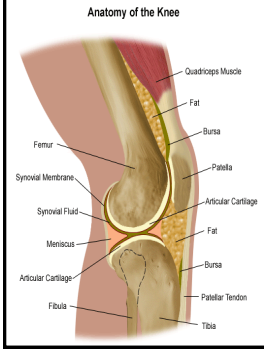
# Musculoskeletal Disorders

Sarah Granger, MSN, RN
Los Angeles County College of Nursing & Allied Health
sgranger@dhs.lacounty.gov

## Objectives

- Identifies general areas of focus related to musculoskeletal disorders
- Discusses the joint disorder of osteoarthritis
- Discusses three bone disorders: Osteoporosis, Osteomyelitis, Osteosarcoma (selected bone tumor)
- Discusses essential elements associated with selected types of musculoskeletal trauma, occupation-related disorders, & the problem of back pain

## Musculoskeletal System Overview



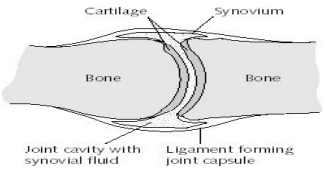

- Bones
- Joints
- Cartilage
- Muscle
- Ligaments/Tendons
- Fascia
- Bursae

## Bones

- Functions:
  - Support
  - Protection of internal organs
  - Voluntary movement
  - Blood cell production
  - Mineral storage

## Joints

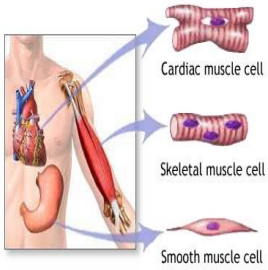
- Where the ends of 2 bones meet
- Classified according to the degree of movement (Fig. 61-4)
- Enclosed in a capsule of fibrous connective tissue




## Cartilage

- Rigid connective tissue in synovial joints
- Support for soft tissue
- Provides surface for joint movement
- Lacks direct blood supply
- 3 types:
  - Hyaline (trachea, bronchi, nose)
  - Elastic (ear, larynx)
  - Fibrous (vertebral disks, protective cushion between bones)

## Muscle

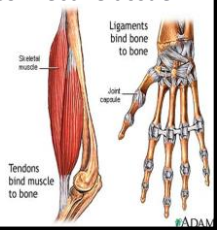



3 types of muscle tissue:

1. Cardiac
   - Heart
2. Smooth
   - Hollow structures: airways, arteries, GI tract, uterus
3. Skeletal
   - Move and support the skeleton

## Ligaments & Tendons

- Ligaments attach bones to bones
- Tendons attach muscles to bones
- Composed of dense, fibrous connective tissue
- Poor blood supply
- Ligaments:
  - More elastic than tendons
  - Provide stability
  - Permit controlled movement at the joint

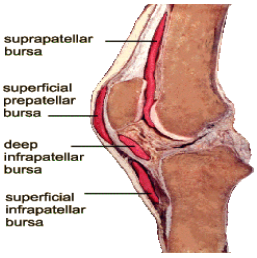



## Fascia & Bursae

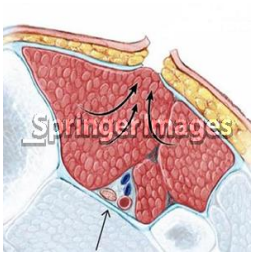
- Fascia: layers of connective tissue that can withstand limited stretching
  - Encloses individual muscles
  - Provides strength to muscles
- Bursae: small sacs of connective tissue lined with synovial membrane and contain synovial fluid
  - Located at bony prominences or joints to relieve pressure
  - Decrease friction between moving parts

## Comparison

**Bursae**




**Fascia**




## Normal Assessment Findings

- Normal spinal curvatures
- Absence of:
  - muscle atrophy or asymmetry
  - joint swelling, deformity, or crepitation
  - tenderness on palpation of spine, joints, or muscles
- Full ROM of all joints without pain or laxity
- Muscle strength of 5

*Review table 61-6 (Assessment Abnormalities)*

## Gerontologic Differences

- Bone:
  - Decrease in bone density
- Joints:
  - ↑ risk of cartilage erosion
  - Loss of water from disks
- Muscle:
  - ↓ in number & diameter
  - Loss of elasticity (ligaments/cartilage)
  - ↓ ability to store & release glycogen

*Review Table 61-1 (Gerontologic Assessment Abnormalities)*

## Sprains & Strains

- 2 most common types of injury
- Sprain: Injury to ligament(s) resulting in partial or complete tearing of the fibers
  - Ankle & knee joints
- Strain: Injury to muscle(s) caused by excessive pull or stretch (may also involve tendons)
  - Lower back, calf, & hamstrings

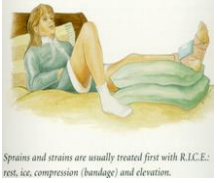
## Clinical Manifestations

- Pain
- Edema
- Decrease in function
- Contusion

- R/O fracture with X-ray
- Recovery: 3-6 weeks
- Surgical repair possible for severe strains

## Treatments

- RICE:
  - Rest
  - Ice
  - Compression
  - Elevation
- Mild analgesics/NSAIDs
- After 24-48 hours, heat may be applied

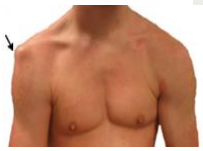

Sprains and strains are usually treated first with R.I.C.E.: rest, ice, compression (bandage) and elevation.

## Dislocation & Subluxation

- Dislocation: displacement of a bone from a joint
  - Considered orthopedic emergency
  - Upper extremity: thumb, elbow, shoulder
  - Lower extremity: hip, knee
  - Congenital anomaly
- Subluxation: partial displacement of joint surface

## Clinical Manifestations

- Deformity
- Asymmetry
- Local pain/tenderness
- Decrease mobility
- Swelling



## Treatment

- Realign/Reduction
  - Manual
  - Open
- Immobilization
- Pain management
- ROM exercises

## Repetitive Strain Injury (RSI)

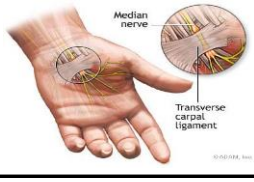
- Multiple causes:
  - Prolonged force
  - Poor posture & positioning
  - Poor workplace ergonomics
  - Badly designed workplace equipment
  - Repetitive heavy lifting
- Symptoms:
  - Pain, weakness, numbness, or impaired motor function

## Prevention & Treatment of RSI

- Prevention:
  - Education
  - Ergonomics
- Treatment:
  - Modification of equipment/activity
  - Heat/cold applications
  - NSAIDs
  - Rest
  - Physical therapy

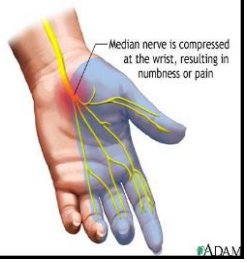
## Carpal Tunnel Syndrome (CTS)

- Caused by compression of the median nerve
- Most common compression neuropathy in the upper extremity
- Associated with continuous wrist movement



## Clinical Manifestations of CTS

- Weakness (thumb)
- Burning pain
- Numbness & Tingling
- Impaired sensation



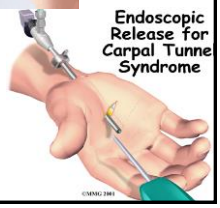

## Physical Signs of CTS

**Tinel's Sign**

**Phalen's Sign**

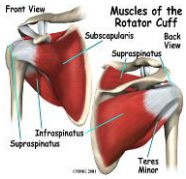
## CTS Treatments

- Prevention:
  - Adaptive devices
  - Ergonomic changes
- Activity modification
- Immobilization
- Carpal tunnel release: (last)
  - Open release surgery
  - Endoscopic carpal tunnel release



## Rotator Cuff Injury

- Complex of 4 muscles in the shoulder
- Causes of injury:
  - Gradual, degenerative aging process
  - Repetitive overhead motions
  - Falling onto outstretched arm
  - Blow to upper arm
  - Heavy lifting
  - Repetitive work motions



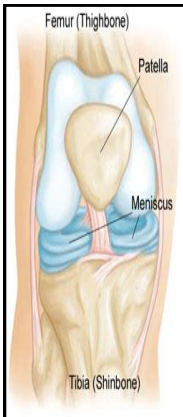

## Manifestations

- Shoulder weakness
- Pain
- Decreased ROM

- Drop arm test
- MRI

## Rotator Cuff Injury Treatment

- Partial tear/cuff inflammation:
  - Rest
  - Ice & heat
  - NSAIDs
  - Corticosteroid injections
  - Physical therapy
- Unresponsive to treatment/complete tear:
  - Surgical repair of tear
  - Acromioplasty




## Meniscus Injury

- Crescent-shaped pieces
- Associated with ligament sprains
- Injury could result in a torn meniscus
- Athletes
- Certain occupations
- Older adults

## Clinical Manifestations

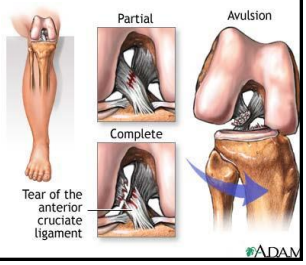
- Localized tenderness, pain, & swelling
- Joint instability
- Described by client as:
  - Locking
  - Click
  - Pop
  - Give way
- McMurray's test
- MRI

## Meniscus Injury Management

- Prevention:
  - Warm-up
- Treatment:
  - Ice
  - Immobilize
  - Use of assistive devices
  - Physical therapy
  - Surgical repair

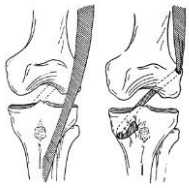
## Anterior Cruciate Ligament (ACL) Injury

- Caused by noncontact injuries:
  - Pivoting, landing following jumps, or slowing down when running
- Classified as:
  - Partial tear
  - Complete tear
  - Avulsion




## ACL Treatments

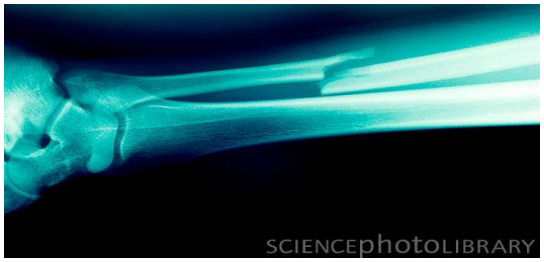
- Rest/immobilization
- Ice
- NSAIDs
- Elevation
- Use of assistive devices
- Physical therapy
- Reconstructive surgery
  - Continuous Passive Motion (CPM) machine



**Complete recovery 6-8 months**

## CPM Machine

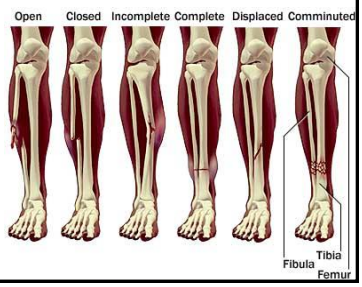
## Fractures




Disruption or break in the continuity of the structure of the bone

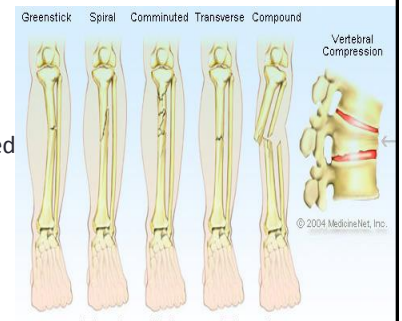
## Classification of Fractures

- Open (compound)
- Closed (simple)
- Complete
- Incomplete
- Displaced
- Nondisplaced




## Types of Fractures

- Transverse
- Spiral
- Greenstick
- Comminuted
- Oblique
- Pathologic
- Stress



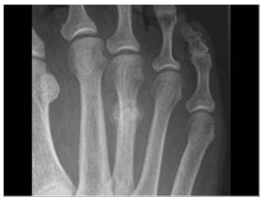

Typical Bone Fractures

## Clinical Manifestations

- Edema & swelling
- Pain & tenderness
- Muscle spasm
- Deformity
- Ecchymosis/contusion
- Loss of function
- Crepitation

## Stages of Fracture Healing

1. Fracture hematoma:
   - Bleeding creates hematoma
   - 72 hours after injury
2. Granulation tissue:
   - Osteoid produced
   - 3-14 days post-injury
3. Callus Formation:
   - Network of bone
   - End of second week
   - Verified by X-Ray



## Stages of Fracture Healing (cont)

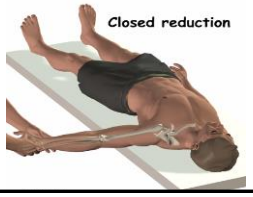
4. Ossification:
   - Prevent movement
   - 3 weeks – 6 months following injury
5. Consolidation:
   - Bony union
   - Up to 1 year following injury
6. Remodeling:
   - Union complete
   - New bone deposited in sites subjected to stress

## Factors Affecting Healing Time

- Age
- Displacement of fracture
- Blood supply to area
- Immobilization
- Implants
- Infection
- Hormones

## Fracture Reduction

- Closed Reduction:
  - Nonsurgical, manual realignment
  - Use of traction & countertraction
  - After reduction, need to maintain alignment




## Fracture Reduction (cont)

- Open Reduction:
  - Surgical incision
  - Internal fixation (ORIF)
    - Wires, screws, pins, plates
    - Joint surfaces
  - Benefits:
    - Early ambulation
    - ↓ risk r/t to immobility
    - Promotes fracture healing

## Internal fixation

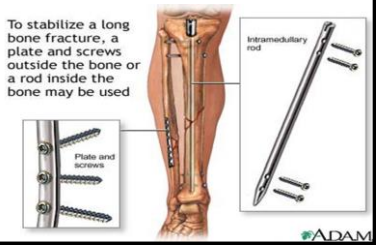
- Uses pins, plates, intramedullary rods, and metal & bioabsorbable screws for realignment
- Used to realign & maintain bony fragments
- Regularly evaluated by x-ray

## External Fixation

- Metal pins inserted into bone & attached to an external rod
- Used to apply traction or compress fracture fragments
- Often used to salvage a limb
- Complications:
  - Pin loosening
  - Infection (pin care)

## Video

https://www.youtube.com/watch?feature=player_detailpage&v=6-mvDbJeUiU



## Fracture Reduction (cont)

- Traction
  - Application of pulling force on injured part while countertraction pulls the opposite way
  - Purpose:
    - Prevent or reduce pain & muscle spasms (neck/back)
    - Immobilize a joint or part of body
    - Reduce fracture or dislocation
    - Treat pathologic joint condition
  - Skin & skeletal

## Skin Traction

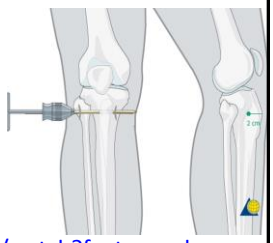
- Short-term treatment
- Applied directly to skin
- Weight range: 5-10 lb
- Purpose:
  - Maintain alignment
  - Assist in reduction
  - Diminish muscle spasms

## Skeletal Traction

- Long-term pull
- Physician inserts pin/wire into bone
- Weight range: 5-45 lbs
- Purpose:
  - Align bones & joints
  - Immobilize
  - Treat joint contractures & genetic abnormalities
- Disadvantages:
  - Infection & complications r/t immobility

## Skin Traction

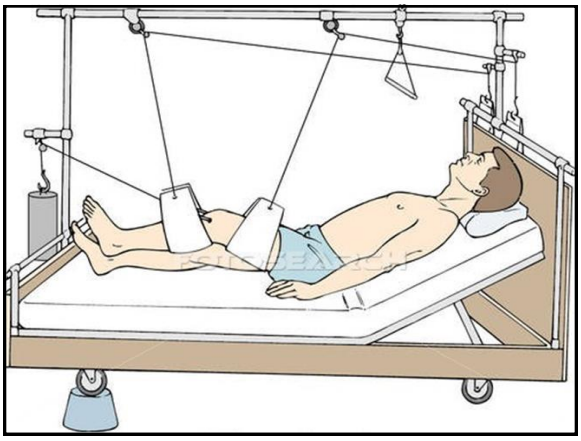
## Skeletal Traction



- Video: https://www.youtube.com/watch?feature=player_detailpage&v=o61eekzW1qo

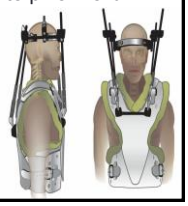
## Traction Considerations

- Inspect skin regularly
- Inspect pin sites for infection
- Ensure weights are hanging free of bedframe and floor
- Maintain correct skeletal alignment
- Provide an overhead trapeze
- Frequent neurovascular assessment:
  - Circulation, motor, & sensory



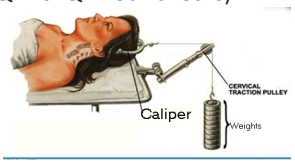
## Cervical Skeletal Traction

- Promote healing & prevent further injury
- Cervical skeletal traction:
  - Only used in ICU
  - Traction applied to tongs attached to pins in skull
- Halo vest apparatus:
  - Metal ring fits attached by pins
  - Ring is connected by metal bars to a plastic, sheepskin-lined vest



## Cervical Traction Considerations

- Neurologic status (Q2 vs. Q4 hour checks)
- Respiratory status
- Skin integrity
- Infection
- Pin dislodgement
- Never use Halo vest apparatus to turn or reposition client
- Maintain HOB elevated




## Pin Care

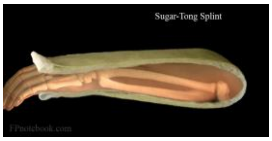
- External fixators & skeletal traction
- Physician orders solution
  - ½ hydrogen peroxide & ½ NS
- LAC+USC Procedure:
  - Sterile procedure
  - Soak a cotton tipped applicator in solution
  - Clean around pin site using circular motion
  - Start at pin site & work outward
  - Use new sterile applicator for each pin site

## Fracture Immobilization

- Casts
  - Temporary circumferential immobilization
  - Common after closed reduction
  - Incorporates joints above & below fracture
  - Wet cast- handle with open palm
  - Synthetic versus plaster material
  - Types of casts

## Types of Casts

- Long arm/short arm cast
- Sugar-tong splint
- Body jacket
- Hip spica




- Long leg/short leg cast
- Cylinder cast
- Jones dressing

## Cast Syndrome

- Can occur with body jacket or hip spica casts
- Occurs when cast applied too tightly
- Compression of the superior mesenteric artery against the duodenum
- Client C/O:
  - Abdominal pain/pressure, N/V
- May require removal or splitting of cast

## Cast Care

- Frequent neurovascular assessments:
  - Circulation, motor, & sensory
- ↑ above level of heart
- Ice applications/Repositioning
- Client teaching:
  - Do not remove padding
  - Do not get wet
  - Do not put anything down cast
  - Appearance of extremity after cast removal

Table 62-9, p 1520

## Nutritional Therapy

- Dietary Requirements:
  - Protein (1 g/kg of body weight)
  - Vitamins (B, C, &D)
  - Calcium, phosphorus, and magnesium
- 3 large meals vs. 6 small meals
- 2-3 L/day of fluids
- Needed for tissue repair & bone healing

## Complications of Fractures

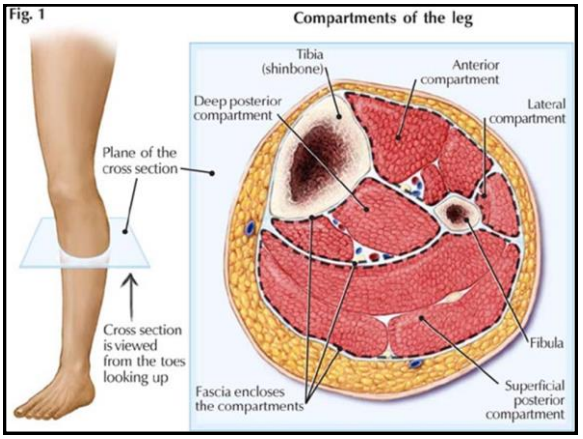
- Infection
- Compartment syndrome
- Venous thromboembolism
- Fat embolism syndrome
- Hemorrhage
- Non-union of fracture

## Infection

- ↑ incidence in open fractures & soft tissue injury
- Dead & contaminated tissue ideal medium
- Treatment:
  - Debridement
  - Irrigated with antibiotic solution
  - Antibiotic-impregnated beads

## Compartment Syndrome

- Elevated intracompartmental pressure
- 2 basic causes:
  - ↓ compartment size
  - ↑ compartment content
- Associated most commonly with fractures of distal humerus & proximal tibia
- Delayed diagnosis/treatment = irreversible muscle & nerve damage



## Clinical Manifestations

- Early recognition is imperative
- 6 Ps (characteristic signs)
  - Paresthesia
  - Pain
  - Pressure
  - Pallor
  - Paralysis
  - Pulselessness

## Treatment

- Do not elevate above heart
- No cold compresses
- Loosen bandage
- Bivalve cast
- Reduce traction weight
- Fasciotomy
- Amputation

## Venous Thromboembolism (VTE)

- Thrombus formation in lower extremities
- Prophylaxis:
  - Low-molecular weight heparin
  - Compression stockings (TED hose)
  - Sequential compression devices (SCDs)
  - ROM
  - Dorsiflex/plantar flex

## Fat Embolism Syndrome (FES)

- Factor in many deaths associated with fractures
- Fat globules from fractures distributed into tissue & organs
- Tissue of lungs, brain, heart, & kidneys most affected
- Symptoms 24-48 hours after injury
- Assess for CNS & Respiratory changes

## Amputation

- Clinical Indications:
  - Underlying disease
  - Trauma
- Clinical Manifestations:
  - Loss of sensation
  - Inadequate circulation
  - Pallor
  - Local/systemic manifestation of sepsis

## Amputation Surgery

- Elective vs. Emergency
- Goal:
  - Preserve extremity length & function
  - Remove all infected, pathologic, & ischemic tissue
- Closed amputation:
  - Soft tissue padding covering residual limb
- Open amputation:
  - Residual limb not covered with skin

## Nursing Considerations

- Assessments
- Client teaching
- Body image
- Phantom limb sensation (90%)
  - Mirror therapy
  - Pain Management
- Prevent flexion contracture
- Residual limb bandages
- Gait training

## Mirror Therapy

- Video: https://www.youtube.com/watch?v=hrqi1B9Xbt0

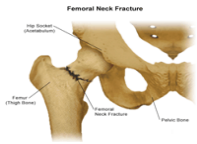
## Prosthetic Limbs

- Upper extremities:
  - Arm and hook
  - Cosmetic hand
- Lower extremities:
  - Importance of proper fit
- Prosthesis care
- Gerontologic considerations

## Replantation

- Surgical reattachment of a body part by microsurgical means
- Goal: Successful restoration of function
- Treatment:
  - Repositioning to promote venous drainage
  - Medicinal leech therapy
  - Heparin

## Hip Fracture




- Common in older adults
- 90% due to fall
- Women > men
- 30% will die within 1 year of fracture
- Clinical Manifestation:
  - External rotation, pain/tenderness
  - ↓ blood flow = avascular necrosis

## Management of Hip Fractures

- Surgical interventions:
  - Hemiarthroplasty
  - Total hip arthroplasty (THA)
  - Hip resurfacing
- Cemented arthroplasty:
  - Less active, older adults with ↓'d bone density
- Cementless arthroplasty:
  - Long-term implant stability
  - Facilitating ingrowth of new bone tissue

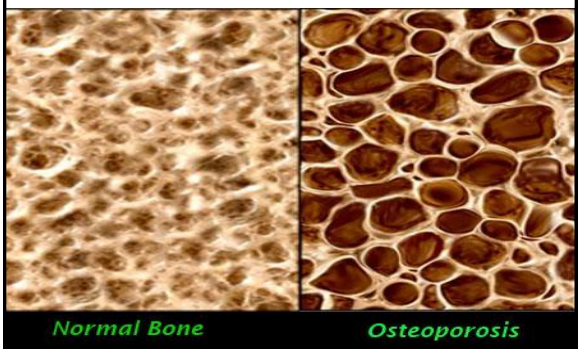
## Precautions

- Check weight bearing status
- Avoid extreme internal rotation & 90-degree flexion for 4-6 weeks
  - Elevated toilet seat
  - Abduction pillow
  - Use assistive devices
  - Never cross legs
  - Never twist to reach behind
  - No baths or driving cars
- DVT prophylaxis

## Gerontologic Considerations

- Risk factors:
  - Gait & balance problems
  - Decreased vision & hearing
  - Decreased reflexes
  - Orthostatic hypotension
  - Medication use
- Treatments:
  - Calcium & vitamin D supplements, estrogen replacement, bisphosphonate drug therapy

## Osteoporosis

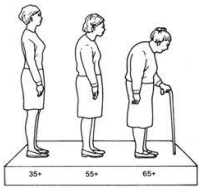


## Osteoporosis

- Porous bone (fragile bone disease)
- Chronic, progressive metabolic bone disease characterized by low bone mass & structural deterioration of bone tissue, leading to increased bone fragility
- 10 million in U.S. affected (80% female)
- Occurrence of fractures:
  - 1:2 women & 1:8 men over age 50

## Reasons for Female Prevalence

1. Lower calcium intake throughout lifetime
2. Smaller frame
3. Bone resorption at earlier age/more rapid during menopause
4. Pregnancy & breastfeeding
5. Longevity




## Pathophysiology

- Remodeling: bone continually deposited & resorbed
- Osteoporosis: rate of resorption > deposition
- Bone mass determined by a combination of:
  1. Hereditary (70%)
  2. Nutrition
  3. Exercise
  4. Hormone function

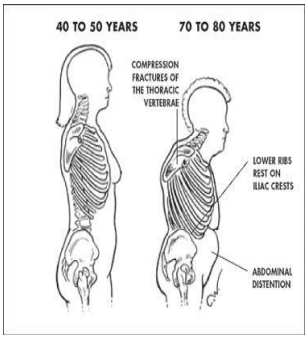
- Most commonly: spine, hips, & wrists

## Risk Factors

- Multiple risk factors (Table 63-12)
- Family history
- Smoking/ETOH (>2 drinks/day)
- Inactive lifestyle
- Diet low in calcium/vitamin D
- Certain medication (long-term use of corticosteroids)

## Clinical Manifestions

- "Silent disease"
- Back pain
- Loss of height
- Spinal deformities
  - Kyphosis



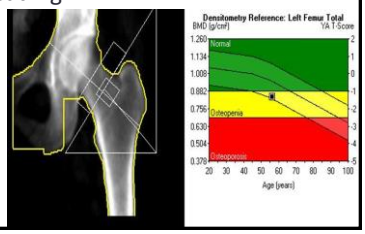

## Diagnostic studies

- X-ray (undetected until 25-40% of calcium lost)
- Bone mineral density (BMD):
  - Assess bone mass
  - Quantitative ultrasound (QUS)
    - Heel, kneecap, or shin
  - Dual-energy x-ray absorptiometry (DEXA)
    - Spine, hips, & forearm

## Diagnostic Studies

**DEXA**

- Reported as 'T-scores'
- Bone density reading
  - Normal
  - Osteopenia
  - Osteoporosis




## Primary Interventions

**Goal: Retaining bone health**

- A balanced diet rich in Calcium/Vitamin D
  - 1000 mg/day vs 1500 mg/day
- Weight-bearing exercise
- Healthy lifestyle
  - Smoking cessation
  - ↓ ETOH intake
- 20 minute exposure to sunlight/day
- Bone density testing

## Secondary Interventions

**Goal: Attaining optimal bone health**

Medications to prevent bone loss:

- HRT- Hormone Replacement Therapy
- Calcitonin
- Bisphosphonates:
  - alendronate (Fosamax)- once weekly (PO)
  - ibandronate (Boniva)- once monthly (PO)
  - zoledronic acid (Reclast)- once yearly (IV)

## Bisphosphonate: Client Teaching

Instruct client to:

- Take with full glass of water
- Take 30 minutes before food or other medications
- Remain upright for at least 30 minutes after taking

## Secondary Interventions (cont)

**Additional medications:**

- Raloxifene (Evista):
  - Selective Estrogen Receptor Modulator (SERM)
  - Mimics effect of estrogen on bone without stimulation of breast & uterine tissue
- Teriparatide (Forteo):
  - 1st drug approved to stimulation new bone formation
- Denosumab (Prolia):
  - Inhibits osteoclast formation & function

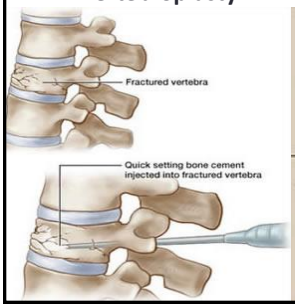
## Secondary Interventions (cont)

**Braces/Procedures:**

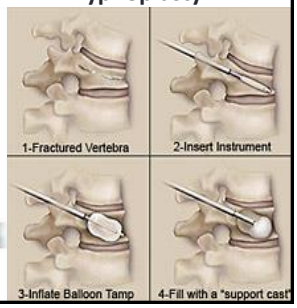
- TLSO brace (thoracic-lumbar-sacral orthosis)
- Vertebroplasty
- Kyphoplasty

## Procedures

**Vertebroplasty**




**Kyphoplasty**

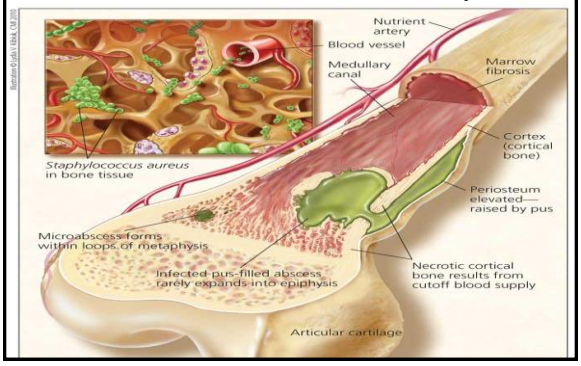



## Tertiary Interventions

**Goal: Maintaining optimal bone health**

- Primary & secondary interventions
- Report new pain sites
- Emphasis on safety to prevent fractures:
  - Falls at home
  - Falls during daily activities
  - Falls in bathroom

## Osteomyelitis

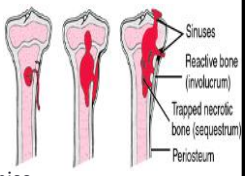


## Osteomyelitis

- Severe infection of the bone, bone marrow, & surrounding soft tissue
- Commonly caused by *Staphylococcus aureus*
- Indirect entry:
  - Children
  - Adult:
    - Vascular insufficiency (DM)
    - GU & Respiratory infections

## Osteomyelitis (cont)

- Direct entry:
  - Open wound
  - Presence of foreign body
- Infection results in:
  - Increased pressure
  - Ischemia/vascular compromise
  - Cortical devascularization
  - Sequestrum




## Clinical Manifestations

- Acute Osteomyelitis:
  - Duration: < 1 month
  - Systemic manifestations:
    - Fever, night sweats, chills, restlessness, nausea
  - Local manifestations:
    - Bone pain, swelling, tenderness, warmth, & ↓ movement (Late: drainage)
- Chronic Osteomyelitis:
  - Duration: > 1 month or nonresponsive
  - Local manifestations more common than Systemic

## Diagnostic Studies

- Bone or soft tissue biopsy
- Blood &/or wound cultures
- ↑ WBC
- ↑ ESR (erythrocyte sedimentation rate)
- Radiologic signs appear after 10 days
  - Bone scans
  - MRI
  - CT

## Osteomyelitis Treatments

- IV/Oral antibiotics
- Surgical Interventions:
  - Amputation
  - Antibiotic beads
  - Debridement
  - Grafting (skin/muscle)
- Wound VAC
- Splinting of extremity

## Primary Interventions

- Control of existing infections
- Teach local & systemic manifestations
- Involve family members
- S/S to immediately report:
  - Bone pain, fever, swelling, & restricted limb movement

## Secondary Interventions

- Immobilization
- Avoid excess manipulation
- Pharmacologic/nonpharmacologic pain relief
- Types of dressings
- Maintain proper body alignment
- Avoid heat & activity to affected area
- Teaching on antibiotic therapy
- Provide psychological & emotional support

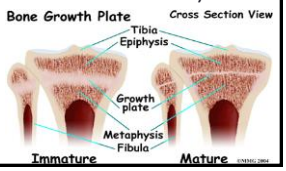
## Tertiary Interventions

- Physical & psychological support
- Client teaching:
  - Continue antibiotics after symptoms subside
  - Dressing changes/supplies
- Close follow-up

## Osteosarcoma

## Osteosarcoma

- Primary bone tumor that is extremely aggressive & rapidly metastasizes
- Occurs in metaphyseal region of long bones
- Most common bone tumor in children & young adults (lesser extent in older adults)
- Relation with fractures




## Clinical Manifestations

- Gradual onset of pain, swelling, & ↓ ROM
- Diagnostic tests:
  - Tissue biopsy
  - X-ray
  - CT/positron emission tomography (PET) scans
  - MRI
- "Sunburst" appearance on viewing

## Treatments

1. Chemotherapy:
   - Preoperative
   - Postoperative
2. Surgical interventions:
   - Limb salvage procedures
   - Amputation

Adjunct treatments increased projected 5-year survival rate to 70%

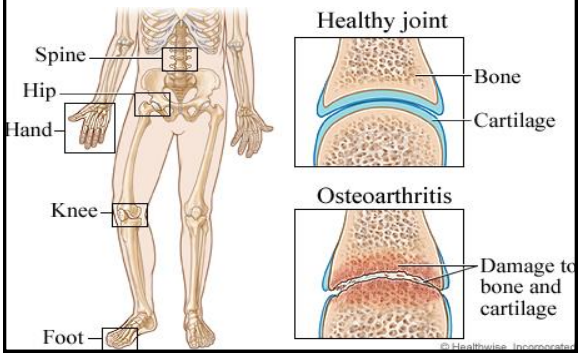
## Nursing Management

- Primary Interventions:
  - Teach public to recognize warning signs
  - Importance of periodic screening/health exams
- Secondary Interventions:
  - Prevention of pathologic fractures
  - Pain management
  - Rest periods
  - Physical & Psychological support

## Nursing Management

- Tertiary Interventions:
  - Educate clients to avoid falls/injury to minimize fractures
  - Psychological support
  - Importance of keeping appointments
  - Address client specific concerns

## Osteoarthritis

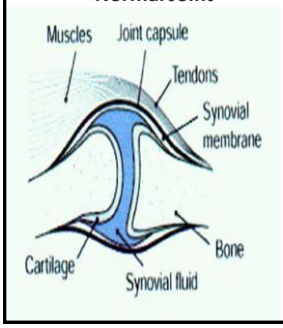


## Osteoarthritis (OA)

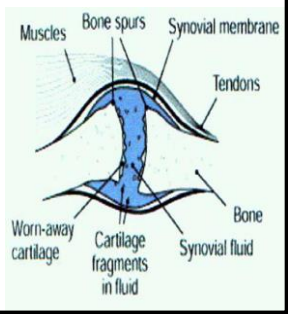
- Cartilage becomes worn away & irregular surfaces form
- Affected cartilage becomes softer & less able to resist wear
- Destruction > repair
- Irregular surface creates uneven distribution of stress on joint & decrease in motion
- Common sites: fingers, neck, low back, knees, and hips

## Comparison

**Normal Joint**




**Joint with OA**

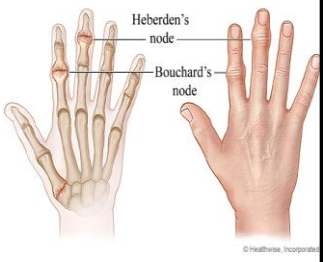



## Prevalence of OA

- 21 million Americans affected
- Not a normal part of aging
- Women > men
- Most common in older adults
- Risk factors:
  - Aging women
  - Obesity
  - Previous sports injury
  - Occupational physical requirements

## Clinical Manifestations

- Systemic manifestations are not present in OA
- Joint pain
- Joint stiffness
- Crepitation
- Deformity
  - Heberden's nodes
  - Bouchard's nodes




## Diagnostic Studies

- Bone Scan
- CT scan
- MRI
- X-rays
- Synovial fluid analysis

****Changes do not always correlate with the degree of pain/symptoms experienced by client****

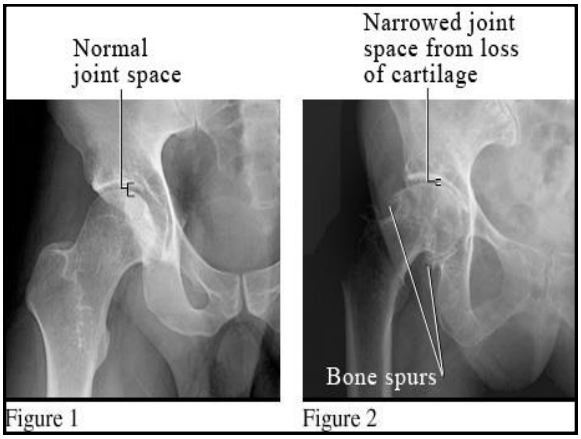



Figure 1 Figure 2

## Collaborative Care

1. Rest & joint protection:
   - Immobilization
   - Assistive devices
2. Heat & cold applications
3. Nutrition therapy & exercise:
   - Weight reduction
   - Aerobic conditioning
   - ROM exercises

## Collaborative Care

4. Complementary & alternative therapies:
   - Acupuncture
   - Yoga/massage/guided imagery
   - Glucosamine & chondroitin

5. Drug therapy:
   - OTC
     - Tylenol
     - Topical ointments (BenGay/Aspercreme)

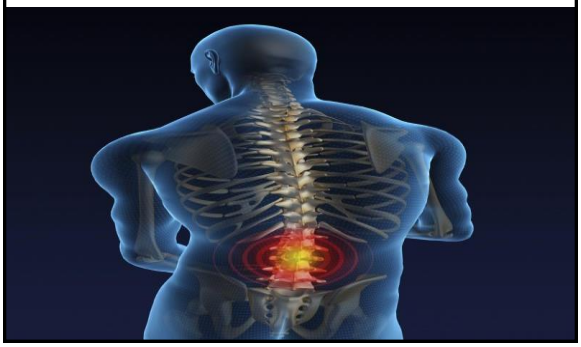
## Collaborative Care

5. Drug therapy (cont):
   - NSAIDS
     - COX-1 & COX-2 (ex: Advil, Motrin)
     - COX-2 (ex: Celebrex)
     - Aspirin (ASA)
   - Corticosteroids
     - Intraarticular injections
   - Hyaluronic Acid (HA)
     - Contributes to viscosity & elasticity of synovial fluid

## Client Teaching

- Information about nature/treatment of OA
- Correct posture/body mechanics
- Pain management
- Correct use of assistive devices
- Joint protection & energy conservation (table 64-4)
- Nutritional choices/weight management

## Back Pain



## Low Back Pain

- Approximately 80% of adults affected
- Missed work (<age 45)
- Common problem since lumbar region
  - Bears most weight of the body
  - Most flexible region on spinal column
  - Contains nerve roots
  - Inherently poor biomechanical structure

## Risk Factors

- Lack of muscle tone
- Excess body weight
- Poor posture
- Cigarette smoking
- Jobs requiring:
  - Heavy lifting
  - Vibration
  - Prolonged sitting

## Causes of Back Pain

- Cause of musculoskeletal origin:
  - Acute lumbosacral strain
  - Instability of the lumbosacral bony mechanism
  - Osteoarthritis of the lumbosacral vertebrae
  - Degenerative disk disease
  - Herniation of a intervertebral disk

## Acute Back Pain

- Lasts < 4 weeks
- Usually associated with activity that caused undue stress on tissues of lower back
- Treatment:
  - Combination of:
    - Analgesics (NSAIDs)
    - Muscle relaxants
    - Massage/manipulation
    - Alternating heat & cold
  - Brief period of rest

## Client Teaching

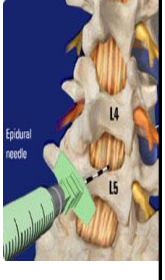
- Use proper body mechanics at all times
- Maintain appropriate body weight
- Flat/low heel shoes
- Sleep supine or side-lying
- Smoking cessation

## Chronic Back Pain

- Pain persists longer than 3 months
- Discomfort increases after inactivity
- Spinal stenosis: narrowing of vertebral canal
  - Pain associated with stenosis:
    - Starts in low back
    - Radiates to buttock or leg
    - Worsens with standing or walking

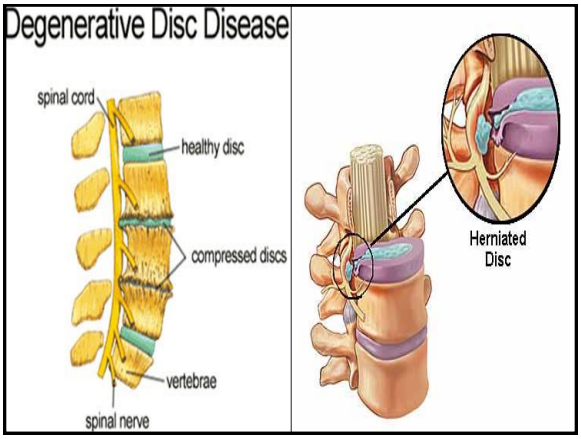
## Treatments for Chronic Back Pain

- Combination of:
  - Analgesics (NSAIDs)
  - Muscle relaxants
  - Massage/manipulation
  - Local heat application
- Epidural corticosteroid injections
- Surgical interventions



## Intervertebral Disk Disease

- Degenerative disk disease (DDD):
  - Progressive degeneration
  - Normal process of aging
  - Disks lose elasticity, flexibility, & shock absorbing capacities
- Herniated intervertebral disk (slipped disk):
  - Natural degeneration with age & repeated stress
  - Nucleus pulposus may first bulge then can herniate



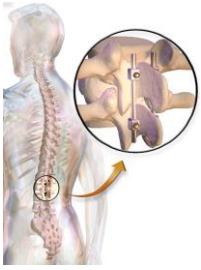

## Clinical Manifestations

- Pain:
  - Lumbar disk damage: Pain radiates from low back down to knee (along sciatic nerve)
  - Cervical disk damage: Pain radiates into the arms and hands
- Positive straight leg test
- Depressed/absent reflexes
- Multiple nerve root (*cauda equina*) compression- MEDICAL EMERGENCY

## Diagnostic Studies

- Myelogram
- MRI
- CT scan
- Epidural venogram or diskogram
- Electromyogram (EMG)

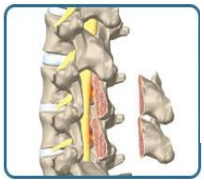
## Surgical Therapy

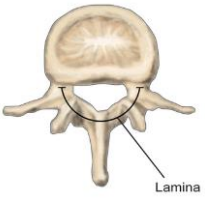


- Laminectomy
- Diskectomy
- Percutaneous diskectomy
- Charite disk
- Spinal fusion

## Laminectomy

- Traditional surgical procedure
- Excision of lamina to access disk
- Minimal hospital stay





## Diskectomy

- Diskectomy:
  - Performed to decompress nerve root
  - Removal of damaged portion
  - Helps maintain spine stability
- Percutaneous Diskectomy:
  - Tube passed through soft tissue
  - Laser used on damaged portion of disk
  - Outpatient surgical procedure

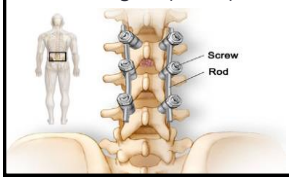
## Artificial Disks

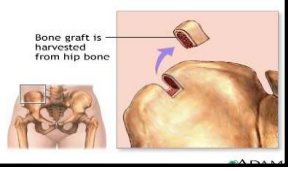
Goal is to restore movement & eliminate pain

- Charite disk:
  - Used for DDD lumbar disk damage
  - Allows movement at implant level
- Prodisc-L:
  - Used to treat DDD
- Prestige cervical disc system:
  - Treatment of DDD of cervical spine

## Spinal Fusion

- Performed to stabilize the spine
- Metal fixation with rods/plates/screws
- Use of bone morphogenetic protein (BMP)
- Fused with bone graft
  - Allograft (donor) vs. autograft (self)



## Post-Operative Nursing Interventions

- Post-op positioning
- Pain management
- Assess for presence of CSF/headache
- Assess neurovascular/cardiovascular function
- Bladder/bowel function
- Use of TLSO brace/cervical collar
- Surgical site/donor site
- Level of activity

QUESTIONS?

## References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- Lewis, S. M., et.al. (2017) *Medical surgical nursing- Assessment and management of clinical problems* (10th ed.). St. Louis: Elsevier.


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