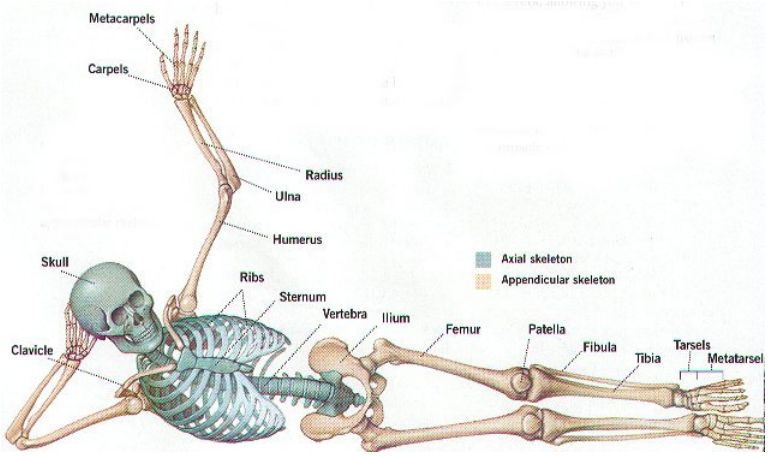
The Skeletal System

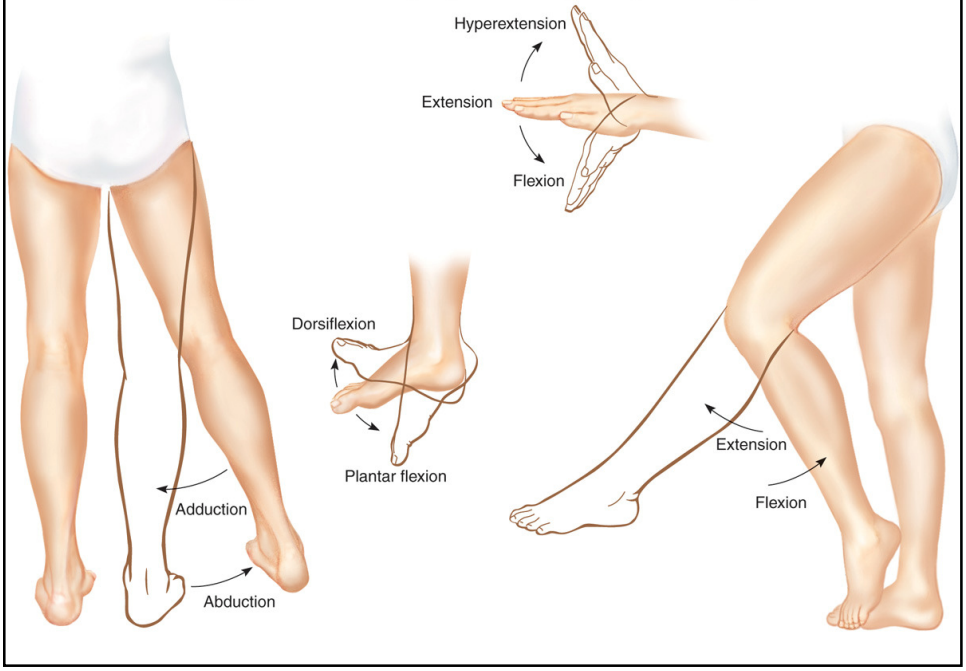


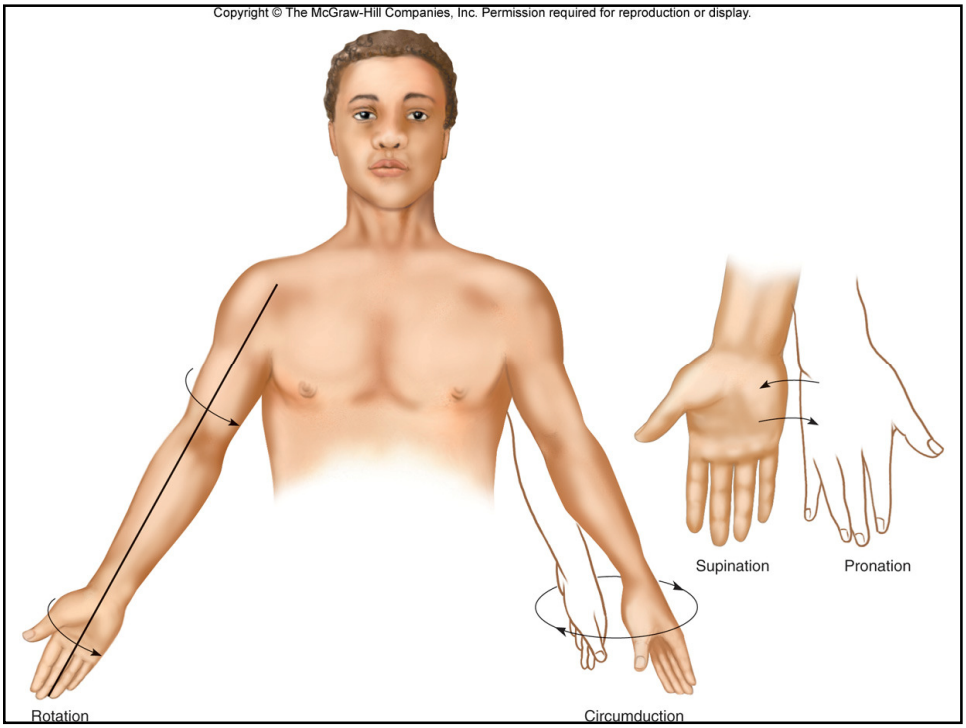
Anatomy and Physiology
Mrs. Michaelsen

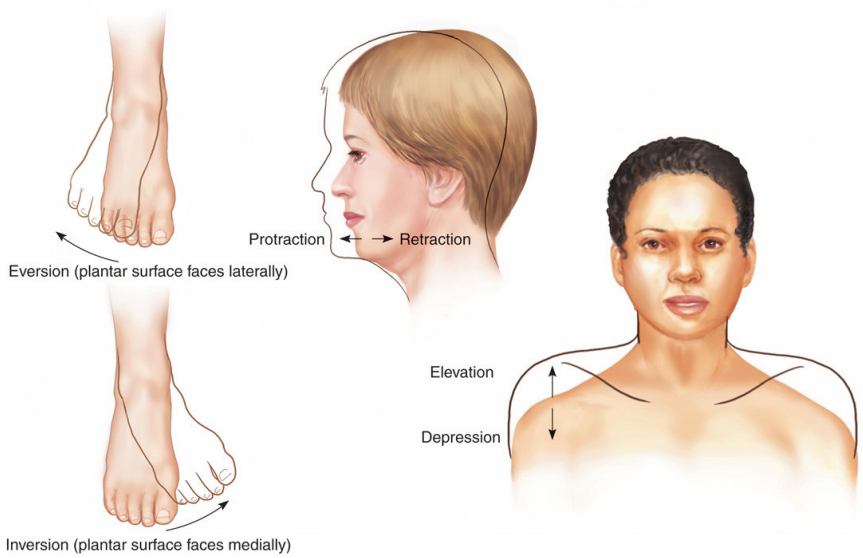
Types of Joint Movements

A. The following terms describe movements at joints (p. 165): There will be a quiz on these!

1. Flexion
2. Extension
3. Dorsiflexion
4. Plantar flexion
5. Hyperextension
6. Abduction
7. Adduction
8. Rotation
9. Circumduction
10. Pronation
11. Supination
12. Eversion
13. Inversion
14. Retraction
15. Protraction
16. Elevation
17. Depression





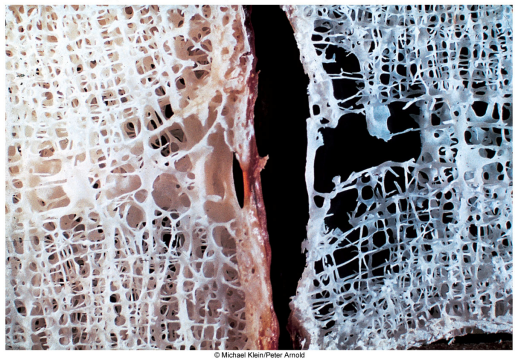


7.1 Introduction

A. Bone is an

B. Composed of:

1.



7.1 Introduction (and 7.4 Bone Function)

A.

B. Protects

1.

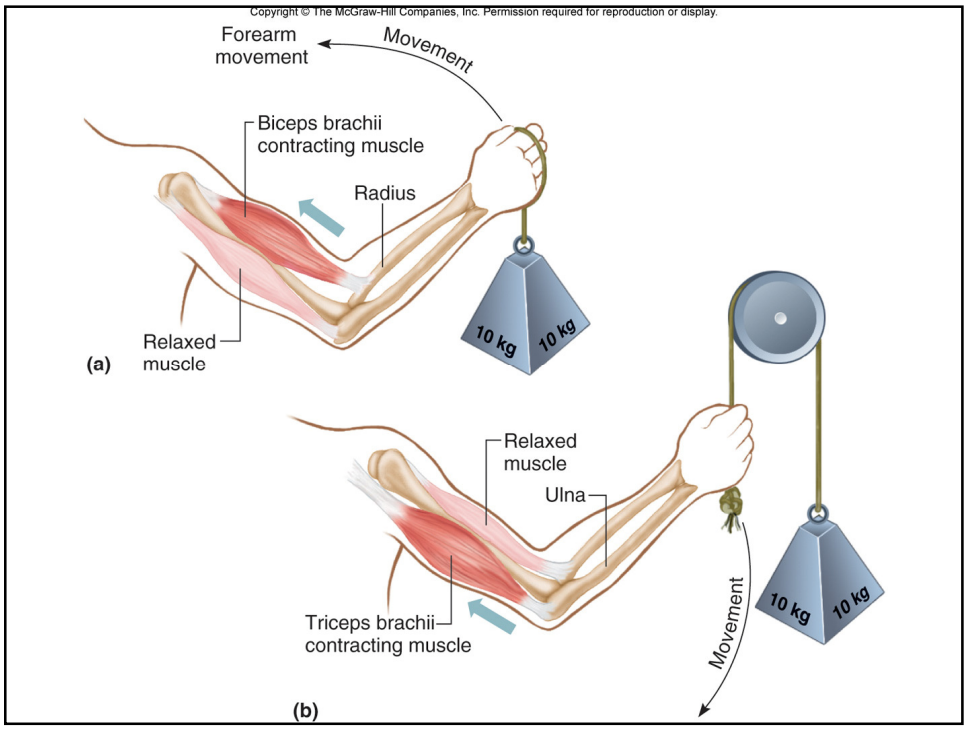
C. Helps make

1.

D. <u>Hematopoiesis</u> or

1. Begins in

E. Passageway for



7.1 Introduction (and 7.4 Bone Function)

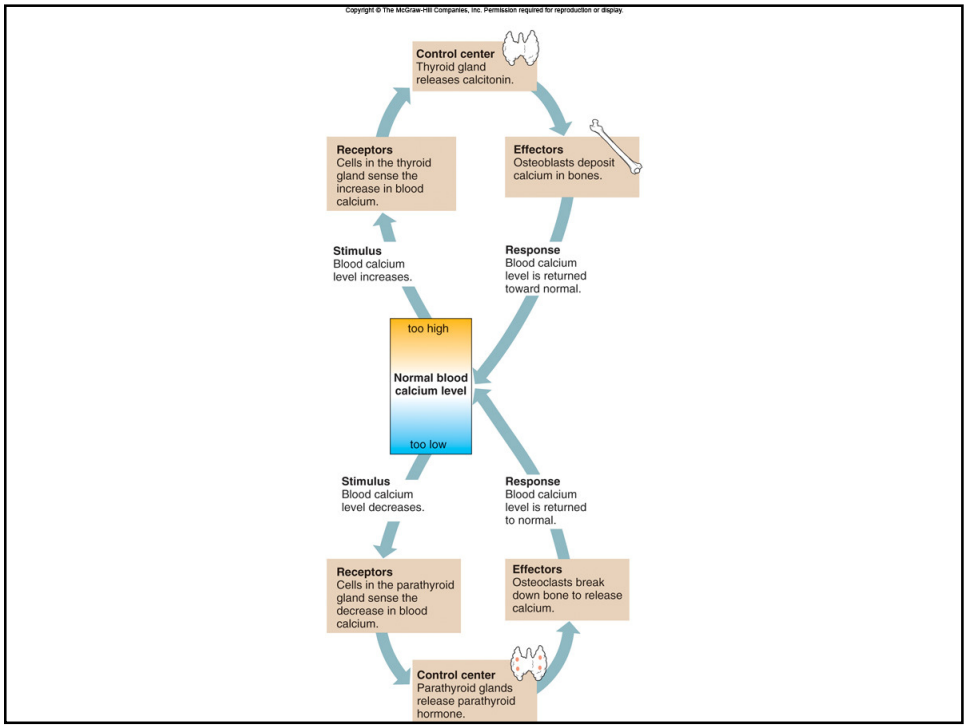
A. Stores

1. Bone stores

2. Blood calcium is low, stimulates osteoclasts to

3. Blood calcium is high, and osteoblasts

4. Calcium is needed for



7.2 Bone Structure

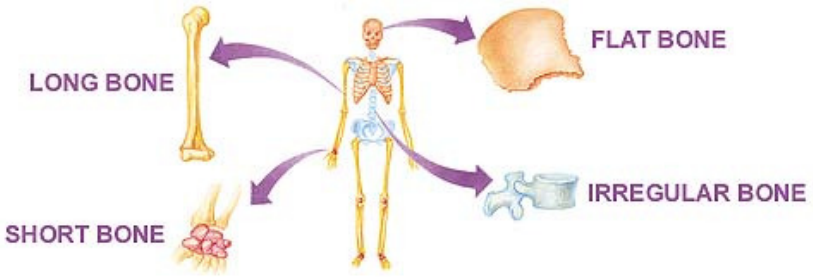
A. Long:

B. Short:

C. Flat:

D. Irregular:

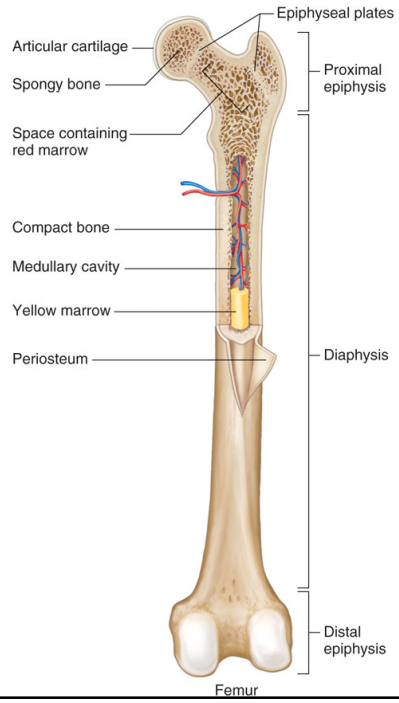
E. Sesamoid (round):



7.2 Bone Structure

A. Parts of a Long Bone

1. Epiphyses or ends of the bone;
2. Articular cartilage:
3. Diaphysis:
4. Medullary cavity:
5. Endosteum:
6. Periosteum:



7.2 Bone Structure

A. Microscopic Structure

1. <u>Spongy</u>

   a. Also called

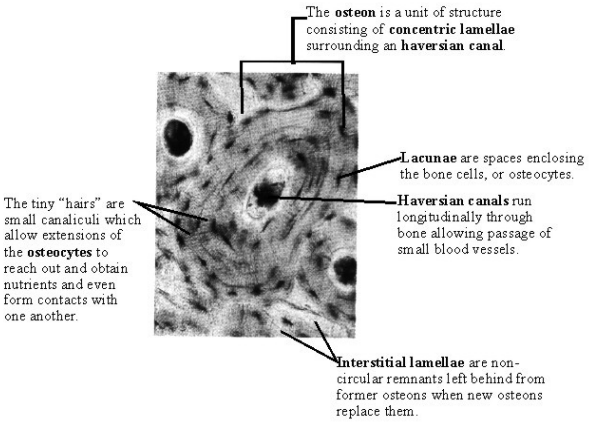
   b. Texture results from needlelike threads of bone called

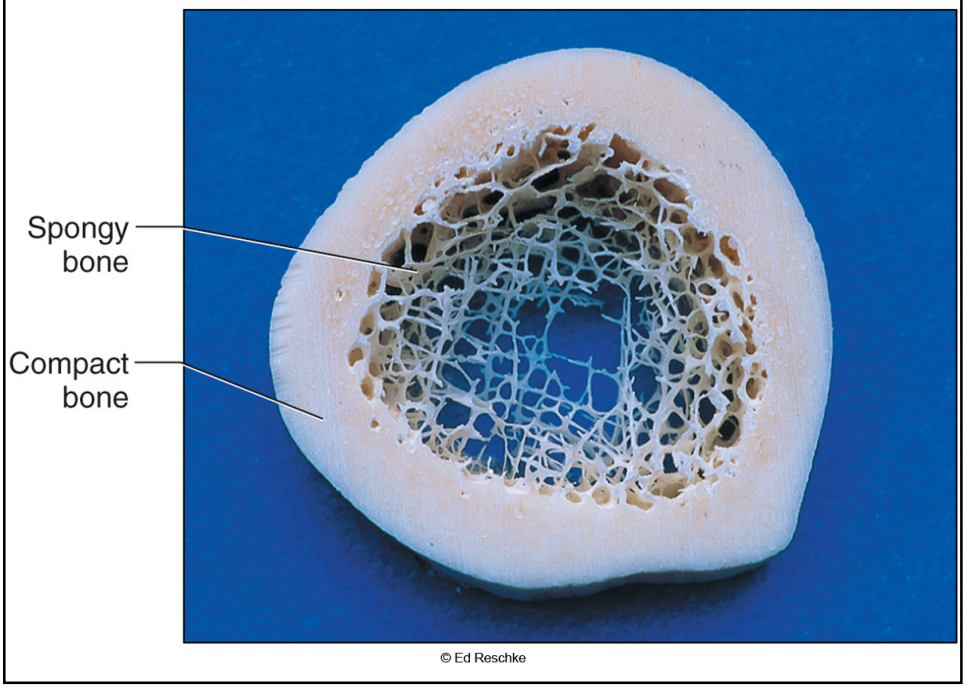
   c. Found in

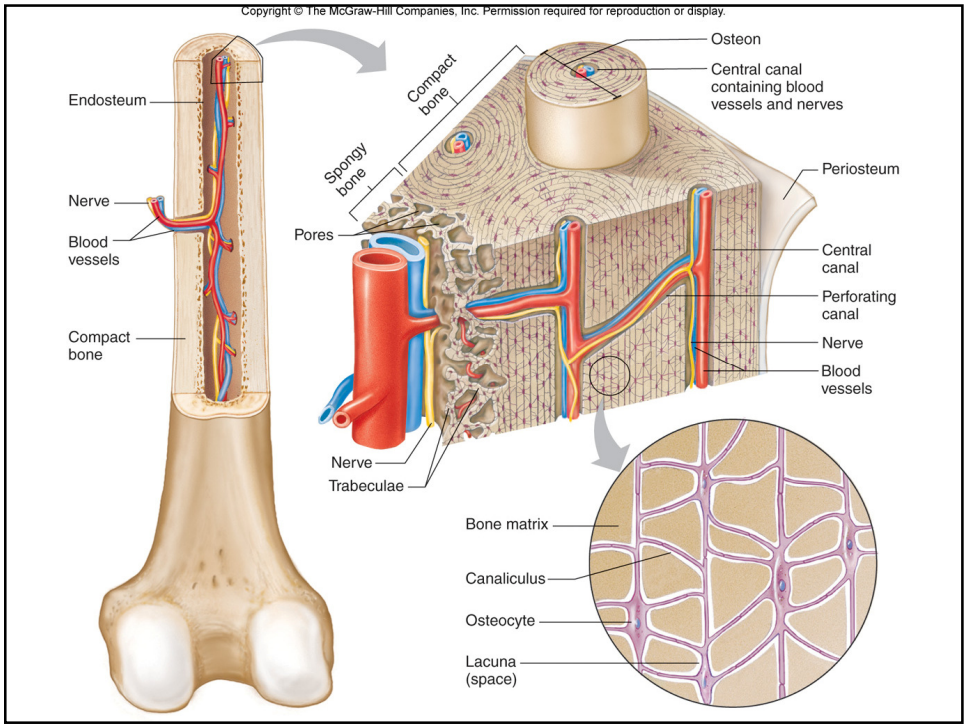
   d. Spaces contain

2. Compact

a. Structural unit is an







7.3 Bone Development and Growth

A. Intramembranous Bones

1. Broad,
2. Form by replacing
3. Osteoblasts become

4. Once completely surrounded by

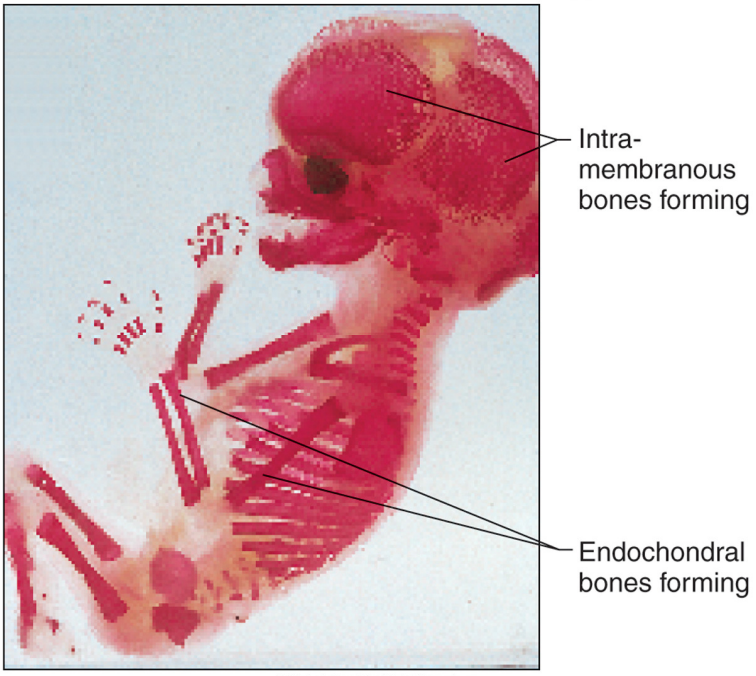
5. The periosteum develops and

Bone remodeling video

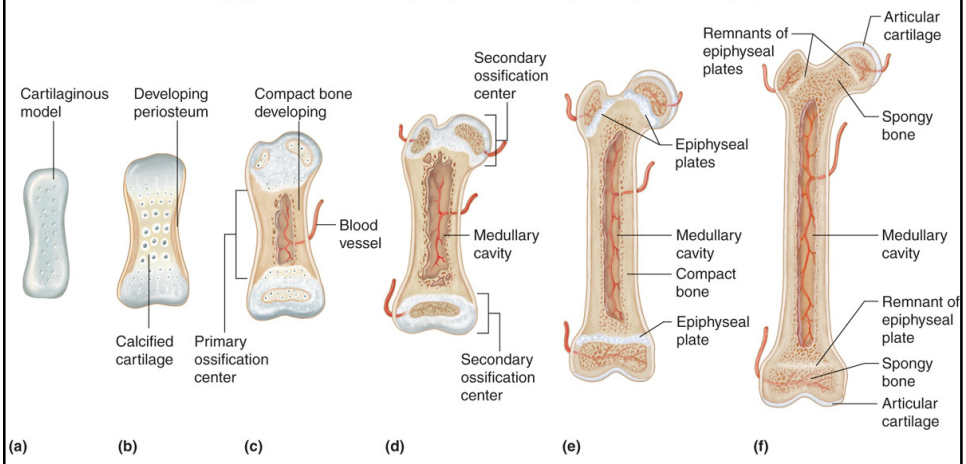
7.3 Bone Development and Growth

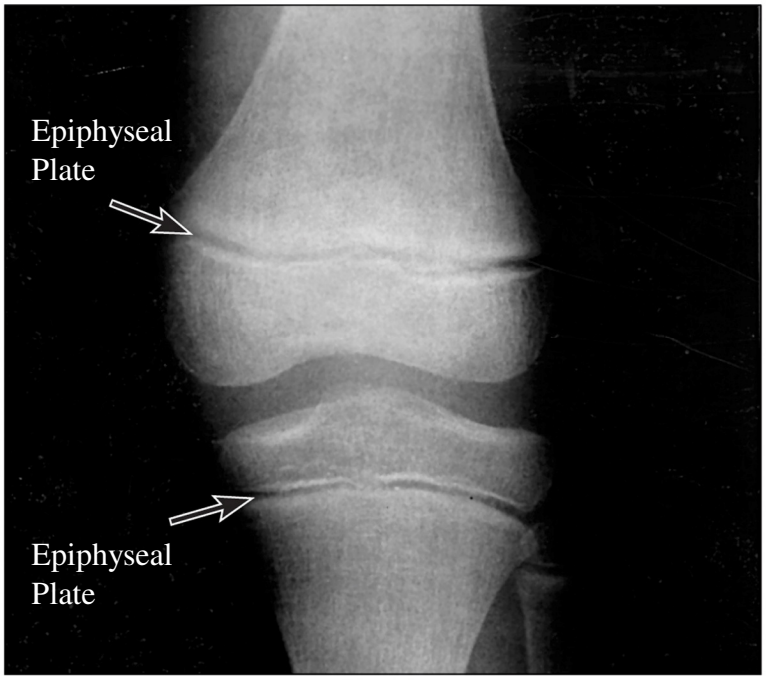
B. Endochondral Bones

1. Most bones
2. Formed from hyaline cartilage
3. Primary ossification begins in
4. Epiphyseal plate (metaphysis) remains
5. Epiphyseal plates are
6. Long bones thicken as compact bone is formed



Bone Growth and Development





7.3 Bone Development and Growth

C. Homeostasis of Bone Tissue
   1. is exchanged each year.
   2. Osteoclasts break down
   3. Osteoblasts invade the region and
   4. This occurs through life and

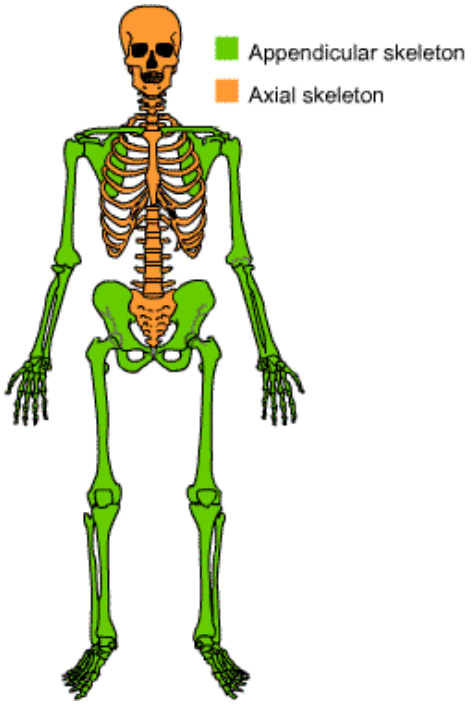
7.3 Bone Development and Growth

D. A number of factors influence bone development, growth, and repair.
   1. Vitamin D is necessary for
      a. Without it the matrix of bone lacks
   2. Growth hormone secreted by the anterior pituitary stimulates
   3. Sex hormones stimulate
   4. Physical exercise stimulates bone to

VI. Divisions of the Skeleton

A. Skeleton composed of the following divisions and subdivisions:

1. Axial skeleton
   a.
   b.
   c.
   d.
2. Appendicular skeleton
   a.
   b.



VII. Differences Between a Man's and Woman's Skeleton

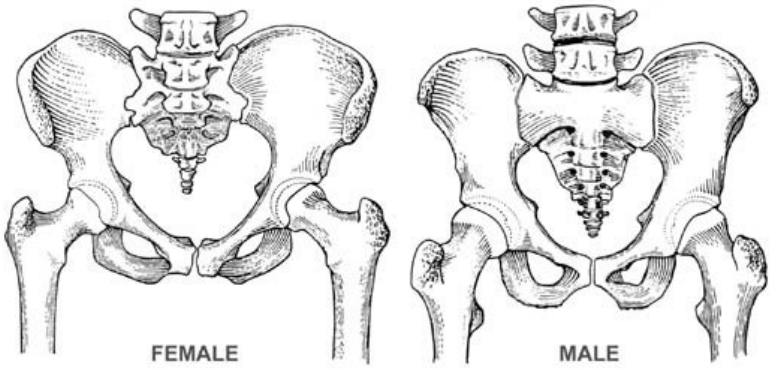
A. Size: Male skeleton

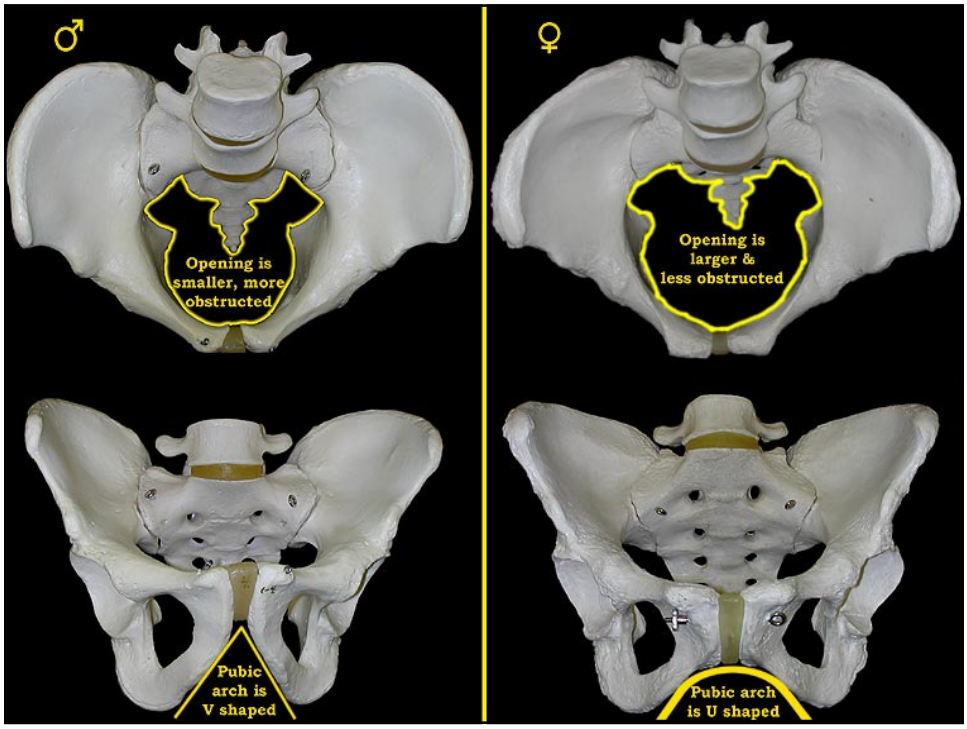
B. Shape of pelvis:

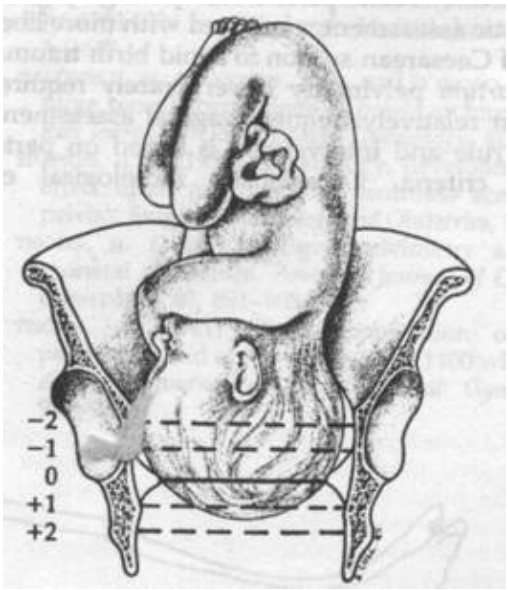
C. Size of pelvic inlet: Female pelvic inlet generally

D. Pubic angle: Angle between pubic bones of

Female and Male Pelvis




♂
Opening is smaller, more obstructed
Pubic arch is V shaped
♀
Opening is larger & less obstructed
Pubic arch is U shaped


−2
−1
0
+1
+2

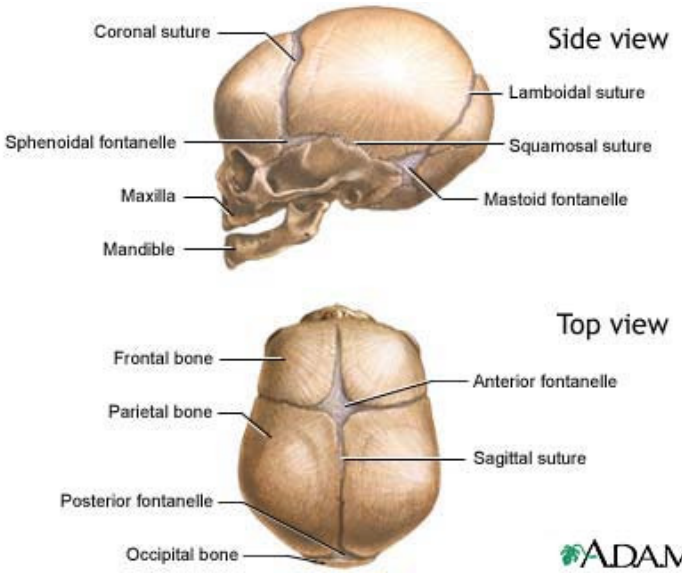
VIII. Joints (Articulations)

A. Kinds of Joints
   1. Functional
   2. Classified by
      a.
      b.
      c.

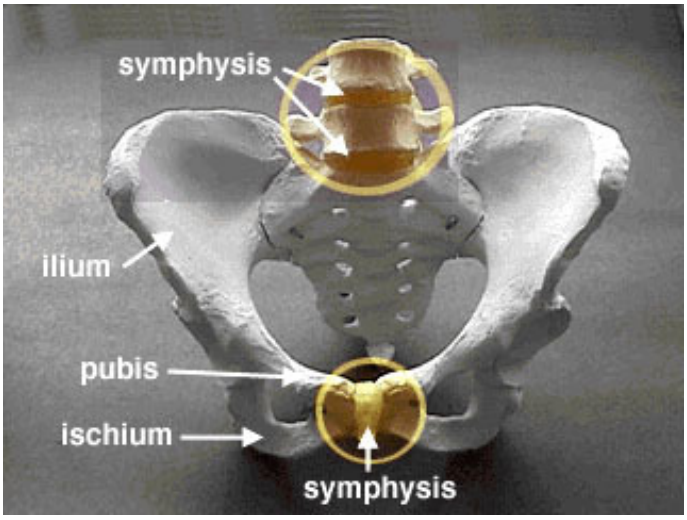
B. Fibrous Joints
   1. Between bones that
   2.

C. Cartilaginous Joints
   1.
   2.

Synarthroses



Amphiarthroses



D. Synovial Joints

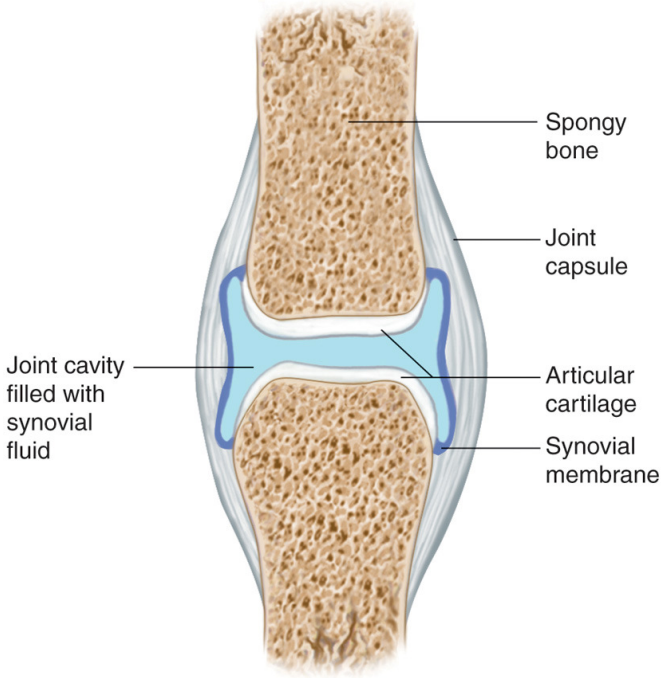
1.
2. Structures of freely moveable joints –

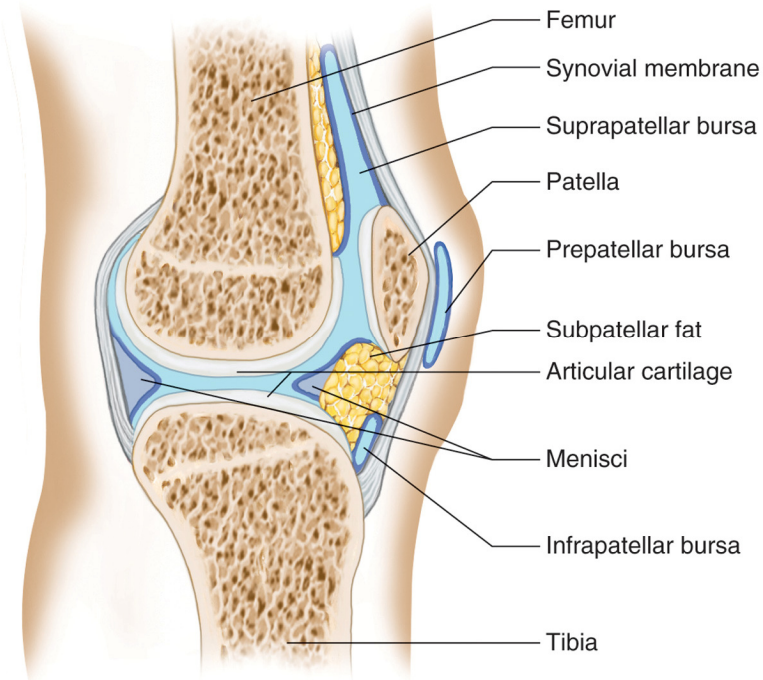
   a. Articular cartilage: Covers joint

   b. Synovial membrane: Lines joint

   c. Joint cavity space between

3. Some have
4. Others have

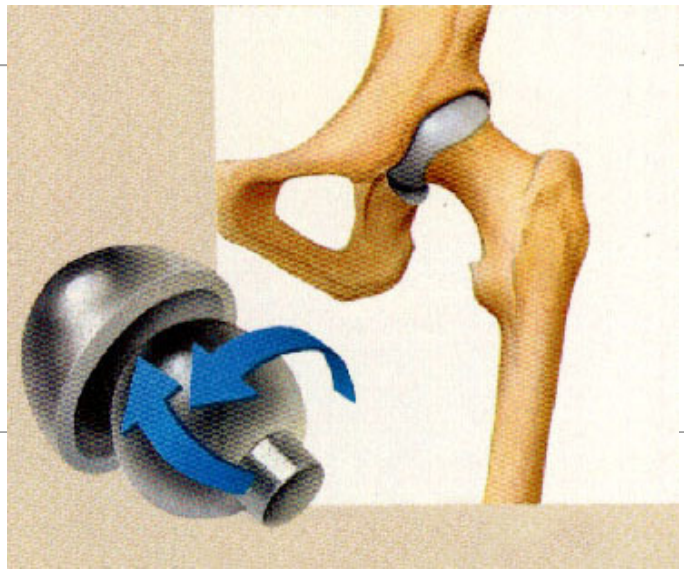




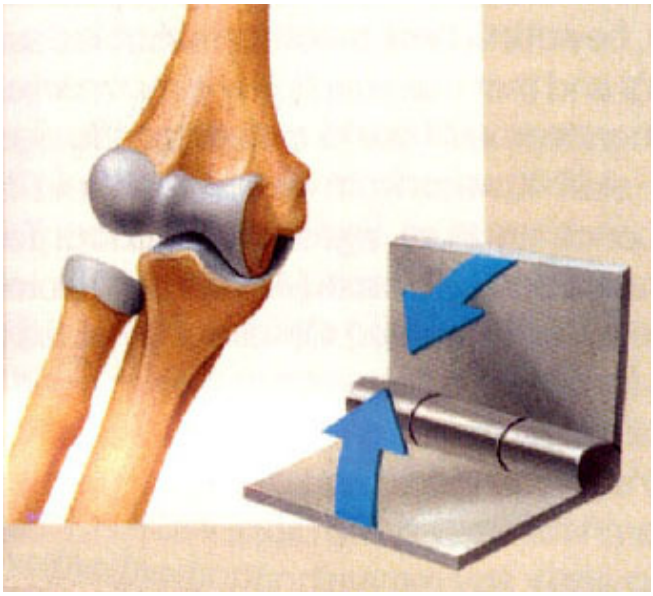
E. Types of freely moveable joints:

1. Ball and socket –
2. Hinge –
3. Pivot –
4. Saddle –
5. Gliding –
6. Condyloid –

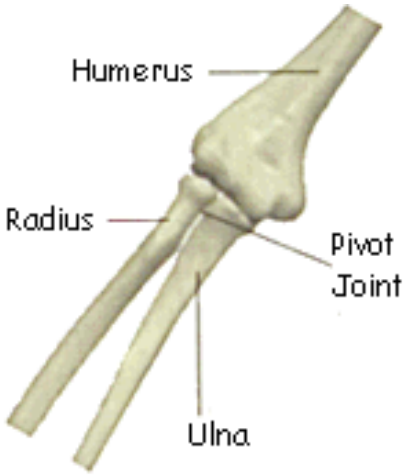
Ball and Socket



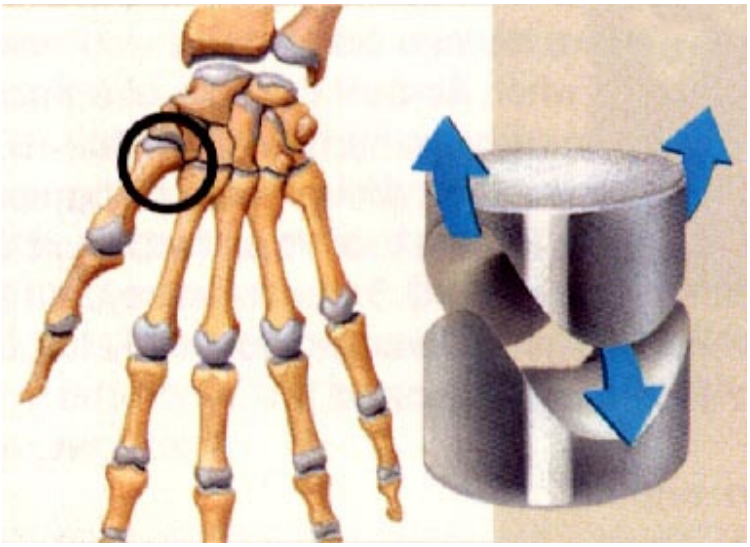
Hinge



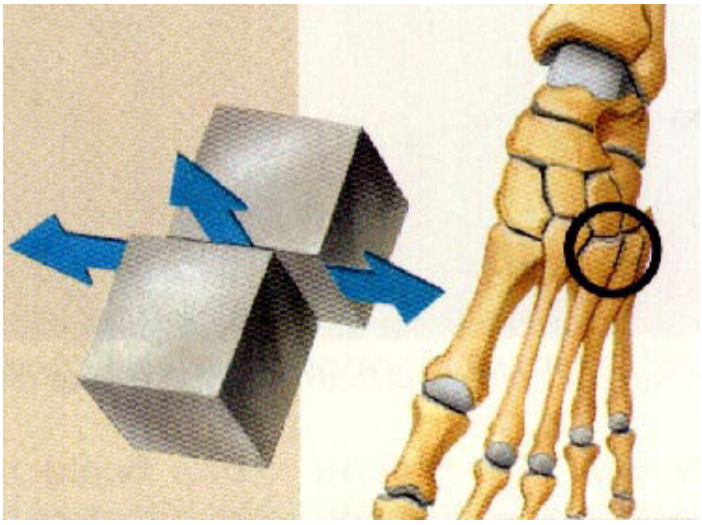
Pivot

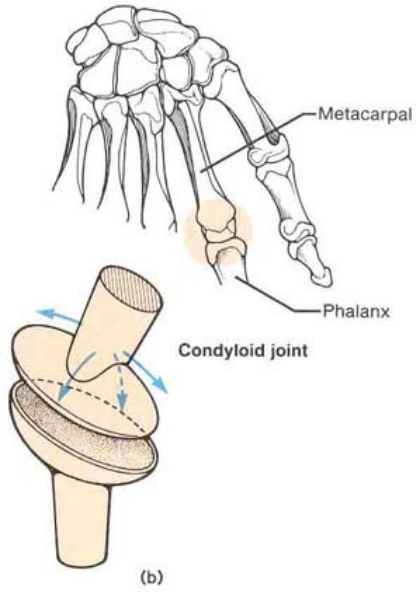


Saddle Joint



Gliding



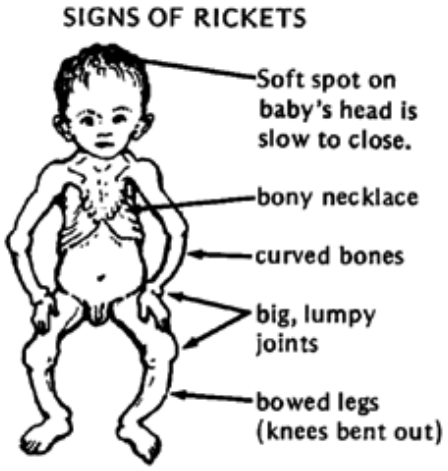


Disorders of the Skeletal System

A. Bone tumors and cancers:

B. Metabolic bone diseases
   1. Osteoporosis:
   2. Osteomalacia:
   3. Paget Disease:

Rickets



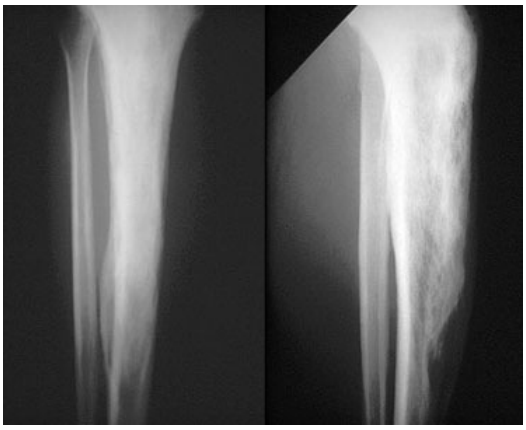
Osteoporosis

Bone section through hip

Normal Bone

Bone with Osteoporosis

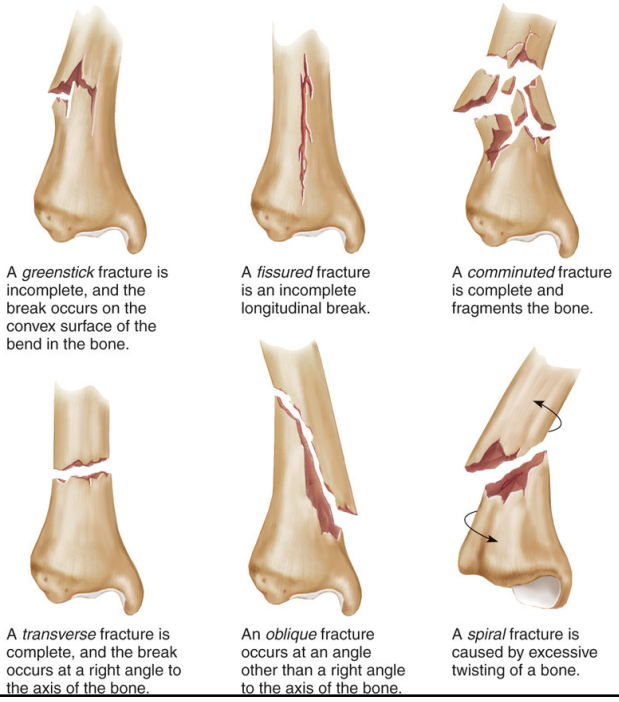
Paget Disease



This is an advanced case of Paget's disease in the tibia. The bone has become very large in comparison to the fibula and the trabeculae have become very coarse.

C. Bone Infection
   1. Osteomyelitis: General term for
   2. Bone infections may also be caused by

D. Bone Fractures
   1. Open (Compound) fractures:
   2. Closed (Simple):
   3. Complete fractures involve total
   4. Incomplete (Greenstick, fissure):
   5. Comminuted:
   6. Fracture lines can be



A *greenstick* fracture is incomplete, and the break occurs on the convex surface of the bend in the bone.

A *fissured* fracture is an incomplete longitudinal break.

A *comminuted* fracture is complete and fragments the bone.

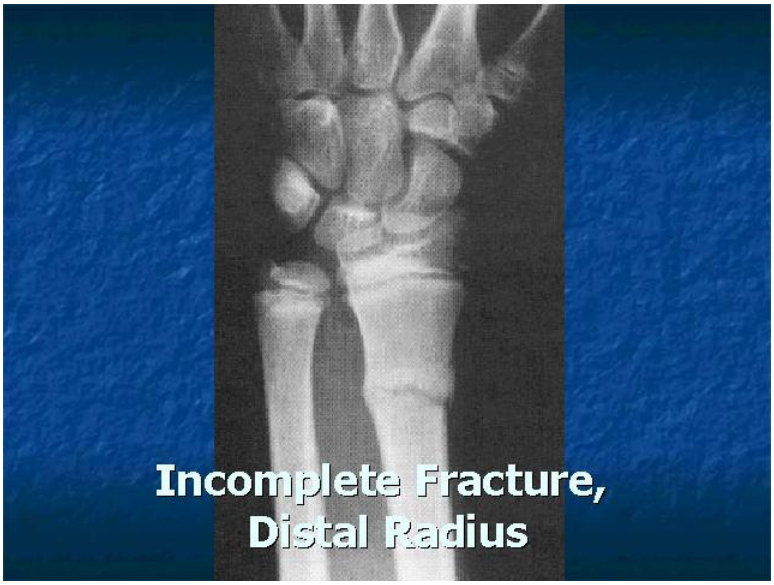
A *transverse* fracture is complete, and the break occurs at a right angle to the axis of the bone.

An *oblique* fracture occurs at an angle other than a right angle to the axis of the bone.

A *spiral* fracture is caused by excessive twisting of a bone.

Osteomyelitis of Big Toe

Closed Fracture



Comminuted Fracture

A transverse fracture of the tibial shaft.

Oblique Fracture

Patient with an anterior dislocation of the right shoulder.

E. Joint Disorders

1. Noninflammatory joint disease does not usually involve

   a. Osteoarthritis: Degenerative

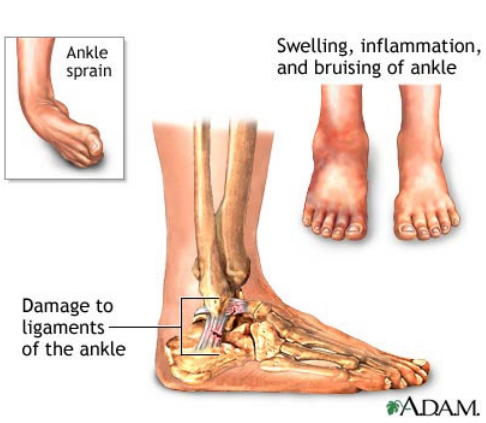
   b. Traumatic Injuries:

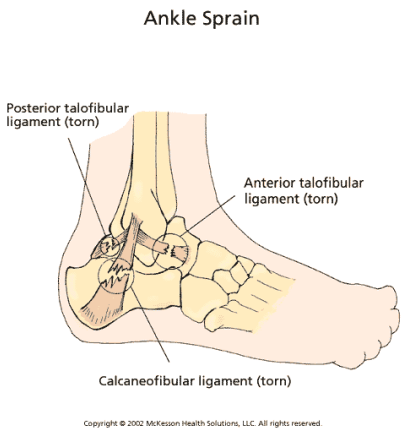
      *i. Subluxation: D*islocation of articular surfaces.

      ii. Sprain:

Osteoarthritis

Ankle Sprain





Figures: Courtesy of Mark Tranovich, MD

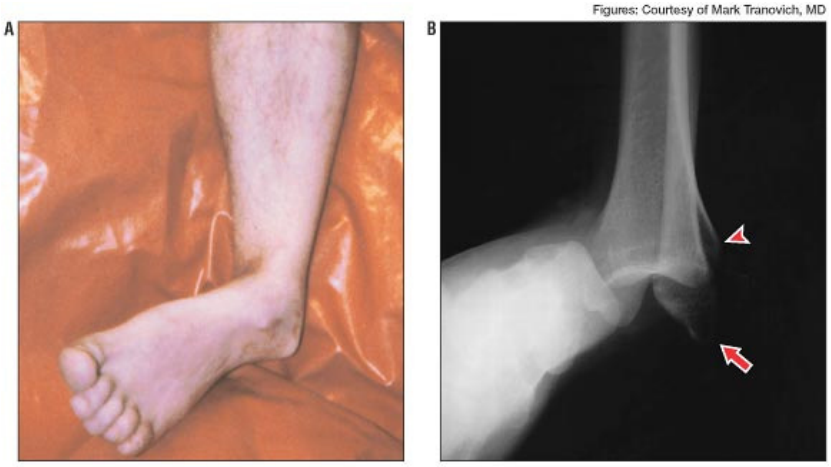


FIGURE 1. Photo (A) of the left ankle of a 33-year-old male recreational softball player shows tibiotalar dislocation of the ankle. The foot is displaced medially, and the skin is tented over the prominence of the lateral malleolus. Anterolateral radiograph of the same ankle (B) shows that the talus is completely disassociated from the ankle mortise (arrow), and a small avulsion of the fibula is evident (arrowhead).

2. Inflammatory joint disease (arthritis): Inflammation of synovial membrane

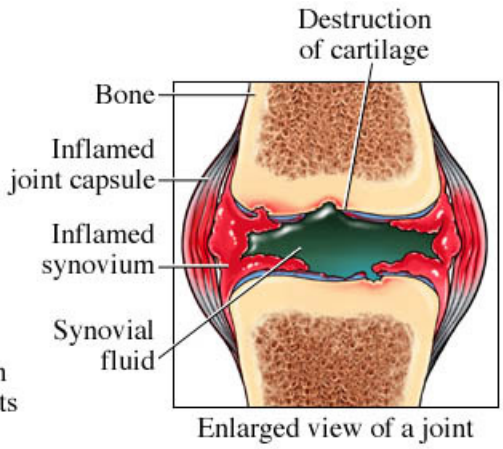
   a. Rheumatoid arthritis:

   b. Gouty arthritis: Synovial inflammation caused by

   c. Infectious arthritis: Arthritis resulting from

Joints typically affected by rheumatoid arthritis

Joint pain occurring in various joints



Enlarged view of a joint

Rheumatoid Arthritis

Gouty Arthritis