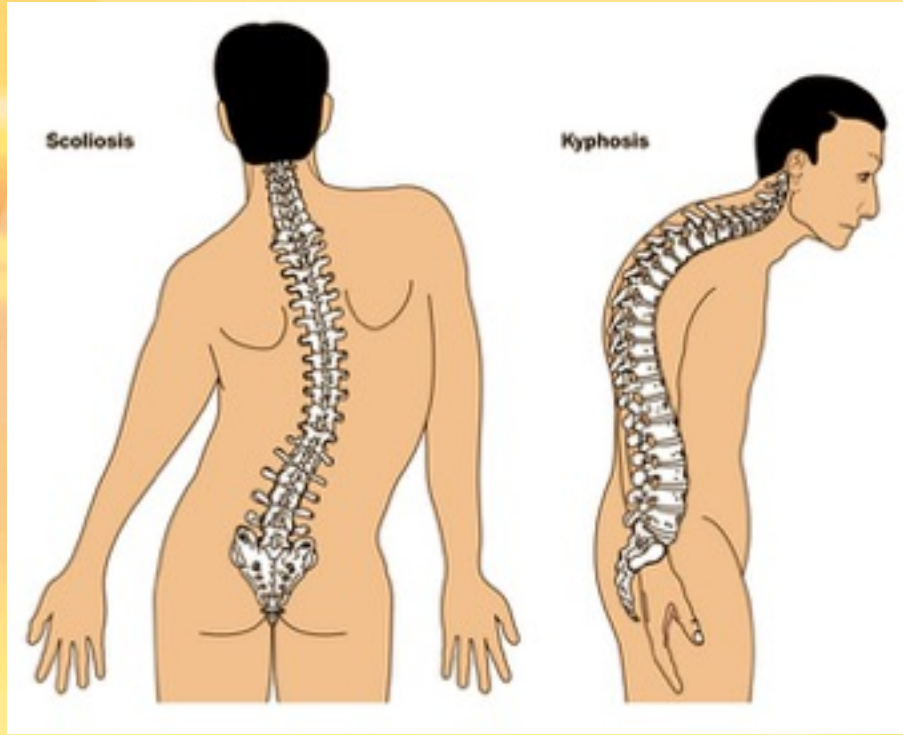
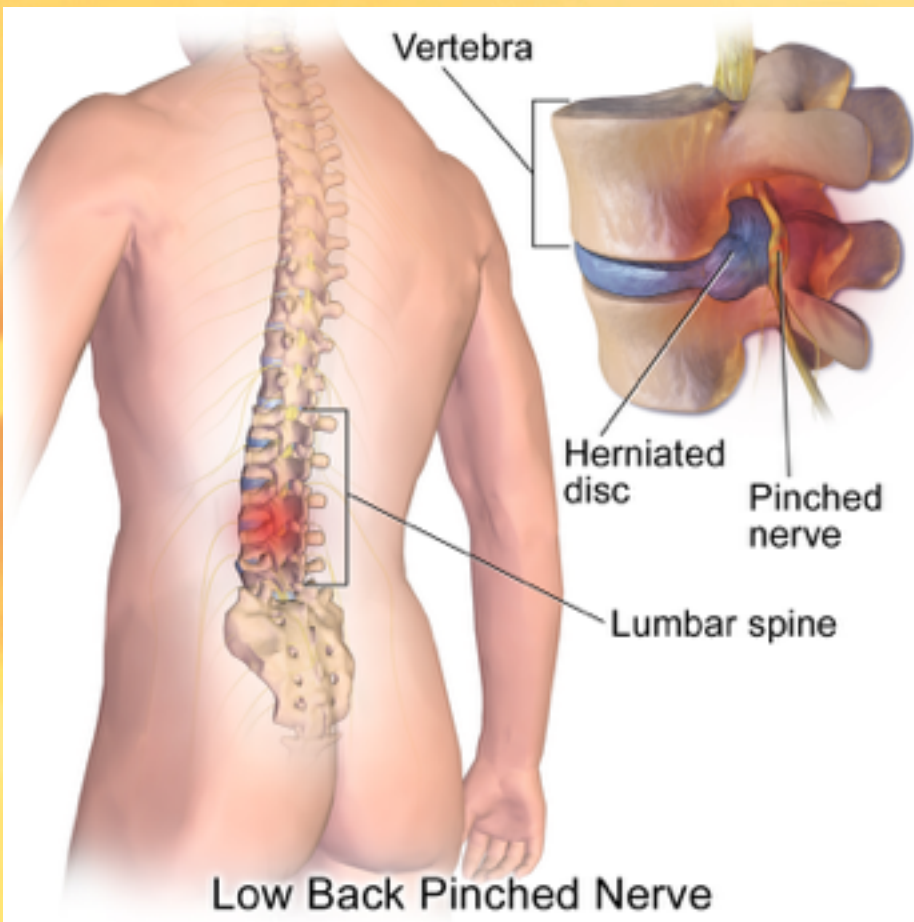
Disorders of the Skeletal System (continued)

- Dislocation
 - When bones move out of their proper location, usually in the shoulder or hip
- Fracture
 - A broken bone caused by trauma
- Gout
 - A painful swelling of a joint that results from the buildup of uric acid crystals, most commonly in the great toe



Disorders of the Skeletal System (continued)

- Herniated disk
 - A ruptured or “slipped” disk between vertebrae
- Kyphosis
 - Also called “hunchback” or “humpback,” is an abnormal curvature of the thoracic part of the spine
- Lordosis
 - Also called “swayback,” is an abnormal curvature of the lumbar spine



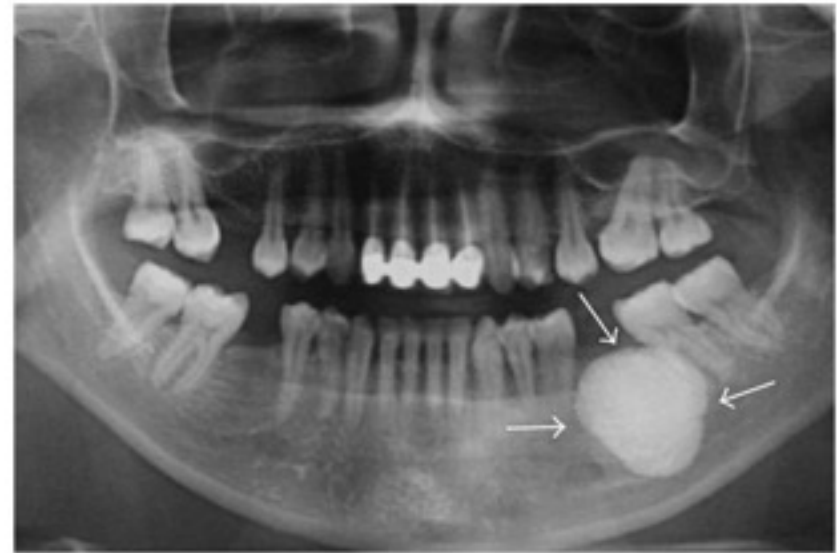
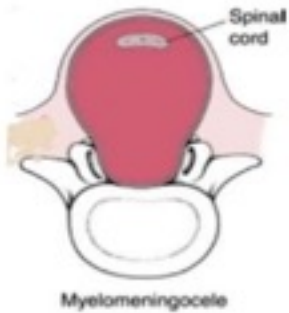
Disorders of the Skeletal System (continued)

- Meningomyelocele
 - Also called spina bifida, is a congenital condition of the spinal column
- Osteoma
 - A bone tumor
- Osteomalacia
 - Also called rickets in children, is a softening of the bones caused by vitamin D and calcium deficiency

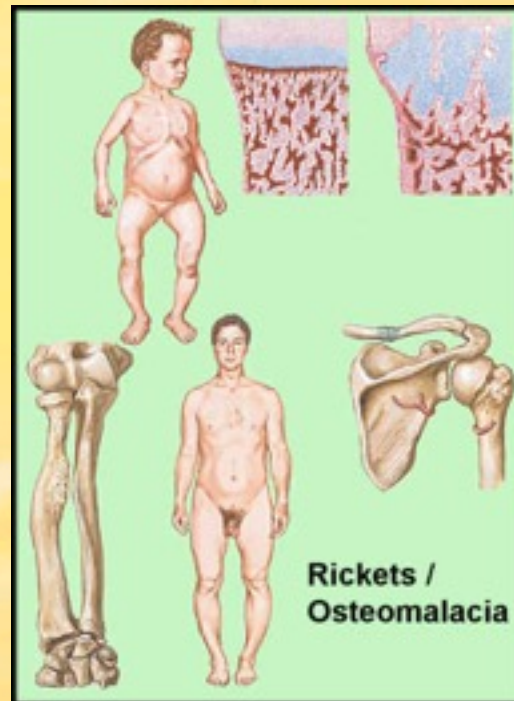
Spina bifida cystica

Myelomeningocele-

- 10 times more frequent
- portion of the spinal cord or the nerve roots are displaced through the spina bifida defect into the sac

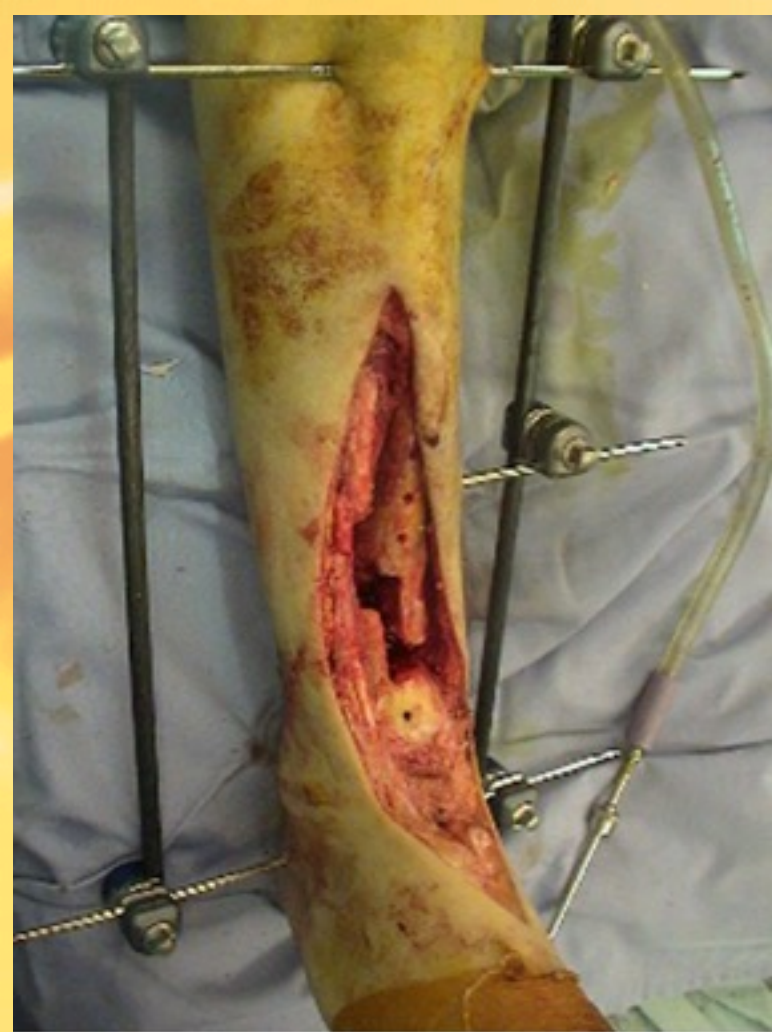


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Disorders of the Skeletal System (continued)

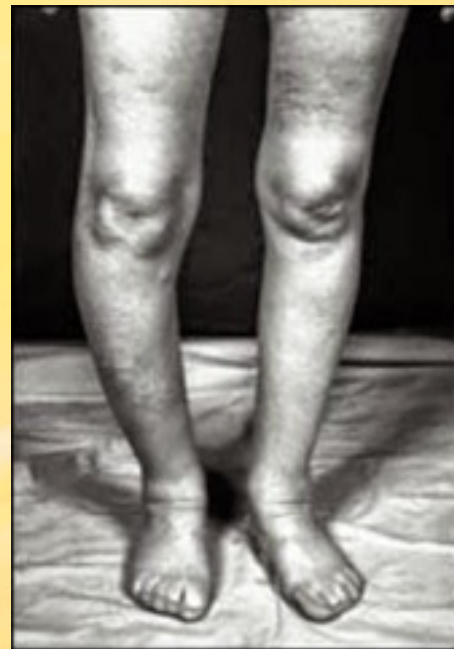
- Osteomyelitis
 - A bacterial infection of the bone
- Osteoporosis
 - A weakening of the bones
- Paget's disease
 - Also called osteitis deformans, is due to excessive destruction of bone cells



Healthy bone



Osteoporosis



Disorders of the Skeletal System (continued)

- Periodontitis

- An inflammation of the tissues that keep teeth in place

- Rheumatoid arthritis

- Pain and stiffness in the joints caused by thickening of the synovial membrane

- Rickets

- A painless deformity at the epiphysis of the bones caused by insufficient vitamin D



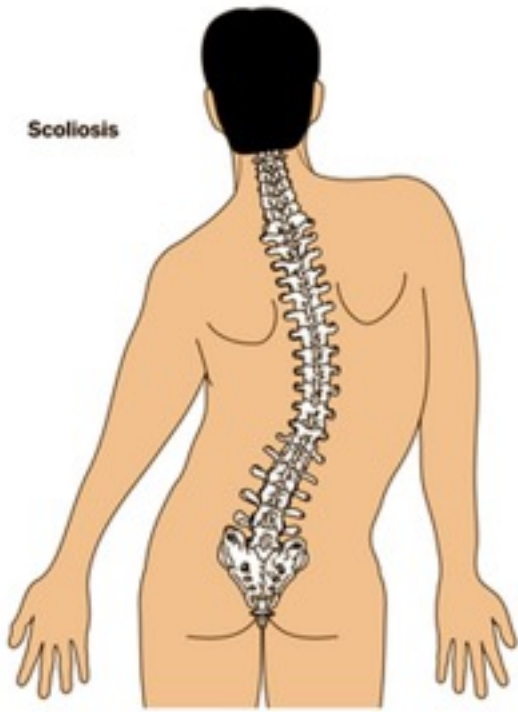
Today



Disorders of the Skeletal System (continued)

- **Scoliosis**
 - An abnormal lateral spinal curvature
- **Subluxation**
 - A partial dislocation of a joint, such as in the neck in a “whiplash” injury
- **Talipes**
 - A congenital deformity involving the foot and ankle

Scoliosis



Kyphosis



NORMAL



SUBLUXATION



Today



Issues and Innovations

- Progress in dental care
 - Corrective measures including bonding, bleaching, and implants
- Bone substitutes and repairs
 - Bone replacing material including organoapatites and coral
 - Surgical implants for cranial and joint injuries
 - Bone regeneration