I. Remodeling

A. Purpose
   1. growth (appositional)
      a. osteoclasts remove bone from inner surface as outer surface thickens
      b. maintains constancy of marrow cavity
   2. shape changes
   3. stress adjustments
      a. muscle strength puts pressure on attachment sites
      b. stressed bones can become thicker and stronger
   4. repair
   5. Ca++ regulation
      a. vital for muscle function
      b. must be maintained at relatively constant levels
      c. bone major storage site

Fractures: Table 6.2

II. Repair
   A. Clot formation at site of fracture
      1. blood vessels and cells invade clot
         a. osteoprogenitors
         b. fibroblasts
         c. osteoclasts
      2. fibers made to hold fragments together: “mesh”
      3. cartilage produced within fiber “mesh”

   B. Callus
      1. zone of tissue repair between fragments
      2. osteoblasts enter callus --> hard callus
      3. bony callus formed in 4-6 weeks
      4. remodeling into compact and spongy bone

III. Developmental
   A. Osteogenesis imperfecta
      1. genetic
      2. insufficient collagen
      3. fetal fractures
B. Rickets
   1. diet lacking in
      a. minerals (Ca, PO₄)
      b. or vit. D
   2. soft, weak bones

IV. Infections
   Osteomyelitis
   1. bone inflammation
   2. often bacterial infection
   3. danger of complete bone destruction
   4. treat with antibiotics

V. Tumors
   A. Osteosarcoma
      most common primary malignant tumor of bone
   B. Osteoma
      benign bone tumor

VI. Decalcification
   A. Osteomalacia
      1. softening of bones
      2. progressive loss of calcium
      3. usually diet related
   B. Osteoporosis
      1. loss of bony tissue
      2. bones brittle, liable to fracture
      3. generalized (elderly)
      4. localized

VII. Joint disorders (pg. 272-276)
   A. Osteoarthritis - inflammation of a joint
      1. disease of joint cartilage
      2. causes secondary changes in underlying bone
         a. pain
         b. impaired function
      3. from overuse
      4. visible loss of cartilage
5. painkillers and reduced pressure

B. Rheumatoid Arthritis
   1. can affect joints severely
   2. hands, feet, wrists, ankles, hips, shoulders
   3. articular cartilages destroyed
   4. bones can fuse (severe)
   5. blood test for rheumatoid factor

C. Gout
   1. crystals of uric acid form in joints
   2. treatment- drugs increase excretion or inhibit formation of uric acid salts

D. Bursitis
   1. bursa - fluid-filled sac which cushions joints
   2. inflammation of bursa
   3. corticosteroids